VALUATION OF A LISTED COMPANY USING THE DCF MODEL: A CASE STUDY OF ANGLO AMERICAN PLC

A MINI THESIS SUBMITTED IN PARTIAL FULFILMENT

OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF BUSINESS ADMINISTRATION (FINANCE)

OF

THE UNIVERSITY OF NAMIBIA

BY

MPINGANA LAIMI KALIMBA

201212765

APRIL 2019

SUPERVISOR: DR. AUBREY CHIBUMBA

(INSTITUTE OF FINANCE & ECONOMICS, ZAMBIA)

ABSTRACT

Anglo American Plc ("Anglo") is one of the world's largest mining companies. In addition to the London Stock Exchange, it is listed on the Johannesburg Stock Exchange with operations that span the globe. At the date of valuation, 30 September 2014, Anglo's shares constituted a significant portion of the investment portfolio of the researcher's employer and was one of the primary drivers of portfolio performance. Incorporated in 1917, Anglo's maturity was further evidenced in decreased trading volumes of its shares despite price volatility due to its dependence on global commodity prices and GDP cycles. Its trading volumes declined, indicating that investors opted to hold onto the shares for longer thus exhibiting both equity and bond-like characteristics. As a case study, the research sets out to establish Anglo's investment case and ascertain whether it warranted a buy/hold/sell recommendation. By employing the Discounted Cash Flow (DCF) method and limiting cash flow to potential dividends referred to as Free Cash Flow to Equity (FCFE), the study derived DCF model inputs using the company's financial statements and market data to build an excel based model. Amongst others, model inputs include expected cash flows, expected growth in those cash flows, Terminal Values and discount rates or cost of financing. Using a five-year growth period, the expected cash flows inclusive of the terminal value were discounted using the cost of financing specifically the cost of equity to determine the total present value of those cash flows at valuation date and subsequently an estimate of the intrinsic value per share. It was found that Anglo's market price per share was significantly higher than the estimated intrinsic value per share that resulted from the DCF model. Relative Valuation was also undertaken as a complement to DCF model and found that the share was overpriced albeit to a lesser extent than DCF model results. This lead to the conclusion that as at valuation date,

the shares were overpriced with limited upside potential and warranted a sell recommendation. Limitations of the study include the fact that the analysis did not take account of qualitative factors of the company, no access to management to better inform model inputs, not fully exploring the impact of cyclicality of the company as it is influenced by commodity prices giving rise to the need to normalise cash flows, no undertaking of sensitivity analysis and controlling for differences in the comparables. It is thus recommended that additional research should take account of these limitations.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS/ACRONYMS

Anglo	Anglo American Plc
CFA	Chartered Financial Analyst
DCF	Discounted Cash Flow
DDM	Dividend Discount Model
EBIT	Earnings Before Interest & Tax
EBITDA	Earnings Before Interest, Tax, Depreciation & Amortisation
EV	Enterprise Value
FCFE	Free Cash Flows to Equity
FCFF	Free Cash Flow to Firm
GARCH	Generalised Auto Regressive Conditional Heteroskedasticity
GDP	Gross Domestic Product
IMF	International Monetary Fund
JSE	Johannesburg Stock Exchange
NPV	Net Present Value
REIT	Real Estate Investment Trusts
S&P	Standard & Poor
SWOT	Strengths, Weaknesses, Opportunities and Threats
USD	United States Dollar
ZAR	South African Rand

ACKNOWLEDGMENTS

The infallible support of my thesis supervisor Dr. Aubrey Muyeke Chibumba that continued to probe, question and stretch my thinking but above all, being that relentless voice beyond the cyber connection that pushed me to “just finish”; I am grateful.

To my husband and young children, bonding time stolen is for a greater cause. Your unwavering understanding is acknowledged and appreciated.

DECLARATIONS

I, Mpingana Laimi Kalimba, hereby declare that this study is my own work and is a true reflection of my research, and that this work, or any part thereof has not been submitted for a degree at any other institution.

…… …… ……

Name of Student **Signature** **Date**

CHAPTER ONE

1. INTRODUCTION

The objective of this thesis is to determine the market value of Anglo American Plc ("Anlgo") as at 30 September 2014 and the implicit value per share. The study- different valuation methods founded in academic contributions in the field of finance. The result is an investment recommendation or specific output with significant relevance on investor's decisions and capital allocations.

Key terms are defined as follows:

- *Listed company* - A company whose shares are traded on a stock exchange.
- *Value* – The estimated worth of an asset based on its underlying characteristics.
- *Price* – The worth of an asset as observed in the market thus based on market forces of supply and demand.
- *Equity or share* – An investor's proportional ownership of an asset which in this study the asset being referred to is the company.
- *Valuation* – The process of determining an asset's value.

1.1 Background of the study

The background highlights why the study chose to value this specific company among the multitude of listed companies. It also delves into the characteristics of Anglo's shares by investigating factors that formed an investor's view of the company and made them hold the shares for longer. This was undertaken by analysing the empirical evidence of Anglo's dividend policy, share price volatility, credit risk, foreign ownership and dependency on macro and commodity cycles.

1.1.1 Interest in Anglo

Anglo American Plc ("Anglo") is one of the world's largest mining companies, with a dual listing on the London Stock Exchange and the Johannesburg Stock Exchange ("JSE") and with physical presence on almost every continent. Its primary business is mining bulk commodities (iron ore, manganese, metallurgical coal and thermal coal). It is also involved in the mining of base metals and minerals (copper, nickel, niobium and phosphates); and precious metals and minerals particularly platinum and diamonds (Anglo American Plc, 2014).

The interest of the study in examining the value of Anglo stems from the employer's significant investment in this share as at the valuation date of 30 September 2014, making up the largest portfolio holding and one of the drivers of the portfolio's performance. Additionally, Anglo is one of the six (6) largest JSE constituents by market capitalisation, hence, its movements have a great impact on the South African equity market as represented by the JSE overall index.

1.1.2 Anglo's background and basic share analysis

As on 22/09/2014 Anglo's share performance statistics showed that traded volumes diminished substantially from 8.74 million shares over 10 years, averaging at 874 thousand shares per year, to current levels of 647 thousand shares per year ("Share Performance", 2014). This is a 27% decrease in annual trading activities and implies that investors are holding the shares longer in their portfolio and foresee realisable value in the company. Had an investor purchased the shares 10 years prior, they would have made a capital return of 76.67% ("Share Performance", 2014). To qualify the above statement, that shareholders are opting to hold the shares for much longer, basic

share information analysis was undertaken to understand the investor view of the share.

a) Dividend policy

Looking at Anglo's historical financials (10 years, 2004 – 2014), it was found that Anglo paid dividends even in years when earnings were negative (2012, 2013 and 2014) and the level of dividends paid out stayed relatively the same averaging about USD5/share. Even when earnings were very high (2007, 2008, 2010, 2011), dividends paid out stayed at similar levels as the years with much lower or negative earnings.

Additional debt taken on, reflecting the increase in Long Term Debt was especially high in the period 2008 – 2013. However, the net cash spent in investing activities by far outstripped the leveraging. Although it is also around the same time when Anglo repurchased equity, the amount towards equity repurchases was relatively small when compared to the increase in debt. With the exception of 2006 and 2007 where dividends paid were substantially more than the increase in Long Term Debt, dividends seem to be a fraction of Long Term Debt ranging between 0-33% and the 2008 (85%) outlier.

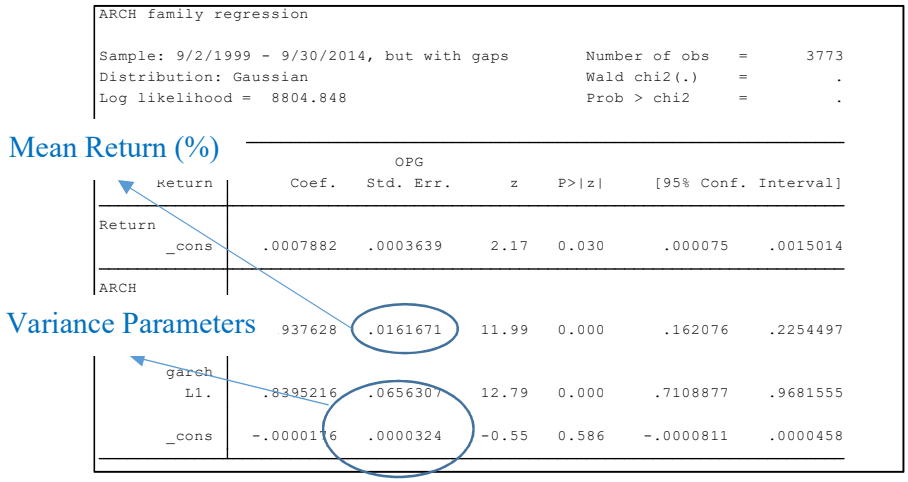
From the preceding statistics, one can infer that an alternative reason for investors holding onto their shares for longer is a prudent dividend policy. Dividends were paid out of corporate earnings, and at times from retained earnings to maintain a stable dividend policy. Despite leverage, borrowed funds were used to augment funding investments to create future value and not to buy back equity where the latter implies that Anglo cannot add value, hence, rather gives back cash to investors instead of investing it in new ventures. The dividend policy was consistent such that Anglo opted

to pay dividends every year without resorting to leverage to fund dividends and share buy backs. This is testimony to the management's prudent dividend policy.

b) Share price volatility

Share price volatility is defined as a statistical measure of dispersion on share price returns as measured by standard deviation or variance between the returns; this gives one an idea of the riskiness of the share. In studying the relationship between stock returns volatility and trading volume in Nigeria between 2000 – 2011 using the Generalised Auto Regressive Conditional Heteroskedasticity ("GARCH") model, Kalu and Chinwe (2014) found that there exists a positive and statistically significant relationship between trading volume and stock returns volatility. Earlier, research findings of Omran and Mackenzie (2000) and Darrat *et al*. (2003), concur with the preceding as they also found corroborative evidence that reduction in traded volume has an impact on share price volatility such that increased volatility is accompanied by earnings or dividend volatility and suggests a declining share price. Pursuant to the above, the GARCH model (Bollerslev, 1986 as cited in Reider, 2009) was used to forecast volatility of share price return time series by applying it onto Anglo's share price daily data from Bloomberg for the last 15 years (Aug'99 – Sept'14) to estimate volatility using the statistical software package Stata with return as the dependent variable and time as the independent variable.

Table 1.1: GARCH (1,1) results

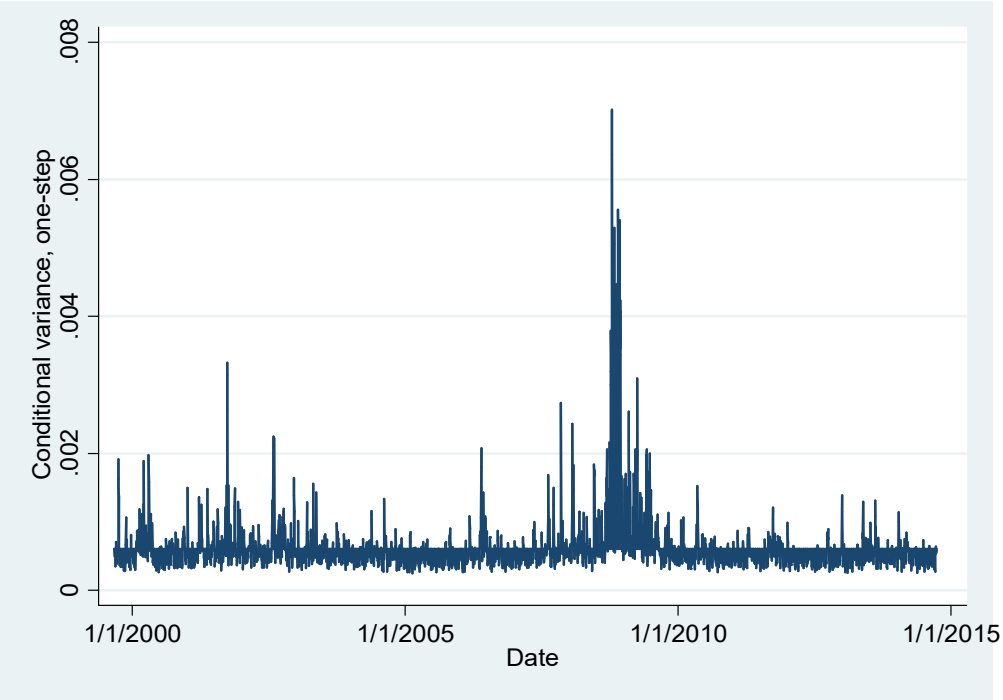



```
ARCH family regression

Sample: 9/2/1999 - 9/30/2014, but with gaps        Number of obs   =      3773
Distribution: Gaussian                             Wald chi2(.)    =         .
Log likelihood =  8804.848                         Prob > chi2     =         .

                                    OPG
      Return |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Return       |
       _cons |   .0007882   .0003639     2.17   0.030      .000075    .0015014
-------------+----------------------------------------------------------------
ARCH         |
       _cons |    937628   .0161671    11.99   0.000      .162076    .2254497
-------------+----------------------------------------------------------------
       garch |
         L1. |   .8395216   .0656307    12.79   0.000     .7108877    .9681555
             |
       _cons |  -.0000176   .0000324    -0.55   0.586    -.0000811    .0000458
------------------------------------------------------------------------------
```

Data Source: Bloomberg)

The preceding results show a highly significant coefficient 0.8395216 (83.95%) of garch L1 implies persistent price volatility with negligible drift component of -0.0000176 (0.00%).

Figure 1.1: Plotted predicted error variances



(Data Source: Bloomberg)

Figure 1.1. also visually confirms evidence of share price volatility reflected in spikes of the variance particularly for the 2008/2009 period.

Reduction in traded volume could result in either higher or lower share price volatility with a positive statistically significant relationship such that reduction in share price volatility would suggest lower earnings/dividend volatility. Conversely, increase in share price volatility should be reflected in increased earnings/dividend volatility and would suggest a declining share price. However, this is not the case for Anglo. Anglo's share price volatility analysis confirms that the reduction in traded volume resulted in higher share price volatility and increasing prices thus exhibiting characteristics outside the expected norm.

c) Credit risk and bond feature

Anglo's credit risk is as in the credit rating table below, which has changed over time. Anglo has consistently been rated by both credit rating agencies (Moody's and Fitch) with BBB or higher.

Table 1.2: Anglo's Credit Ratings

(Data Source: Bloomberg)

The implication of the long term historic investment grade rating is that essentially Anglo shares can be viewed as investment grade convertible bonds. CFA Institute (2015) defines a convertible bond as "*a hybrid security with both debt and equity features. It gives the bondholder the right to exchange the bond for a specified number of shares in the issuing company. Thus, a convertible bond can be viewed as the combination of a straight (option-free bond) plus an embedded equity call option*." The value of a convertible bond cannot fall below the price of the straight bond. When the share price goes up, investors get capital appreciation. The additional benefit of the convertible bond feature of a share such as Anglo's, is that when the share price goes down, the bond-like component of the share provides a floor to the price of the share. This downside protection on the back of a relatively stable and consistent dividend policy comes to the fore when the share price goes down and provides further reason

why investors hold the share for longer in addition to the upside potential that flows through from capital appreciation, essentially based on the company's credit risk and bond feature.

d) Foreign ownership

According to Bloomberg (December, 2015), as at the valuation date of 30 September 2014, Anglo's ownership structure was primarily constituted of foreigners 57% (37.18% RSA, 5.64% Unknown and the remainder foreigners). Mia and Nagata (2015) found that increased foreign ownership has a positive effect on company valuation through their control on self-interested managerial behaviour and efficient use of corporate resources. By implication, foreign ownership does drive share price. A majority foreign ownership such as that of Anglo as reflected above (57%) is a potential value driver if those foreigners practice shareholder activism; another potential reason why shareholders opted to hold onto the shares.

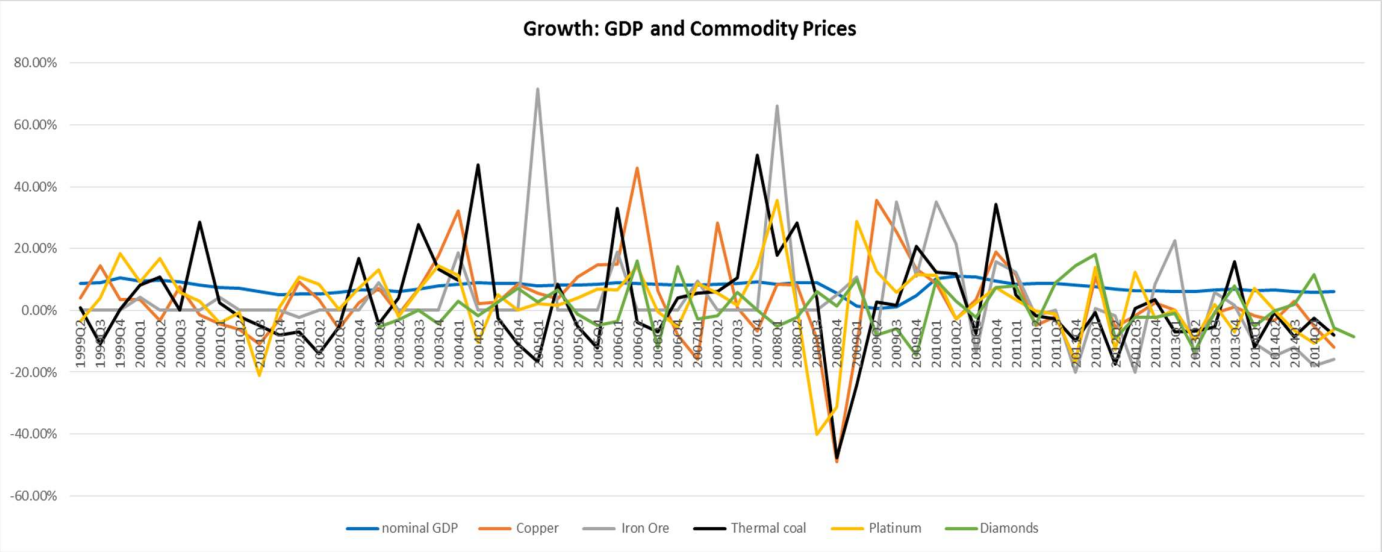
e) Dependency on macro and commodity cycles

Commodity companies like Anglo have an additional source of volatility. Damodaran (2009), defines a commodity company as one that produces one or more commodities and its earnings and value are thus dependent on the price of the underlying commodities. He lists their overarching characteristics as: dependent on the commodity price cycle as they are price takers, have volatile earnings and cash flows and this volatility also shows up in volatile equity values and debt ratios and have finite resources. When valuing a commodity company, it is thus important to understand the interaction between the commodity price cycles and how the cycles' shifts affect revenues and earnings. Dependence of a company value on firm specific

characteristics is subordinated to dependence on movement of macro variables such as commodity prices and underling economic growth.

Although uncertainty and volatility are common in valuation, commodity companies have volatility reflected in their earnings and cash flows beyond their control due to movement in commodity prices. It follows that reported fiscal year results are a function of the stage of commodity price cycle that year. Even the best run company can be at risk of adverse macro movements. As a solution, Damodaran (2009) posits that "*trying to forecast the next cycle is not only futile but dangerous and that it is far better to normalise earnings and cash flows across the cycle".* Primary commodities are herein defined as those that constitute more than 10% of the company's revenue. Bloomberg (2015), showed that as at end of financial year 2014, Anglo's primary commodities as a portion of revenue were Diamond (23.3%), Copper (15.6%), Iron Ore (13.4%), Thermal Coal (11.8%) and Platinum (10.3%). To gain understanding of Anglo's value drivers, growth in Anglo's five primary commodities' prices are graphed against growth in global Gross Domestic Product ("GDP") for the period 1999 – 2014 (15years).

Figure 1.2: GDP and Commodity Prices



(Data Source: IMF & World Bank data)

Figure 1.2 shows that in the last quarter of 2013, except for platinum, Anglo's primary commodity price levels were quite high. This might have created future expectations of a continued upward price cycle and invariably higher earnings expectations.

Given the preceding analysis of Anglo's dividend policy, share price volatility, credit risk or bond feature, foreign ownership and dependency on macro and commodity cycles; the potential basis for shareholders holding the share for longer were put forward.

1.2 Statement of the problem

Shareholders were holding Anglo shares for longer. However, a potential investor has no idea if at the then prevailing market price levels of above R260, the share still held value. Additionally, the existing shareholders may have been holding Anglo shares when they should have been disposing of them. This determination of whether Anglo was correctly valued by the market is done by estimating Anglo's share intrinsic value and comparing it to the market price to ascertain if a potential investor could have

taken advantage of the differential by investing in it and gaining from that investment or existing shareholders should diminish or entirely eliminate Anglo shares from their portfolios. However, before Anglo can be valued it is imperative to determine the best way to value Anglo (both from a theoretical and practical perspective) within the multitude of valuation approaches and methods provided in financial literature.

1.3 Objectives of the study and/or research questions

This study aims to estimate the underlying (intrinsic) value of Anglo and value drivers. The objectives are to:

1) Provide a foundational understanding of equity valuation concepts and framework of ideas or beliefs that aid in deciding how to undertake valuation especially the approaches and methodologies.
2) Determine the valuation method best suited to value Anglo.
3) Undertake valuation of Anglo according to theoretical and empirical literature regarding company valuation with the aim of establishing the target price as informed by the estimated intrinsic value per share.
4) Ascertain which investment recommendation the analysis yields thus advising potential investor to act in accordance to any of the following 3 actions:
    - Buy the shares or,
    - Hold onto the shares or,
    - Sell the shares.

Given the above objectives, the primary research question is: "*By applying fundamental analysis to Anglo, what is the intrinsic value of its shares as at 30 September 2014 and how does it compare to the value perceived by the market?*". To

find the answer to the research question presented above, the sub-questions are presented below and answered in different sections of this thesis:

1. Are price and value synonyms; is the value of company's shares the same as the price reflected in the market?
2. What is the most suitable method to value Anglo?
3. What is the estimated intrinsic value of Anglo?
4. Is the market overpricing or under-pricing Anglo shares?
5. What action should an investor take considering the results of the share analysis?

1.4 Significance of the study

This study makes both theoretical and practical contribution to the body of knowledge particularly for the following beneficiaries:

1) Investment public and individual investors

   The study serves as a guide if they should buy or sell Anglo shares. The final results of the process can inform potential investors if Anglo is a good investment at current price levels or not.

2) The researcher

   The study will aid them to apply theoretical knowledge acquired in their academic course work.

3) Future researchers

   This study can be used by future researchers as a reference for valuing a listed company thus giving them ideas or guidance in their future studies, particularly those that are new to the field of equity valuation.

1.5 Limitation of the study

The analysis was based on secondary information as contained in the Bloomberg platform database. It thus assumes that, as a publicly traded company, the information provided by Anglo is true and realistic as per the laws and regulations. This will be augmented by other public information. The lack of interaction with management to put forth clarifying questions of the estimates is a hindrance to greater output quality. Anglo is valuated as a going concern, hence, a greater reliance on forecasting and estimates which unfortunately render themselves to subjectivity.

The chosen valuation method is by no means all-encompassing and analysts valuing another company other than the one used in the case study are strongly encouraged to apply their mind in the validity of certain assumptions and make changes where circumstances deem it necessary. The DCF method is a good basis but should not be applied in a vacuum.

1.6 Delimitations of the study

Price and value are both greatly influenced by the passage of time. The price a share holds at a point in time will not necessarily be the same a year from that date or even a week from that date. The same applies to value. Value and price are functions of circumstances prevailing at that specific time as they are not static values. The objective of establishing whether Anglo was under/correctly/overvalued is also time specific. This study will only focus on a specific date instead of a time series which would have informed if the share continued to provide value or not.

Comprehensive valuation requires that the target company be analysed from different angles with an array of quantitative and qualitative factors in order to provide a 360-

degree perspective of the company and potential future performance. This study shall be limited to a single quantitative method without considering other valuation methods. Additionally, qualitative analysis particularly evaluation of the company via SWOT analysis was also not undertaken. The rationale for this is limited time and the need to narrow down the scope of the study and evidence ability to synthesise ideas and apply academic theory to real life problem within a limited time frame.

The thesis is organised in five major chapters:

1) Chapter 1 provides the background on Anglo and proceeds to articulate the statement of the problem, the study's significance, limitations and delimitation thereof.
2) Chapter 2 reviews the literature to provide theoretical basis of estimating value thus putting forth succinct definition of terms to remove ambiguities, rationale for undertaking valuation and the different valuation methodologies. Given the theory, the chapter proceeds to explore the empirical literature to determine the method/s that best apply to Anglo.
3) Chapter 3 covers how the research was undertaken and how the model inputs were estimated.
4) Chapter 4 shows the results emanating from the preceding chapter, particularly the inputs derived and outputs of the two different valuation methods. A discussion of those results is also included.
5) Chapter 5 concludes this thesis by analysing the findings of this work under the scope of company valuation.

CHAPTER TWO

2. LITERATURE REVIEW

"*There is no greater impediment to the advancement of knowledge than the ambiguity of words*." – Thomas Reid

Humans subconsciously translate what they hear or view through their personal filters of common sense, giving rise to different understandings of the same thing. To eliminate these ambiguities, this section aims to provide a clear understanding of the salient definitions and concepts with the view of establishing a theoretical framework of how the objectives of this study were achieved.

The chapter begins by defining key words pertinent to the subject matter: listed company, price, value, valuation.

To better position the study at hand within the greater body of knowledge of valuation, the literature review provides insight of other uses of valuation, the premises of any valuation undertaking (beliefs or assumptions guide) and the broad research approaches of how valuation can be done.

With the above aerial view of valuation, the review then attempts to narrow down the scope by identifying the different valuation approaches within the field and associated models, with the aim of choosing the best valuation method to value this specific company. Theory (postulated ideal) and real life do not often perfectly converge and the practice of valuation is no exception to that. This gives rise to the need to also

gauge what industry practitioners do, inclusive of rationale thereof, before concluding on the best method to apply in the valuation of Anglo.

2.1 Key definitions

2.1.1 Listed company

A listed company is one whose shares are traded on a stock exchange. For a company to be listed, it must meet the exchange's listing requirements that ensure that only high quality shares are publicly traded. The JSE is South Africa's primary stock exchange. According to the JSE (2017), its functions are primarily governed by the General Principles as outlined in the JSE listing requirements document and broadly include provision of a primary market, operation of an efficient secondary market trading system, investor protection, high quality company disclosures, equitable treatment of securities of the same class and ensuring that Listing Requirements continue to foster investor confidence in relation to disclosure standards and issuer's corporate governance conduct. The above governance principles are cascaded into detailed listing requirements, too extensive to add value to this discussion. However, if a listed issuer contravenes the spirit of the above governance principles, it is within the JSE's powers to invoke issuer suspension, censure, impose penalties and in the gravest instances de-listing.

Janmohammed (2010), avows that advantages of listing on a stock exchange include access to capital by issuing shares, wider ownership, brand awareness and increased corporate governance to be transparent to more stakeholders and the upholding of the exchange's disclosure requirements. Mateiciuc (2009) attempted to answer the question, why companies list on stock exchanges and concurred that financing or capital raising was the primary reason. Other motives he found that strongly came to

the fore, include companies' ability to reward management shares thereby linking compensation to company performance and deleveraging. The latter essentially arises from the fact that increased equity, invariably decreased the leverage (Debt/Equity ratio) as the denominator in the leverage ratio increased, but the numerator stays the same.

The practical consequence of decreased leverage is that it enhances the company's ability to borrow more or at least use that perceived financial improvement as a bargaining tool to negotiate lower borrowing costs. Meteiciuc (2009), further broadened the scope of understanding and found that listing also comes with disadvantages such as original owners diminished or loss of control over the company and overemphasis on shortermism in relation to profit and profit sharing such as focus on quarterly earnings. He avows that disadvantages also include additional costs by fulfilling listing requirements such as auditing fees and potential under-pricing of the companies' shares at the initial public offering due to information asymmetry.

2.1.2 Price versus Value

The first sub-question of this study attempts to clarify if price is the same as value asks, "*Are price and value synonyms; is the value of a company's shares the same as the price reflected in the market?*"

CFA (2017, v4 p8), advances three basic variations in the definition of value. Intrinsic value, is the value of an asset given a hypothetically complete understanding of the asset's investment characteristics. *Fair market value,* is the value at which an asset or liability would change hands between a willing buyer and seller when both the buyer and seller are not under any obligation to buy or sell. Additionally, both buyer and

seller are all knowing such that they are informed about all material aspects of the asset and transaction. *Investment value,* is the value of an asset to a particular buyer. The significance of this is that an asset may be worth more to a particular buyer, due to reasons such as synergies between the asset in question and the buyer's other existing assets. Valuation focuses on the first definition of value, namely, *Intrinsic Value,* under the going concern assumption.

In layman language usage, price and value are often used as synonyms. However, in valuation, a clear distinction is made between the price of an asset and the value of an asset. Price is essentially the market price and is thus observable or can be seen. Fernandez (2007), makes a clear distinction between price and value. He asserts that price is "the quantity agreed between the seller and buyer". Unlike value, an asset's price is based on market forces of supply and demand; it is driven by market moods, momentum and surface stories about fundamentals. Damodaran (2006) reinforces the difference between value and price. He defines intrinsic value as "*the value that would be attached to an asset by an all-knowing analyst with access to all information available right now and a perfect valuation*". He concludes that such an analyst does not exist thus one can only make a best estimate of the intrinsic value. In distinguishing an asset's value from its price, Damodaran (2014), stresses that value is based on accounting and estimates; it is driven by cash flows from existing assets, growth in those cash flows and quality of that growth. CFA (2017), supports the above and postulates that an asset's value may be derived from either future investment returns which is a function of future cash flow in addition to methods comparison with similar assets and net worth of liquidation. Intrinsic value is not observable as it is "*the value of an asset given a hypothetically complete understanding of the asset's investment characteristics*" (CFA, 2017). However, complete understanding based on hypotheses

is virtually impossible, as real life dynamics are far too complicated to arrive at perfection or completeness, intrinsic value is thus only an unobservable estimate. This estimation introduces errors to the valuation process. Implicitly, the search for intrinsic value questions the accuracy of the market price as an estimate of value. Valuation thus assumes that market prices are not the best estimate for intrinsic value. If the afore-mentioned holds, then the underlying basic assumption is that markets are inefficient because, what they reflect is not necessarily the true value.

2.1.3 Valuation

If price and value are not the same as indicated above, and price is reflected in the market then what is the process of determining that value? The answer to that lies in valuation.

Valuation is a "scientific attitude towards art" (Froidevaux, 2004). According to Damodaran (2012), every asset has a value and "*the key to successfully investing in and managing these assets lies in not only in understanding what the value is, but also the source of that value*". In making an investment, an investor commits funds over a period in the hope of deriving a rate of return as compensation. The foundational reasoning of that investing, is that an investor should not pay more for an asset than the asset is worth, which gives rise to the distinction between the price of an asset (as determined by the market forces of supply and demand) and the asset's intrinsic value (estimated worth based on the asset's underlying characteristics). Valuation focuses on the latter and is thus the methodological process of determining an asset's intrinsic value; an educated guess considering future uncertainties which is an art rather than a science. Investor opportunity lies in taking advantage of the differential between the

intrinsic value and the market price of an asset, such as a share. So how does one identify these investment opportunities?

2.2 Background of Valuation

2.2.1 Uses of valuation

Valuation has a wide range of applications. CFA (2017), provides several areas where valuation can potentially be applied. *Selecting assets,* (such as shares), by comparing the Intrinsic Value to the Market Value to ascertain if the specific share is under/fairly/over-valued. *Inferring or extracting market expectations,* based on the assumption that a price reflects consensus investor expectation about future performance of that company. A multifactor model is then used to ascertain how certain variables interact to influence price to conclude on the reasonability of a specific variable and not reasonability of the price. Price thus helps to provide information of the targeted variable. *Evaluating corporate events* such as mergers and acquisitions, divestitures (a specific division is sold off entirely with possibly different shareholders) and spin-off (a division is turned into a company and shareholders remain the same as the original company). *Rendering fairness opinions* such as to parties of a merger who may be required to get a third-party opinion on the fairness of the terms of the transaction. *Evaluating business strategies and models,* to ascertain the impact on shareholder value. *Communication with the analyst and shareholders,* so that different community segments have the same understanding. *Appraising private businesses,* for transactional purposes such as a sale, taxation matters such as in the case of levying estates and Initial Public Offerings. Evaluating or setting *share-based compensation* as it is now common for a large portion of executive compensation to be made up of share options, this necessitates the need to forecast the

company's performance to attach a value to the share options that augment traditional compensation such as salary.

This study will focus on the first stated valuation application, whereby valuation is used to determine the value of an asset particularly the shares of a listed company, Anglo. Fernández (2013), augments the above by specifying eight uses of valuation which can be classified into, or can be considered as a subset of the above general categories; in the buying and selling of company operations, valuation of listed companies, public offerings, inheritance and wills, compensation schemes based on value creation, strategic decision on the company's continued existence and lastly strategic planning.

2.2.2 Market beliefs and valuation assumptions

The investor's valuation tool reflects their belief in the type of information that the market has already priced into share prices and methods used to find pockets of investable shares in the market. The Efficient Market Hypothesis (Fama, 1970 as cited in Bodie, Kane & Marcus, 2009) posits that share prices already reflect available information and provides three versions of that hypothesis. The weak-form states that share prices reflect all historic market information, hence, technical analysis is futile. The semi-strong-form states that share prices already include all public information, hence, in addition to technical analysis, fundamental analysis is also futile. The strong-form states that share prices include all information (public and private) hence all analysis including insider trading is futile.

Given that market prices are not the best estimates of intrinsic value CFA (2017), hypothesises that for one to undertake valuation as founded on fundamental analysis, they make two overarching assumptions. The first assumption is that *mispricing exists*. Mispricing is defined as the situation in which the price of an asset is not equal to the value of that asset. This is at odds with the market efficiency theory and invariably promulgates one's belief that markets are informationally inefficient. The supportive argument stems from viewing the above from the opposing side in terms of efficiency. In the absence of mispricing, where an asset's price equals the asset's value, there would be no need to undertake valuation. In that case, a rational investor would not work hard to establish the value of things if markets are efficient. The above is clearly framed in the Grossman's Stiglitz paradox (Grossman & Stiglitz, 1980 as cited in Wu & Ou-Yang, 2014). In summary, the paradox states that if markets were informationally efficient (reflect all available information and represent an asset's fair value), no rational person would incur costs of valuation. If no rational person undertook the cost of valuation, then how would prices reflect value? It, thus, follows that markets are only efficient because of the activity of investors that undertake the cost of valuation to arrive at a value of an asset. The market does not know the price. The market participants' actions influence prices, which reflect their demand and supply interaction but people can be wrong which leads to the conclusion that prices can be wrong.

Essentially, investors will not rationally incur the costs of analysis unless they expect to be rewarded for that effort in the form of abnormal returns or excess risk adjusted returns commonly referred to as alpha. Kay (2013), affirms the above that markets are inefficient. He contends that "*a contradiction lies at the heart of the efficient market hypothesis: if market prices did incorporate all available information about the value*

of an asset, no one would have an incentive to obtain information in the first place". Sewel (2012), studied the empirical evidence of stock returns to ascertain the validity of the theory of an efficient market, using the four autocorrelation statistical tests on daily, weekly, monthly and annual stock market returns. He too found that markets were inefficient across the different time periods.

The alternative is that markets are efficient, rational investors would rather opt for passive investment and save on costs. However, the existence of vibrant financial markets such as that of the JSE is testimony that investors' activeness as they continue to derive value from the process inherently attests to the fact that markets are inefficient. Harford and Alexander (2013), wrote that in echoing the 1996 sentiments of economist Robert Shiller, the United States Federal Reserve chairman Alan Greenspan conceded that markets are not efficient and emphasized that the observed financial markets overpricing is nothing more than "*irrational exuberance*"; the unsustainable enthusiasm of investors, that consequently drive asset prices as opposed to fundamentals. However, they further went on to provide alternative views from other economists such as Eugene Fama's contrary view, that "*prices reflect all available information*", because markets are efficient which thus makes it difficult for one to beat the market. In as much as their article gave diverse and opposing views of the argument of whether markets are efficient or not, the overriding message is that, no narrative is definitive and there is room for a grey area sandwiched between the polarised views of efficiency and inefficiency. The grey area is supported by Asness and Liew (March, 2014), who looked at both sides of the argument to identify which side holds more value. Their conclusion offers a more mundane view of whether markets are efficient or not. They argue that market efficiency or lack thereof is not clear cut, in that markets are neither efficient nor inefficient but rather somewhere in-

between. They proposition that "*the idea that markets are literally perfect is extreme and silly, and thankfully (at least for us), there's plenty of room to prosper in the middle*".

The second assumption in undertaking valuation is *Convergence*; that an asset's price and value will converge. It is thus expected that convergence will occur sometime and within the investor's investment horizon. For the convergence to occur, a catalyst is required. That catalyst is essentially any variable expected to change and with material impact on the company's performance and invariably impacts the estimated share value. If the catalyst is expected to occur at a time later than the investor's time horizon, it follows that although the mispricing is identified, it is not an investment opportunity for that particular investor as the catalyst for convergence lies outside the investor's investment horizon.

Identification of an opportunity thus spans three facets: mispricing, catalyst and convergence within the specified investment horizon. Comparison of market price and intrinsic value should lead one to either of the following three conclusions. The asset is *Undervalued,* if the estimated intrinsic value is greater than the market price. If the estimated intrinsic value is equal to the market price, then the asset is *Valued.* If the estimated intrinsic value, is less than the market price, then the conclusion is that the asset is *Overvalued.* Judgement of valuation results in line with the above assessment will answer the fourth sub-question of this thesis*; "Is the market overpricing or under-pricing Anglo shares?".*

2.2.3 Equity research approaches

The investment universe is often very wide. In the case of the JSE listed Anglo, as at the valuation date of 30 September 2014, the JSE had 164 (Bloomberg, 2015), shares listed on its main board. Given the relatively large number of shares in the index, share selection is an important factor. CFA (2017), guides that in narrowing down which shares to analyse from the universe of listed companies, two basic filtering approaches exist. In the *Top-down* approach, the analyst examines the economy to identify industries which are expected to thrive in that environment. Securities from the potentially lucrative industries are then analysed. Essentially, analysis begins with a macroscopic view then narrowing to industry and then individual securities. In the *Bottom-up* approach, the analyst follows industries and forecasts fundamentals for companies in those industries. The major distinction between the top-down approach relative to the Bottom-up approach is that in the latter, the broad sector and economic conditions are disregarded and the focus is rather on selecting securities based on individual company attributes. The choice of the filtering approach is nullified in the context of this report's valuation as it is a case study which specifically only focuses on a single asset or security. However, it is a salient undertaking in the process of valuation in the absence of a target security.

After using one of the above or even a hybrid of the two research approaches to identify the asset or security to analyse, the dilemma of which valuation model to use comes to the fore. The next section provides some guidance.

2.3 Choosing the appropriate valuation model

Sub-question two of this study asks, "*What is the most suitable method to value Anglo?*". This section explores the different ways one can value an asset and subsequently chooses among that universe, one that is most suitable to be used as the primary tool to value Anglo based on the company's characteristics and industry best practices.

2.3.1 Different valuation approaches and associated models

A view of the philosophy or way of thinking about valuation is pertinent in attempting to bring clarity to the process. Within each approach, there may be several models which are essentially a simplification of the real world practical drawbacks that evolve around uncertainties about the model's appropriateness and correctness of input values. CFA (2017), posits that an asset's value may be derived from 3 basic approaches and their associated valuation models.

The first valuation approach is ***Future Investment Returns,*** which are a function of cash flows and how they are defined. Identified economic and fundamental variables drive these returns, hence are used to forecast future cash flows which are then discounted to arrive at an estimate of the asset value. Within this approach there are two broad valuation models. The first type of models are the *Absolute Valuation Models*. These models specify an asset's intrinsic value hence aim to provide a definitive figure for the asset's value. Examples of these models include Present Value or Discounted Cash Flow ("DCF") models. They are ideal for a cash generating asset. The basic principle underlying DCF models is that individuals defer consumption, hence invest for expected future benefits and expect a rate of return over the investment period.

DCF thus suggests that the intrinsic value of an asset is equal to the present value of the asset's expected future cash flows discounted at a rate that reflects the riskiness of the cash flows. The cash flows used depend on the perspective the investor is valuing the company from. If it is at the company level, then Free Cash Flow to Firm ("FCFF") also referred to as Residual Income is used. Residual Income is defined as the economic profit or income more than the required income needed to compensate for the risk of the business. If it is at shareholder level, expected cash flows are either cash expected to be distributed to shareholders (dividends) as in the case of the Dividend Discount Model ("DDM"), or Free Cash Flows to Equity ("FCFE"), defined as the cash flows available to be distributed to shareholders after meeting capital expenditure and working capital needs. The cash flows are then discounted using a discount rate. Salient decision points in this stage are deciding on the type of cash flow to be discounted, how the cash flows are forecasted into the future and the discount rate to be used.

Another example of a Future Investment Return approach is the Asset Based Valuation Models. These pay attention to the market value of an asset or the resources it controls. In this type of valuation, it is assumed that the value of a company is equivalent to the total value of the company's assets. Asset-based valuation thus advances the view that the estimated intrinsic value of common shares is the total value of the company's assets, less the value of liabilities and preference shares value. The assets reported are at market value; essentially the adjusted book value or carrying value of the assets and liabilities. This type of valuation model is ideal for companies that own a specific asset such that if the asset is replicated then the company's business is also replicated. Real Estate Investment Trusts ("REIT"), are an explicit example of this. If one can buy similar properties as those in the REIT then one can replicate the REIT's business.

The second possible valuation approach is referred to as ***Similar Assets***. It can be used to compare the target asset and arrive at a comparable asset value. The valuation models that stem from this approach are called *Relative Valuation* models. These models are also sometimes referred to as the method of comparable. They state the value of an asset relative to another asset. They are based on the law of one price which argues that there is a strong tendency for price convergence for assets that are similar thus two identical assets should sell at the same price. Unlike absolute valuation methods such as the DCF method which estimate an asset's value in isolation, the underlying principle in this method is that one cannot price something in isolation but rather as a multiple of similar assets (comparables). Indication of whether an asset is expensive or cheap depends on the broader context, hence, relative to alternatives. It is thus a form of relative valuation and aims to determine whether an asset is under/fairly/overvalued when compared to closely matched assets such as shares or average value of a share's peer group.

Given an asset's derived value, one thus asks the question "*given the same amount of money, what else can that amount buy?*". Although fundamental value provides an estimate of a company's value, one has to take into account the effect of market forces (supply and demand) to provide a holistic view of valuation. The above is clearly illustrated with an example of a residential property. Given specific characteristics of a house such as number of bedrooms, finishes and size of the land one may conclude that the value of the house is for instance N$1.3 million; fundamental valuation. However, when you compare that house to what other properties in the areas are priced at and those houses' offerings, one might have to decrease (discount) or increase (add a premium) to the target house in order to arrive at a more realistic value of the target

house given intangible characteristics that influence prevailing market conditions; relative valuation.

Examples of these types of models are the price multiples or enterprise multiples which make use of the ratio of Share Price or Enterprise Value ("EV"), versus a fundamental variable (i.e. revenue, earnings, cash flows, book value etc.) to judge relative value. The fundamental variable can be stated on a forward basis (forecasted), or trailing basis (historic). EV is a measure of a company's total market value, excluding the cash and short term investments as they can be used by an acquirer to pay for acquiring the company. If using the EV method, value of common equity is thus equal to EV, less liabilities and preference share value and there are only two choices for the denominator being Revenue and EBITDA. The value of an asset is derived by comparing the price of comparable assets using a standardised variable such as earnings, cash flows, book value or sales. The lower the ratio, the more the asset is attractively valued.

A drawback to these models is that they do not consider the future, although some analysts circumvent this by using forward fundaments as a denominator. Unlike the absolute value models which determine a target price, relative valuation models do not set a target price that one can compare to market price but rather give an indication of how expensive (overvalued), or cheap (undervalued), an asset is relative to its comparables. It thus follows that, given two comparable assets with the findings of one being overvalued relative to the other, the implication is not conclusive that the undervalued asset really is undervalued only that it is undervalued relative to the comparable asset. It could be that both assets are overvalued, except that one is less overvalued than the other. In the absence of a definitive conclusion of over or

undervaluation, the merit of this method only comes to the fore when one compares two companies in the same sector or industry. Given that the share pick options of either assets are mutually exclusive, the winning choice is the one that is undervalued relative to the other.

The third type of approach is referred to as the ***Liquidation Method*** and relies heavily on accounting estimates of value or book value. It considers accounting asset value and is based on the premise that the primary assumption of the valuation of a going concern (which assumes that the company will continue operating in the foreseeable future) is not valid. It thus follows that the basic assumption of the liquidation method is that the company will not continue operating soon, hence, its value is estimated using its salvage value; the value of its assets if they had to be disposed.

Damodaran (2014), suggests a fourth approach based on ***Options***. The associated valuation model is referred to as *Contingent Claim Model.* He posits that the value of an asset is derived using option pricing models and is ideal for assets with share option characteristics. He puts forth three main characteristics of an option: "They derive their value from an underlying asset, which has value; The payoff on a call option (put option), occurs if the value of the underlying asset is greater, (lesser) than an exercise price that is specified at the time the option is created. If this contingency does not occur, the option is worthless; They have a fixed life." He asserts that, given an asset with similar characteristics, it can be viewed as an option thus valued in a similar manner. An example of such an option is the company that owns natural resources such as a mining company's mineral deposits or a timber company's forest. This method enables one to value companies that under the traditional methods may be undervalued or not valued at all. However, drawbacks to this model are that the model

inputs are not easy to source, it is highly dependent on the value of the underlying asset and there exists potential double counting for some assets.

Figure 2.1: Summary of valuation models

Valuation approach	Future Investment Returns	Similar Assets	Liquidation Method	Options
Valuation type	Absolute	Relative	Absolute	Absolute
Valuation model examples	PV or DCF -FCFF -FCFE -DDM Asset Based i.e. REITs	P/E P/BV EV/EBITDA	Bankrupt company	Natural reserves (i.e. mineral deposits & timber)

Given the four broad valuation approaches in Figure 2.1 and their associated valuation models, asset value is thus not a unique number such that any given asset has the same value to everybody. It is an estimate of value and highly dependent on the context that the person undertaking the valuation brings to the process, thus either an estimate or a

comparison figure. For example, if one believes that the company's future is bleak or non-existent they will use the liquidation method. Another may believe that it has turnaround potential, thus estimate the value based on future investment returns. In addition to the context that one finds the company in, the perspective that one brings to that asset is also a factor that influences judgement of the valuation approach adopted. An example of perspective is the questioning of whether the company has a good investment case for shareholders. The valuation method adopted in the former will be different to the one that questions whether the company is a takeover candidate. What one wants to evaluate the company for (perspective), thus also greatly influences the choice of valuation method.

Given the above, valuation is not a hard fact, quantitative or operational technical process, the narrative or story that surrounds the target company is essential to the degree of establishing what makes sense in that specific valuation. Judgements integral in valuation include how the company is to be valued, the context the company is found in, the story behind the company, which gives an idea of what makes sense, the applicability of the type of valuation technique to be used and the perspective from which one values the company.

2.3.2 Industry Practice

In financial markets, theory alone is not enough. An investor can be correct in all theoretical aspects but if majority of investors act to the contrary, their move the market. Knowing which valuation is common among industry participants enables an investor to benchmark their investment analysis decision. In prior discussions, it was highlighted that, which valuation approach one chooses depends on the company being analysed and the circumstance surrounding it. Consideration should thus be consistent

with purpose of valuation, inclusive of the perspective of the analyst, the company's characteristics which is a function of understanding the company's business and the industry it is in. Additionally, the appropriateness of data in terms of availability and quality is also an important consideration. The above signifies that the choice of model thus depends on the availability of input information, one's confidence in the input information and appropriateness of the model. Bancel & Mittoo (2014), surveyed 365 European finance practitioners and found that relative valuation is the most popular valuation approach or method but practically all respondents used the DCF method. Building onto Bancel & Mitoo's research and using a larger sample size of 13,500 CFA Institute members, Pinto *et al*., (2015), surveyed professional practices in their selection of equity valuation approaches. They found that almost all of them use more than one valuation approach.

The most popular approach is a Market Multiples approach, as 92.8% of analysts use it and within that approach among the top multiples are Price/Earnings (88.1%) and Price/Book Value (59.0%). However, New Constructs (2016), assert that the preceding popular valuation matrices "do a poor job of valuing stocks".

The drawback to the Price Earnings ratio is that it is based on accounting earnings (New Construct, November 2015). However, accounting rules change over time, accounting data has loopholes that can be manipulated by company management and the ratio also overlooks assets and liabilities that have a bearing on valuation. CFA (2017) concurs with the above and puts forth three main drawbacks. Firstly, denominator in the P/E ratio Earnings Per Share ("EPS") can be zero, negative or very small when compared to intrinsic value; the P/E multiple will thus not make economic

sense in that instance. Secondly, in arriving at the earnings value (an input into EPS) involves a great amount of subjectivity. One has a choice on what to keep in that number (i.e. recurring items) and what to take out of that number thus making EPS difficult to forecast and adjust. Thirdly, EPS is a highly managed number in accordance to a company's assumptions and accounting policies. Cognisant of the P/E ratio popularity as it is widely recognised and used, CFA (2017) rationalises that earnings power is a chief driver of investment value; the more a company earns, the more it should be worth.

Price/Book Value is less preferred because the Book Value ("BV"") can be written down at management's discretion, some assets and liabilities can be omitted from book value by placing them off the balance sheet, at best it estimates liquidation value and not that which matters to equity investors primarily capital used to generate returns (New Construct, January 2016). CFA (2017) concurs with the above that discretion in accounting treatments compromise BV usefulness and asserts that BV "may be a misleading valuation indicator". Additionally, assets other than those in financial statements such as human capital in service focused companies are omitted in financial statements. Comparability between companies and historically may be difficult because of significant differences in asset average age the practice of share repurchases and issuances. On a balance of scale, CFA (2017) also puts forth positive attributes of the ratio. Primarily that the denominator BV is a cumulative balance sheet amount hence is usually greater than zero even when EPS less or equal to zero. Additionally, the matric is also more stable than EPS. It is thus appropriate for valuing companies whose assets are mainly liquid such as companies in the financial industry and for companies not expected to continue as going concerns.

2.3.3 Chosen valuation model

Section 2.2.2 herein enunciates how one's market beliefs influence their valuation tool. The author's market belief is that of the weak-form which posits that markets are inefficient; although technical analysis is futile because share prices reflect all historic information, fundamental analysis can still be used to estimate a share's value and inform an investment decision. Valuation, being part of fundamental analysis is embedded in two main assumptions as discussed in the same section; mispricing exists and an asset's price and value will converge over some time horizon.

However, within fundamental analysis there are several valuation approaches and associated models as articulated in section 2.3.1 herein, a summary thereof provided in Figure 4 of the same section. The *Options* approach is more applicable to assets with contingencies such as natural deposits or reserves thus is not suitable for Anglo. The *Liquidation Method* is also not applicable because the analysis is to be done from an investor's point of view thus Anglo is to be valued as a going concern. The approaches thus not eliminated in terms of applicability to Anglo are *Similar Assets* (Relative Valuation) and *Future Investment Returns* (Present Value or Discounted Cash Flow) approach.

Section 2.3.2 of this document discusses that empirical evidence show that the top valuation matrices as used in the most popular valuation method Market Multiples have been found to be flawed. Given the above, it thus follows that the next popular valuation method is to be employed in this paper. From the preceding section, closely following the Market Multiples approach, Pinto *et al.,* (2015), ranked the DCF method

in second place to Multiples as the survey found that 78.8% of valid respondents use the DCF method.

No method is however without flaws in entirety as valuation is both a science and an art, the lesser of any evil shall prevail. Contrary to New Construct's implied relative strength of the DCF, Steiger (2008), highlights weaknesses of the DCF. He examined the theoretical and practical aspects of the DCF method and found that it is vulnerable to changes in the underlying assumptions. Particularly, marginal changes in the perpetual growth rate, which lead to large variances in the terminal value which accounts for a significant portion of the company's value. He concludes that, it is very easy to manipulate the DCF analysis to result in the desired value by adjusting inputs. However, if astutely used, the method can be a powerful valuation tool as its validity is completely dependent on the quality and validity of the data that is used as input.

Fernández (2013), used eleven different methods to value the same company and arrived at eleven different valuation figures. He provides an appealing explanation of why the DCF is the best method to value a company. He ascribes the fundamental flaw valuation methods other than DCF to be that the methods are too polarised in either source of input or perspective such that in addition to the fact that all of them only consider historic data, some methods only use balance sheet data, while others only use income statement data. Given two companies with identical accounting reports (income statements and balance sheets) their prospects should form an integral part of informing their valuation. If one has a negative outlook, in terms of profitability while the other has a positive outlook, logic dictates that the one with the positive outlook should yield a higher valuation figure than its counterpart.

The DCF model is thus chosen for this study, due to its popularity among investment professionals, stronger validity of matrices and qualitative rationale. However, relative valuation shall also be undertaken as a complementary method. The relative valuation multiples to be used are P/E and P/BV on an equal weighted basis.

2.3.4 Conceptual representation of chosen valuation model

Sub-question three of this study asks, "*What is the intrinsic value of Anglo?".* To begin to delve into this exploration, the chosen valuation method (DCF valuation model) provides a starting point that leads to a solution of that question.

CFA (2017) advances that the intrinsic value of an asset in the DCF valuation model is equal to the present value of the asset's future cash flows including the terminal value. In mathematical notation, the DCF model is as represented by the below formula inclusive of the expanded notation thereof.

$$\text{Intrinsic Value} = \sum_{t=0}^{n} \frac{CF_t}{(1+r)^t} + \frac{TV}{(1+r)^n}$$

$$= \sum_{t=0}^{n} \frac{CF_t}{(1+r)^t} + \frac{\left(\frac{CF_n * (1+g)}{(r-g_s)}\right)}{(1+r)^n}$$

$$= \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \cdots + \frac{CF_n}{(1+r)^n} + \frac{\left(\frac{CF_n * (1+g)}{(r-g_s)}\right)}{(1+r)^n}$$

$$= \frac{CF_0(1+g)}{(1+r)^1} + \frac{CF_1(1+g)}{(1+r)^2} + \frac{CF_2(1+g)}{(1+r)^3} + \cdots + \frac{CF_{n-1}(1+g)}{(1+r)^n} + \frac{\left(\frac{CF_n * (1+g)}{(r-g_s)}\right)}{(1+r)^n}$$

Where: $t = \text{time in years; starting from zero to n years.}$

$CF_t = \text{Cash Flow at time t}$

r = discount rate

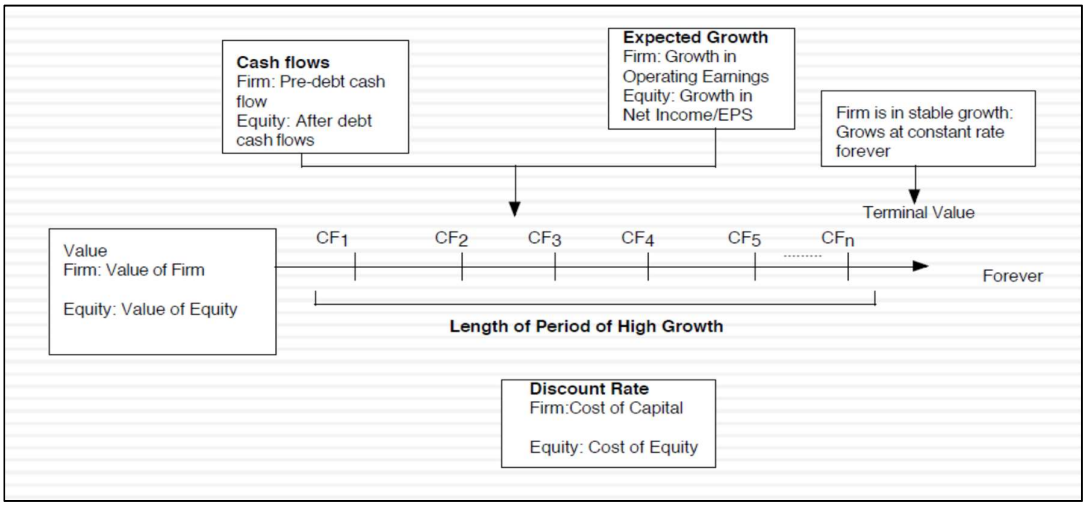
TV = Terminal Value

g = growth in Cash Flow during forecast period

g_s = growth in stable state

For a better understanding of how the variables in the above mathematical representation relate to each other, Damodaran (2016) provides a succinct graphical representation or conceptual model of the generic DCF model (Figure 2.2) which can be applied to FCFF, FCFE and DDM.

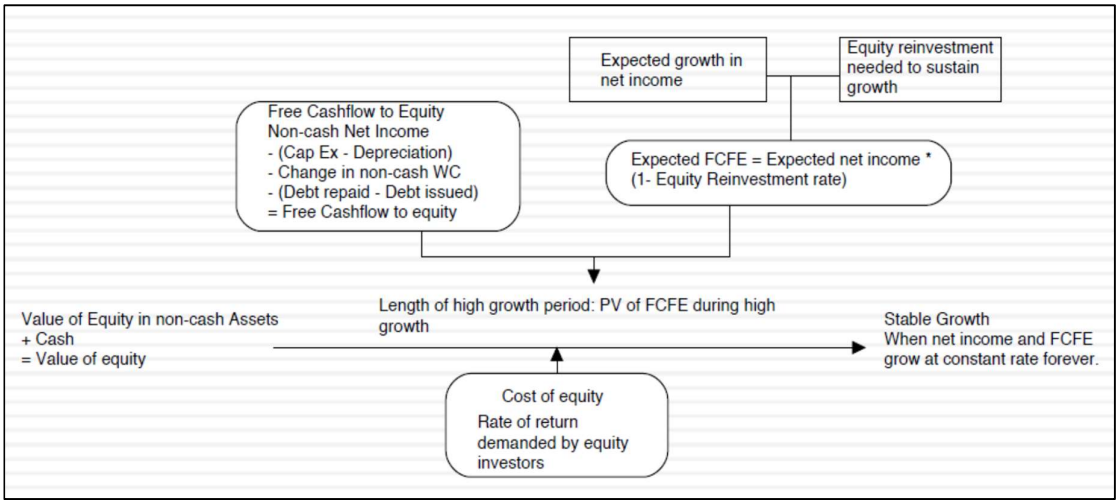
Figure 2.2: Generic DCF Valuation Model



(Source: Damodaran, 2016)

Figure 2.3 below illustrates how the generic model is specifically applied to FCFE which is what this study will use.

Figure 2.3: DCF Valuation Model using FCFE



(Source: Damodaran, 2016)

Given that the DCF model proposes that the value of an asset is equal to the present value of the asset's future cash flows including the terminal value, the above figure maps out one needs to be done to carry out the model.

a) **Cash flow:** Determine the most recent Cash Flows, in this case *Free Cashflow to Equity* ("FCFE") as defined or guided by the equation in the above figure.

b) **Growth**: Determine the cashflow's expected growth rate. This is a function of the *expected growth in net income* and *equity re-investment needed to sustain growth*. This growth rate is then used as a multiplier of the cash flow determined in the preceding (a) and extrapolate the cash flow into the future and called *Expected FCFE*.

c) **Time**: The horizontal line reflects the investor's investment horizon thus the forecasting period. The FCFE (a) is increased by the growth rate in (b) over the specified time horizon.

d) **Terminal Value**: On the far right of the diagram is the Terminal Value at the end of the forecasting period. The expected FCFE in the last period of the forecasting period is then assumed to grow indefinitely at a *stable growth rate*.

e) **Discount rate:** *Cost of Equity* (rate of return demanded by equity investors) is then used to discount the expected FCFE and Terminal Value over the time horizon, in order to bring them to present day.

The present value that results from expected FCFE discounting in (e) is the estimated *Value of Equity*. If that value is divided by the number of shares outstanding for Anglo, then that result is the estimated intrinsic value of Anglo's shares.

CHAPTER THREE

3. RESEARCH METHODS

3.1 Introduction

This chapter broadly outlines the approach taken in carrying out the study and justification of the research method. It further explores how the research was executed starting with sourcing of data and manipulation thereof, culminating in using that data to undertake the two valuation methods emanating from chapter 2; primarily the DCF method (especially estimation of inputs) and alternative method used was Relative Valuation.

3.1.1 Research Design

The study uses a hypothetical deductive approach which involves judging tenability of a hypothesis by testing it. This is more appropriate for this study as it uses quantitative data to reach a conclusive answer (undervalued, correctly valued, and overvalued). The alternative is the inductive approach which has no clearly defined hypothesis and a vague problem statement. Additionally, the quantitative research design was used, particularly descriptive statistics. Anglo was quantitatively described in terms of its intrinsic value derived from a collection of information without any inferential or being representative to the population. The Discounted Cash Flow method was used as a basis to build a financial model in excel that links the estimated inputs and calculating the intrinsic value.

The DCF model is as represented by the below formula which basically states that the intrinsic value of an asset is equal to the present value of the asset's future cash flows including the terminal value; $\text{Intrinsic Value} = \sum_{t=0}^{n} \frac{CF_t}{(1+r)^t} + \frac{TV}{(1+r)^n}$

The theoretical framework particularly on how to estimate the model's input was based on Aswath Damodaran's (Damodaran, 2014) views on valuation. Although the annual report figures are in USD, Bloomberg converts them to South African Rand ("ZAR"), the chosen currency for the valuation was ZAR, and discount rate consistent with that currency of choice. The forecast period was 5 years. The model input estimates are as reported in section 3.2.

3.1.2 Population

This is a case study, the population is thus only one listed company, Anglo.

3.1.3 Sample

Anglo will be valued as at 31 September 2014 using data from the last 12 months' period; 1 October 2013 to 31 September 2014.

3.1.4 Procedure

Woodridge (2012) defines econometric modelling as a quantitative analysis of actual phenomena based on developed theories and observations that are appropriately related. He thus implies that the use of empirical data as input into a model which is based on existing theory with the aim of forecasting a variable output encompasses econometric modelling.

To undertake econometric modelling herein, financial Statements (annual, interim and quarterly) as provided on Anglo Balance Sheet and Income Statement figures as

provided by financial data vendor Bloomberg and already converted from USD to ZAR currency were used for estimating the model inputs. The data of primary interest were earnings (both operating earnings and Net Income), Capital Expenditure, Depreciation, Working Capital, Cash, Debt and Equity. Bloomberg was also used to source historic market data such as prices, index values for beta regressions. Microsoft Excel was used to store all the collected data in order easily manipulate the data where necessary while maintaining a record of how the data was changed and linking the data by using excel mathematical operators and formulae to connect the data in order to calculate Anglo's intrinsic value.

The data was collected from Bloomberg and downloaded from the Bloomberg terminal into Microsoft Excel where a financial model was built that makes use of the inputs as estimated from the source data. Other data sources such as the International Monetary Fund ("IMF"), and the World Bank's databases were also used to collect macroeconomic data and commodity prices.

3.1.5 Data collection

(a) ***Data collection from Bloomberg***

1) Segment Revenue of Anglo: FY 2013-2014.
2) Income Statement of Anglo: adjusted, annual data and reported in ZAR mill, FY2005-2013.
3) Income Statement of Anglo: adjusted, semi-annual data and reported in ZAR mill, FY2005-2013.
4) Balance Sheet: adjusted, annual data and reported in ZAR mill, FY2005-2013.
5) Cash Flow Statement: standardized, annual data and reported in ZAR mill, FY2005-2013.

6) Credit Ratings of Anglo by both Moody's and Fitch (inclusive of associated rates)

7) Comparable companies' regression betas and debt ratios of all JSE listed companies on valuation date but limited to the below Subsectors of the International Classification Benchmark (ICB), which Anglo's four primary commodities fall into.

- Coal,
- General Mining,
- Platinum and Precious Metals
- Iron and Steel

8) Market data: as at valuation date (30 September 2014)

- JSE All Share Index level (ALSI)
- Dividend Yield of the index
- Bond Yields: 10 year USD denominated South African Government Bond, 10 year United States of America government treasury bond.

9) Analysts' consensus expectations of growth in South Africa's Real GDP and inflation as measured by the Consumer Price Index (CPI).

10) Data collected from the IMF and the World Bank

(Quarterly time series, 15 years for the period 1999 – 2014)

- Global Real GDP
- Global Inflation
- Commodities' prices (Copper, Iron Ore, Thermal coal, Platinum Diamonds

3.1.6 Data manipulation

(a) Some time series data was retrieved in horizontal (from left to right) sequence from its data sources. The series were thus converted to vertical (from top to bottom) sequence by using the excel function "TRANSPOSE".

(b) Where sourced data downloaded into excel was hard coded decimal values but with the unit of measurement explicitly stated as percentages, they were converted into percentage format by dividing the figures by 100.

3.1.7 Data analysis

The model's inputs derived from the source data underwent modification where necessary to ensure that estimated inputs encompass the principle of being futuristic or forward looking; i.e. less reliance on historic analysis such as regression and opting for implied equity risk premium and computed market cost of debt.

Global data, particularly GDP and commodity prices' data time series were analysed to derive respective growth rates by using the formula:

$growth\ rate = \left(\frac{X_i}{X_{i-1}} - 1\right) * 100$; where: $X_i = recent\ period\ figure\ \ and$

$$X_{i-1} = prior\ period's\ figure$$

In the absence of Nominal GDP figures, they were derived such that

Nominal GDP growth rate = Real GDP growth rate + Inflation rate.

3.2 DCF model inputs

3.2.1 Risk Free Rate (rfr)

This is the rate of return expected from an investment that is default free and without any re-investment risk. The 10 year South African government bond rate (R186, ticker: SABG 10 ½ 12/21/26) was used which was 8.32% at valuation date; rfr = **8.32%**.

3.2.2 Equity Risk Premium (RP)

This reflects fundamental judgements one makes about the level of risk in the market and what price to attribute to that risk. As an essential input into cost of equity, the equity risk premium affects the expected return on a risky investment and invariably intrinsic value of the investment. Investors are risk averse thus would pay a lower amount for a risky asset than a risk-free asset and that differential is the equity risk premium. Most risk return models agree on this fundamental, however, the difference comes in on how to measure that risk premium. This study derived the equity risk premium implied by the index level by using similar valuation method as that used to value fixed income instruments such as bonds, hence:

$$\text{Equity Index Level} = \sum_{t=0}^{n} \frac{CF_t}{(1+r)^t} + \left(\frac{CF_n * g_s}{(r-g_s)*(1+r)^n}\right)$$

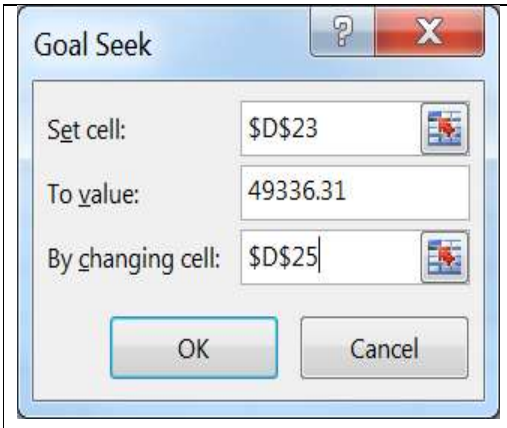
Given the Index Level of 49,331.31 as at 30/09/2014 and Dividend Yield on the index of 3.07%, makes the initial Cash Flow of 1,514.62 (aggregate index dividends) which was then used as a basis for future cash flows when the growth rate from consensus analyst expectations was applied.

Table 3.1: Expected Return on stocks

Date		**30/09/2014**						
Year	t	**0**	**1**	**2**	**3**	**4**	**5**	**TV**
Growth in Cash Flows	g		6.76%	6.76%	6.76%	6.76%	6.76%	
Growth (in Stable State)	g_s							8.32%
Cash Flow (based on Dividend Yield of 3.07%)	CF_t	1 514.62	1 617.08	1 726.46	1 843.24	1 967.92	2 101.03	73 284.18
Discount factor	$(1+r)^t$		1.11	1.24	1.38	1.54	1.72	1.72
Discounted or Present Value of Cash Flows	PV(CF)		1 451.24	1 390.50	1 332.30	1 276.55	1 223.12	42 662.61
NPV (CF)		**49 336.31**						
Expected Return on Stocks (r)		11.43%	*Goal Seek!*					

The Expected Return on Stocks is computed by using Excel's "*Goal Seek*" function found within *What-If-Analysis* tools of the group. Data Analysis was undertaken such that the NPV was set to equal to Index level of 49,336.31, by changing the cell containing Expected Return on Stocks (r) value.

Table 3.2: Goal Seek excel function



Set Cell: Reference of the cell that contains NPV.

To Value: Index Value of 49,336.31.

By Changing cell: Reference of cell that contains Expected Return on Stocks (r).

The preceding exercise yielded the result of r =11.43%.

The Equity Risk Premium is defined as the difference between the expected return on stocks (equities market) represented by the index and risk free rate. It is thus calculated as follows:

$$RP = r - rfr = 11.43\% - 8.32\% = \mathbf{3.11\%}$$

3.2.3 Beta (β)

This study makes use of Bottom-up Beta, hence is not based on a single regression of stock returns versus return on index. A regression beta is a result of regressing time series of returns on a company's share price returns relative to returns on the index. Taking all the JSE listed companies at the valuation date, they were further filtered to only those in subsectors in which Anglo primarily operated in (businesses or commodities which made up of at least 10% of Anglo's Revenue) thus resulting in 12 comparable companies.

Table 3.3: Comparable JSE listed companies

	Ticker	Short Name	Beta YTD	Debt/Equity LF	ICB Subsector	Businesses
	AGL SJ Equity	ANGLO AMER PLC	2.46	74.39%		Copper, Coal, Iron Ore, Platinum and Diamonds
1	EXX SJ Equity	EXXARO RESOURCES	1.01	12.83%	Coal	Coal
2	BIL SJ Equity	BHP BILLITON PLC	1.12	40.51%	General Mining	Coal, Iron, Copper
3	ACL SJ Equity	ARCELORMITTAL SO	1.04	6.68%	Iron & Steel	Steel (Iron)
4	ASR SJ Equity	ASSORE LTD	1.47	5.07%	General Mining	Iron
5	ARI SJ Equity	AFRICAN RAINBOW	1.16	12.42%	General Mining	Platinum, Iron, Coal, Copper
6	AMS SJ Equity	ANGLO AMERICAN P	1.20	29.12%	Platinum & Precious Metals	Platinum, Copper
7	NHM SJ Equity	NORTHAM PLATINUM	1.08	12.44%	Platinum & Precious Metals	Platinum
8	LON SJ Equity	LONMIN PLC	1.13	17.35%	Platinum & Precious Metals	Platinum
9	IMP SJ Equity	IMPALA PLATINUM	1.19	14.18%	Platinum & Precious Metals	Platinum
10	RBP SJ Equity	ROYAL BAFOKENG P	0.78	0.00%	Platinum & Precious Metals	Platinum
11	KIO SJ Equity	KUMBA IRON ORE L	1.20	13.52%	Iron & Steel	Iron
12	AQP SJ Equity	AQUARIUS PLATINU	0.62	25.39%	Platinum & Precious Metals	Platinum
	Ave. Beta		**1.08**	**15.79%**		

(Source: Bloomberg)

It would have been ideal to use the above to derive a bottom up Levered Beta for Anglo, based on weighted averages per business segment. However, that would yield too low a beta because all the companies have betas which are substantially below that of Anglo's regression beta Year-To-Date (YTD) of 2.46 relative to the average of 1.08.

Given the large difference in betas, the 12 companies are thus not sufficiently good comparables to Anglo hence the resolve to use Anglo's single regression beta,

β = **2.46**.

3.2.4 Discount rate (r)

The discount rate is the rate used to discount the cash flows to present value. The discount rate used is dependent on the cash flow used. It is imperative that there is a consistency between cash flows and discount rate. If cash flow to equity is used, then the discount rate must be the cost of equity. If cash flow to firm is used, then the Weighted Average Cost of Equity which requires computation of the Cost of Debt must be used.

- Cost of Equity (K_e): $Ke = rfr + \beta (RP)$

  $= 8.32\% + 2.46\% (3.11\%) =$ **15.96%**

- Cost of Debt (K_d): $K_d = rfr + \text{Default Spread}_{Anglo} + \text{Default Spread}_{RSA}$

  $= 8.32\% + 1.75\% + 1.92\% =$ **11.99%**

The Default Spreads are as taken from the ratings given by the rating agencies, hence used the average of 2% (Baa2 by Moody's) and 1.5% (BBB by Fitch) to arrive at Default Spread $_{Anglo}$ = 1.75%. The Default Spread for South Africa (RSA) was taken as the difference between the 10 year USD denominated South African government bond rate (4.665%) and 10 year USA government Treasury bond rate (2.750%) thus making the Default Spread $_{RSA}$ = 1.92%.

3.2.5 Market Value of Equity; MV (E)

This is the value of the company's equity in the market and is calculated as below:

MV (E) = Price per share x Number of shares outstanding

= (25,242 cents /100) x 1,281mill = **R323,350 mill**

3.2.6 Market Value of Debt; MV (D)

Debt is defined as all liabilities of the company that are interest bearing. The market value of debt is the value of the company's debt in the market. MV(D) is computed by discounting the interest expense by a discount rate which is the rate at which the company can go out and borrow from the market at that point in time; namely the cost of debt.

$\mathrm{MV(D)} = \sum_{t=0}^{n} \frac{CF_t}{(1+r)^t}$ where: CF=interest expense,

t = average maturity of the debt

r = market cost of debt (K_d)

To arrive at the most recent interest expense of Anglo, the growth in interest expense of the last five years (2009-2013), as derived from the interest expense in the Cash Flow Statement and used to compute a geometric average growth rate of 8.38%. Using the "*Cash Paid for Interest Expense*" figures from the Cash Flow Statement and computing the year-on-year growth rates, the average growth rate in interest was calculated using the arithmetic mean method. The average growth rate was then applied onto the most recent year's interest expense figure (2013: R8,752.86 mill) to arrive at the forecasted interest expense for 2014 (R9,486.12 mill).

Table 3.4: Growth in interest expense

	2008	2009	2010	2011	2012	2013	2014
Interest expense	6 122.32	6 233.10	6 122.84	5 861.60	6 363.02	8 752.86	
g (interest expense)		1.81%	-1.77%	-4.27%	8.55%	37.56%	**8.38%**

If interest expense grows at the same rate (8.38%) for the next five years and the terminal value of that debt is the current book value of total liabilities (R355,606.80 mill), the market value of debt is calculated using the discounted cash flow formula highlighted earlier and worked out as below follows.

Table 3.5: Market Value of Debt

Year	**1**	**2**	**3**	**4**	**5**
Growth in interest expense	8.38%	8.38%	8.38%	8.38%	8.38%
Interest expense	9 486.12	10 280.80	11 142.05	12 075.46	13 087.06
BV(D)					355 606.80
Total CFs	**9 486.12**	**10 280.80**	**11 142.05**	**12 075.46**	**368 693.86**
Discount rate (Kd)	11.99%	11.99%	11.99%	11.99%	11.99%
PV(CFs)	**8 470.73**	**8 197.69**	**7 933.46**	**7 677.74**	**209 328.25**
MV(D)	**241 607.87**				

The Market Value of Debt is thus **R241,608 mill**.

3.2.7 Weighted Average Cost of Capital (WACC)

WACC is the cost of financing attributable to the whole company's interest groups, both debt holders and equity shareholders. It is computed as a weighted average of the cost of financing for equity shareholders and the after-tax cost of financing for debt holders.

$$\text{WACC} = (W_e * K_e) + \left(W_d * K_d * (1 - t)\right)$$

where: t = marginal tax rate, 28%

$$W_e = \left(\frac{MV(E)}{MV(E) + \text{MV}(D)}\right)$$

$$W_d = \left(\frac{MV(D)}{MV(E) + \text{MV}(D)}\right)$$

= (57.23% x 15.96%) + [42.77% x 11.99% x (1-0.28)]

= **12.83%**

3.2.8 Expected Cash Flow:

Not all firms pay out all cash flow that they can as dividends. Some firms hold back on distributions thus a better measure of cash flow is potential dividends; the amount the firm can reasonably afford to pay out as dividends. The starting (t=0) Cash Flow shall be trailing 12 months' earnings. Earnings are defined as either, Earnings Before Interest and Taxes ("EBIT") which is sometimes also referred to as Operating Income, if using cash flow to firm. If one uses cash flow to equity, then earnings refers to Net Income available to common shareholders which is essentially the income left after deducting debt holders' claims, taxes and earnings attributable to preferred shareholders if there are any.

Table 3.6: Trailing 12 months' earnings

Date	12/31/2013	06/30/2014	**Trailing 12 months**
Period	S2 2013	S1 2014	
EBIT	31 436	28 923	**60 359**
Net Income	16 061	13 691	**29 752**

The preceding figure reflects how the trailing 12 months' earnings figures were computed by adding semi-annual earnings of the last two semi-annual reporting seasons. Unfortunately, Anglo does not publish quarterly statements which would have been better in computing trailing 12 months to September 2014. In the absence of quarterly data, the above calculation assumes a lagging quarter such that the third

quarter data of 2014 (Q3'14: September) are implicitly represented within the 12 months to 30 June 2014. By definition, the cash flows are calculated as follows:

- Free Cash Flow to Firm (FCFF):

  = EBIT (1- t) + (Capex-Depreciation) + Δ non-cash Working Capital

- Free Cash Flow to Equity (FCFE)

  = Net Income + (Capex – Depreciation)

  + Δ non-cash Working Capital

  + (Principal paid on debt – New debt issues)

  + Preferred Dividends

Using the preceding formulae, and marginal tax rate of 28%, the cash flows calculations are as computed in the following table.

Table 3.7: Free Cash Flow

	Free Cash Flow to Firm (CFF)			Free Cashflow to Equity (FCFE)	
Earnings:	**EBIT (1-t)**	**43 458**		**Net Income**	**29 752**
Plus: **Net Capex**		**34 220**			**34 220**
Capex		59 108			59 108
Deprciation		(24 888)			(24 888)
Plus: Change in non-cash Working Capital		(10 818)			(10 818)
Plus: Net Debt issued					9 380
Less: Preffered Dividends					-
	FCFF	**66 860**		**FCFE**	**15 730**

(Source: Anglo's annual financial statements)

3.2.9 Growth in Cash Flow (g)

A company's growth is a function how much it reinvests as reflected by their Net Capital Expenditure (Net Capex) inclusive of change in Working Capital (ΔWC) and how well or efficiently it utilises the invested capital as reflected by profitability

measures of Return on Capital (ROC) and Return on Equity (ROE). Given the above, one should not endow a company with growth as it is a function of fundamentals and calculated as follows:

g(FCFE) = g(NI) = Retention Ratio x ROE = [1-Dividends/NI] x [NI /BV(E)]

g(FCFF) = g (EBIT) = Re-investment Rate x ROC

= [Net Capex + ΔWC/EBIT(1-t)] + [EBIT(1-t)/BV(Capital)]

Where: BV(Capital) = BV(Equity) + BV(Debt) – Cash

Using the Balance Sheet and Income Statement data of the Financial Year ended December 2013, the fundamental growth values were calculated as per table 3.8.

Table 3.8: Expected growth in earnings

g(EBIT)	**4.03%**	[g(EBIT) = ReinvR x ROC]
Re-investment Rate	53.85%	[ReinvR = (Net Capex +ΔWC)/EBIT(1-t
Return on Capital	7.48%	[ROC = EBIT(1-t)/BV(Cpt)]
Net Capex	34 220.12	
ΔWC	(10 818.04)	
EBIT(1-t)	43 458.26	
BV(Capt)	580 863.37	[BV(Capt) = BV(E) + BV(D)]
BV(D)	187 771.67	

g (NI)	**4.42%**	[g(NI) = RR x ROE]
Retention Rate (RR)	62.39%	[RR = 1-(Divs/NI]
ROE	7.09%	[ROE = NI/BV(E)]
Dividends	10 486.93	
Net Income	27 879.84	
BV(E)	393 091.70	

3.2.10 Growth in stable state (g_s)

Anglo is a mature company, it is thus assumed that it will grow at a stable rate into perpetuity. The limitation being that the stable growth rate should not be greater than the expected growth in the economy (GDP growth) or the risk-free rate (rfr). Given that the risk-free rate was calculated at 8.32%, it shall serve as a proxy for growth in the stable state. $g_s \leq$ g(economy) $\approx$ rfr = **8.32%**

3.2.11 Terminal Value (TV)

Since the cash flows are assumed to grow indefinitely into perpetuity, the Terminal Value is assumed to capture that indefinite growth in Cash Flows beyond the normal growth period. It is calculated using the below formula and respective Cash Flow for the firm (FCFF) or for equity shareholders (FCFE). The discount rate (r) is also dependent on the cash flow used such that WACC is applied to FCFF and Ke is applied for FCFE.

$$TV = \frac{CF_n * (1+g)}{(r - g_s)}$$

Table 3.9: Terminal Values

Description	TV (Firm)	TV(Equity)
Cash Flows: FCFF & FCFE	66 860	15 730
Normal growth rate: g(EBIT) & g(NI)	4.03%	4.42%
Growth rate in stable state	8.32%	8.32%
Discount rate (Ke & WACC)	12.82%	15.95%
Terminal Value (TV)	**1 546 420.01**	**215 340.17**

3.3 Relative Valuation

Table 3.10: P/E and P/BV of comparable companies

	P/E	P/BV
AGL SJ Equity	297.10	1.00
Comparable companies		
EXX SJ Equity	8.31	1.40
BIL SJ Equity	10.13	1.86
ACL SJ Equity	na	0.73
ASR SJ Equity	na	na
ARI SJ Equity	7.54	1.17
AMS SJ Equity	358.91	1.93
NHM SJ Equity	2792.1438	1.29
LON SJ Equity	na	0.63
IMP SJ Equity	101.16	1.01
RBP SJ Equity	30.10	1.02
KIO SJ Equity	6.03	4.06
AQP SJ Equity	na	na
Group Average	**74.60**	**1.23**

(Source: Bloomberg)

In calculating the average P/E ratio for the group, the ratio for counter NHM was excluded as it too large relative to peers, hence, would have had an extreme upward bias on the group's value. By the same token, the P/BV ratio for KIO was also removed to eliminate the extreme upward bias. The above group average figures were used to compute the value per share.

CHAPTER 4

4. RESULTS AND DISCUSSION

4.1 Results: DCF method

4.1.1 Results: DCF model Inputs

Table 4.1 is a summary of the model inputs as estimated from the preceding section:

Table 4.1: Summary of model inputs

Section	Description of Input	Symbol	Result
(a)	Risk Free Rate	rfr	8.32%
(b)	Equity Risk Premium	RP	3.11%
(c)	Beta	β	2.46%
(d)	Discount rate (r) Cost of Equity Cost of Debt	 K_e K_d	 15.96% 11.99%
(e)	Market Values of Equity	MV (E)	R323,350 mill
(f)	Market Values of Debt	MV (D)	R241,608 mill
(g)	Weighted Average Cost of Capital Weights: Equity vs Debt		12.83% 57.23% vs 42.77%
(h)	Free Cash Flow to: Firm Equity	 FCFF FCFE	 R66,860 mill R15,730 mill
(i)	Growth in:		

	Free Cash Flow to Firm Free Cash Flow to Equity	g(FCFF) g(FCFE)	4.03% 4.42%
(j)	Growth in stable state	g_s	8.32%
(k)	Terminal Values using: Free Cash Flow to Firm Free Cash Flow to Equity	 TV(FCFF) TV(FCFE)	 R1,546,420 mill R 215,340 mill

Using the inputs from the above table, one has the option to use either the direct or indirect method of valuation to derive equity value. The direct method values equity only, while the indirect method first values the firm then debt obligations are deducted to arrive at value of equity. In the absence of preference of either method, the caveat is that whichever method is chosen, internal consistency between cash flows, growth in cash flows and discount rates as per the table below, must be clearly maintained; the direct method was chosen.

Table 4.2: Difference in valuation methods

	Firm Value	**Equity Value**
Cash Flow	FCFF	FCFE
Discount Rate (r)	WACC	Ke
Growth (g)	g (Operating Income)	g (Net Income)

4.1.2 Results: DCF valuation

The valuation results of the Discounted Cash Flow (DCF) model using Free Cash Flow to Equity were as follows:

Table 4.3: DCF Valuation – FCFE

DCF Valuation: Equity						
Year	**0**	**1**	**2**	**3**	**4**	**5**
Growth in Cash Flows (g)		4.42%	4.42%	4.42%	4.42%	4.42%
FCFE	**15 730**	16 426	17 153	17 912	18 704	19 532
TV(FCFE)						**215 340**
Total FCFE		16 426	17 153	17 912	18 704	234 872
Discount rate		15.95%	15.95%	15.95%	15.95%	15.95%
Discounted Cash Flows: PV(Total FCFE)		**14 166**	**12 758**	**11 490**	**10 348**	**112 068**
Value (Equity) = NPV (FCFE)	**160 830**					
Value per share	126	Rands				
Value per share	**12 555**	Cents				
Difference	12 687					
Premium/(Discount)	101.1%					
Conclusion	*Overvalued!*					

Given FCFE of R15,730 mill, growth in cash flows of 4.42% per annum, growth in stable state of 8.32% the value of equity in Anglo at 30 September 2014 was R160,830 mill. This equates to an intrinsic value per share of 12,555 cents (R126).

4.1.3 Results: Relative Valuation

Table 4.4: Relative Valuation results

Ratio	**P/E**	**P/BV**
1) group average	74.60	1.23
Multiplier variable	**EPS**	**BVPS**
2) Anglo's financials	0.85	251.84
3) Value per share = (1) x (2)	63.38	308.78
Average: Value per share	**186.08**	

For each ratio, the critical value or multiplier variable is the denominator of the ratio i.e. P/E it is E and for P/BV it is BV. To derive the estimated value per share through relative valuation, the group average for each ratio was multiplied by the multiplier variable of the target company giving a value per share of R63.38 when the P/E ratio was used and R308.78 when P/BV was used. Subsequently, the value per share derived from relative valuation was calculated as the average value per share derived from each ratio resulting in value per share of R186.08.

4.2 DISCUSSION

4.2.1 Discount rate

The 10 year South African government bond rate was used as proxy for the risk-free rate (8.32%) while the expected return on stocks/equities was 11.43%. The results which show expected return on equities being more than the return expected from bonds are consistent with the theory that shares are riskier than bonds hence investors demand compensation for taking on additional risk. This gives rise to the Equity Risk Premium of 3.11%. This essentially means that an equity investor will demand a premium of 3.11% to be incentivized to invest in relatively risky assets such as Anglo shares instead of investing in lower risk assets such as a government bonds. Although a sufficient proxy for risk-free returns, future events have demonstrated that a government bond is not necessarily risk free. Testimony to the preceding are the recent spates of the South African government credit rating downgrades. A case in point is the June 2017 downgrade by Moody's of South Africa's rating to Baa3 with a negative outlook. Moody's cited reasons for the downgrade as "*the weakening of South Africa's institutional framework; reduced growth prospects reflecting policy uncertainty and slower progress with structural reforms; and the continued erosion of fiscal strength due to rising public debt and contingent liabilities*" (Moody's, 2017). The government is the lender of last resort and its ability to meet debt obligations is highly correlated with the country's economic performance. However, the rating downgrades and rationale thereof infused by a "negative outlook" essentially implies that the rating agency does not view the South African government to be without risk. Reuters (2017), alluded that earlier in April 2017 the Standard & Poor's ("S&P") rating agency also downgraded South Africa's rating to junk status (from BBB- to BB+) with the trigger

cause being the political uncertainty (invariably economic uncertainty) due to president Jacob Zuma's firing of the country's Finance Minister, promulgating the view of risk in terms of policy continuity that subsequently filter into default risk.

The key take from the above is that default risk thus exists and the rate on a government bond should not be taken as definitive that it is indeed default risk free. With hindsight, the risk-free rate should have been higher than a government bond rate. Keeping all else constant, if a higher value is deducted from the return expected from stocks/equities, the risk premium would be lower than the current result of 3.11%. This would have had a downward effect on the cost of equity.

Beta measures how risky an asset is (in this case, Anglo shares are), relative to the market. The resulting beta was 2.46. If the market is regressed against itself, the resulting beta would be 1. The fact that Anglo's beta of 2.46 is more than 1 implies that Anglo is riskier than the aggregate market as represented by the JSE index. There are also no perfect comparables to Anglo as none of the 12 companies identified as comparables really meet all the characteristics of Anglo particularly the business they undertake. Most of them operate in a single natural reserve while Anglo's operations at the time spanned six different natural reserves (copper, coal, iron ore, platinum and diamonds). It is no wonder that they all have levered betas substantially below that of Anglo. In a perfect method, the average beta of all the comparables would have been unlevered (excluding the effect of the individual companies' financing decisions as encompassed by their debt to equity ratio) and used in arriving at Anglo's effective levered beta. However, given that all the comparables' betas were substantially below that of Anglo, it seemed imprudent to make use of the average beta from comparables. The average beta would have had a downward bias on the results which would lead to

a lower result closer to the riskiness of the market. The resolve to use a single regression beta of 2.46 is thus merited; invariably Anglo being riskier than the aggregate market.

In arriving at all three results in the preceding discussion (rfr, RP and β), some level of subjectivity permeated into the methodology. It brings to the fore literature earlier discussed in the Literature Review of this study, pegged on the premise of subjectivity that postulate that valuation straddles between a science and an art. Science provides the guideline or maps out the journey to arrive at one's destination as outlined by the pre-set objectives. However, art or subjective judgment enables one to effectively manoeuvre the terrain in that journey. Particularly the journey towards this study's objectives primarily of establishing Anglo's intrinsic value amongst others is by far unscathed by subjectivity and judgment calls.

The results of rfr, RP and β formed inputs into the calculation of cost of equity; the rate which the company would have had to pay if it had to go and raise funds in the equity market. The cost of equity (15.96%) was higher than the cost of debt (11.99%). It would have costed Anglo 3.97% more to raise funds from investors in the equity market than the same unit funds from debt funders.

4.2.2 Market Values

The derived market value of equity (R323.35 mill) and market value of debt (R241.61 mill) shows that the company relied more on equity (57.23%) funding than debt (42.77%) funding. However, the difference is marginal and the tax effect on debt helped to depress the Weighted Average Cost of Capital (WACC) to 12.83%; much lower than the cost of equity of 15.96%. Given the relationship that the value of equity

is equal to the value of the firm less debt and that a lower discount rate of WACC increases the value of the firm, it follows that the value of the firm is higher due to the debt component relative to the value of the firm if it only had equity funding. Debt helps but all good things have a limit hence the positive contribution of debt too has a limit. The establishment of that limit is a potential topic for further investigation. The key deduction from this is that the company's mix of debt and equity is a salient matter for consideration. That capital structure has an impact on value, thus, a key value driver in relation to valuation.

4.2.3 Cash flow and growth

The Free Cash Flow to the Firm (FFCF) stood at R66.86mill while the Free Cash Flow to Equity (FCFE) was R15.73mill. FCFF is much larger than the FCFE and looking at FCFF alone, may lead an investor to the conclusion that the company has a healthy potential cash flow position. However, perspective is an important element. As an equity investor, the general financial status of the company is not an insignificant consideration, however, greater focus should be placed on what an equity investor has potential claim to. That figure is much smaller and may lead to a different conclusion altogether. DCF is based on the theory that the value of an asset is a function of the cash flows it can possibly generate in the future, discounted to a present date (Damodaran, 2014). The growth in that cash flow supports the level of that cash flow in future. That growth is not bestowed upon a company but directly emanates from how the company runs its operations. Damodaran thus suggests that growth in cash flow is a result of the rate at which the company reinvests in future growth coupled with the return on capital the company is able to yield on invested capital.

Anglo's growth in cash flow due to all stakeholders FCFF was estimated at 4.03% marginally lower than the growth attributable to equity investors FCFE which was 4.42%. South Africa's growth in Gross Domestic Product (GDP) has been on a downward trend from a record high of less than 3.5% post the 2007/2008 financial crisis. The expected growth in Anglo's cash flow was thus higher than the growth expected from South Africa's general economy as represented by the GDP figures. This divergence in growth is congruent with the fact that the company's revenue streams are diversified in terms of geography, with operations in almost every continent and products spanning from minerals to precious metals (Anglo American Plc, 2013). Although domiciled in South Africa, the geographical diversification provides rationale for the company's expected growth rate to be higher than that of South Africa.

CFA (2017), advocates that with regards to the DCF method, the growth in the stable state should be less or equal to the growth in the economy which can be approximated with the risk-free rate. Considering the downward trend in the growth of the economy, the risk-free rate was then deemed to be a better proxy for growth in the stable state for Anglo of 8.32%. The theoretical framework provides that in calculating the terminal value in the equity valuation, the discount rate to be used is a function of the cost of equity less the growth in the stable state. It thus follows that the higher the growth rate in the stable state, the lower the terminal values' discount rate. If that lower discount rate is applied to discount the cashflow in the year after the final year of the forecasting period to the present date, it will result in a higher terminal value.

Given an FCFE in the base year of R15,730 mill, projected forward for a period of five years with a growth rate in that cash flow of 4.42% year-on-year and a growth rate of 8.32% in the stable state or years post the forecasting period, gives a total cash flow between R16,426mill in the first year to R234,872mill (inclusive of terminal value of R215,340) in the final year of the forecasting period. In keeping with internal consistency of the DCF valuation method, if FCFF is used then WACC should be used to discount those cashflows and if FCFE is used then the cost of equity should be used (Damodaran, 2014). The yearly cashflows were discounted using the derived cost of equity of 15.96%, yielding a Net Present Value ("NPV") of R160,830mill. This result is juxtaposed with the alternative scenario of using FCFF yielding a terminal value of R1,546,420mill. In the absence of keeping with internal consistency, if the FCFF value was erroneously used, it would have substantially overstated the terminal value and caused upward distortion to subsequent intrinsic value.

4.2.4 Intrinsic Value estimated from DCF

With the NPV of R160,830mill, it was divided by the number of shares outstanding resulting in an estimated value of R126/share. This result was then compared to the price at which Anglo was trading at, in the market at the valuation date of R252/share. Given the derived intrinsic value of R126/share and the market price of R252/share, the market participants essentially attached a premium of 101.1% to the shares. The market price was above the estimated intrinsic value, leading to the conclusion that Anglo shares were overpriced hence the counter warranted a sell recommendation. Two of the main objectives were thus met; establishing an estimate of intrinsic value of R126/share and a sell recommendation because the share was overvalued. In the statement of the problem as contained in this study (section 1.2) there is a line graph (IMF & World Bank, 2017) that depicts the growth in GDP and commodity prices for

the period 1999 to 2014; 15year trend. That graph shows that at valuation date, growth in nominal GDP was relatively stable but commodity prices of interest that constituted a significant component of Anglo's revenue were relatively peaked except for the precious metals that had troughed.

DCF is based on future expectations, particularly of the extent and level of future cash flow. The substantial premium which investors attached to Anglo's shares could have been because at the time, commodity prices were booming in the short term prior valuation period and the large premium indicates that investors expected that upward trend in underlying commodity prices to continue hence support the share price. With hindsight, that expectation did not materialize as commodity prices started to lose their lure on the back of dissipating global demand particularly that of China. Beyond the scope of this discussion, macroeconomic data have shown that things were slowing down. It is a human flaw in that it is easier to believe in fairy tales than facts on hand and this instance is an explicit display of what Alan Greenspan, describes as "irrational exuberance", as articulated in section 2.1.5 earlier in this study.

4.2.5 Intrinsic Value estimated from Relative Valuation

P/E ratio gave a value per share of R63.38 while P/BV ratio gave a value per share of R308.78. The P/E derived value is lower than that of the P/BV derived value. The P/E valuation's downward bias is testimony to the low earnings period as at valuation date on the back of depressed commodity prices as evidenced in Figure 1.2 where most of Anglo's resources had relatively low values at valuation date compared to historic trends. It thus follows that at the point in time, some of the companies in the comparable peer group reported negative earnings thus the "n.a." or unable P/E data for those companies upon retrieving the Multiples from Bloomberg. These negative

earning companies that were subsequently excluded from the group's average P/E had a downward bias on the multiple and invariably had a downward pull on the resulting estimate of value. The book value of Anglo used as a multiplier in P/BV group average is not influenced by market forces but is a function of the original price paid for assets and accounting adjustments which thus heavily influence the BV. For a physical asset intensive sector such as resources, the high BV multiplier that gave rise to a higher value per share compared to that derived from P/E is as per expectation. The average value per share derived from relative valuation is R186 which is higher than the one derived from DCF of R126, although still lower than the market price of R252.

4.2.6 Difference in estimated values

Literature Review particularly that of the DCF model indicates that the value of a share is a function of cash flow, growth in cash flow and cost of equity. Damodaran (2014) supports the above and stressed that drivers of value are primarily capacity to generate *cashflows* from existing assets, expected *growth* in those cash flows and associated uncertainty or quality of those cashflows as embedded in the *discount rate* which in this case is the cost of equity. The difference between the above figures DCF (R126), Relative Valuation (R186) and Market Price (R252) can be explained by the afore mentioned variables. In their survey of investment industry practitioners, Pinto et al (2015), hinge the popularity of Relative Valuation to its simplicity of use and fewer assumptions.

Damodaran (2012), argues that Relative Valuation includes just as many assumptions as DCF; while assumptions in DCF are explicit those same assumptions are implicit and unstated in Relative Valuation. He supports this argument with the fact that in its

most basic stable form the DCF model where equity value is represented by P_0, can be written as follows:

$$P_0 = \frac{\mathrm{CF}_1}{(\mathrm{r} - \mathrm{g})}$$

If both the left and right side of the above equation are divided by the same denominator such as EPS or BV, the left side of the equation gives the Multiple while the right side reflects how the Multiple can be calculated and invariably gives an indication of the Multiple's value drivers which are similar to that of the DCF model, being cashflows, growth and discount rate. From the equation, one can deduce that value (P_0) is positively correlated to cash flow (CF_1), positively correlated to growth (g) and negatively correlated to the discount rate or risk (r). It thus follows that the Market Price of R255 which is greater than Relative Valuation estimated value of R186 and which is greater than that estimated with DCF of R126 because all else held constant, the relatively larger value implicitly assumed either one or more of the following assumptions; greater cashflow, greater growth and less risk.

4.2.7 Limitations

This study attempted to estimate the value of Anglo at valuation date. However, that estimate could have been better informed by not only looking at the quantitative factors but at the qualitative factors as well. CFA (2017), recommends that equity valuation should not be undertaken in silo. Considerations should be given to all factors that may influence future performance of the company. CFA puts forth Porter's Five Forces model as a tool that can be used to analyse the qualitative aspects of a company. The application to the industry in which the company operates entails looking at the five areas (intra-industry rivalry, threats of new entrants, the power of buyers, the power of

suppliers and availability of substitutes) that interact and contribute to the company's attractiveness or lack thereof in terms of prospects for sustained profitability in the future. Other qualitative aspects include analysing the company's relative competitive position within the industry commonly referred to as market share and the strategy it employs to ensure that it remains competitive such as cost leadership or ensuring that its pricing is lowest without compromising profitability, differentiation by providing unique product or services and lastly focus on niche market.

Historic performance in terms of how the company promised it would do (strategy) relative to how it executed on that strategy also gives one a view on the company management's ability to deliver on promises going forward. The above not only makes one understand the company's business in relation to the industry and competitors, it would have also helped identify the company's economic drivers of business and the threats and opportunities that the company faces that impact prospects. In the author's view, the methodology employed in this study which focused only on quantitative aspects as per the DCF method lacked that broader insight which a qualitative analysis would have provided. Damodaran (2010), admonishes valuations that are purely based on numbers as not only are they easily manipulated in spreadsheets, that analysis may yield results that look good but unrealistic in the face of circumstance of the company. He proposes that there are two sides of valuation: numerical figures and the narrative. The narrative is the story that comes with those numbers, the nuances that cannot quite be captured in numbers or quantified. That narrative serves as a second level of check of whether one's quantitative output makes sense considering the prevailing circumstances of the company's operations. As this qualitative aspect of analysis has not been undertaken in this study, it thus follows that it lacks in giving a 360-degree perspective on the company hence its profitability prospects which the narrative may

have shown to warrant a premium or even a discount adjustment to the derived intrinsic value of R126/share.

The study also heavily relieved on third party information such as that provided by Bloomberg to carve out a view on the company's performance drivers which in my view was not even clearly established. Access to management would have aided in this analysis by being able to ask clarifying question to gauge the quality and validity of the valuation input. The final limitation of this study identified by the researcher is the exclusive focus on the DCF method.

Anglo's source of revenue is minerals and precious metals. The interaction of those commodity prices would aid in understanding the revenue drives and their behaviour through economic cycles. The concept of cyclicality is explored by Damodaran (2009) and finds substantial merit in deviating from how other companies are valuated relative to how cyclical companies, particularly commodity based companies should be evaluated. He suggests that performance numbers should be adjusted to be reflective of how they would be given normal trading conditions; normalization. The concept of cyclicality as exhibited by the underlying commodities was not taken into consideration in this study.

The historic cash flows and growth therein might have been over or understated particularly in the base year due to cyclical nature of commodity markets and may have warranted adjustments to normalize them. This study did not undertake sensitivity analysis of the estimated inputs that informed the DCF valuation. Steiger (2008), avows that the DCF method is highly sensitive to input estimates especially the terminal value that constitutes a greater part of discounted NPV or intrinsic value.

The degree to which this study's output is influenced by which input would have provided insight on which variable to place special focus on and require greater effort to ensure that it is the best estimate possible considering the cost benefit analysis given the trade-off between effort and additional value derived.

In establishing the peer group or comparable companies, decision for inclusion was based on companies that operated businesses in which Anglo was also involved. Anglo as a diversified miner derived a significant amount of its revenue from 5 main businesses or mined resources. However, most of the companies only operated in one to three of those businesses thus diminishing their comparability to Anglo. Additionally, with the exception of one of those companies, they do not operate on a global scale and are predominantly geographically operate in South Africa with limited or no exposure to other territories. This further reduces the degree to which these companies can actually be defined as comparable to Anglo. The data output from Bloomberg that was used in the relative valuation did not have ratio values for some of the companies thus reducing the reliability of results of the relative valuation.

DCF valuation method and Relative Valuation gave different estimations of value. Although theoretically this can be attributed to difference in assumptions of cashflows, growth and risk, the establishment of the extent of those correlations would provide better insight into which assumption had greater in the divergence of value.

The last limitation but maybe the most important one is the benefit of hindsight. This study was undertaken and concluded about four years after the valuation date of interest. Hindsight is the ability to understand a situation after it has already happened, enabling one to provide greater rationale to results. In real life, dynamics are constantly

changing and investors do not have the benefit of knowing things for a fact. It is easier to see what was but harder to see what will be.

4.2.8 Significance and implications of findings

The earlier identified limitations or drawbacks were not identified to imply that the estimated intrinsic values of R126/share and R186 and subsequent sell recommendations are wrong. They were put forth to highlight that valuation is a scientific based art which provides estimates and inputs into those estimates would be improved by considering those aspects as well.

In providing the orientation for this study, earlier in this document, it was highlighted that at the time of valuation Anglo constituted a significant holding in the researcher's employers' portfolio. This study deduced that Anglo's shares were overpriced and by implication the portfolio risk profile was higher than perceived because when the pricing anomaly corrects, the portfolio had great potential for substantial losses. On the other hand, it was also an opportune time for profit taking by selling the counter while it was at its peak and realising some capital gains and using those proceeds to buy other counters that are overpriced in the market.

Additionally, stemming from the same orientation, was that Anglo was one of the largest members of the JSE broad market index at the time. The JSE index, being a market capitalisation based index (share price for each share x number of shares outstanding), Anglo made up a significant portion of the index in terms of weighting. This implies that the loss potential impact would not only have been widespread but Anglo's overpricing increased the probability that the market was also overpriced.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATIONS

For extended periods Anglo dominated the South African equity market as one of the top 5 companies by market capitalisation on the JSE. Anglo's shares thus impacted investment portfolios and market data indicate that investors held the shares for longer. However, what a share trades at in the market (price) is not necessarily the same as its intrinsic value given the company's fundamentals; qualitative and quantitative characteristics that contribute to its economic wellbeing and invariably valuation. This study aimed to estimate the intrinsic value of Anglo, the drivers of that value and determine investor action recommendations.

5.1 Summary of the study

The first objective of this study was to provide a foundational understanding of equity valuation concepts and framework of ideas or beliefs that aid in deciding how to undertake valuation especially the approaches and methodologies. The literature review of this study revealed that there are several ways to estimate an asset's value. One's choice of valuation method is grounded on their belief about markets and perspective. This study was founded on the belief that markets are inefficient and Anglo shall continue to operate under the going concern assumption.

The second objective was to determine the valuation method best suited to value Anglo. Given the belief discussed in the prior paragraph, popularity of methods amongst surveyed industry practitioners and suitability of methods in terms of stronger validity of matrices and qualitative rationale, it was decided to value Anglo primarily using DCF valuation method and complemented with Relative Valuation. The third

objective was to undertake valuation of Anglo according to theoretical and empirical literature regarding company valuation with the aim of establishing the target price as informed by the estimated intrinsic value per share. Anglo's financial information was extracted from Bloomberg in addition to macro-economic data from other resources. The company's segmental data reflect that its revenues were primarily driven by five commodities (Diamond, Copper, Iron Ore, Thermal Coal and Platinum). Additionally, historical analysis of the prices of these commodities reflect that their returns are highly volatile in nature and to a high degree tend to be positively correlated to the global GDP cycle. For comparables, particularly in beta estimation and relative valuation considerations, JSE listed companies in the same sector as Anglo and with businesses in the afore mentioned commodities were used.

This study attempted to establish Anglo's investment case and ascertain whether it warranted a buy/hold/sell recommendation. By employing the Discounted Cash Flow (DCF) method and limiting cash flow to potential dividends referred to as Free Cash Flow to Equity (FCFE), the study derived DCF model inputs using the company's financial statements and market data to build an excel based model. Using a five-year growth period, the expected cash flows inclusive of the terminal value were discounted using the cost of financing specifically the cost of equity to determine the total present value of those cash flows at valuation date and subsequently an estimate of the intrinsic value per share. Relative Valuation using P/E and P/BV was also undertaken as a complement to DCF.

5.2 Summary of results

In fulfilment of the third objective, the outcomes of the process undertaken was an estimated intrinsic value or target price. The DCF valuation yielded an estimated value of R126 per share and Relative Valuation yielded an estimated value of R186 per share. However, at valuation date, Anglo's shares were trading at R252 per share in the market. The theoretical body of knowledge as discussed in the literature review postulates that the value of a company's shares is a function of the company's capacity to generate cashflows (CF), the expected growth of that cash flow (g) and the risk associated with the cash flows (r). The difference in the values is attributed to the difference in assumption of the above variables that drive value.

The fourth (final) objective of this study was to ascertain an investment recommendation based on the outcome of the analysis and advise the action of potential investor. The outcome of the investment analysis was that Anglo's market price per share in the market was significantly higher than the estimated intrinsic value per share that resulted from the DCF model. Relative Valuation was also undertaken as a complement to DCF model and found that the share was overpriced albeit to a lesser extent than DCF model results. This lead to the conclusion that as at valuation date, the shares were overpriced with limited upside potential and warranted a sell recommendation. It thus follows that for an investor who already owned the share, they should have sold it to realise capital appreciation or unlock value because the downside potential was great given that the market price was not supported by the company's underlying characteristics because the estimated values are less than the market price.

5.3 Recommendations

The study was not without limitation and those limitations include the fact that the analysis did not take account of qualitative factors of the company, no access to management to better inform model inputs, not fully exploring the impact of cyclicality of the company as its influenced by commodity prices giving rise to the need to normalise cash flows, no undertaking of sensitivity analysis and controlling for differences in the comparables. It is thus recommended that the above identified limitations provide room for additional research that could augment understanding of Anglo not only for that point in time but also a learning base for future valuations of pitfalls to avoid and aspects that require greater focus in deriving better valuation input estimates.

REFERENCES

Anglo American Plc. (2014). *2013 Annual Report of Anglo American*. Retrieved from: http://www.angloamerican.com/~/media/Files/A/Anglo-American-PLC-V2/investors/reports/annual-report2013.pdf

Antonios, S., Ioannis, S. & Panagiotis, A. (2012). *Equity Valuation with the Use of Multiples*. American Journal of Applied Sciences 9 (1): 60-65, 2012. http://thescipub.com/PDF/ajassp.2012.60.65.pdf

Asness, C., & Liew, J. (2014). *The Great Divide over Market Efficiency*. Retrieved from Institutional Investor website: https://www.institutionalinvestor.com/article/b14zbgrj5pflsc/the-great-divide-over-market-efficiency?ArticleId=3315202&p=6

Bodie, Z., Kane, A., & Marcus, A. (2009). *Investments* (8th ed.). Pennsylvania. McGraw-Hill Companies, Inc.

Bancel, F., & Mittoo, U. (2014). "*The Gap between the Theory and Practice of Corporate Valuation: Survey of European Experts*," Journal of Applied Corporate. Finance, Fall 2014, Volume 26, Issue 4, pp. 106-117. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2542678

Bloomberg L.P. (2015). JSE and Anglo company statistics, 30/09/2014. Retrieved Dec. 5, 2015 from Bloomberg database.

CFA Institute (2015). Equity and Fixed Income. Level 1, Volume 5.

CFA Institute (2017). Equity and Fixed Income. Level 1, Volume 4.

Damodaran, A. (2006). *Valuation Approaches and Metrics: A survey of the Theory and Evidence*. Retrieved November 18, 2015, from the New York University website: http://people.stern.nyu.edu/adamodar/pdfiles/papers/valuesurvey.pdf

Damodaran, A. (2008). *What is the risk free rate? A Search for the Basic Building Block.* http://people.stern.nyu.edu/adamodar/pdfiles/papers/riskfreerate.pdf

Damodaran, A. (2009). *Ups and Downs: Valuing Cyclical and Commodity Companies*. Retrieved from Stern School of Business website: http://people.stern.nyu.edu/adamodar/pdfiles/papers/commodity.pdf

Damodaran, A. (2010). *The Little Book of Valuation*. Retrieved from Stern School of Business website: http://people.stern.nyu.edu/adamodar/pdfiles/papers/littlebookvaln.pdf

Damodaran, A. (2012). *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* (3rd ed.). New Jersey. John Wiley and Sons.

Damodaran, A. (2014). *Price and Value: Discerning the difference*. [Slide deck]. Retrieved from Stern Business School website: http://people.stern.nyu.edu/adamodar/pdfiles/country/valueversuspriceNew.pdf

Damodaran, A. (2017). *An Introduction to Valuation*. [Slide deck]. Retrieved from Stern Business School website: http://people.stern.nyu.edu/adamodar/pdfiles/eqnotes/ValIntrospr17.pdf

Darrat, A.F.; Rahman, S., and Zhong, M. (2003). *Intraday Trading Volume and Return Volatility of the DJIA Stocks: A Note*. Journal of Banking and Finance, 27(10): 2035-2043

Damodaran, A. (2015). *Equity Risk Premiums (ERP): Determinants, Estimation and Implications*, the 2015 Edition. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2581517

Damodaran, A. (2016). *Valuation: Lecture Note packet 1, Intrinsic Valuation*. [Slide deck]. Retrieved from Stern Business School website: http://people.stern.nyu.edu/adamodar/pdfiles/eqnotes/basics.pdf

Fernández, P. (2007). *Company Valuation Methods. The most Common Errors In Valuations*. IESE Business School – University of Navarra. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=274973

Fernández, P. (2013). *Company Valuation Methods*. IESE Business School – University of Navarra. https://is.vsfs.cz/el/6410/leto2014/N_OP/um/Fernandez_2013_Company_Valuation_Methods_SSRN-id274973.pdf

Harford, T., & Alexander, R. (2013). *Are markets 'efficient' or irrational?* Retrieved from BBC website: http://www.bbc.com/news/magazine-24579616

IMF & World Bank. (2017). Quarterly time series for GDP and commodity prices.

Janmohamed, M. (2010, March). *Listing on African Stock Exchanges: Many Advantages and Few Drawbacks*. Porparco's Magazine, 5, 9-11. Retrieved from Porparco website: http://www.proparco.fr/jahia/webdav/site/proparco/shared/PORTAILS/Secteur_prive_developpement/PDF/SPD5/SPD5_Janmohamed_uk.pdf

JSE (2017). *JSE Limited Listing Requirements*. https://www.jse.co.za/content/JSERulesPoliciesandRegulationItems/JSE%20Listings%20Requirements.pdf

Kaluwa, K.O. & Chinwe O.C. (2014). *The relationship between stock returns volatility and trading volume in Nigeria*. Business Systems and Economics, vol. 4 (2): 115-125. https://www.mruni.eu/upload/iblock/25d/01_BSE_2014_4(2)_Kalu-Chinwe.pdf

Kay, J. (2013). *The market is not the best place to set a fair price for assets*. Retrieved from Financial Times website: https://www.ft.com/content/dd2d655c-ed75-11e2-8d7c-00144feabdc0

Koller, T., Goedhart, M. & Wessels, D. (2010). *Valuation: measuring and managing the value of companies*. McKinsey & Company. http://elibrary.bsu.az/books_200/N_1.pdf

Mian, R., & Nagata, K. (2015). *Foreign Institutional Ownership and the Valuation Effect of Investment and Pay-out Decisions*. Journal of Finance and Economics. Vol. 3, No. 5, 2015, pp 97-104. http://pubs.sciepub.com/jfe/3/5/3]

Mateiciuc, A. G. (2009). *Why do firms go public?* https://thesis.eur.nl/pub/6225/scriptie-v2%20Adi%20Mateiciuc.pdf

Moody's. (2017, June 09). *Rating Action: Moody's downgrades South Africa's rating to Baa3 and assigns negative outlook.* Retrieved from Moody's website: https://www.moodys.com/research/Moodys-downgrades-South-Africas-rating-to-Baa3-and-assigns-negative--PR_367769

New Construct. (2015, November 30). *Why PE Ratios Are Not A Good Measure Of Value*. Retrieved from New Construct website: https://www.newconstructs.com/pe-ratios-good-measure-value/

New Construct. (2016, January 6). *The Problem With Using Accounting Book Value*. Retrieved from New Construct website: https://www.newconstructs.com/problem-using-accounting-book-value/

New Construct. (2016, February 24). *How EV/EBITDA Misses The Point On Valuation*. Retrieved from New Construct website: https://www.newconstructs.com/evebitda-misses-point-valuation/

Omran, M.F., & Mckenzie, E. (2000). *Heteroscedasticity in Stock Returns Data Revisited: Volume versus GARCH Effects*. Applied Financial Economics, 10: 553-560

Reider, R. (2009). Volatility Forecasting I: GARCH Models. http://cims.nyu.edu/~almgren/timeseries/Vol_Forecast1.pdf

Pinto, J.E., Robinson T.R., & Stowe, J.D. (2015). *Equity Valuation: A Survey of Professional Practice*. [Survey Paper]. Retrieved from Social Science Research Network website: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2657717

Thomson Reuters. (2017, April 3). *South Africa's credit rating downgraded to junk by S&P after finmin changed*. Retrieved from Thomson Reuters website: https://www.reuters.com/article/us-safrica-ratings-s-p/south-africas-credit-rating-downgraded-to-junk-by-sp-after-finmin-changed-idUSKBN1751WI?il=0

Schreiner, A. (2007). *Equity Valuation Using Multiples: An Empirical Investigation*. University of St. Gallen, Austria. https://www1.unisg.ch/www/edis.nsf/SysLkpByIdentifier/3313/$FILE/dis3313.pdf

Steiger, F. (2008). *The Validity of Company Valuation Using Discounted Cash Flow Methods*. [Seminar Paper]. Retrieved from Cornel University Library: http://arxiv.org/ftp/arxiv/papers/1003/1003.4881.pdf]

Woodridge, J. (2012). *Introductory Econometrics: a modern approach* (5th ed.). Michigan State University. South-Western CENGAGE Learning.

Wu, W., & Ou-Yang, H. (2014). *Informationally Efficient Markets in Grossman and Stiglitz (1980)*. Peking University. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2433662

APPENDICES

Anglo American PLC (AGL SJ) - Adjusted	INCOME STATEMENT						
In Millions of ZAR except Per Share	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
12 Months Ending	12/31/2007	12/31/2008	12/31/2009	12/31/2010	12/31/2011	12/31/2012	12/31/2013
Revenue	**179 582.1**	**217 387.6**	**175 452.2**	**204 533.4**	**222 116.0**	**235 472.6**	**283 160.4**
+ Sales & Services Revenue	--	--	175 452.2	204 533.4	222 116.0	235 472.6	283 160.4
- Cost of Revenue	99 380.0	128 486.0	109 394.7	115 002.5	124 778.7	212 114.2	215 550.1
+ Cost of Goods & Services	--	--	109 394.7	115 002.5	124 778.7	212 114.2	215 550.1
Gross Profit	**80 202.0**	**88 901.6**	**66 057.4**	**89 530.9**	**97 337.4**	**23 358.4**	**67 610.3**
+ Other Operating Income	--	--	0.0	0.0	0.0	0.0	0.0
- Operating Expenses	20 115.7	18 862.7	29 239.2	27 293.1	27 114.4	-21 741.0	8 087.0
+ Selling, General & Admin	--	--	26 858.7	26 005.6	27 760.9	34 048.3	38 543.5
+ *Selling & Marketing*	--	--	*13 374.7*	*12 728.5*	*12 987.0*	*16 609.5*	*17 177.6*
+ *General & Administrative*	--	--	*13 484.0*	*13 277.1*	*14 773.8*	*17 438.8*	*21 365.9*
+ Research & Development	--	--	286.0	212.1	276.0	656.8	994.0
+ Other Operating Expense	--	--	2 094.5	1 075.3	-922.5	-56 446.1	-31 450.5
Operating Income (Loss)	**60 086.3**	**70 039.0**	**36 818.2**	**62 237.9**	**70 223.0**	**45 099.4**	**59 523.3**
- Non-Operating (Income) Loss	--	--	42.1	-4 389.1	-6 987.4	-1 469.7	270.2
+ Interest Expense, Net	5 788.6	7 022.9	3 650.7	2 618.8	1 815.9	2 783.3	4 670.8
+ *Interest Expense*	*5 788.6*	*7 022.9*	*6 460.2*	*5 120.7*	*4 960.9*	*5 747.2*	*7 054.4*
- *Interest Income*	--	--	*2 809.5*	*2 501.8*	*3 145.1*	*2 963.9*	*2 383.6*
+ Other Investment (Inc) Loss	--	--	-193.5	-219.5	-428.5	-443.4	-173.7
+ Foreign Exch (Gain) Loss	28.2	4 139.4	201.9	-124.4	116.2	738.9	202.7
+ (Income) Loss from Affiliates	-1 389.0	-10 765.7	-2 254.3	-6 174.0	-7 132.7	-3 924.5	-2 393.3
+ Other Non-Op (Income) Loss	--	--	-1 362.7	-490.1	-1 358.3	-624.0	-2 036.2
Pretax Income (Loss), Adjusted	**62 194.5**	**70 815.6**	**36 776.1**	**66 627.0**	**77 210.4**	**46 569.1**	**59 253.1**
- Abnormal Losses (Gains)	-10 759.4	2 156.4	2 885.2	-13 313.7	-1 104.0	47 973.0	42 847.5
+ Impairment of Goodwill	--	0.0	--	--	--	--	--
+ Other Abnormal Items	--	--	2 885.2	-13 313.7	-1 104.0	47 973.0	42 847.5
Pretax Income (Loss), GAAP	**62 194.5**	**70 815.6**	**33 890.9**	**79 940.7**	**78 314.4**	**-1 404.0**	**16 405.6**
- Income Tax Expense (Benefit)	18 987.6	20 250.7	9 395.9	20 548.4	20 773.4	3 226.7	12 294.5
+ Current Income Tax (Benefit)	--	--	10 699.7	18 646.5	16 691.4	11 954.3	15 305.4
+ Deferred Income Tax (Benefit)	--	--	277.6	1 097.3	3 217.7	410.5	2 653.8
+ Tax Allowance/Credit	--	--	-1 581.4	804.7	864.3	-9 138.1	-5 664.8
Income (Loss) from Cont Ops	**43 206.9**	**50 564.9**	**24 495.0**	**59 392.2**	**57 541.0**	**-4 630.6**	**4 111.0**
- Net Extraordinary Losses (Gains)	-14 411.7	0.0	0.0	0.0	0.0	0.0	0.0
+ Discontinued Operations	--	--	0.0	0.0	0.0	0.0	0.0
+ XO & Accounting Changes	--	--	0.0	0.0	0.0	0.0	0.0
Income (Loss) Incl. MI	**57 618.6**	**50 564.9**	**24 495.0**	**59 392.2**	**57 541.0**	**-4 630.6**	**4 111.0**
- Minority Interest	6 120.0	7 477.3	4 096.5	11 521.5	12 732.8	7 438.6	13 385.0
Net Income, GAAP	**51 498.5**	**43 087.5**	**20 398.5**	**47 870.8**	**44 808.2**	**-12 069.2**	**-9 274.0**
- Preferred Dividends	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- Other Adjustments	--	--	0.0	0.0	0.0	0.0	0.0
Net Income Avail to Common, GAAP	**51 498.5**	**43 087.5**	**20 398.5**	**47 870.8**	**44 808.2**	**-12 069.2**	**-9 274.0**
Net Income Avail to Common, Adj	**51 498.5**	**43 087.5**	**25 176.4**	**35 376.4**	**44 561.2**	**26 790.3**	**27 879.8**
Net Abnormal Losses (Gains)	--	--	4 777.9	-12 494.4	-247.0	38 859.5	37 153.8
Net Extraordinary Losses (Gains)	-14 411.7	0.0	0.0	0.0	0.0	0.0	0.0
Basic Weighted Avg Shares	1 309.0	1 202.0	1 202.0	1 206.0	1 210.0	1 254.0	1 281.0
Basic EPS, GAAP	**39.34**	**35.86**	**16.99**	**39.72**	**37.04**	**-9.61**	**-7.24**
Basic EPS from Cont Ops	**28.48**	**35.86**	**16.99**	**39.72**	**37.04**	**-9.61**	**-7.24**
Basic EPS from Cont Ops, Adjusted	**29.65**	**37.01**	**20.95**	**29.33**	**36.83**	**21.36**	**21.76**
Diluted Weighted Avg Shares	1 327.0	1 215.0	1 253.0	1 281.0	1 282.0	1 254.0	1 281.0
Diluted EPS, GAAP	**38.78**	**35.45**	**16.66**	**37.89**	**35.52**	**-9.61**	**-7.24**
Diluted EPS from Cont Ops	**--**	**--**	**16.66**	**37.89**	**35.52**	**-9.61**	**-7.24**
Diluted EPS from Cont Ops, Adjusted	**29.64**	**36.99**	**20.47**	**28.14**	**35.33**	**21.36**	**21.76**
Reference Items							
Accounting Standard	IAS/IFRS	IAS/IFRS	IAS/IFRS	IAS/IFRS	IAS/IFRS	IAS/IFRS	IAS/IFRS
EBITDA	69 943.2	82 506.7	51 328.5	76 275.8	84 510.1	64 590.8	84 980.9
EBITDA Margin (T12M)	38.95	37.95	29.26	37.29	38.05	27.43	30.01
EBITA	60 100.4	70 072.0	36 936.0	62 464.6	70 368.2	45 353.9	60 092.7
EBIT	60 086.3	70 039.0	36 818.2	62 237.9	70 223.0	45 099.4	59 523.3
Gross Margin	44.66	40.90	37.65	43.77	43.82	9.92	23.88
Operating Margin	33.46	32.22	20.98	30.43	31.62	19.15	21.02
Profit Margin	28.68	19.82	14.35	17.30	20.06	11.38	9.85
Revenue Per Employee	1 795 820.76	2 070 358.43	1 639 739.81	2 045 334.36	2 221 160.35	2 221 439.75	2 889 391.72
Dividends per Share	8.74	7.27	0.00	4.75	5.37	6.98	8.20
Total Cash Common Dividends	36 790.7	4 271.6	0.0	5 742.7	6 522.6	8 897.8	10 486.9
Capitalized Interest Expense	0.0	1 776.4	2 069.3	1 938.5	2 665.7	2 282.5	3 223.2
Personnel Expense	26 024.2	27 108.4	31 325.3	31 704.1	34 036.5	41 486.9	48 193.8
Depreciation Expense	9 842.8	12 434.7	14 392.5	13 811.1	14 141.9	19 236.8	24 888.2
Rental Expense	1 290.3	1 735.1	958.9	885.1	929.7	1 486.1	1 370.3

Appendix 1: Income Statement

Anglo American PLC (AGL SJ) - Standardized	BALANCE SHEET									
In Millions of ZAR except Per Share	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
12 Months Ending	12/31/2004	12/31/2005	12/31/2006	12/31/2007	12/31/2008	12/31/2009	12/31/2010	12/31/2011	12/31/2012	12/31/2013
Total Assets										
+ Cash, Cash Equivalents & STI	16 744.0	21 839.0	20 991.7	21 469.6	27 711.9	24 125.2	42 162.7	94 737.1	76 978.4	81 050.7
+ Cash & Cash Equivalents	16 732.7	21 737.6	20 991.7	21 469.6	26 083.4	24 125.2	42 162.7	94 737.1	76 978.4	81 050.7
+ ST Investments	11.3	101.4	0.0	0.0	1 628.4	0.0	0.0	0.0	0.0	0.0
+ Accounts & Notes Receiv	21 817.6	25 616.2	30 334.5	20 584.5	18 534.2	18 420.5	18 535.5	21 835.1	21 118.2	27 311.5
+ Accounts Receivable, Net	--	--	--	--	--	18 420.5	18 535.5	21 835.1	21 118.2	27 311.5
+ Notes Receivable, Net	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0
+ Inventories	20 096.2	22 618.5	20 782.0	16 083.4	25 433.9	23 704.6	23 739.2	28 400.1	42 406.0	50 383.2
+ Raw Materials	7 276.3	7 484.6	7 211.5	4 823.6	7 285.7	5 468.6	5 421.0	6 758.9	7 918.3	9 626.3
+ Work In Process	4 994.3	7 123.4	5 122.1	5 571.5	7 935.2	10 095.8	10 012.1	12 015.7	12 716.7	15 738.8
+ Finished Goods	7 825.6	8 010.6	8 448.4	5 688.2	10 213.1	8 140.1	8 306.1	9 625.5	21 771.0	25 018.0
+ Other Inventory	--	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+ Other ST Assets	9 790.5	12 098.3	17 910.0	14 326.8	18 675.4	15 158.5	12 245.0	10 893.3	38 785.9	11 257.0
+ Prepaid Expenses	--	--	--	--	--	1 483.4	1 053.9	1 825.0	1 526.0	2 251.4
+ Derivative & Hedging Assets	--	--	--	--	--	2 693.7	2 483.3	1 388.9	856.3	736.4
+ Assets Held-for-Sale	--	--	--	--	--	4 575.6	2 173.7	0.0	26 705.1	0.0
+ Income Taxes Receivable	--	--	--	--	--	1 579.3	1 547.9	1 671.5	3 984.6	2 377.7
+ Misc ST Assets	--	--	--	--	--	4 826.5	4 986.3	6 007.9	5 714.0	5 891.5
Total Current Assets	**68 448.3**	**82 172.0**	**90 018.1**	**72 464.3**	**90 355.4**	**81 408.8**	**96 682.5**	**155 865.6**	**179 288.5**	**170 002.4**
+ Property, Plant & Equip, Net	187 836.5	195 169.7	164 201.7	161 478.5	278 107.1	259 761.2	262 224.5	327 437.2	379 220.5	436 657.5
+ Property, Plant & Equip	260 899.7	279 477.4	251 312.8	227 616.5	363 125.3	357 930.0	359 611.8	450 154.5	531 625.9	652 982.1
- Accumulated Depreciation	73 063.2	84 307.8	87 111.2	66 138.0	85 018.2	98 168.8	97 387.3	122 717.3	152 405.4	216 324.6
+ LT Investments & Receivables	6 155.1	5 767.1	13 912.9	33 003.8	29 858.0	20 117.9	21 209.8	23 385.5	20 253.5	15 212.8
+ LT Investments	--	--	--	--	--	20 117.9	21 209.8	23 385.5	20 253.5	15 212.8
+ Other LT Assets	40 226.4	45 744.1	56 685.8	40 187.8	69 863.3	54 265.1	58 939.6	78 288.1	92 145.2	126 825.8
+ Total Intangible Assets	14 971.7	16 300.1	14 912.2	10 676.5	28 295.5	20 486.9	15 255.3	18 750.4	38 735.1	42 955.6
+ *Goodwill*	*14 586.6*	*15 932.5*	*14 681.6*	*10 607.9*	*27 438.9*	*19 881.7*	*14 695.4*	*18 080.1*	*25 043.4*	*28 069.0*
+ *Other Intangible Assets*	*385.1*	*367.6*	*230.6*	*68.6*	*856.6*	*605.2*	*559.9*	*670.2*	*13 691.6*	*14 886.6*
+ Deferred Tax Assets	--	--	--	--	--	2 125.4	2 562.3	4 279.8	10 207.3	14 350.1
+ Derivative & Hedging Assets	--	--	--	--	--	1 756.4	3 062.9	5 394.2	6 332.9	6 354.4
+ Investments in Affiliates	19 739.5	20 058.2	33 402.2	22 924.3	33 999.8	24 442.6	32 275.8	42 313.5	26 806.8	48 521.0
+ Misc LT Assets	5 515.3	9 385.8	8 371.5	6 587.0	7 568.1	5 453.8	5 783.3	7 550.2	10 063.1	14 644.7
Total Noncurrent Assets	**234 218.0**	**246 680.9**	**234 800.4**	**234 670.2**	**377 828.4**	**334 144.3**	**342 373.9**	**429 110.8**	**491 619.1**	**578 696.1**
Total Assets	**302 666.3**	**328 852.9**	**324 818.6**	**307 134.5**	**468 183.8**	**415 553.0**	**439 056.4**	**584 976.4**	**670 907.7**	**748 698.5**
Liabilities & Shareholders' Equity										
+ Payables & Accruals	16 449.6	19 887.1	22 801.5	17 469.4	29 961.6	36 612.2	38 342.3	53 505.6	45 042.6	53 686.6
+ Trade creditors	16 449.6	19 887.1	22 801.5	17 469.4	29 961.6	21 689.8	18 100.8	24 233.4	22 745.9	24 870.7
+ Accrued Taxes	--	--	--	--	--	5 380.0	6 804.3	13 768.0	7 816.5	8 774.2
+ Other Payables & Accruals	--	--	--	--	--	9 542.3	13 437.3	15 504.2	14 480.1	20 041.7
+ ST Debt	19 156.2	13 156.7	14 171.5	40 448.5	63 857.8	11 062.6	10 110.9	8 220.5	21 067.3	22 177.4
+ ST Borrowings	--	--	14 136.5	40 414.2	63 707.2	11 003.6	10 078.0	8 188.2	21 041.9	22 103.8
+ ST Capital Leases	--	--	34.9	34.3	150.6	59.0	32.9	32.3	25.4	73.6
+ Other ST Liabilities	18 652.3	27 359.0	24 513.6	20 852.1	37 604.9	2 103.3	3 464.7	4 312.1	7 121.4	11 993.5
+ Deferred Revenue	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0
+ Derivatives & Hedging	--	--	--	--	--	560.9	527.0	1 308.2	2 373.8	3 913.7
+ Misc ST Liabilities	18 652.3	27 359.0	24 513.6	20 852.1	37 604.9	1 542.4	2 937.8	3 003.9	4 747.6	8 079.8
Total Current Liabilities	**54 258.1**	**60 402.7**	**61 486.5**	**78 770.0**	**131 424.3**	**49 778.1**	**51 917.9**	**66 038.2**	**73 231.2**	**87 857.5**
+ LT Debt	44 263.8	40 325.5	29 488.9	16 495.0	67 877.1	94 582.1	78 410.5	95 730.3	128 438.7	165 594.2
+ LT Borrowings	44 263.8	40 325.5	28 832.1	15 932.4	67 227.6	94 500.9	78 377.5	95 593.0	128 277.6	165 078.7
+ LT Capital Leases	--	--	656.9	562.6	649.5	81.2	32.9	137.3	161.1	515.5
+ Other LT Liabilities	47 219.6	53 349.1	44 282.3	44 929.1	64 093.1	64 043.6	58 616.8	74 452.4	98 435.7	102 155.0
+ Accrued Liabilities	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0
+ Pension Liabilities	--	--	--	--	--	5 210.3	3 892.9	5 160.0	11 945.2	12 666.8
+ Deferred Revenue	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0
+ Deferred Tax Liabilities	--	--	--	--	--	38 317.0	37 156.7	46 270.3	51 299.2	48 994.4
+ Derivatives & Hedging	--	--	--	--	--	4 302.5	4 973.1	7 671.3	6 790.7	11 983.0
+ Misc LT Liabilities	47 219.6	53 349.1	44 282.3	44 929.1	64 093.1	16 213.9	12 594.2	15 350.8	28 400.6	28 510.8
Total Noncurrent Liabilities	**91 483.4**	**93 674.6**	**73 771.3**	**61 424.1**	**131 970.3**	**158 625.7**	**137 027.3**	**170 182.7**	**226 874.4**	**267 749.3**
Total Liabilities	**145 741.4**	**154 077.3**	**135 257.8**	**140 194.2**	**263 394.6**	**208 403.8**	**188 945.2**	**236 220.9**	**300 105.6**	**355 606.8**
+ Preferred Equity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
+ Share Capital & APIC	13 476.8	15 108.6	24 345.8	23 679.0	32 484.3	25 468.4	22 731.4	27 875.2	43 482.6	53 970.7
+ Common Stock	--	--	--	--	--	5 446.4	4 861.1	5 959.4	6 544.9	8 121.9
+ Additional Paid in Capital	--	--	--	--	--	20 021.9	17 870.3	21 915.8	36 937.8	45 848.8
- Treasury Stock	--	--	--	--	--	--	--	56 404.6	56 453.7	67 994.6
+ Retained Earnings	100 062.0	126 160.6	137 927.2	108 789.1	177 218.6	157 127.6	178 808.0	341 915.9	342 019.9	403 738.5
+ Other Equity	17 406.5	8 428.9	7 330.3	21 648.0	-19 362.5	10 177.0	23 989.5	2 285.3	-10 190.3	-56 516.7
Equity Before Minority Interest	**130 945.3**	**149 698.1**	**169 603.3**	**154 116.2**	**190 340.3**	**192 773.0**	**225 528.9**	**315 671.8**	**318 858.5**	**333 197.9**
+ Minority Interest	25 979.6	25 077.5	19 957.4	12 824.1	14 449.0	14 376.2	24 582.3	33 083.7	51 943.5	59 893.8
Total Equity	**156 924.9**	**174 775.6**	**189 560.8**	**166 940.3**	**204 789.2**	**207 149.2**	**250 111.2**	**348 755.5**	**370 802.0**	**393 091.7**
Total Liabilities & Equity	**302 666.3**	**328 852.9**	**324 818.6**	**307 134.5**	**468 183.8**	**415 553.0**	**439 056.4**	**584 976.4**	**670 907.7**	**748 698.5**
Reference Items										
Accounting Standard	IAS/IFRS	IAS/IFRS	IAS/IFRS	IAS/IFRS	IAS/IFRS	IAS/IFRS	IAS/IFRS	IAS/IFRS	IAS/IFRS	IAS/IFRS
Shares Outstanding	1 359.4	1 359.4	1 361.4	1 322.1	1 316.5	1 204.2	1 207.8	1 208.2	1 275.0	1 278.5
Number of Treasury Shares	--	--	41.5	20.8	26.4	138.7	135.2	134.8	130.5	127.0
Pension Obligations	6 800.7	7 972.6	5 415.6	3 046.5	3 774.6	5 210.3	3 892.9	5 160.0	11 945.2	12 666.8
Future Minimum Operating Lease Obligation	2 752.0	3 130.7	6 051.5	3 471.9	4 603.0	6 110.6	4 722.8	6 500.5	6 383.8	5 018.3
Capital Leases - Total	1 007.9	1 216.8	691.8	597.0	800.1	140.2	65.9	169.6	186.5	589.2
Options Granted During Period	2.1	3.9	0.4	0.3	0.3	1.5	0.2	0.1	0.2	0.1
Options Outstanding at Period End	56.8	35.7	30.5	22.8	17.9	21.2	5.2	4.0	2.7	1.1
Net Debt	46 676.0	31 643.1	22 668.7	35 474.0	104 023.1	81 519.5	46 358.6	9 213.7	72 527.6	106 721.0
Net Debt to Equity	29.74	18.11	11.96	21.25	50.80	39.35	18.54	2.64	19.56	27.15
Tangible Common Equity Ratio	40.31	42.68	49.92	48.38	36.84	43.61	49.62	52.44	44.31	41.13
Current Ratio	1.26	1.36	1.46	0.92	0.69	1.64	1.86	2.36	2.45	1.94
Cash Conversion Cycle	58.70	58.81	59.41	42.72	28.04	38.94	49.14	47.06	55.42	70.00
Number of Employees	213 000.00	195 000.00	113 000.00	100 000.00	105 000.00	107 000.00	100 000.00	100 000.00	106 000.00	98 000.00

Appendix 2: Balance Sheet

Anglo American PLC (AGL SJ) - Standardized	CASH FLOW STATEMENT								
In Millions of ZAR except Per Share	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
12 Months Ending	12/31/2005	12/31/2006	12/31/2007	12/31/2008	12/31/2009	12/31/2010	12/31/2011	12/31/2012	12/31/2013
Cash from Operating Activities									
+ Net Income	22 420.3	41 882.5	51 498.5	43 087.5	20 398.5	47 870.8	44 808.2	-12 069.2	-9 274.0
+ Depreciation & Amortization	15 543.3	9 573.5	9 856.9	12 467.7	14 510.3	14 037.9	14 287.2	19 491.4	25 457.6
Product/Brand Segments	**15 543.3**	**13 784.8**	**9 856.9**	**12 467.7**	**14 510.3**	**14 037.9**	**14 287.2**	**18 793.5**	**27 986.0**
Coal	1 197.1	1 171.3	1 558.2	2 420.8	2 994.6	3 182.1	3 653.5	4 786.6	7 334.3
Metallurgical Coal	--	--	--	--	**2 094.5**	**2 355.5**	**2 723.8**	**3 760.3**	**5 462.1**
Thermal Coal	--	--	--	--	**900.1**	**826.6**	**929.7**	**1 026.3**	**1 872.2**
Other Base Metals	1 986.7	2 417.1	2 425.5	2 809.2	2 271.2	2 158.0	2 295.2	4 236.5	6 716.6
Copper	--	--	--	--	**2 052.5**	**1 967.8**	**2 099.1**	**4 039.5**	**6 398.2**
Nickel	--	--	--	--	**218.7**	**190.2**	**196.1**	**197.0**	**67.6**
Niobium	--	--	--	--	--	--	--	--	**250.9**
Platinum	2 725.3	3 006.1	3 208.1	4 189.0	5 349.9	5 486.4	5 295.0	5 402.4	5 635.8
Diamonds	--	--	--	--	--	--	--	1 165.9	4 323.4
Ferrous Metals & Industries	1 910.3	1 347.3	705.1	718.8	681.4	1 038.8	1 111.3	1 633.9	2 615.2
Corporate Activities	101.9	115.1	141.0	190.0	3 028.2	336.5	297.8	353.0	434.3
Phosphates	--	--	--	--	--	--	--	--	--
Investment in Associates	--	--	--	--	--	--	--	--	--
Industria Iminerals	1 579.2	1 516.6	1 819.1	2 139.9	185.1	1 836.1	1 634.3	1 215.1	907.1
Exploration	--	--	--	--	--	--	--	--	19.3
Gold	3 425.8	1 239.0	--	--	--	--	--	--	--
Paper & Packaging	2 617.1	2 972.3	--	--	--	--	--	--	--
+ Non-Cash Items	6 342.1	6 763.8	-7 086.0	7 551.7	2 944.1	-7 008.0	6 740.5	41 413.0	53 289.2
+ Stock-Based Compensation	--	--	--	--	1 716.0	1 602.0	1 844.9	1 913.0	1 939.7
+ Other Non-Cash Adj	6 342.1	6 763.8	-7 086.0	7 551.7	1 228.1	-8 610.0	4 895.6	39 500.0	51 349.5
+ Chg in Working Capital	-3 272.9	-2 640.5	-4 850.9	-190.0	-7 654.7	-2 779.8	-1 154.9	-4 318.6	-10 818.0
+ (Inc) Dec in Accts Receiv	-3 820.6	-4 075.9	-2 742.7	661.0	--	--	--	--	--
+ (Inc) Dec in Inventories	-2 884.5	-2 024.4	-2 481.9	-8 254.0	193.5	-2 260.4	-2 556.7	-2 701.2	-5 423.5
+ Inc (Dec) in Accts Payable	3 432.1	3 459.7	373.7	7 403.0	--	--	--	--	--
+ Inc (Dec) in Other	0.0	0.0	0.0	0.0	-7 848.2	-519.4	1 401.8	-1 617.4	-5 394.5
+ Net Cash From Disc Ops	--	--	--	--	0.0	0.0	0.0	0.0	0.0
Cash from Operating Activities	**41 032.8**	**55 579.3**	**49 418.6**	**62 916.9**	**30 198.2**	**52 120.9**	**64 680.9**	**44 516.5**	**58 654.8**
Cash from Investing Activities									
+ Change in Fixed & Intang	-18 969.1	-19 018.4	-26 933.8	-42 269.6	-38 366.0	-38 156.2	-44 495.8	-48 383.5	-57 757.3
+ Disp in Fixed & Intang	2 082.2	677.1	782.6	247.9	386.9	468.2	559.3	541.9	1 351.0
+ Disp of Fixed Assets	--	--	--	--	*386.9*	*468.2*	*559.3*	*541.9*	*1 351.0*
+ Disp of Intangible Assets	--	--	--	--	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
+ Acq of Fixed & Intang	-21 051.3	-19 695.5	-27 716.4	-42 517.5	-38 752.9	-38 624.3	-45 055.1	-48 925.4	-59 108.4
+ Purchase of Fixed Production Assets	--	--	--	--	*-38 752.9*	*-38 624.3*	*-45 055.1*	*-48 925.4*	*-59 108.4*
+ Acq of Intangible Assets	--	--	--	--	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
+ Net Change in LT Investment	267.4	216.7	3 906.1	908.8	14 905.6	-929.0	-116.2	-131.4	0.0
+ Dec in LT Investment	1 560.1	487.5	4 237.5	7 031.2	17 168.4	51.2	0.0	0.0	0.0
+ Inc in LT Investment	-1 292.6	-270.8	-331.4	-6 122.3	-2 262.8	-980.2	-116.2	-131.4	0.0
+ Net Cash From Acq & Div	--	--	--	--	5 181.6	16 671.4	3 530.0	-39 656.0	-2 007.3
+ Cash from Divestitures	--	--	--	--	6 149.0	1 894.6	138.0	0.0	0.0
+ Cash for Acq of Subs	--	--	--	--	-967.4	14 776.7	3 392.0	-39 656.0	-2 007.3
+ Cash for JVs	--	--	--	--	0.0	0.0	0.0	0.0	0.0
+ Other Investing Activities	-356.6	5 274.2	5 478.4	-58 124.8	-2 473.1	2 626.2	3 290.3	2 356.4	3 618.9
+ Net Cash From Disc Ops	--	--	--	--	0.0	0.0	0.0	0.0	0.0
Cash from Investing Activities	**-19 058.2**	**-13 527.5**	**-17 549.3**	**-99 485.6**	**-20 751.8**	**-19 787.7**	**-37 791.7**	**-85 814.5**	**-56 145.7**
Cash from Financing Activities									
+ Dividends Paid	-7 240.0	-19 553.3	-10 844.0	-12 806.5	0.0	-2 209.2	-5 941.5	-7 964.0	-10 403.1
+ Cash From (Repayment) Debt	-12 658.8	4 549.8	22 005.3	54 662.9	-3 120.8	-8 368.6	-2 157.2	40 115.7	9 380.1
+ Cash From (Repay) ST Debt	--	--	--	--	-55 719.4	-17 103.0	-9 159.2	-6 133.1	-22 263.3
+ Cash From LT Debt	--	--	--	--	52 598.6	8 734.4	7 002.0	46 248.9	31 643.5
+ Repayments of LT Debt	--	--	--	--	0.0	0.0	0.0	0.0	0.0
+ Cash (Repurchase) of Equity	1 528.2	-26 554.0	-42 889.6	-5 535.7	-386.9	-468.2	-2 520.4	-1 880.2	-752.7
+ Increase in Capital Stock	1 528.2	0.0	944.8	330.5	243.9	307.2	145.3	197.0	135.1
+ Decrease in Capital Stock	0.0	-26 554.0	-43 834.4	-5 866.2	-630.9	-775.4	-2 665.7	-2 077.2	-887.8
+ Other Financing Activities	--	--	--	--	-3 760.0	-387.7	27 187.1	-7 890.1	-12 651.6
+ Net Cash From Disc Ops	--	--	--	--	0.0	0.0	0.0	0.0	0.0
Cash from Financing Activities	**-18 370.5**	**-41 557.6**	**-31 728.3**	**36 320.8**	**-7 267.7**	**-11 433.7**	**16 567.9**	**22 381.4**	**-14 427.3**
Effect of Foreign Exchange Rates	--	--	--	--	2 658.1	2 077.5	-5 164.3	-903.1	-3 483.8
Net Changes in Cash	**1 267.2**	**-162.5**	**662.8**	**-2 726.5**	**4 836.8**	**22 977.1**	**38 292.9**	**-19 819.8**	**-15 401.9**
Cash Paid for Taxes	**6 074.7**	**13 040.1**	**20 348.4**	**17 953.8**	**12 247.5**	**18 156.4**	**18 441.9**	**14 770.4**	**11 590.1**
Cash Paid for Interest	**3 483.1**	**1 990.5**	**3 405.5**	**6 122.3**	**6 233.1**	**6 122.8**	**5 861.6**	**6 363.0**	**8 752.9**
Reference Items									
EBITDA	48 833.1	65 593.0	69 943.2	82 506.7	51 118.2	88 982.3	84 176.0	6 354.8	48 686.0
Trailing 12M EBITDA Margin	26.05	38.77	38.95	37.95	29.14	43.51	37.90	2.70	17.19
Interest Received	--	--	--	--	2 052.5	1 719.1	2 542.2	2 282.5	1 862.5
Net Cash Paid for Acquisitions	184.7	1 063.0	13 304.7	53 745.8	967.4	-14 776.7	-3 392.0	39 656.0	2 007.3
Free Cash Flow	19 981.5	35 883.8	21 702.1	20 399.5	-8 554.7	13 496.6	19 625.8	-4 409.0	-453.6
Free Cash Flow to Firm	24 434.4	39 062.5	25 723.6	25 414.1	-3 885.6	17 301.0	23 270.8	--	1 314.2
Free Cash Flow to Equity	9 404.9	41 110.7	44 490.1	75 310.3	-11 288.6	5 596.1	18 027.9	36 248.7	10 277.6
Free Cash Flow per Basic Share	15.17	26.86	16.58	16.97	-7.12	11.19	16.22	-3.52	-0.35
Price to Free Cash Flow	15.68	13.50	25.97	10.97	--	33.99	16.52	--	--
Cash Flow to Net Income	1.83	1.33	0.96	1.46	1.48	1.09	1.44	--	--

Appendix 3: Cash Flow Statement