

Valuation of agricultural property from a wealth creation perspective

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Abstract

Shareholders value is created when capital is invested at a return higher than the cost of capital. Adam Smith develop the concept of creating value in 1776 when he wrote in his: "An inquiry into the nature and causes of the wealth of nations:" "bigger return on capital is required by investors". The aim of value-based management (VBM) is to create businesses that will be sustainable in the long term. The underlying principles of VBM require that value has to be created consistently over the long-term. The mentioned is contrary to the approach to maximise profits which is more short-term orientated.

Based on the assumption that value is created only if the return generated on an investment is bigger than the cost of capital the question arises what is the intrinsic value of an operational efficient asset. In line with the VBM approach the counter question is what amount can be paid for an operational efficient asset? The answer should be that one could pay an amount equal to intrinsic value. In determining purchase amount and based on the fact that intrinsic value is based on required return it is obvious that possible return should at least be equal or bigger than required return. Under consideration in this study is the value of agricultural land in a sheep farming area in the upper Karoo area in South Africa.

The aim of the study is to develop a theoretical valuation model based on the above mentioned concepts, to apply the model to determine agricultural land value on "an as is basis". On an as is basis means that provision is not made for expansion or improvement since these costs will be for the account of the buyer of the land.

To develop and test the model - benchmark data both from the business sector, like the Johannesburg Securities Exchange (JSE), property and bond markets and farming data of a study group from the area under consideration were obtained and used as inputs into the model.

The results of the study show that three out of the four farms that was bought in the Williston area are over valuated which mean that the farmer (investor) does not received his expected return as compared to the benchmark's return. Farmers need to generate more income and NOPAT to get the expected return. The only way to do

this in the Williston area is to manage the farms more effectively and generate more numbers of lambs per unit.

During the study, there is no provision made for compensation for the farmer / shareholder. The study focuses only on the valuation of agricultural property on a production point of view

Even though the study and model focus only on NOPAT and cash yield it is important for other studies to investigate more value-based management metrics for the agricultural environment.

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Table of Contents

Abstract	i
Acknowledgements.....	iv
List of Tables	ix
List of Figures.....	x
Table of Abbreviations	xi
Chapter 1 - Background: Valuation of agricultural property.....	. 1
1.1. Introduction.....	1
1.2. Problem statement.....	4
1.3. Research goals	5
1.3.1. Primary objective	5
1.3.2. Secondary objective	5
1.4. Scope of Study	5
1.4.1. Field of Study	5
1.5. Research methodology	5
1.5.1. Literature study	6
1.5.2. Empirical Study	6
1.5.2.1. Selection of data	7
1.5.2.2. Population study and sampling method	7
1.5.2.3. Data collection.....	7
1.5.2.4. Data analysis.....	7

1.6. Limitation to the study	7
1.7. Interpretation of the study	8
Chapter 2 - Farming – Value-based management and valuation of farm property	10
2.1. Introduction.....	10
2.2. Value-based management.....	10
2.2.1. Value-based management principles.....	10
2.2.2. Advantage of value-based management	12
2.2.3. Disadvantage of value-based management	13
2.2.4. Shareholder value	14
2.2.5. Value drivers of value-based management	21
2.3. Share price movement.....	24
2.4. Value-based performance measures	26
2.4.1. Economics value added	26
2.4.1.1. Calculating EVA	28
2.4.1.2. Descriptions.....	29
2.4.1.3. Advantage of EVA.....	32
2.4.2. Shareholder value added	33
2.4.3. Total shares return.....	33
2.4.4. Market value added	34
2.4.5. Cash flow return on investment.....	36
2.4.6. Residual income	36

2.4.7. Gordon growth model	38
2.5. Valuation methods and models	39
2.5.1. Earnings multiple models	39
2.5.2. Capitalization of current earnings approach	39
2.5.3. Discounted cash flow model.....	40
2.5.4. Net assets value approach	45
2.5.5. P/E ratio as valuation model.....	45
2.6. Value-based management in the farming environment.....	46
2.7. Summary	48
Chapter 3 - Empirical study	49
3.1. Introduction.....	49
3.2. Research procedure.....	49
3.3. Data analysis	49
3.4. Variables included in the data analysis	50
3.4.1. Independent variable	50
3.4.2. Dependent variable.....	50
3.4.2.1. Production unit adjustment factor	50
3.4.2.2. Hectare needed per real weight production unit	50
3.4.2.3. Carcass weight of progeny marketed per production unit	51
3.4.2.4. Income generated per benchmark production unit	51
3.4.2.5. Net operating profit.....	51

3.4.2.6. Net operating income after taxes (NOPAT) per production unit	51
3.4.2.7. Determination of agricultural land value	51
3.5. Model	52
3.5.1. Production inputs.	52
3.5.2. Directly allocate variable costs and overhead cost	53
3.5.3. Income statement	54
3.5.4. Required return.	55
3.5.5. Determining of agricultural land value.....	56
3.5.6. Loan amount that can be serviced per production unit.	57
3.6. Summary	57
Chapter 4 - Conclusions and recommendations	58
4.1. Introduction.....	58
4.2. Results and conclusions	58
List of References	63

List of Tables

Table 2.1: Business factors and risk premium	31
Table 2.2: VBM in the farming environment	46
Table 3.1: Production input.....	52
Table 3.2: Directly allocate variable costs in the Williston area	53
Table 3.3: Overhead cost	53
Table 3.4: Income statement for benchmark farm.....	54
Table 3.5: Average total return of urban properties over the past ten years.....	55
Table 3.6: JSE All Share index	55
Table 3.7: Long term benchmark from the urban property and stock exchange	56
Table 3.8: Required rate for the benchmark farm.....	56
Table 3.9: Determining of agricultural land value.....	56
Table 3.10: Loan amount that can be serviced per production unit.	57
Table 4.1: Comparision of value per hectare for the benchmark and the four farms bought in 2014 in the Williston area.....	58
Table 4.2: Cash yield and long term required return.....	58
Table 4.3: Comparing the benchmark returns against the returns needed per farm bought in 2014 in the Williston area.	58
Table 4.4: Comparison between number of lambs and the four farms bought.....	59
Table 4.5: Number of lambs marketed per production unit	60

List of Figure

Figure 1.1: Number of farms, total area and average size of farms in RSA from 1918 to 2007	1
Figure 1.2: Total farming debt	3
Figure 1.3: Graphical interpretation of the studies per chapter	8
Figure 2.1: Shareholders value road map.....	15
Figure 2.2 Value Driver Tree - Financials	22
Figure 2.3: Value Driver Tree: Non - financials	22
Figure 2.4: Financial Drivers.....	23
Figure 2.5: The Discounted Cash Flow Process.....	44

Table of Abbreviations

Acronym	Term
CC	Percentage Cost of Capital
CE	Capital Employed
CEO	Chief Executive Officer
CFROI	Cash Flow Return on Investment
CY	Cash Yield
DCF	Discounted Cash Flow
DERO	Discount Equity Risk Option
EBIT	Earnings before Interest and Tax
ERCF	Equity as residual cash flow method
EVA	Economic Value Added
FCF	Free Cash Flow
GGM	Gordon Growth Model
JSE	Johannesburg Securities Exchange
MVA	Market Value Added
NAV	Net Assets Value
NOPAT	Net Operating Profit after Tax
P/E	Price Earnings Ratio
RI	Residual Income
ROE	Return on Equity

ROI	Return on Investment
ROIC	Return on Invested Capital
RSA	Republic of South Africa
SVA	Shareholder Value Added
TC	Total Cost
TSR	Total Shareholder Return
VBM	Value-based Management
WACC	Weighted Average Cost of Capital

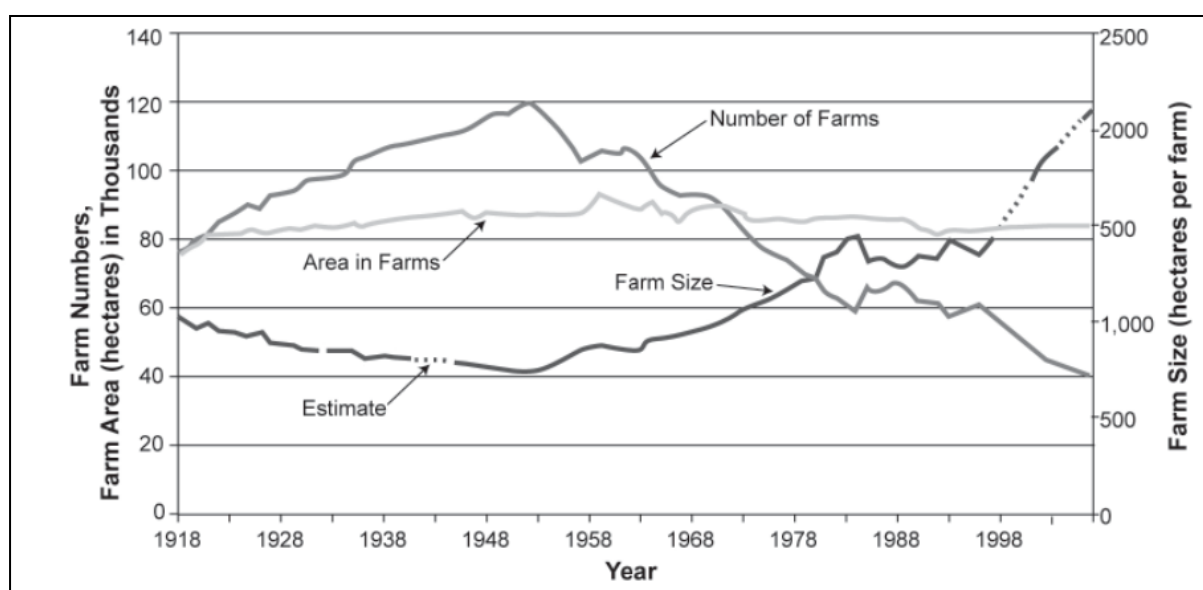
Chapter 1

Background: Valuation of agricultural property

1.1. Introduction

According to the World Bank (2013), 80.7 percent of the Republic of South Africa's (RSA) land surface is suitable for agricultural purposes. Of the mentioned 80.7 percent, only 12 percent is suitable for planting crops and 3 percent is considered good fertile soil. The rest is to a bigger or lesser extent considered meeting the needs of livestock farming. In line with the mentioned the biggest share of agricultural land in SA is used for livestock farming.

Figure 1.1: Number, total area and average size of farms in RSA from 1918 to 2007



Source: Adopted and adjusted from Liebenberg and Pardey, (2010)

Figure 1.1 shows the structural changes in South African agricultural land since 1918. According to Liebenberg and Pardey (2010: 392), the number of farming entities has decreased by about 1.23% per year. The result is that by the end of 2007 compared to 1918 the number of farming entities had decreased by almost 50 percent. Considering the latter it is interesting to note that, as expected, the hectares per farming entity had increased.

In 1960, the area being utilized for farming peaked at 91.8 million hectares. Since then a steady decline has been observed. Reason for the decline may be urbanisation of a big part of the population and lately expansion of the mining sector. Since 1996 the area has more or less stabilized at 82.2 million hectares. This means a decrease in agricultural land area of about 11.6 percent. Compared to the latter the number of farms peaked at 119600 in 1953 and then steadily decreased to almost half the number in 2007. Considering both these changes in total number of farms, as well as the area occupied by farm land, one may argue that the average farm size should have increase between 1953 and 2007. This is contra the situation before 1953 since between 1910 and 1952 farm size has decreased by almost 300 hectares per farm. According to the 2007 census figures it seems that from 1960 the size per farm has increased to an average of almost 1,833 hectares in 2002 for the country as a whole (Liebenberg and Pardey, 2010:392). It is important to note that based on preliminary figures from the census of 2009 it is predicted that the number of farm units would decrease to 39982 and the average size would increase to over 2000 hectares per farm. In line with the forecast Nedbank's' African Agriculture Review (2013:4) indicate that it is unlikely that there are currently more than 35000 commercial farms left in South Africa. In the popular press as well as scientific publications a number of reasons are listed for the decline in number of farming entities which include: safety on farms, crime, financial factors such as non-profitable farms, high inputs cost, low prices for produce, lifestyle changes and a number of others. A golden rule in the investment world is that one should not pay too high a price for an asset – the result of paying too much is that in the long term it becomes difficult to generate an acceptable rate of return. In the case of investment in farm property the same principle should apply. If one considers a situation where the price paid for the property is too high in combination with high operational input cost and low selling prices for produce – chances for meeting required return must become challenging. It is therefore essential for prospective land buyers to determine the fair value of the property under consideration based on specific assumptions derived from lifestyle and personal requirements as well as financial factors and the production ability of the land.

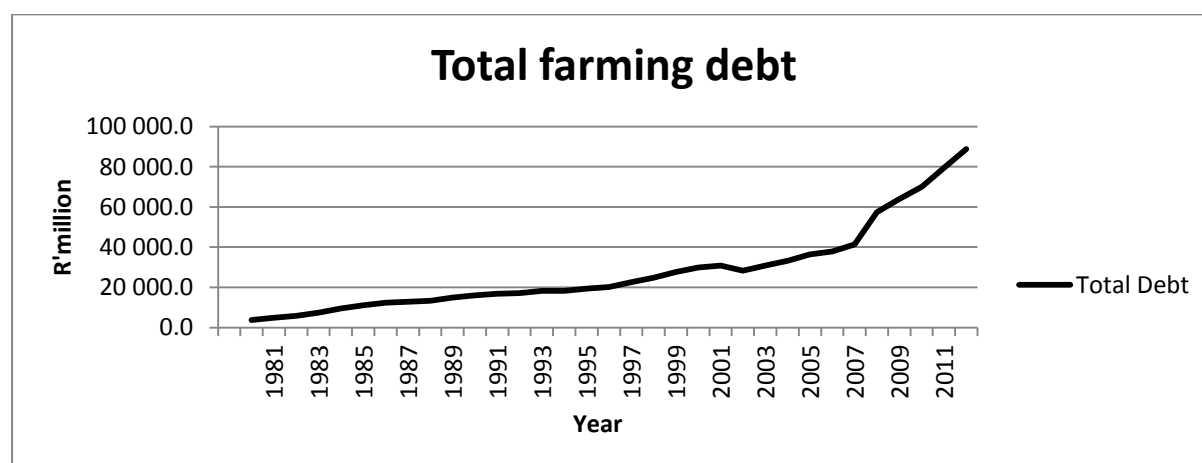
At an operational level financial factors influencing a farm's profitability are input cost versus the selling price of the produce. Input includes all production costs, amongst

others fuel, fertilizer and labour. Over the past few years a significant increase in the fuel price has influenced most of the operational agricultural functions. In addition, the fuel price has also impacted the price of fertiliser. Moreover, the exchange rate is a major role player as the price of all commodities -fuel, fertiliser and grain - is dependent on the US Dollar-Rand exchange rate.

Labour offers an ever-increasing challenge in South Africa's agricultural sector. Not only strikes, but also increased wage demands, is becoming an annual occurrence. Minimum wages have been increased by R36 from R69 to R105 per day in the past year.

It is often highlighted in the popular press that the level of debt of farmers is increasing. From the arguments above it is clear that if the rate of return on farming entities do not meet required rate of return and/or are unable to service debt it is inevitable that "farm debt" will have to increase if the farming entities have to stay in production.

Figure 1.2: Farming debt in Rand 1981 to 2011



Source: Own

According to the figures above the total farming debt has increased from R3838 million in 1980 to R88779 million in 2011. This is an increase of R84940 or 2213 percent for the period 1981 to 2011. Between 2008 and 2011 the total debt grew by R31366 million. In order to get perspective one needs to get the mentioned figure in a more digestible format and a basis that allows for comparison. The increase in total

farm debt for the period 1980 (R3838m) to 2011 (R88779m) translates into a compounded increase of around 10.7 percent per year. The mentioned 10.7 percent sounds ‘very bad’ but has the debt in real terms increased out of proportion. Considering the inflation rate over the same period it appears that inflation averages at around 10.35 percent. One therefore has to conclude that total debt has in real terms stayed relatively stable for the period under consideration. For the period 2008 to 2011 the increase in farm debt at about 11 percent per year was substantially higher than the inflation rate of about 6.6 percent per year for the same period.

Nonetheless high levels of debt for specifically small farmers certainly place a burden on the ability to survive and/or grow. One can argue that smaller farms do not succeed in providing the lifestyle requirements of the owners. Thus one may conclude a certain minimum area of land, productively producing at a specific level and purchased at a fair value is required in order to grow, survive and be sustainable.

As indicated above farms are not only getting bigger, but also more commercialised and mechanized. The latter one may argue necessitate a change in management from a farming lifestyle to a more business orientated approach. Derived from the mentioned it is concluded that decisions to invest in farming should be based on business considerations and principles. Normally in business an investment should generate a return that meets an investor’s requirements to make the investor willing to invest. Investment in a farming entity should not be different.

Based on the assumption that investment in and operating a farm entity should be treated according to “generally accepted” business principles and accepting the fact that investment in farm property requires a “huge” investment the question may be asked what the fair value of agricultural land is for a specific production system.

1.2. Problem statement

To determine a realistic investment or fair value of agricultural land for a specific production system in this case sheep farming in a Karoo area within the context of value-based management.

1.3. Research goals

The objectives of this study are divided into primary and secondary goals.

1.3.1. Primary objective

The primary object of this study is to determine based on required return and operating profitability what the fair value for agricultural land is.

1.3.2. Secondary objectives

The following can be considered secondary objectives:

- To develop, based on VBM principles a valuation model to determine, fair value for agriculture property.
- To use on the developed model to determine, according to benchmark variables, the fair value of agriculture property; and
- To use scenario analysis to demonstrate the effect of effective management on the fair value of agricultural land.

1.4. Scope of the study

With an emphasis on financial management, the study will be limited to the fields of financial strategic and creating shareholders value and packaged under value-based management

1.4.1. Field of study

The field of study for this research is financial management. The research focused on how potential and current investors can use Value-Based Management (here after referred to as VBM) to determine the value of agricultural property. The study will also focus on how VBM can be successfully incorporated into the farming business.

1.5. RESEARCH METHODOLOGY

The research was conducted in two phases: Phase one consisted of an in-depth literature study on VBM, value drivers, metrics and valuations methods. This was

followed by an empirical study on required return and operating profitability what the fair value for agricultural land is.

1.5.1. Literature study

A literature study will be done to provide a conceptualisation of Value-Based Management. The literature study will focus on the following:

- Defining VBM.
- Discussing the VBM principles.
- Assessing the advantages and disadvantages of applying VBM.
- Determining the value of shareholders.
- Identifying the value drivers of VBM.
- Identifying VBM performance measures; and
- Discussing the different valuations methods.

The following sources will be used to provide a comprehensive overview of the subjects:

- Internet articles.
- Magazines.
- Other essays.
- Other valuation models.
- Publications of other valuation companies.
- Scientific journals.
- Support and information from UFS Department of Agricultural Economics.
- Valuation roles of farm property; and
- Historical data on capital growth and dividend yield.

1.5.2. Empirical study

Data was collected by focussing on the aspects identified during the literature study.

1.5.2.1. Selection of data

The empirical study will be done by means of a quantitative study and in two steps. The first step is to build a valuation model using the knowledge regarding VBM as obtained in chapter two. Secondly historical agricultural data of a farmers study group in possession of the UFS Department of Agricultural Economics **was** obtained and used as benchmark data in the to be developed model. This enabled comparison of benchmark and actual results to determine whether a farmer receives realistic return on investment and also whether farms are under- or overpriced.

1.5.2.2. Population study and sampling method

The population study is based on the benchmark. The data on in the benchmark is made based on historical data and projections. The quantitative data that were received from the UFS is based on agricultural data from the Williston area in the Karoo.

1.5.2.3. Data collection

Data were collected from the UFS Department of Agricultural Economics database.

1.5.2.4. Data Analysis

Data were analysed by calculating agricultural land prices using the benchmark valuation model that was developed according to the literature study in Chapter 2.

Data from the UFS were compared to the assumptions data and determine whether land price is under- or overvalued. By this the study one can determine if VBM is correctly implemented or not in the farming structure.

1.6. Limitations to the study

The main focus of the study is to determine whether a farmer which focuses mainly on sheep farming receives fair compensation. A generic valuation model has been developed to determine whether the agricultural land in the area is under- or overvalued.

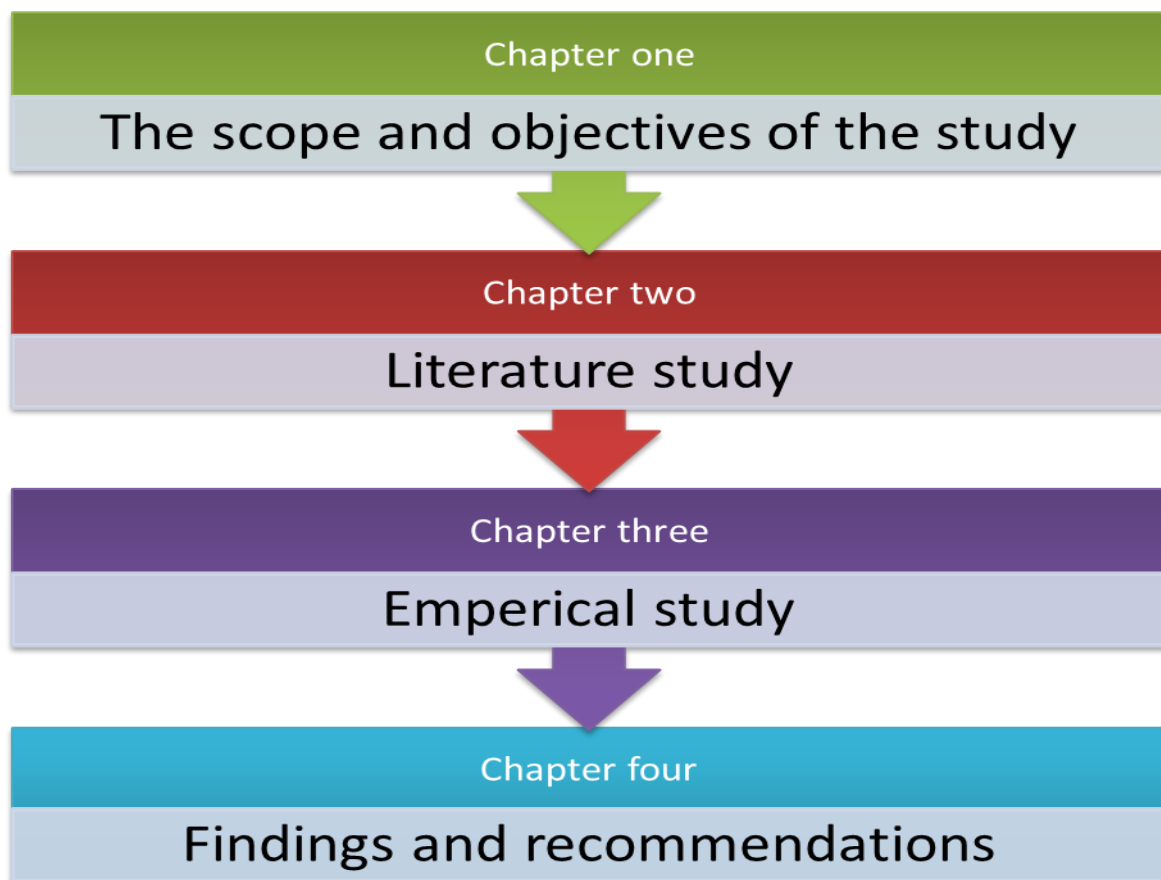
The following restrictions can be found in the study:

- The study focuses on a specific area, namely the Williston area in the Karoo and not the whole of South Africa.
- The study focuses on a small herd only and excludes other products grown on agricultural land.
- There are several variables, like price per carcass, weight per carcass, production cost and total sheep per hectare that can complicate the study; and
- The possible non-cooperation of the companies could complicate the collection of data.

A limitation may occur in that the valuation process is a very complex one. Individuals may view certain variables as superior to others. Subsequently, the valuation may differ.

1.7. Interpretation of the study

Figure 1.3: Graphical interpretation of the studies per chapter



Chapter 1: The scope and purpose of the study

The function of this chapter is to lay the foundation in order for the reader to clearly comprehend the purpose of the study.

Chapter 2: Literature study

This chapter contains the literature study providing the theoretical basis for the study. The first section of the chapter will focus on the origins of VBM, its principles, advantage and disadvantage, as well as shareholder values, and value drivers. The section will also focus on the link between VBM and the market in terms of share prices. The second section will focus on the metrics used in VBM. The final section will look into the different valuation methods used to determine the value of companies.

Chapter 3: Empirical study

In this chapter, the agricultural land price will be determined according to the valuation model that was developed. The benchmark will be compared to the actual price of agricultural properties in the Williston area.

Chapter 4: Findings and recommendations

The results of the research will be presented in the form of descriptions, descriptive tables, model and recommendations. The identified errors and short comings will stream line future valuations processes.

Chapter 2

Value-based management and valuation of farm property

2.1. Introduction

The purpose of this chapter is to provide an overview of relevant literature and theory regarding wealth creation and management. The principle of value-based management (VBM), financial performance measurement, valuation of property from a wealth management perspective and the need to create value for the shareholder (farmer) in the agricultural production sector are discussed. The approach to the principles of value management as in the corporate area is considered for application within the farming environment. Given that the focus of the study will be on the valuation of farm property from the perspective of value management particular attention will be given to valuation models in general but specifically considered for use in the farming sector.

2.2. Value-based management

VBM is not easy and are not meant to be defining by one or two definitions. VBM can be seen in two ways, one where share value is created which stimulates the economics. The other is a more narrow view of VBM considering management aspects of organisations by specifically using performance measurements as indicators of ability to create value successfully.

2.2.1. Value-based management principles

Value-based management (VBM) is defined in both financial and non-financial terms, which has the eventual tenacity to maximize the value of the corporation (Moskalev and Park, 2010).

Debnath and Tokuda (2013:46) stated the conventional financial aspects of value creation are mostly grounded on maximizing shareholder value, while the non-financial aspects of value creation concern the satisfaction of the company's stakeholders.

Manktelow, (2012) stated that VBM is both a philosophy and a methodology. As such it is indicated that every employee or person involved in an organisation that are managed according to VBM principles should know that the decisions you make on a daily basis all either positively or negatively influence to the value of the company. Therefore, VBM must be practised not only by management but by all stakeholders, therefore people at all levels in the organisation must participate in driving overall value.

According to Cupic et al. (2012:3) it is also a managerial approach in which company objectives, systems, strategies, processes, performance measurements, and culture have as guiding objective - shareholder value maximization. The simple concepts behind VBM are value and value creation.

According to Fourie (2012:14) there are four key elements differentiating VBM from other management approaches. These elements of VBM are:

- The main objective is to create value for shareholders.
- Identify the value drivers through the VBM system.
- It connects performance measurement, target setting and rewards to value creation or value drivers; and
- VBM connects decision making and action planning, at both strategic and operational level, to value creation or value drivers.

It can be concluded that wealth can only be created only when decision makers understand the VBM process and are provided with the correct information specifically regarding value drivers. Finally one may argue based on general VBM knowledge that it is important to incentivise people for making decisions that create value for an organisation. In this context one has to realise that for company to create shareholder value it needs to make investments that have a rate of return higher than the cost of capital. When the return is higher than the cost of capital wealth is created and vice versa.

Companies who have implemented a VBM system started to realise that the basic and traditional accounting performance metrics is very unreliable when it needs to determine if wealth has been created for a specified period.

The mentioned is one of the reasons why companies started to supported new value-based oriented metrics such as Economic value Added (EVA), Cash Flow Return on Investment, Shareholder Value Added and other Value-based metrics.

2.2.2. Advantage of value-based management

Value-based Management (2009b) lists the following aspects for which VBM provides consistency:

- The corporate mission (business philosophy).
- The corporate strategy (course of action to achieve corporate mission and purpose).
- Corporate governance (who determines the corporate mission and regulates the activities of the corporation).
- The corporate culture.
- Corporate communication.
- Organisation of the corporation.
- Decision process and systems.
- Performance management processes and systems; and
- Reward processes and systems.

VBM implementation aligns the interests of management with the interest of shareholders within the company. The process begins by applying the concept of economic profit, also known as economic value added (EVA), to the decisions and management practices of a business.

According to Lucintel (2006) there are various advantages for a company when implementing VBM:

- Can maximize value creation consistently.
- It increases transparency of the company.
- It helps organizations to deal with globalized and deregulated capital markets.
- Aligns the interests of managers with the interests of shareholders and stakeholders.
- Facilitates communication with investors, analysts and communication with stakeholders.

- Improves internal communication about the strategy.
- Prevents undervaluation of the stock.
- It sets clear management priorities.
- Facilitates to improve decision making.
- It helps to balance short-term, middle-term and long-term trade-offs.
- Encourages value-creating investments.
- Improves the allocation of resources.
- Streamlines planning and budgeting.
- It sets effective targets for compensation.
- Facilitates the use of stocks for mergers or acquisitions.
- Prevents takeovers; and
- It helps to better manage increased complexity and greater uncertainty and risk.

2.2.3. Disadvantage of value-based management

It's also important to understand that the VBM has some pitfalls. Companies need to get everyone involve, not only accountants and management making the VBM process too complex for the stakeholders should be avoided. Also debate should be encouraged and dissent accommodated, particularly if VBM challenges long-held beliefs.

The disadvantages of VBM according to 12 manage (2005) is as follow:

- VBM is an all-embracing, holistic management philosophy, which often requires culture change. VBM programmes are typically large-scale initiatives that take considerable time, resources and patience to be successful.
- Value creation may sound simpler than corporate strategy but is not, because it is actually more or less the same.
- Economic value added, performance management and the balanced scorecard are very powerful management support tools and processes, but each has its own costs.

- It is of the utmost importance to measure the right things, because if not, it could lead to value destruction.
- VBM requires strong and explicit CEO and Executive Board support.
- Comprehensive training and management consultancy are advisable or even necessary, but can be quite costly; and
- The perfect VBM or valuation model has not been invented yet. Any method chosen will have certain drawbacks, which should be taken into account.

Other problems that occur regarding successful implementation of VBM are that the company needs employees to accept and buy-in into the VBM system. Also some academics believe that VBM cannot serve both the needs of shareholders and costumers specifically when managers are trying to increase cash flow.

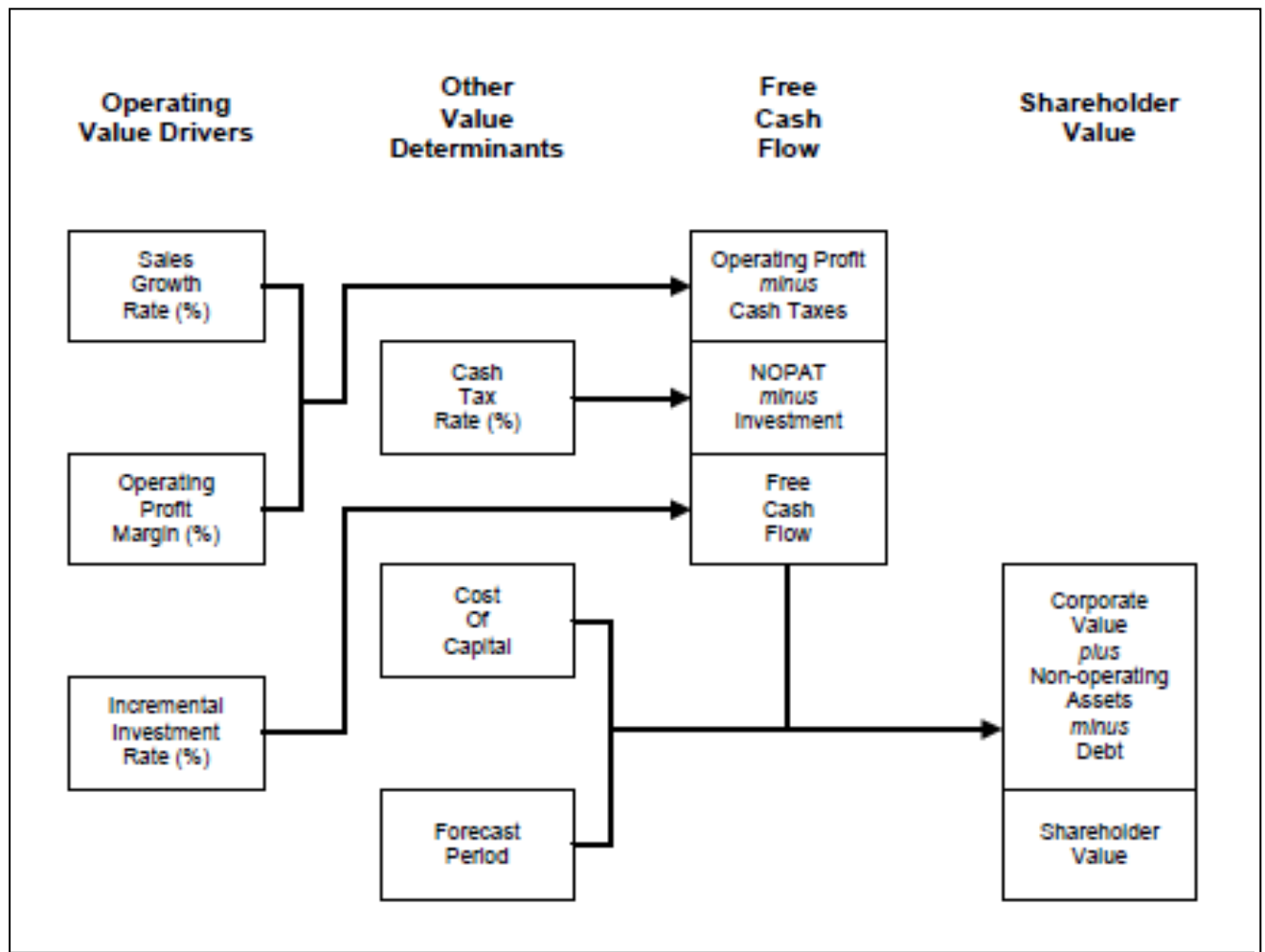
2.2.4. Shareholders value

Anon (2008) describes shareholders value as the value created for shareholders by growing earnings, dividends and share price. In other words, shareholder value is the sum of all strategic decisions that affect the company's ability to efficiently increase the amount of free cash flow over time.

Many academics and advisors prescribe that companies should be managed to create shareholders value over a period of time. However, to provide guidance on the best way to achieved this is different story. According to Fourie (2012:19) creating value is not about applying a prescribed set of tools or processes but about creating competitive advantage in the marketplace.

According to Beneke (2007:16) Rappaport and Maubossin developed in 2001 Shareholder value road map (figure 2.1).

Figure 2.1: Shareholders value road map.



Source: Adopted from Beneke, (2007:16)

Figure 2.1 shows the different relationships that are created to calculate shareholders value. Sales growth rate and operating profit margin plays a big role in calculating NOPAT. NOPAT plays a big part in calculating free cash flow (FCF). The cost of capital, forecast period and FCF helps to determine the value of an entity.

The forecasting period brings us to the next segment of share value. Managers need to decide over which time period shareholders value will be manage. The forecasting period can be a negative aspect of pursuing shareholder value. It is negative in the sense that managers and investors are neglecting long-term investments because the focus is on the next interim or quartile results. The end result is that executives are destroying the value that is supposed to be created and executives almost

always claim that pressure from the stock market was responsible for doing so (Rappaport, 2006:66).

Rappaport (2006:68) published ten principles essential for shareholder value creation which he has identified through consulting companies over an extended period of time. The ten principles are:

Principle 1: Do not manage earnings or provide earnings guidance.

“Companies that fail to embrace this first principle of shareholder value will almost certainly be unable to follow the rest” (Rappaport, 2006:68). A research on earnings was conducted, where 80% of the respondents indicated that manager are willing to decrease value-creating spending on research and development, advertising, maintenance and hiring, in order to meet the company’s earning bench mark. Some indicate that they will delay a new project and sacrifice value in order to meet the bench mark.

There are three reasons why companies should not only focus on earnings:

- The company’s value and the change in value over the period of time can be indicated by the company’s bottom line.
- Companies try to boost short term earnings by investing at rates below the cost of capital and by that compromise value that can be created; and
- Companies try to report good earnings by stretching permissible accounting to the limit. This is done by via destroying operating decisions.

Principle 2: Make strategic decisions that maximize expected value, even at the expense of lowering near term - earnings.

More and more companies evaluate strategic decision against historical earnings. Companies need to measure strategic decisions against expected incremental value of FCF. In order for a company to make strategic decision the following three questions must be answered to determine if the decision would produce the greater value:

- How do alternative strategies affect value?
- Which strategy is most likely to create the greatest value; and

- How sensitive is the value of the most likely scenario to variables such as shifts in competitive dynamics, technology life cycles, regulatory issues, and other relevant variables?

At corporate level, executives must address the following questions:

- Do any of the operating units have sufficient value-creation potential to warrant additional capital?
- Are the operating units that do not have potential, candidates for restructuring; and
- What mix of investment in operating units is likely to produce the most overall value?

Principle 3: Make acquisitions that maximize expected value, even at the expense of lowering near-term earnings.

Even though most of a company's value is created in its day-to-day operations, a major acquisition can destroy value faster than any other corporate activity.

This norm used by these companies when considering an acquisition, is to evaluate the impact on the earnings per share of the company, but it does not say anything about the deal's long-term potential to add value. Management must be able to identify when, where and how real performance gains can be achieved by estimating the present value of the resulting incremental cash flows and then subtracting the acquisition premium (Rappaport, 2006:5).

Principle 4: Carry only assets that maximise value.

Principle 4 consists of two parts:

First, value-orientated companies must regularly monitor whether there are buyers willing to pay a meaningful premium above the estimated cash flow value to the company for its business units, brands, real estate and other detachable assets.

Secondly, companies can reduce the capital employed and increase value by focusing on high-value activities such as research, design and marketing, where the company enjoys a comparative advantage. Companies can also outsource low value-added activities that can be reliably performed by others at lower cost, such as manufacturing (Rappaport, 2006:5-6).

Principle 5: Return cash to shareholders when there is no credible value creating opportunities to invest in the business.

Various companies especially well established companies tend to have retained capital on hand. Companies tend to have excess when there limited value creating investment opportunities in the market. When companies has large amount of excess cash is it's better to distribute some of the cash to its shareholders. The money can be return to its shareholders in form of dividend and share buy-back. A company only buys back shares when the company's shares are trading below its estimated market value. Dividends are paid out if the company's share price is higher than the expected value. When buying back shares, a company will improve is EPS.

Principle 6: Reward CEOs and other senior executives for delivering superior long-term returns.

Rappaport (2006:6) stated that a company needs to have incentives in place for maximizing the potential for superior return. According to Rappaport (2006:6) standard stock option is an imperfect vehicle for motivating long term, value maximising behaviour. There are three reasons for this:

- Standard stock options reward performance well below superior return levels. In a rising market, executives realise gains from any increase in share price.
- The typical vesting period for stock options is between three and four years, and coupled with executives' inclination to cash out early, the long-term motivation that is intended with stock options is diminished; and

- When options are hopelessly below strike price, the ability of these stock options to motivate all is lost.

By adopting a discounted indexed-option plan or a discounted equity risk option (DERO) plan, a company can overcome the above problems. By adopting an indexed-option plan, a company's executives can only be rewarded when the shares of the company outperform the index of the company's peers and not because of rise in the market.

Principle 7: Reward operating-unit executives for adding superior multiyear value.

The question now is how to reward operating unit executives? Operating unit executives have limited impact on the overall performance of the company. Thus rewarding operating unit executives with a stock option program will be useless and inappropriate. Rappaport (2006:7) stated that normally companies has long and short term incentives plans that rewards operating unit executives for exceeding financial performance and goals.

Shareholders value added is a metric that is created to measure operating units' performance. The metric can be used as incentive for the operating unit. SVA is calculated by applying standard discounting techniques to forecast operating cash flow, and then subtracting investments made during the period.

Principle 8: Reward the middle managers and frontline employees for delivering superior performance on the key value drivers they influence directly.

The need for recent and direct information to guide managers and frontline employees on their daily activities will make the SVA an inappropriate metrics. SVA is not able to provide a day to day guidance on how to increase SVA. Rappaport (2006:8) suggests from experience that most businesses can focus on three to five leading indicators and at the same time capture an important part of the indicators'

long-term value-creation potential. By improving leading-indicators performance will lead to greater SVA and in turn increase long-term shareholders value.

Principle 9: Require senior executives to bear the risks of ownership just as shareholders do.

Risk accrues for a company, when executives and shareholders sell their shares shortly after they received it. Investors can interpreted this action - which the party's only focus on the short term earns instead of the long term value, which in this case will increase value of the company's share price. Companies need to try to align the interest of both parties. A share ownership guideline for senior managements can be adopted by a company to align the interest of the parties. By adopting this guideline owners of shares will be more willing to take risk to increase value of the business. Two other possible ways to balance executives and shareholders' risk are:

- To extend the time before executives can sell shares through the exercise of option; and
- Not to count restricted grants as shares.

Principle 10: Provide investors with value-relevant information.

Shareholders need to be informed better by companies. Companies should not only use financial reports because it only focuses on short-term earnings and can lessen investor's uncertainty for the time. Rappaport (2006:10) developed a "Corporate Performance Statement", which sets out to do the following:

- Separates out cash flows and accruals, providing a historical baseline for estimating a company's cash flow prospects and enabling analysts to evaluate how reasonable accrual estimates are.
- Classifies accruals with long cash-conversion cycles into medium and high levels of uncertainty.

- Provides a range and the most likely estimate for each accrual, rather than the traditional single point estimates ignoring the wide variability of possible outcomes.
- Excludes arbitrary, value-irrelevant accruals, such as depreciation and amortisation; and
- Details assumptions and risks for each line item while presenting key performance indications that drive the company's value.

2.2.5. Value drivers of value-based management

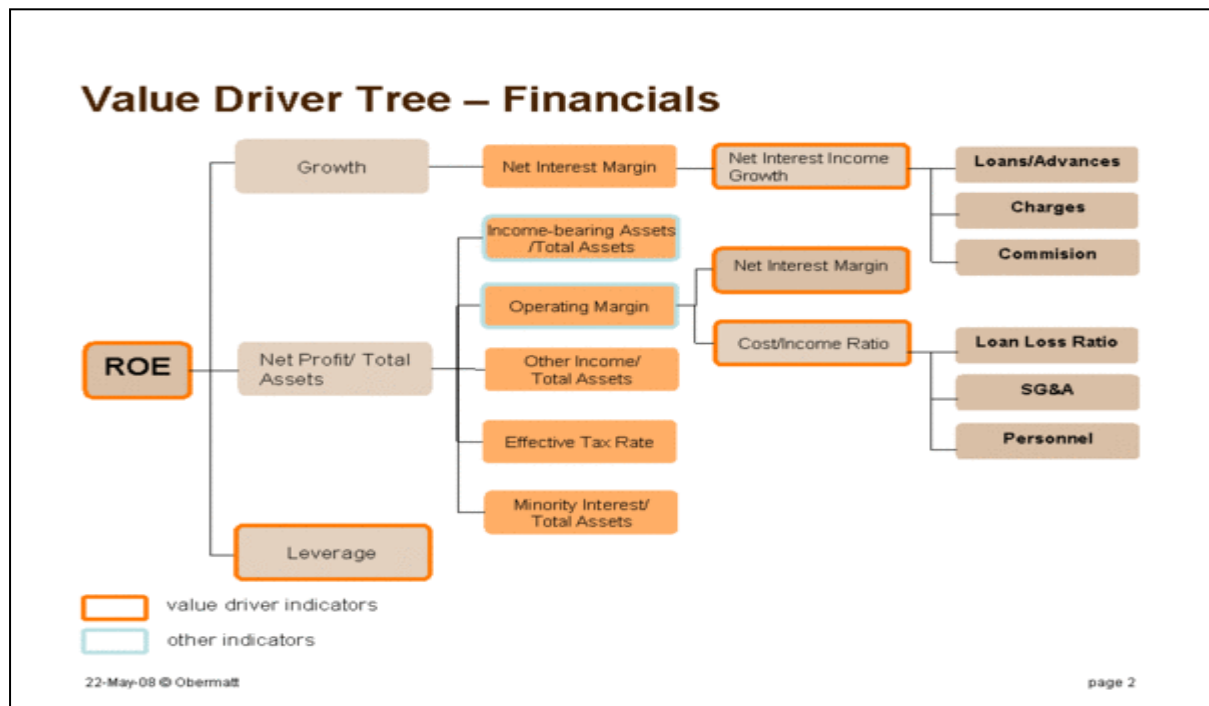
An important aspect for VBM is that a company should understand its performance variables that create value. By understanding the performance variables top managers can act not only on value but on things that influence other business activities like total production -and capital cost and sales. All performance variables that influence the company's value should be seen by the company as value drivers

Plowman (2012:50) states that there are seven so-called generic value drivers found in all organizations these are:

- Value and price, (the revenue drivers, where volume is derived either from growth in the market or growth in market share).
- Operating margins.
- Tax (using different tax jurisdictions to advantage).
- Fixed assets.
- Working capital.
- Cost of capital; and
- The length of time a company maintains a competitive advantage against competitors.

About a century ago, Du Pont created a metric concept called the value driver tree, which splits value-based metrics such as Economic value added (EVA) and Return on Investment (ROI) into "sub-metrics" to show the source of the value added. Value drivers include measures of growth, margins, capital efficiency and leverage (Obermatt, 2010). The Du Pont value tree for a financial company is depicted in figure 2.2.

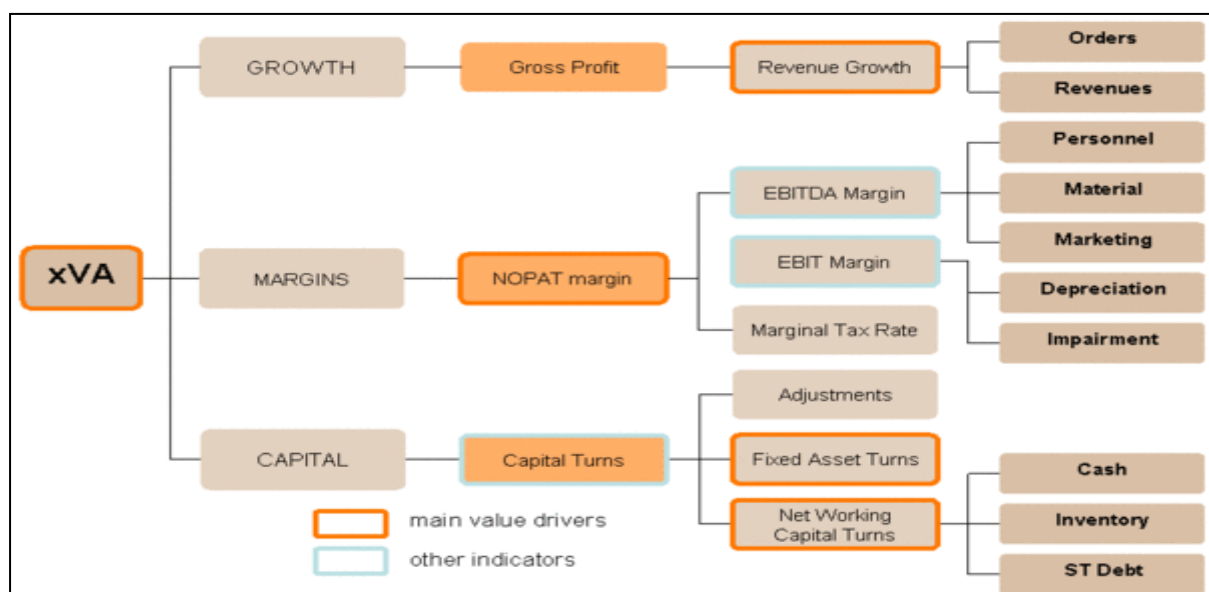
Figure 2.2 Value Driver Tree - Financials



Source: Adopted from Obermatt, (2010)

The Du Pont value driver tree (figure 2.3) for non-financial companies is depicted in figure 2.3.

Figure 2.3: Non - financials

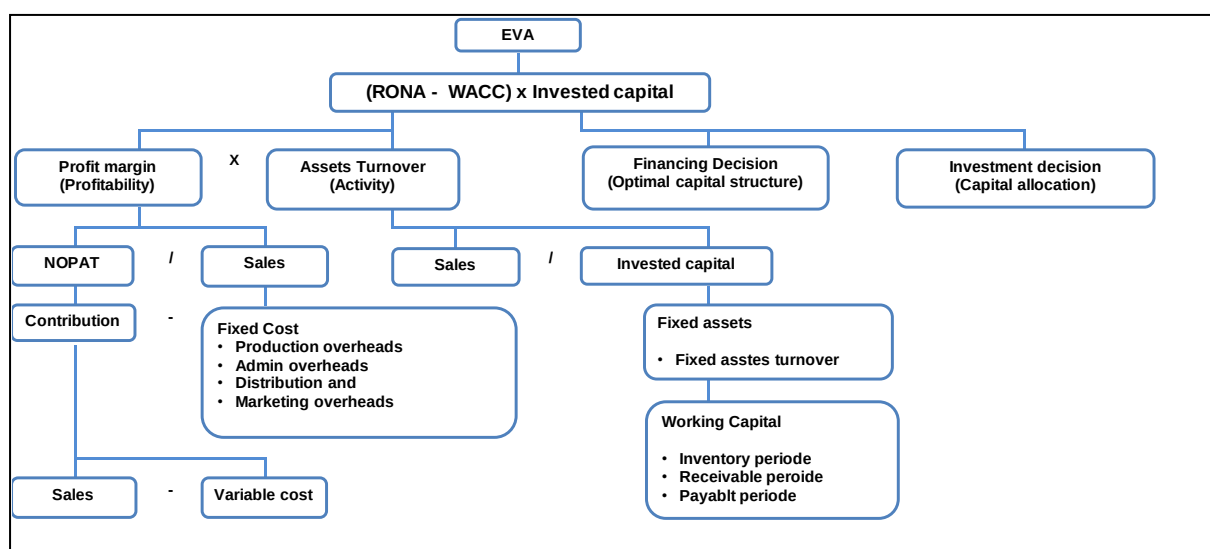


Source: Adopted from Obermatt, (2010)

From the above value driver trees one can conclude that every company will develop an own unique set of value drivers. Financial company's drivers will differ from operating business value drivers. Financial company's business is based on delivering financial services like bank and assets management. Operating company's business is based on producing products and delivering services. Each company has a unique situation for which its value drivers are used. Each value driver needs to be broken to operational levels. It's important that each value driver is reviewed on a regular basis. By reviewing the value drivers' internal and external changes can be identified.

Friedl (2012:11) also developed a value driver tree. Tree focuses on the financial drivers of the company which is based on calculating economic value added (EVA) as seen in figure 2.4. EVA is one of the most used performance-based variables.

Figure 2.4: Financial drivers



Source: Adopted and adjusted from Friedl, (2012:11)

EVA is a metrics focus strongly on value creation for its shareholders. It's also a long-term approach by using capital invested.

According to Van Eeden (2005:18-19) a company's intrinsic value is influenced by six factors. Four of which managers have under control and two factors which are beyond management's control.

The four factors under management's control

- Net operating profit after tax NOPAT.
- The tax benefit of debt associated with management's target capital structure.
- The amount of new capital invested for growth in a normal year of the investment cycle; and
- The after-tax rate of return expected from new capital investments.

The two factors beyond control

- Weighted cost of capital (WACC).
- The future period of time over which investors expect management will have attractive investment opportunities.

The controllable factors will be easily control if management uses the value drivers correctly as explained in figures 2.2 and 2.3. The two factors beyond control is mostly influence by systematic and non-systematic risks.

2.3. Share price movement

Share price shows on a daily based movement because of the market factors the influence the share price.

Pettinger (2012) stated the there are certain factors that has strong influence on the movement of the share price and the general stock market. Underlying factors affecting the stock market is:

- Economic growth. Higher economic growth or better prospects for growth will help firms be more profitable because there will be more demand for goods and services. This will help boost company dividends and therefore share prices.
- Lower interest rates. Lower interest rates can make shares more attractive for two reasons. Lower interest rates help boost economic growth making firms more profitable. Also lower interest rates make shares relatively more attractive than saving money in a bank or holding bonds. If bond yields fall, it may encourage investors to switch into shares which give a relatively better dividend.

- **Stability.** Stock markets dislike shocks that could threaten economic stability and future growth. Therefore, they will tend to fall on news of terrorist attacks or spikes in the price of oil. They will also dislike political instability which may make it difficult to pursue strong economic policies.
- **Confidence and expectations.** A key factor is the mood of investors. If they receive economic news that gives optimism then they are more likely to buy shares. If they receive bad news they will sell. This is why in the depth of a recession; stock markets can start to rise. Investors are always trying to predict the future. Therefore if they feel the worst is over the stock market can rally – even when economic fundamentals remain poor.
- **Bandwagon effect.** At times the stock market seems to over-react to certain events. For example, in 1987, relatively little bad news caused the stock market to fall 25%. Even today it remains a little mystery why the stock market fell so much – there was no economic problem. In fact the stock market soon recovered its lost ground. Part of the issue is that people follow the mood. When prices fall, people may feel the need to follow suit and get out of the market; and
- **Related markets.** Often investors have choices. For example, rather than investing in stock market, they could buy government bonds or commodities. If investors feel government bonds are overpriced and likely to fall, then the stock market can benefit as people move into shares.

Investors need to look at the following aspects of a company before buys its shares:

- Cash flow
- Cost of capital
- Non-operating assets and debt
- Market-implied forecast period

By identifying these aspects investors can see what the company's long-term view is. The cost of capital show what is the expected rate of return the company is projecting for its share.

2.4. Value-based performance measures

According to Cupic et al. (2012:3) VBM systems attempt to accomplish this goal by providing managers with a set of decision-making tools (metrics) that, at least in theory, identify which alternatives create or destroy value, and often by linking compensation and promotions to shareholder value.

The following metrics were identified and will be discussed in this study:

- Economic value added
- Shareholders value added
- Total shares return
- Market value added
- Cash flow return on investment
- Residual income
- Gordon growth model

2.4.1. Economic value added

The primary objective for companies is to maximise shareholder value and wealth. Thus companies' need successful performance measurements, who can evaluate the company's performance in the long run. According to Ryan (2011:1) in practice, many organisations use profit-based measures as the primary measure of their financial performance. Two problems relating to the use of profit for measuring the performance of a company is:

- A company's profit ignores the cost of capital. Wealth is only generated when the company generate a return in excess of the required rate of return.
- Profits calculated in accordance with accounting standards do not truly reflect the wealth that has been created, and are subject to manipulation by accountants.

EVA is a performance measurement system that aim to overcome this two weakness

EVA was introduced by GM motors in 1920, it was used as a company performance measurement but after that EVA was forgotten through the years until it was again

introduced by Stern & co in 1989. EVA according to Deuschinger and Friedl (2008:1) “is practical refinements of economists’ concept of residual income - the value remaining after a company’s stockholders and all the other providers of capital have been compensated”. EVA is a performance measure and, when linked to management payment, provides a strong incentive for managers to select and implement value-creating investments. By thus the company can determine if it creates value or are destroying value.

According to Nagan (2008:8) the EVA can also be used for the following purposes:

- To set organisational goals.
- Performance measurement.
- Determining of bonuses.
- Communication with shareholders and investors.
- Motivation of managers.
- Capital budgeting.
- Corporate valuation; and
- Analysing equities.

The question now is what will happen if EVA increase and how do we increase EVA? The answer is reasonable simple, increased in EVA means shareholders wealth are created. An increase in EVA will result that the market value of the company’s shares will increase over a period. Finance and Money (2011) stated that there are four ways to increase a company’s EVA:

- Increase operating efficiency.
- Invested only in investments that show promise to have higher returns than WACC.
- Get rid of lazy assets that earn less than WACC; and
- WACC is lowered by altering financial strategies.

By using EVA a company can implement an EVA metric which all stakeholders will understand and eliminate the confusion created by using multiple performance measures.

2.4.1.1. Calculating EVA

EVA can be calculated on various methods. In this section we will be focussing on the different methods.

The EVA formula according to Correia et al. (2008:628) is:

$$EVA = NOPAT - (CE \times WACC)$$

Where:

NOPAT = Net operating profit after tax

CE = Capital employed (Unadjusted total assets minus total liabilities)

WACC = Weighted average of cost of capital.

The above formula is generic and derived from the equations by:

- 1) Ehrbar (1998:3) stating that:

$$EVA = NOPAT - (TC \times CC\%)$$

Where:

NOPAT = Net operating profit after tax

CC% = Percentage cost of capital

TC = Total capital

- 2) Brigham and Ehrhardt (2005:110) indicate:

$$EVA = EBIT (1 - \text{Tax rate}) - (\text{Total net operating capital} \times WACC)$$

Where:

EBIT = Earnings before interest and tax

WACC = Weighted average cost of capital

3) Martin and Perry (2000:88) calculate EVA as:

$$EVA = NOPAT - (k \times CAPITAL)$$

Where:

NOPAT = Net operating profit after tax

k = Company's weighted average cost of capital.

CAPITAL = Total capital invested

Brigham and Ehrhardt (2005:110) also developed an alternative formula for EVA. That calculates EVA in terms of ROIC.

The alternative EVA was calculated as:

$$EVA = (\text{Operating capital}) (\text{ROIC} - \text{WACC})$$

Where:

Operating Capital = the sum of net operating working capital and operating long term assets. It is the total amount of capital needed to run the business.

ROIC = is the ratio of NOPAT to total operating capital

WACC = Weighted average cost of capital.

All above equations although different according to variables used and the names applied to variables are actually based on the same variables and the same underlying principle.

2.4.1.2. Descriptions

To calculate EVA it's important to know the terms en descriptions that are used in the formulas and calculations.

- Weighted average cost of capital

Obaidullah (2011) define weighted average cost of capital (WACC) as the average after tax cost of all the sources. It is calculated by multiplying the cost of each source

of finance by the relevant weight and summing the products up. In other words WACC is calculated by the cost of equity plus the cost of debt as shown as follow:

$$WACC = w_d r_d (1 - T) + w_{ps} r_{ps} + w_{ce} r_s$$

Where:

W_d = weight of debt

r_d = after tax cost of debt

w_{ps} = weight of preferred equity

r_{ps} = cost of preferred equity

w_{ce} = weight of common equity

r_s = cost of common equity

- Cost of equity

Capital Asset Pricing Model (CAPM) is the commonly used method to determine the cost of equity for companies.

$$CAPM = K_{RF} + \beta(M_{RP})$$

Where

K_{RF} = The risk-free rate of return

β = Beta of the company

M_{RP} = Market risk premium

In theory, the risk-free rate (K_{RF}) is represents the interest an investor would expect from an absolutely risk-free investment over a specified period of time. The investor will accept risk if the return rate is greater than the risk-free rate.

Beta (β), measure the volatility of a share's rate of return in relation to the rate of return of the market. A share that is more volatile than the market has a beta above one. Shares that are less volatile than the market have betas of less than one. Shares which are more risky have the potential for higher returns if the investor is willing to take on the risk.

According to Van Eeden (2005:51) Damodaran developed a list (figure 2.1) that shows the risk premiums for specified categories of risk - based on the presence of specified risk factors for the unlisted business sector.

Table 2.1: Business factors and risk premium

Category	Risk Premium	Factors
1	6 - 10%	Established business; strong second-line management; history of stable earnings; predictable future
2	11 - 15%	Established business in a more competitive environment; good second-line management; stable earnings; more or less predictable future
3	16 - 20%	Business in a highly competitive industry that requires small capital investment to enter; good performance in past years, but uncertain future
4	21 - 25%	Small business that depends on the skill of one or two people; or larger businesses that are highly cyclical; very uncertain future
5	26 - 30%	Small "one-man" businesses of a personal service nature where the continuity of income is doubtful

- **Capital**

Anon (2007) define capital as money, property, and other valuables which collectively represent the wealth of an individual or business. Net working capital is defined as the excess of current assets over operating current liabilities. In most cases it equals cash plus accounts receivable plus inventories minus accounts payable minus accrued expenses (Obaidullah, 2013). Net operating working capital (NOWC) is different from (net) working capital which simply equals current assets minus current liabilities. NOWC is use to calculated the free cash flow of a company.

- **Net operating profit after tax (NOPAT)**

NOPAT is metric measuring the company's profit before interest rates. The metric doesn't include savings on tax because of the existing debt the company has.

$$NOPAT = EBIT \times (1 - Tax Rate)$$

- **Return on invested capital (ROIC)**

The ROIC ratio is seen by investors as a more informative ratio than Return on Assets (ROA) and Return on Equity (ROE). ROIC is calculated by dividing NOPAT by the invested capital. ROIC tells an analyst how efficient the firm was in investing capital in profitable investments (Saliq, 2011).

The ROIC and WACC needs to be measured against each other because WACC is minimum return rate that a company must earn for its shareholders. For investment purposes ROIC value needs to be greater than WACC, which mean wealth and value is being create for shareholders. ROIC is calculate as follow:

$$ROIC = \frac{NOPAT}{Total\ Operating\ Capital}$$

2.4.1.3. Advantage of EVA

Economic value added (2010:6) lists advantages of using EVA:

- EVA is closely related to NPV. It is closest in spirit to corporate finance theory
- That argues that the value of the firm will increase if it takes on positive NPV projects.
- It avoids the problems associated with approaches that focus on percentage
- Spreads - between ROE and cost of equity, and ROC and cost of capital. These approaches may lead firms with high ROE and ROC to turn away good projects to avoid lowering their percentage spreads.
- It makes top managers responsible for a measure that they have more control over - the return on capital and the cost of capital are affected by their decisions - rather than one that they feel they cannot control as well – the market price per share; and
- It is influenced by all of the decisions that managers have to make within a firm - the investment decisions and dividend decisions affect the return on capital (the dividend decisions affects it indirectly through the cash balance) and the financing decision affects the cost of capital.

2.4.2. Shareholder value added (SVA)

The origins of the shareholder value view can be dated all the way back to economist Adam Smith. In *The Wealth of Nations*, Adam Smith argued that the individuals pursue of wealth will create a capitalistic society for everyone's benefit (Jensen and Wittrup, 2012:8).

According to Jensen and Wittrup (2012:8) the following major developments have led to the increasing use of shareholder value:

- Globalization and deregulation.
- The end of capital and exchange controls.
- Advances in IT.
- More liquid securities markets.
- Improvements in capital market regulation.
- Generational changes in attitudes towards savings and investments; and
- The expansion of institutional investments.

Alfred Rappaport developed SVA in 1980 and it's metric which reflects a company's performance in a way that is meaningful to shareholders. The primary goal of any company should be to increase the returns to shareholders, not necessarily to create value for the company as a whole. Companies looking for very high shareholder value added believe that management should make decisions for the company that caters to shareholder interests first and foremost (Anon, 2010).

The SVA methodology is an approach to assist management in the decision making process. Its applications include performance monitoring, capital budgeting, output pricing and market valuation of the entity.

SVA is calculated as follow:

$$SVA = NOPAT - \text{Cost of Capital}$$

2.4.3. Total shareholders return (TSR)

TSR measure the actual return that the company shareholders received. The TSR also serve to measure wealth created for shareholder, however, TSR must take into

account the risk-adjusted opportunity costs that the shareholder face (Sharma, 2013:81).

Dividend and expansion in market capitalization are two ways in which shares can be increase, TSR takes into account the sum of these two factors. TSR measure the performance of the shares with the help of market value of the shares and dividend (Sharma, 2013:86).

$$\frac{P_{t+1} + P_t - D_{t+1}}{P_t}$$

Where:

P_{t+1} = End of the period share price

P_t = Beginning of the period share price

D_{t+1} = Dividend paid at the end of the period

According to Agarwal et al. (2008) a better approach to understanding TRS breaks up the metric into four fundamental parts:

- Operating performance of a company
- Share market value at the beginning period
- Changes in share market expectations; and
- Its financial leverage.

2.4.4. Market value added

Obaidullah (2013) defines market value added as it represents the wealth generated by a company for its shareholders since inception. MVA is not a performance metric like EVA, but instead is a wealth metric; measuring the level of value a company has accumulated over time.(Hara and Pruthy, 2014:2).

According to Anon (2010) MVA is an important metric for companies because:

- Management's performance is measured with this metric.
- The general market is reflected by this metric.

- Management has a part in it but not entirely. In a bull stock market, the amount contributed by management may even be negative, but the overall market may be driving the MVA into positive territory; and
- This calculation does not take into consideration any cash payments that have been paid out to shareholders in the interim nor does it measure the opportunity costs in relation to alternative investments.

MVA can be calculated out of the two perspectives:

The shareholders:

$$\text{MVA} = \text{Market value} - \text{Total common shareholders' equity}$$

Where:

$$\text{Market value} = \text{Total shares outstanding} \times \text{Current market price}$$

Total common shareholders equity = the invested capital the shareholders as invested in the company.

And investors:

$$\text{MVA} = \text{Market value of the company} - (\text{Book value of equity} + \text{Book value of Debt}).$$

The above calculations shows that the market value of the company's shares needs to exceed the total shareholders' equity. If this is the case and the MVA is positive the company has added value and vice versa. High MVA indicates that in this period the company has created wealth for his shareholders. Thus the higher the MVA is for the company, the better.

MVA can be improving by the following:

- Positive financial performance over a extend period of time
- Improve the shares book value; and
- Increasing the share price.

Hara and Pruthy (2014:2) stated that EVA and MVA are directly linked. If EVA is decreasing MVA will also simultaneously decrease and this will have a negative impact on the company's growth.

2.4.5. Cash flow return on investment

Cash flow return on investment (CFROI) is the indicator that helps a firm to evaluate the performance of an investment or product. It can also be termed as the calculation that helps the stock market to set prices on the basis of cash flow (Anon, 2012).

CFROI and Return on investment (ROI) shows what is the company's return on investment in percentage. Dispute that CFROI and ROI shown same characteristics, CFROI is far more complex to calculate than ROI.

CFROI is calculated as follow:

Cash Flow Return on Investment =

Cash Flow before Interest and Taxes / Capital Employed

Where ROI is calculate as:

Return on investment = Net profit / Capital Employed

CFROI takes in account adjustments in inflation and changes in depreciation, also calculate the present value of money. CFROI removes the influence of accrual accounting because the cash flow is calculated by using NOPAT. ROI is calculated after non-operating items, such as interest receivable, investment income and interest payable. By using NOPAT to determine return on investment, CFROI and EVA are more alike than CFROI and ROI. CFROI and EVA are compared to cost of capital. To increase CFROI, the company needs to increase his cash flows.

2.4.6. Residual income

Rehman (2014) define residual income as the net operating income that an investment centre earns above the minimum required return on its operating assets.

According to Donnelly (2013) RI can be calculated as follow:

$$R_{it} = X_t - rB_{t-1}$$

Where:

R_{it} = Residual income for year t

X_t = Equity Profit

r = Cost of Equity Capital

B_{t-1} = Book Value of Equity at beginning of period t (end of $t-1$)

This formula can be re-arranged to demonstrate that RI is also the spread between the return on equity (ROE) and the cost of equity times opening book value.

$$RI = [ROE - r]B_{t-1}$$

Where:

ROE = Return on Equity

r = Cost of Equity Capital

B_{t-1} = Book Value of Equity at beginning of period t (end of $t-1$)

According to Fourie (2010:35) there are three key factors that influence economic profit:

- The return on capital achieved.
- The cost of capital.
- The growth of new capital.

According to AccountingTools (2012) the residual income approach may not be as superior as was indicated by the preceding example, for three reasons:

- If a business only has a limited amount of cash available for investment in assets, it may have to use a variety of selection criteria to establish the best possible mix of investments, not all of which may be based on residual income. Other factors, such as risk mitigation and compliance with environmental regulations, may also be considered.
- Under throughput analysis, the only factor that matters is the impact of a proposed investment on the ability of a business to increase its total throughput (revenue minus totally variable costs). Under this concept, the

main focus is on either enhancing throughput through the bottleneck operation or in reducing operating expenses. This analysis requires a consideration of bottleneck usage by the likely mix of products to be manufactured, and their margins. This is a much more detailed analysis than is contemplated under the more simplistic residual income approach; and

- If the residual income method is calculated from estimates of future results, then there is a risk that the estimates will be so inaccurate as to render the results of the analysis invalid.

2.4.7. Gordon growth model

The Gordon growth model (GGM) is a commonly used version of the dividend discount model (DDM). The model is named after finance professor Myron Gordon and first appeared in his article "Dividends, Earnings and Stock Prices," which was published in the 1959 edition of Review of Economics and Statistics (Springer, 2011).

Using the Dividend Discount Model to value the price of the stock, we sum all the company's future dividends, which in this case are assuming to grow at a constant rate (Karlsson and Osterlund, 2011:11).

GGM is calculated as follow:

$$\text{Value of stock} = \frac{D_1}{r - g}$$

Where:

D_1 = Dividend per share

r = Required rate of return

g = Growth rate

2.5. Valuation methods and models

There are different methods and models developed to evaluate the value of a company's share.

2.5.1. Earnings multiple models

The earnings multiple model is based on using future projected earnings and applying an appropriate multiple. The earnings multiple is an easy model to understand and is used to commonly in the valuation of listed and unlisted companies.

The earnings multiple approach have some difficulties with the calculation of earnings and the selecting of good multiple. Mostly companies used earnings multiples to determine the value of the company. In most cases EBIT is used with price earnings or cash flow multiple. Investors can also replace EBIT with NOPAT.

$$\text{Value of company} = \text{EBIT or NOPAT} \times \text{Multiple}$$

Investors are aiming to buy companies with low value because of the low multiples. Then add value by increasing earnings and sell the company at a higher price because of the higher multiples.

2.5.2. Capitalisation of current earnings approach

This approach is more suitable when a company is uncertain or indicative of its future operation. The capitalisation of current earnings approach is based on historical earnings or cash value to determine the value of a company.

$$\text{Value of the company is} = \frac{\text{Cash flow}}{k - g}$$

Or

$$\text{Value of the company is} = \frac{\text{Net income}}{k - g}$$

Where:

$k = \text{Weighted cost of capital}$

$g = \text{the growth rate}$

One can consider this model to use in the empirical model especially the valuation model using net income.

- **Capitalisation rate**

The capitalisation rate of a company can be derived from the company's discount rate. The discount rate is determined based on the company's WACC. To calculate the capitalisation rate the assumption is made that the business has a constant growth rate or the average growth rate that is determine for the period. The capitalisation rate is calculated as follows:

$$\text{Capitalisation Rate} = (\text{Discount Rate} - \text{Growth Rate}) / (1 + \text{Growth Rate})$$

2.5.3. Discounted cash flow model

Athanassakos (2013:2) define the DCF valuation method is based on the principle that the value of an asset is the present value of the expected cash flows resulting from the use of the asset. The DCF determine the value of the company as the present value of expected future cash flow, discounted to present value at a composite cost of capital.

$$\text{Firm Value} = \frac{S (\text{Operating Free Cash Flows}_t)}{(1+r)_t}$$

Where:

$S = \text{the operating free cash flows in period } t$

$t = \text{number of periods}$

$r = \text{Discounted rate or WACC}$

According to Athanassakos (2013:2) three fundamental question must be answer when using the DCF method:

- How is the cash flow defined?

- The period of the projected cash flow?
- What is the discount rate for the cash flow?

These questions need to be answered to get a correct cash flow for the valuations.

The DCF methods can be used in two different ways;

- Free cash flow method (FCF)
- Equity as residual cash flow method (ERCF)

The FCF is the amount of cash a business generates after all expenditures are subtracted including capital expenditures. The ERCF attempts to capture the extra value that an investor can receive beyond opportunity cost.

Athanassakos (2013:3) stated that he prefers the FCF method more than the ERCF method because of the following four reasons.

- The ERCF arrives directly at the value of the company's equity. By this method doesn't provide the company with enough information about the source that create value and the identifying value creating opportunities.
- FCF are calculated before debt payments, which will make the projections less likely to be negative.
- Using the FCF valuation approach, we do not have to consider explicitly the cash flows related to debt, as FCFs are before debt-related charges cash flows. However, interest rates and the capital structure of the company may still affect company (and eventually equity) value through their effect on the company's Weighted Average Cost of Capital (WACC); and
- The two valuation approaches will eventually give the same equity value as long as consistent assumptions are made about growth, and as long as debt and debt-related instruments are valued correctly and the discount rates used to discount cash flows correctly reflect the riskiness of each cash flow stream.

The FCF is calculated as follows:

$$\text{Free Cash Flow (FCF)} = \text{EBIT} (1 - \text{tax rate}) - (\text{Capital expenditures} + \text{Depreciation} - \text{Change in net working capital}).$$

The above calculated FCF will be used in DCF method to determine the value of the company as shown below:

$$\text{Value of the company} = \sum_{t=1}^n \frac{E(FCF_t)}{(1+K)^t} + \frac{TVF_n}{(1+K)^n}$$

Where:

FCF_t = the free cash flows to the company expected over the explicit forecast period

K = the company's weighted average cost of capital (WACC)

n = the number of years of the explicit forecast period

TVF_n = the terminal value of the FCFs at the end of the explicit forecast period.

t = number of periods

The value of the company is determined by the expected future cash flow or the projected free cash flow. The future cash flow will be determined by forecasting earnings, net capital and working capital. The company will use an expected growth rate to calculate the future operating income. Some companies use past growth rate or use analyst forecasting to make estimates. The expected growth rate in operating income is calculated as follow:

$$\text{Expected growth rate} = \text{Return on capital} \times \text{Reinvestment rate}$$

Where:

$$\text{Reinvestment rate} = \frac{\text{Capital expenditure} - \text{Depreciation} + \text{Net working capital}}{\text{EBIT} (1 - \text{tax rate})}$$

$$\text{Return on capital} = \text{NOPAT} / \text{Capital invested}$$

The projection of the cash flow needs to come to an end in the future by computing a terminal value for the cash flow at the end of this period. The value of a bond at maturity, or of an asset at a specified, future valuation date, taking into account

factors such as interest rates and the current value of the asset, and assuming a stable growth rate.

$$TV = \frac{FCF_0 \times (1+g)}{WACC - g}$$

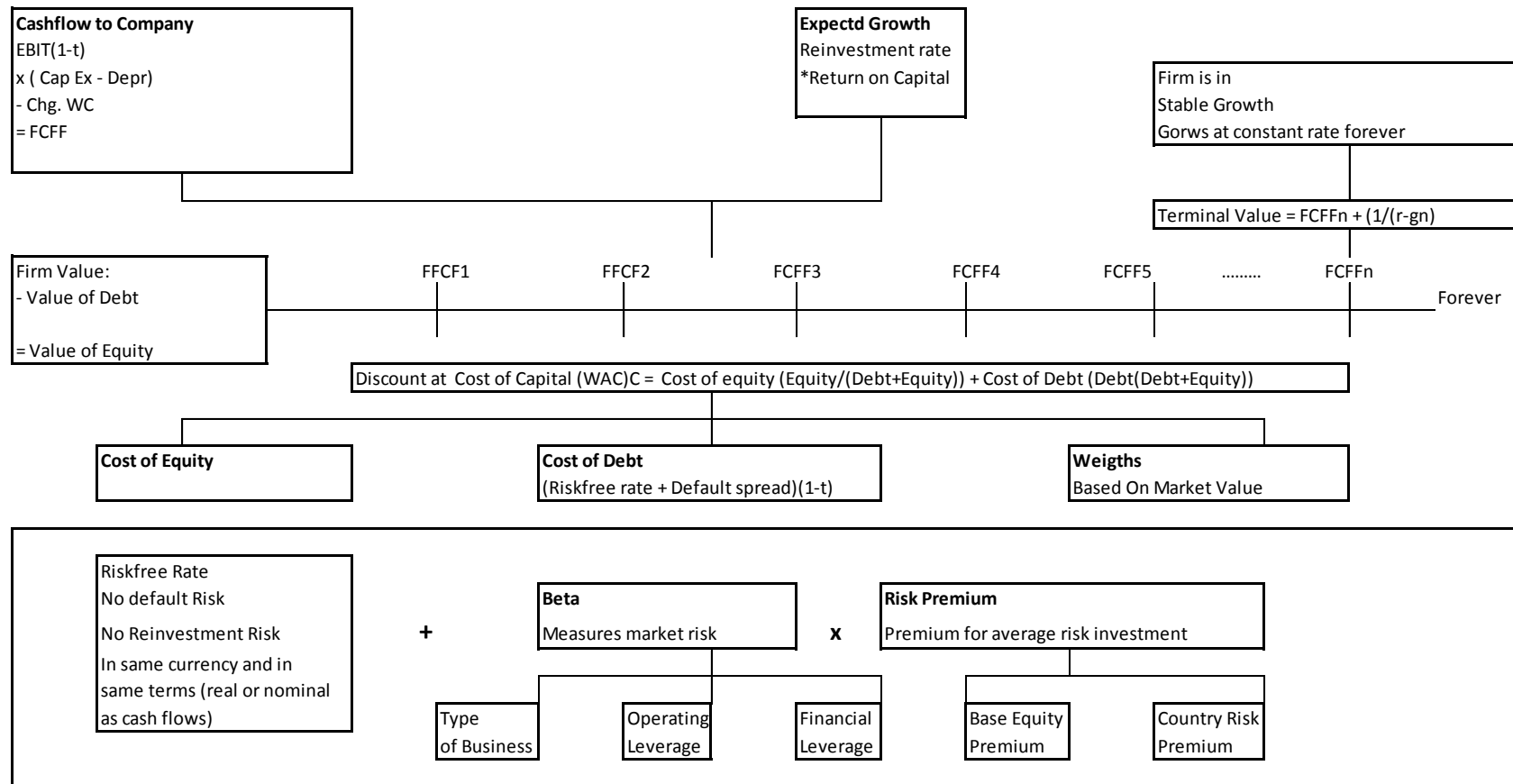
The valuator can assume that the company cannot grow forever, at higher rate than growth rate of the industry. It's important that the company's expected long-term growth rate cannot be higher than the overall industry growth rate.

The valuation process will be as follow to determine the value of the company.

- The starting point for the valuation of a company is the determine how long high growth will last;
- How high the growth rate will be in this period of time;
- The cash flow for this period;
- Determine the terminal value; and
- Discounting the cash flow and terminal value back to the present value.

The valuation process using the DCF is summarising in Figure 2.5.

Figure 2.5: The Discounted Cash Flow Process



Source: Adopted Van Eeden, (2005:46)

2.5.4. Net assets value approach

Net assets value approach is limited to number of situations where it's use to use to determine the value of a company. The NAV approach is generally used if the company is subjected to the following

- Investment company with tangible assets;
- Has a volatile earning history or has no earning history; and
- Are not going to continue with operations because of future concern.

The NAV approach consisted of two methods: Adjusted Book value –and Liquidation Value Method. The methods don't focus on company's earning potential but rather on the sale of the company's assets.

The Adjusted book value methods adjusted the book value of the assets and liabilities to the fair market value to determine the value of the company. Liquidation value method is when a company were to be sold rather than liquidated; both liquidation value and intangible assets would be considered to determine the company's going-concern value. Value investors will look at the difference between a company's market capitalization and its going-concern value to determine whether the company's stock is currently a good buy.

2.5.5. P/E ratio as valuation model

The price/earnings ratio is one of the most used valuation method to investors with limited business knowledge. Analysts use the P/E ratio method to compare the values of companies quoted on the stock exchange. The method is not always site able for small or unlisted businesses because the method only represents the value of established companies with steady profit.

The value of the P/E ratio is determined by dividing the market value per share by the after tax earnings per share. For example of the share price of a company is R10 and the earnings per share is R2, then the P/E ratio for the company is 2. Thus the company value will be determined for each R1 generates in earnings it will be multiplied by 2, to get the value of the company. So the higher the ratio, the higher the value you place on

the business. An unlisted business is usually valued at between five and ten times its annual net profit, depending on its history.

2.6. The value-based management in the farm environment

In Table 2.2 the value-based management (VBM), financial performance measurement, valuation of property from a farming perspective and the need to create value for the shareholder (farmer) in the agricultural production sector are discussed. The approach to the principles of value-based management as in the corporate area applied for use within the farming environment to evaluate.

Table 2.2: VBM in the farming environment

Value driver and metrics	Description
Share price/Price per hectare	The share price in the farming environment for this study will be the price per hectare The price per share will be calculated accordingly to dividend yield and dividend received The dividend per share is profit per sheep/lamb per hectare
Share price movement	The price per hectare movement will be influence by the following: • Weight per carcass • Price per carcass • Dividend yield • Production cost Share price movement is the increase and decrease in Rand per hectare
Value drivers:	
Growth	For the farmer to generate growth he needs to generate more revenue and profit.

	In this study the farmer needs to increase the following: • The weight and selling price per carcass • The reproduction success rate of the ewe
Margin	The margin is mainly driven by NOPAT margin. Using NOPAT the farmer can have a more accurate look of its operation because it doesn't include the tax savings the farmer will receive because of the existing debt the farm have. Margin can only increase when growth occurs and production cost decline. The tax rate that will be used in this study is 30%
Capital	The capital invested is determine by the working capital plus fixed capital or fixed assets. The cost of capital will help the farmer to determine the minimum rate of return for his investment. Capital will mostly be used for buying shares or hectares in the case of the study
VBM Metric:	
EVA	Most of the VBM metrics will be determine on the same principles than which is used for businesses and companies. EVA will be determining accordingly to NOPAT, capital employed which will be the farm and WACC.
TSR	By determine the price per hectare and

	profit per sheep/lamb the TSR can be determined. Growth rate in agricultural land is inflation plus 2-4% per year.
MVA	The market value added is just the difference in price per hectare of the period.
Gordon Growth model	The Gordon Growth model can be used to evaluate the price per hectare using the dividend per share, the growth rate of the price per hectare and WACC. By using dividend per share and dividend yield one also can determine the price per hectare

2.7. Summary

One of the main, if not the main requirement of an investor, is a return on an investment. Over the years, a number of metrics have been developed to help companies implement value-based management systems, such as FCF, DCF, SVA, MVA, CFROI, ROIC and SVA. Stern and Stewart developed one of the most popular VBM metrics, namely EVA. Value-Based Management is not only a method of maximising shareholders' values it also helps encouraging employees to think and act like owners. It is important for every investor to understand VBM from principles to the advantages and disadvantages.

Chapter 3

Empirical study

3.1. Introduction

Over the last period of time VBM became popular method to determine the financial position of a company. Many companies have adopted methods to determine if value is being added or destroyed.

VBM is mostly developed for corporations and not for the agricultural environment like farms. In Chapter two we looked at the literature of VBM and how it can be incorporate into the farming environment.

3.2. Research procedure

In order to determine whether land price is over or under value a quantitative approached where followed. The quantitative analysis was done making use of historical data and comparing it the actual data. A model is developed to determine the value of land per hectare.

The research procedure was firstly to develop a valuation model using the knowledge and equation as discussed in chapter 2. Historical data is based on the variables that will be used in this model.

The University of the Free State Department of Agricultural Economics was used to gather information about Sheep farming and farming prices in the Karoo.

The data and model does not make provision for compensation for the farmer/shareholder

3.3. Data analysis

All data was compiled from the University of the Free State database. A model based on NOPAT and cash yield were develop to determine the relationship between the dependent variables and the independent variable that were considered to have an impact on the dependent variables.

3.4. Variables included in the data analysis

3.4.1. Independent variables

There are a lot of factors that can influence the valuation of property. Based on the knowledge gained from chapter 2 and summarised in Table 2.2, eleven independent variables were considered as the most important factors in the valuation of land:

- Production unit size in hectares.
- Hectare needed per benchmark production unit.
- Benchmark production unit (ewe) weight (kg).
- Production unit real weight(kg).
- Number of lambs marketed per production unit.
- Live slaughter weight (progeny) to production unit weight ratio.
- Average carcass weight to slaughter weight ratio.
- Price per carcass.
- Production cost (Directly allocate variable costs and overhead cost).
- Tax rate; and
- Cash yield.

3.4.2. Dependent variable

3.4.2.1. Production unit adjustment factor.

The production unit adjustment factor is the change between benchmark production unit weight and production unit real weight. For example if the average real weight for an ewe is 60kg and the benchmark is 50kg, then the production unit adjustment factor will be 1.2(60kg/50kg).

3.4.2.2. Hectare needed per real weight production unit

The hectare needed per real weight production unit is total hectare that will be needed per one unit sheep. The total hectare per sheep will increase as the weight of the sheep increase and vice versa. For example if the farmer have 5000 hectare and he need 5 hectare per sheep, the farmer can household up to 1000 units on his farm.

3.4.2.3. Carcass weight of progeny marketed per production unit.

The progeny weight is calculated by multiplying the weight of the sheep by the live slaughter weight (progeny) to production unit weight ratio and the average carcass weight to slaughter weight ratio.

3.4.2.4. Income generated per benchmark production unit

The income generated per benchmark production unit is defined as the income the farmer receives after selling the slaughtered sheep. The revenue per carcass is defined as:

$$\text{Income generated per production unit} = \text{Carcass weight in kg} \times \text{price per kg}$$

3.4.2.5. Net operating profit

The net operating profit is the operational profit the farmer generates in the period of time. The Net operating profit is determined as follow:

$$\text{Net operating profit} = \text{Income generated per production unit} - (\text{Directly allocate variable costs and Overhead cost})$$

The more the production cost the least the margin is.

3.4.2.6. Net operating income after taxes (NOPAT) per production unit

In this study the net profit will be seen as the dividend to determine the share price. NOPAT can be used to determine the net profit in this study. NOPAT is defining as:

$$\text{NOPAT} = \text{Net operating profit} \times (1 - \text{tax})$$

The tax rate in this study will be constant at 28%.

3.4.2.7. Determination of agricultural land value

For this study the determination of agricultural land value will be determined with the same equation as Gordon Growth model:

$$\text{Value of stock} = \frac{D_1}{k - g}$$

- *The share price is the price one can pay per hectare for the farm.*
- *Dividend is the net operating income after taxes (NOPAT) per production unit.*
- *k and g is equalled to the dividend/cash yield.*

3.5. Model

The model is developed based on the independent and dependent variables. The calculation is based on average figures for only a one year period. The model with the assumption will be used as benchmark and will be compared to the actual data.

3.5.1. Production inputs.

The productions inputs for the valuation model are shown in table 3.1.

Table 3.1: Production input.

Production input	Units:	Sheep
Production unit size in hectares		10 000.0
Hectare needed per benchmark production unit		10.0
Benchmark production unit (ewe) weight (kg)		55.0
Production unit real weight(kg)		55.0
Production unit adjustment factor (adjust rel weight to bench mark weight)		1.0
Hectare needed per real weight production unit		10.0
Number of benchmark production units		1 000.0
Number real weight production units		1 000.0
Number of lambs marketed per production unit		1.0
Live slaughter weight (progeny) to production unit weight ratio		60%
Average carcass weight to slaughter weight ratio (meat - quarter 5 excluded))		55%
Carcass weight of progeny marketed per production unit		18.15

For the benchmark valuation we will use a 10 000 hectare farm. In the Williston area about 10 hectare will be need per unit because of the dry conditions in this area. This will gave a total of 1000 units for this farm. Accordingly to Dr. Antonie Geyer the average number of lambs per production unit is no more than 1 and in extreme cases it can be 1.5 units produce. Carcass weight of progeny marketed per production unit will be 33% of the live weight of 55kg per unit.

3.5.2. Directly allocate variable costs and overhead cost

Table 3.2 and 3.3 shows the variable -and the overhead cost per unit in the Williston area.

Table 3.2: Directly allocate variable costs in the Williston area

Directly allocate variable costs	R/Sheep unit
Feed	R 78.61
Animalhealth	R 26.06
Transport	R 7.43
Marketing	R 2.26
Labor: Shearing	R 0.56
Labor: Other	R 3.86
Seed	R 0.63
pesticides	R 0.69
Other	R 0.50
Total	R 120.60

Source: UFS Department of Agricultural Economics

Table 3.3: Overhead cost

Overhead cost	R/sheep unit
Permenent labor	38.27
Fuel and lubricants	40.07
Mechanization: Maintainance and repairs	22.12
Fixed improvements:	
Maintainance and repairs	38.26
Accountant fee	3.06
Bankingcost	2.34
Telephone	6.55
Elektricity	5.2
Water	5.46
Land tax	1.43
Vermin control	3.54
Shortterm insurance	6.19
Longterm insurance	5.77
Membership fee	1.77
Other: Specify	16.78
Total	196.81

Source: UFS Department of Agricultural Economics

These data is based on the average cost per unit in the Williston area. For this study there will be no provision for owner compensation and will only be focusing the cost per unit. The model is develop that one can prove owner compensation. Directly allocate

variable costs and overhead cost will be used in the income statement to calculate the NOPAT for the benchmark.

3.5.3. Income statement

By using the above inputs and cost an income statement can be drafted for the benchmark farm. Like explained above the goal for the income statement is to determine the NOPAT of the benchmark farm as can be seen in table 3.4.

Table 3.4: Income statement for benchmark farm

Income statement	
Carcass price in Rand per kg	R 54.88
	Current situation
Amount (Rand) directly attributable cost of turnover per production unit	R 120.60
Percentage directly attributable cost of turnover per production unit	12%
Amount (Rand) fixed cost / Overheads of turnover per production unit	R 196.81
Percentage fixed cost / Overheads of turnover per production unit	20%
Kilograms carcass produced per benchmark production unit	18.15
Kilograms carcass produced per hectare	1.815
Income generated per benchmark production unit	R 996.07
Gross profit	R 875.47
Net operating profit	R 678.66
Tax rate (Effective)	28%
Net operating income after taxes (NOPAT) per production unit	R 530.20

According to ABSA meat prices for the month of October 2014, the average carcass price in Rand per kg for A2/3 meat was on the 31st of October at R54.88 per kg. This will give the benchmark farm an income of R996.07 per production unit based on the weight of the carcass of 18.15kg.

These will give the benchmark farm a gross profit of R875.47 per unit after directly allocate variable costs is subtracted from the income and a net operating profit of R678.66 after overhead is subtracted from the gross profit.

To not make the study to complex the tax rate will be constant at 28%. By using the NOPAT formula, the NOPAT for the benchmark farm will be R530.20 per unit.

3.5.4. Required return

To determine the required return one has to consider the long term benchmark from the urban property and stock exchange. The average total return on urban property of 11.8% is calculated over the past 10 years as seen in table 3.5.

Table 3.5: Average total return of urban properties over the past ten years

Year		Price	Return
2013	R	1 166 384	9.9%
2012	R	1 061 166	0.6%
2011	R	1 054 788	1.8%
2010	R	1 036 416	7.4%
2009	R	964 876	-0.4%
2008	R	968 309	4.1%
2007	R	930 114	14.5%
2006	R	812 026	15.3%
2005	R	704 204	22.7%
2004	R	573 869	32.2%
2003	R	433 968	21.2%
Average	R	882 375	11.8%

Source: Adopted and adjust from House Price South Africa, (2014)

The dividend yields (D/Y) and price earnings (P/E) for the JSE All Share index is shown in table 3.6:

Table 3.6: Long term benchmark from the urban property and stock exchange

Date	Ave High	Ave Low	Ave Open	Ave Close	Ave TRI	Ave Vol	Interest Yield	Capital Payment Yield	Total Distribution Yield	EY	P/E	DY	High	Low	Open	Close	TRI Close	Volume
21-Oct-14	49 287	48 833	49 054	49 066	6 275	184 166 536	-	-	2.99	6.01	16.63	2.99	4 860 670	4 734 074	47 599	48 530	6 298	37 017 473 859
31-Dec-13	41 974	41 516	41 737	41 765	5 199	196 947 836	-	-	2.72	5.38	18.58	2.72	4 629 020	4 587 317	46 131	46 256	5 840	49 236 959 021
31-Dec-12	35 198	34 877	35 029	35 058	4 233	183 575 046	-	-	2.85	6.77	14.76	2.85	3 938 504	3 909 574	39 385	39 250	4 809	45 893 761 534
30-Dec-11	31 797	31 326	31 578	31 577	3 692	202 411 359	-	-	2.89	7.87	12.71	2.89	3 209 537	3 198 567	31 996	31 986	3 796	50 400 428 409
31-Dec-10	28 729	28 349	28 535	28 553	3 252	193 458 328	-	-	2.20	5.82	17.19	2.20	3 221 004	3 209 282	32 210	32 119	3 701	48 558 040 358
31-Dec-09	23 535	23 069	23 289	23 315	2 594	207 948 082	-	-	2.20	5.81	17.20	2.20	2 767 374	2 747 525	27 475	27 666	3 111	51 987 020 646
31-Dec-08	27 172	26 483	26 853	26 823	2 881	211 807 362	-	-	4.39	10.58	9.45	4.39	2 153 015	2 134 407	21 348	21 509	2 354	53 163 647 971
31-Dec-07	28 443	28 003	28 216	28 232	2 956	171 748 006	-	-	2.55	6.89	14.52	2.55	2 970 168	2 895 797	29 635	28 958	3 067	42 937 001 648
29-Dec-06	21 377	21 037	21 189	21 217	2 166	149 570 922	-	-	2.22	5.78	17.30	2.22	2 498 581	2 489 115	24 986	24 915	2 573	37 093 588 819
30-Dec-05	14 842	14 678	14 750	14 772	1 469	127 404 325	-	-	2.40	6.34	15.78	2.40	1 817 245	1 801 834	18 172	18 097	1 822	31 978 485 640
31-Dec-04	12 273	12 155	12 199	12 221	1 193	136 700 943	-	-	2.62	6.64	15.06	2.62	1 267 577	1 263 016	12 676	12 657	1 237	6 835 047 165

According to table 3.6 the average D/Y for the All Share index is 2.7% and the average P/E is 15.4%. The data above is summarised in table 9.

Table 3.7: Long term benchmark from the urban property and stock exchange

Long-term return benchmarks to consider to determine required return		
Urban property return		Benchmarks
Total return	11.8%	Long- term historic
Rent income	7.1%	Check inflation plus 1 to 2 percent
Capital gains yield	4.7%	Check inflation plus 2 to 3 percent
Stock exchange		Benchmarks
Total return	15.4%	Long- term historic
Dividend Yield	2.7%	Long- term historic: normally 2 to 3%
Capital gains yield	12.6%	Long- term historic compounded about 13%

By considering the data in table 3.7, the required return on the benchmark farm can be determine as seen in table 3.8.

Table 3.8: Required rate for the benchmark farm.

Required return assumptions	
Total long-term required	15.0%
Capital gains yield (increase in agricultural land prices) (Based on either history or expected situation)	8.7%
Cash yield	6.3%

After considering the above data in table 3.8 it is best found that the total long-term required rate must be 15% and the capital gains yield of 8.7% is the average of the property -and stock exchange capital gains yield in table 3.8. This gave the benchmark farm cash yield of 6.3%.

3.5.5. Determining of agricultural land value.

The value of the benchmark agricultural land can be determine by using NOPAT and the cash yield as shown in table 3.9.

Table 3.9: Determining of agricultural land value.

Determination of agricultural land value		
Net operating income after taxes (NOPAT) per production unit		R 530.20
Agricultural land value per production unit based on cash yield of	6.3%	R 8 354.58
Hectares needed per benchmark production unit		10
Agricultural land production value per hectare		R 835.46

By this calculation the price per hectare for the benchmark agricultural land is R835.46 and per production unit R8 354.58. By this we can compare the benchmark results to the actual price per hectares that were paid in the Williston area.

3.5.6. Loan amount that can be serviced per production unit.

The model is also develop to determine the possible amount that can be loan per production unit and is expressed as a percentage as shown in table 3.10.

Table 3.10: Loan amount that can be serviced per production unit.

Loan amount that can be serviced per production unit based on the information	
Amount of cash available to service debt	R 530.20
Interest rate payable on loan amount	11%
Term for loan repayment	10
Maximum loan per production unit	R 4 820.04
Annual payment required	R 1 418.62
Loan servicable per benchmark production unit per selected repayment period	R -3 122.50
Total loan amount per agricultural land production unit	R 3 122 498.42
Possible loan amount as percentage of agricultural land value	37.4%

For the benchmark the interest rate will be at 11% and the repayment period is 10 years, the farmer can only borrow 37.4% of the total loan amount.

3.6. Summary

During this chapter a valuation model where developed that make use of NOPAT and the Gordon Growth model. The valuation model is used to determine benchmark in which the actual data will be compared with in Chapter 4. From the results shows that the agricultural land value per hectare is R835.46.

Chapter 4

Conclusions and recommendations

4.1. Introduction

In this chapter, the findings for the benchmark agricultural land are explored and compared to the actual land values in the Williston area. The evaluation of the findings is correlated with the literature study. Through the evaluation, the research attempts to develop an understanding of whether valuers and farmers can use value-based management measurements to determine agricultural land value and expected returns on its investment

The main object of this study is to determine if the farmer earns the expected returns on his investments through the valuation of agricultural property from a wealth creation perspective.

Before discussing the results of the main and secondary objects, it is also important to see what the effect will be if effective management is introduced in the benchmark model and what the effect will be on the value of agricultural land.

4.2. Results and conclusions

- Primary objective

As explained the model that was developed in Chapter 3 was developed to be used as benchmark and compared to the actual data. Accordingly to the model the land value for the benchmark is R835.46 per hectare. Accordingly to Land Bank in 2014 only four farms were bought in the Williston area. Table 4.1 compares the benchmark agricultural land and the four farms that were bought in 2014 in the Williston area.

Table 4.1: Comparison of value per hectare for the benchmark and the four farms bought in 2014 in the Williston area.

	Agricultural land benchmark	Rooizand	Plat Cypher	Fontein	Riet Poort
Production unit size in hectares	10 000	3 810	9 586	3 539	2 348
Agricultural land production value per hectare	R 835.46	R 1 000.00	R 1 200.00	R 773.00	R 1 244.00
Total Agricultural land value	R 8 354 575.18	R 3 810 000.00	R 11 503 200.00	R 2 735 647.00	R 2 920 912.00

The results show that three of the four farms bought in 2014 are overvalued if compared to the benchmark land value. Only Fontein farm is bought for less than the benchmark value of R835.46 per hectare.

Table 4.2 shows the cash yield and the long term required return if we assume that the NOPAT and the capital gains yield is the same as the benchmark.

Table 4.2: Cash yield and long term required return.

	Agricultural land benchmark	Rooizand	Plat Cypher	Fontein	Riet Poort
Agricultural land production value per hectare	R 835.46	R 1 000.00	R 1 200.00	R 773.00	R 1 244.00
Net operating income after taxes (NOPAT) per production unit	R 530.20	R 530.20	R 530.20	R 530.20	R 530.20
Cash yield	6.3%	5.3%	4.4%	6.9%	4.3%
Capital gains yield (increase in agricultural land prices)	8.7%	8.7%	8.7%	8.7%	8.7%
Total long-term required	15.0%	14.0%	13.1%	15.5%	12.9%

The results shows that the overvalue farms required return is less than the required return of 15% for the benchmark and is more than 11.7% long term return of the urban properties. The Fontein farm shows a bigger return than the 15.4% long term return of the stock exchange.

Table 4.3 shows what the NOPAT, income, carcass weight and slaughter percentage has to be for each farm bought in 2014 in the Williston area to reach a cash yield of 6.3% and return of 15%.

Table 4.3: Comparing the benchmark returns against the returns needed per farm bought in 2014 in the Williston area.

	Agricultural land benchmark	Rooizand	Plat Cypher	Fontein	Riet Poort
Agricultural land production value per hectare	R 835.46	R 1 000.00	R 1 200.00	R 773.00	R 1 244.00
Net operating income after taxes (NOPAT) per production unit	R 530.20	R 634.63	R 761.55	R 490.57	R 789.48
Income generated per production unit	R 996.07	R 1 129.73	R 1 292.20	R 945.34	R 1 327.94
Carcass weight of progeny marketed per production unit	18.2	20.6	23.5	17.2	24.2
Production unit real weight(kg)	55	55	55	55	55
Slaughter percentage	33.0%	37.4%	42.8%	31.3%	44.0%

The results shows that the three overvalued farms needs an average of over 20kg per carcass to reaches the required returns of the benchmark. According to Mr Coetzee Reitz manager of the Williston Vleiskooerasie the average weight per carcass at the abattoir is between 19.3kg and 19.5kg. The Williston Vleiskooerasie's abattoir has slaughter from March 2014 until the end of October 2014 approximately 65000 sheep.

To achieve this require return the farmers need to manage this farms more effectively in the next upcoming years. The only way to do this is to increase the number of lambs per production unit.

Table 4.4: Comparison between number of lambs and the four farms bought.

	Number of lambs		
	1.3	1.5	Rooizand
Income generated per production unit	R 996.07	R 1 294.89	R 1 129.73
Net operating income after taxes (NOPAT) per production unit	R 530.20	R 763.66	R 634.63
	1.3	1.5	Plat Cypher
Income generated per production unit	R 996.07	R 1 294.89	R 1 292.20
Net operating income after taxes (NOPAT) per production unit	R 530.20	R 763.66	R 761.55
	1.3	1.5	Fontein
Income generated per production unit	R 996.07	R 1 294.89	R 945.34
Net operating income after taxes (NOPAT) per production unit	R 530.20	R 763.66	R 490.57
	1.3	1.5	Riet Poort
Income generated per production unit	R 996.07	R 1 294.89	R 1 327.94
Net operating income after taxes (NOPAT) per production unit	R 530.20	R 763.66	R 789.48

Table 4.4 shows us what number of lambs per production unit is required to get the same returns as the bench mark. The results show that Rooizand need between 1.3 and 1.5 lambs per production unit. Plat Cypher needs 1.5 lambs per production unit and Rietpoort more than 1.5 lambs per production unit. The Fontein Farm needs less than 1 lamb per production unit. In order for the model to remain relevant beyond 2014, it must be recalculated on an annual basis.

- **Secondary objective**

By managing the farm more effectively can be done in two methods:

- Lesser hectares per benchmark production unit; and

- More numbers of lambs marketed per production unit

The first method cannot be easily done because of the dry area Williston is situated. By reducing the hectares per production units the farm can house more units but it also can cause soil erosion because of overgrazing the fields. The erosion will make the soil worthless and the value of the agricultural land will decline.

The second method is more reasonable goal to reach. By managing the production units more carefully so that they can produce more lambs in the three cycles over two years. Table 4.5 shows the effect in income and value of the agricultural land if the number of lambs increases from 1 to 1.3 and 1.5.

Table 4.5 Number of lambs marketed per production unit

	Number of lambs marketed per production unit		
	1.0	1.3	1.5
Production unit size in hectares	10 000.00	10 000.00	10 000.00
Hectare needed per benchmark production unit	10.00	10.00	10.00
Number of benchmark production units	1 000.00	1 000.00	1 000.00
Carcass weight of progeny marketed per production unit	18.15	23.60	27.23
Income generated per benchmark production unit	R 996.07	R 1 294.89	R 1 494.11
Net operating income after taxes (NOPAT) per production unit	R 530.20	R 763.66	R 919.30
Agricultural land production value per hectare	R 835.46	R 1 203.32	R 1 448.56
Loan servicable per benchmark production unit per selected repayment period	R -3 122.50	R -4 497.37	R -5 413.94
Total loan amount per agricultural land production unit	R 3 122 498.42	R 4 497 365.40	R 5 413 943.38

By just managing the farm more effectively and increase the number of lambs per unit will have a major effect on the income and the value of the agricultural land per hectare. By increasing the lamb percentage per production unit will increase the value of the land and the farmer will be willing to pay more for the agricultural land.

4.3. Conclusions.

The literature based on the use of value-based management in the agricultural environment (Farming) is inconclusive. This study shows that VBM can be used in the agricultural environment by determine the agricultural land production value per hectare. The study show also the using VBM and the value of agricultural land one can determine if farmers received the expected return on its investment.

Based on the results three out of four farms which are bought in 2014 in the Williston area is over valued when compared to the benchmark which is determine in Chapter 3. This shows that the overvalue farms will not receive the expected return if the NOPAT is assumed to be the same as the benchmark.

The only way for these farms to generate the expected return is to generate more income per production unit. By managing the farm more effectively the farm can produce more lambs per production unit, by producing more lambs per production units the farmer can generate more income and gets its expected return.

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