Financial Analysis of the South African Life Insurance Sector – An Empirical Decomposition of Economic Value Added

Research submitted to the University of the Witwatersrand, Johannesburg in partial fulfillment of the requirements for the Masters of Management in Finance and Investments (MMFI).

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ABSTRACT

The main purpose of the study is to determine which value drivers of economic value added (EVA) are most important. That is, what are the main determinants of the overall company value? The three main questions raised in the study are: (1) How sensitive is total EVA to changes in each of the various value drivers? (2) Which of the value drivers are more important in managing economic value? (3) Is there a combination of these value drivers that best explain EVA as a group? The study, which adopts the Stewart (1991) definition of EVA, covers the life insurance sector in South Africa, specifically focusing on the following companies: Discovery Holdings, Liberty Holdings, MMI Holdings, Old Mutual plc, and Sanlam Ltd. It covers the period 2004-2014 and uses variance analysis and principal component analysis to identify the main drivers of EVA. Five main drivers of EVA were identified namely; underwriting, asset management, costs, opportunity cost and strategic investments.

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Chapter One - Introduction

1.1. Context

Corporate finance teaches us that companies are in business to generate and maximise value for their shareholders. Corporate managers are expected to make decisions that best create and maximise this shareholder value by focusing on capital budgeting, capital structure and working capital decisions. In capital budgeting, managers source and select the most valuable of projects for the company to embark on. In capital structuring, managers pick optimal mix of equity, debt and preference shares to finance selected projects. Lastly, managers manage working capital to ensure day-to-day operations of the company are smooth and value-adding.

Externally, shareholder value is best measured as returns an investor earns on a stock over a period of time usually a year i.e. appreciation of share price plus dividends. Internally, managers have traditionally used accounting metrics such as revenue, profits before interest and tax (PBIT), profits after interest and tax (NPAT), earnings per share (EPS), return on equity (RoE) and return on capital (RoC), net asset value (NAV), free cashflow (FCF) as their own internal measures of value created. Another internal measure of value currently enjoying the spotlight is the economic value added (EVA) metric. This metric entered the mix in 1991 when Stewart published his book, *The Quest for Value* (1991). The EVA gained its fame for two reasons; (1) it adjusts net profits for opportunity cost to the shareholder by deducting cost of capital employed by management in generating these profits; (2) it proposes over 100 potential adjustments to convert accounting figures into economic equivalents (Stewart, 1991).

Though shareholders are the legal owners of a listed company, they are rarely involved in the day-to-day running of the company. They appoint board of directors to represent their interest at the company who in-turn hires managers to run the company on a day-to-day basis. The board of directors is also mandated to provide overall direction of the company as the name suggests. If management focus on wrong metrics because of inappropriate incentive scheme or any other self-interest reason, they will dilute shareholder value – the agency problem occurs. To mitigate against this agency problem, company leadership must select internal measures of value that best align with shareholder interests. The EVA is a potential metric to best align management interest to those of shareholders.

Since its introduction in 1991, the EVA metric had mixed reception both in academia and the corporate world. Majority have demonstrated that the EVA is superior to traditional accounting metrics (Stewart, 1994; Lehn & Makhija, 1997; Lefkowitz, 1999; De Medeiros, 2005). But some have demonstrated the opposite, that EVA is not any superior to traditional accounting metrics (Biddle et al., 1997 and 1999; Ismail, 2006; Peterson & Peterson, 1996; Anastassis and Kyriazis, 2007). In South Africa, of over 15 articles surveys in this study, only a couple present evidence against EVA – with De Wet (2005) as the first article since the 1990s. Hall (2002) used EVA's superiority over accounting measures as a starting point before he focussed on dissecting EVA into what he called "value drivers".

Many of these studies were empirical in nature, trying to find evidence in support EVA or against EVA. Sharma and Kumar (2010) reviewed a total of 112 papers published between 1994 and 2008. They found that a large majority of papers (80 out of 112) were empirical and not theoretical in nature. Amongst many research gaps, Sharma and Kumar (2010) outlined two very important ones. The first gap stems from the fact that majority of studies cover developed countries – this presents an opportunity to undertake emerging markets studies. The second gap stems from the fact that the manufacturing sector is over-represented in EVA related research – this presents a gap to undertake research in other sectors of the economy. In fact, only a few sectors-specific studies were undertaken over this period in South Africa over this period. Geyser and Liebenberg (2003) examined EVA in agribusiness and Hall and Geyser (2004) examined EVA in agricultural co-ops context. De Wet (2005) examined a composition of 89 industrial companies listed on the Johannesburg Stock Exchange (JSE).

1.2. Problem Statement

To mitigate against the agency problem, it is vital that company leadership align management performance measurement to that of shareholders. To do this properly, company leadership must methodologically analyse how the share price moves in relation to changes in internal measures of value. Generally, the EVA is accepted as superior to accounting measures in aligning shareholder and management interest. Taking this superiority as a starting point, one wonders if EVA could be split into several components. The objective of this breakdown of EVA could be to analyse which of these components (or value drivers) are statistically more important than others. Insights from this type of study could help management to focus on a few important drivers behind EVA.

Most of this type of research takes place in the developed world. Very little is written about emerging markets such as South Africa. Because developed countries are structurally different from emerging markets, problems occur when we try to infer insights from the developed world to emerging markets. It is therefore important that emerging markets studies be undertaken in order to produce relevant insights.

Problems also occur when we try to infer insights from one industry to another - simply ignoring stylized facts about sectors of the economy. There is need to undertake sector-specific research to mitigate against this problem. One such sector that warrants a sector-specific study is the life insurance sector. Life insurance sector has a number of stylized facts such as heavy regulation by the Financial Services Board, strict professional standards enforced by the Actuarial Society of South Africa, and the long-term nature of services provided just to name a few.

1.3. Purpose of this study

The primary purpose of this study is to fill the gaps as outlined in Sharma and Kumar (2010) by focusing on the life insurance sector in South Africa as listed on the JSE. The life insurance sector is special because insurance companies make 5.86% of JSE All Share Index. In fact Old Mutual alone makes 2.76% of JSE All Share Index alone. The life insurance sector also manages significant assets on behalf of policyholders – in 2014 the life insurance sector had aroundR1.9 trillion assets under management. This makes the life insurance sector special in the context South African economy.

But instead of adding to the well covered debate of EVA versus traditional accounting measures, this study breaks EVA into fourteen (14) components or “value drivers”. The main objective of this study is to find out which of these components are statistically more important than others. By clearly outlining the few important components coming out of this study, company management can then focus their attention to these few in their mission to generate shareholder value. One way to re-enforce focus on the few important value drivers could be to link the few value drivers to employee incentive scheme as key performance indicators (KPIs).

Some of the fourteen value drivers are Net Earned Premiums, Net Claims and Benefits Incurred, Investment Income, Fee and Commission Income, Acquisition Costs, Interest Charge, Cost of Capital, and Capital Employed. Findings of this study will answer the following

questions for a South African life insurance company considering using EVA as a metric for measuring shareholder value:

- How sensitive is total EVA to changes in each of the fourteen value drivers?
- Which of these value drivers are important in managing economic value - individually?
- Is there a combination of these value drivers that best explain EVA as a group?

The secondary purpose of this study is to demonstrate a two-step approach to studying value drivers behind EVA. This approach may be used by future researchers in their attempt to understand sector-specific dynamics behind business economics. Briefly, the methodology is in two steps (see Chapter 3 for details):

Step 1: Variance Analysis

This step breaks EVA down into components. Variance analysis is then performed to see how sensitive EVA is to changes in components. This analysis together with descriptive statistics gives us initial view of which value drivers are important for EVA for each company.

Step 2: Principal Components Analysis (PCA)

Variance Analysis and descriptive statistics are sufficient only as first attempt at understanding EVA. Following Variance Analysis, this study applies Principal Component Analysis to reduce focus from all components to a few most significant ones. PCA is a powerful statistical technique that uses eigenvector procedures to reduce multi-dimensional data down into three or four dimensions. PCA reduces the 14 dimensions down into a few value drivers.

1.4. Implications of this research

Findings of this research will assist insurance companies in South Africa to better understand EVA. This analysis clearly outlines which components of EVA warrant more attention than others. The findings are also important for managers in financial services sectors as a whole since insurance is similar to other financial sub-sectors. The two-step approach may be of use to researchers wishing to study EVA in other sectors in South Africa or any other country.

Chapter Two – Literature Review

2.1 EVA research in South Africa

Over the past 20 years from 1994 to 2014, considerable amount of research has been undertaken on EVA related topics. Sharma and Kumar (2010) reviewed a total of 112 papers published between 1994 and 2008 worldwide. They covered contributions by researchers from 15 countries including South Africa. In South Africa, a total of 8 studies were covered in Sharma and Kumar (2010). EVA research in South Africa is sequential, with researcher building on their own previous work or that of fellow researchers from in South Africa.

2.1.1 Early research in South Africa (before 2000)

De Villiers (1997) is the earliest EVA related study in South Africa. His paper studied the extent to which inflation distorts EVA. De Villiers (1997) finds that EVA cannot be used under inflationary conditions to estimate actual profitability of a firm. He formulates an adjusted EVA (which he labelled AEVA), which he argued is better than plain EVA in estimating firm profitability under inflationary economic conditions. This is first and the only descriptive EVA study in South Africa as classified by Sharma and Kumar (2010) global literature review paper.

The only other study undertaken before the turn of 2000 was Hall and Brummer (1999). Hall and Brummer (1999) study intended to determine which internal performance measures of a company correlate the best with its external performance measure as represented by the MVA of the corporation - MVA is the market value added which is the sum of present value of all future expected EVAs. Hall and Brummer (1999) links with De Villiers (1997) in that the researchers also touch the issue of adjusting EVA for inflation – "EVA can also be adjusted for inflation purposes or standardized in order to be an even more complete internal performance measure". The most important take away from this study is their suggestion that "other ratios or yardsticks which might have an influence on the market value of a company are also identified and placed alongside EVA as variables that can be correlated with the market value of a company". In this study, principal component analysis (PCA) and variance analysis are applied to see if EVA can be used in combination with a few underlying value drivers in managing economic value creation for shareholders. This is because in practice, it is hard to justify a management incentive scheme with just one KPI (EVA in this case).

2.1.2 Research in the early 2000s in South Africa

Hall (2002) builds on the work he did a few years earlier, Hall and Brummer (1999). Hall and Brummer (1999) had already found "that the market value of a company best correlate with the internal performance measurement Economic Value Added (EVA)". Hall (2002) took this opportunity to now dissect EVA into components (value drivers) with an intention to identify which of these value drivers contributed most to EVA. Hall (2002) observed that in the early stages of conscious value creation, income statements metrics are the strongest drivers of EVA, but as companies mature, balance sheet metrics dominate value creation. Another finding of interest here is that of 147 industrial companies analysed over 10 years (from 1991 to 2000) in the study, only 39 companies created positive EVA for the entire 10 year period. This implies that just over a quarter of companies were consistent generators of shareholder value! This study is similar to Hall (2002) in that it takes EVA's superiority as a starting point before dissecting EVA into 14 components. This study reveals that both income statement and balance sheet value drivers contribute to EVA generation for a life insurance company.

De Villiers (1997), Hall and Brummer (1999) were general non-sector specific studies. Hall (2002) studied a composition of 147 industrial companies, making it a first specific study but still not too specific. Geyser and Liebenberg (2003) is therefore the earliest sector-specific study in South Africa as reviewed by Sharma and Kumar (2010). Geyser and Liebenberg (2003) examined introducing EVA as a performance measure for agribusiness and co-ops in South Africa. Geyser then partnered with Hall to compare EVA against traditional measures of value for co-ops in South Africa, Hall and Geyser (2004). On the basis of their analysis, Hall and Geyser (2004) recommended that, in the first place, a co-operative must determine its financial performance in terms of value creation or destruction – does it have a positive or negative EVA? Once it has established its position in this regard, Hall and Geyser (2004) suggested a few specific areas of focus in order to improve EVA.

De Wet (2005) became the first South African study to produce analysis against EVA's superiority as a measure of shareholder value – as reviewed by Sharma and Kumar (2010). Contrary to Hall and Brummer (1999) findings that EVA is the most correlated to MVA, De Wet (2005) suggested a stronger relationship between cash flow and MVA instead. De Wet (2005) also "found very little correlation between MVA and EPS, or between MVA and DPS", putting a dent on credibility of earnings and/or dividends-based share valuation techniques. The study

covered a composition of 89 industrial companies listed on the Johannesburg Stock Exchange (JSE) from 1995 to 2004.

Subsequent to this study, De Wet authored a number of studies salvaging EVA's importance as a measure of shareholder value. De Wet and Hall (2007) highlights the importance of economic profits (EVA) and their long term effects on shareholder value (MVA) using companies listed on the JSE; De Wet and Du Toit (2007) expose weaknesses inherent in both return on equity (RoE) and EVA, concludes that both are insignificantly correlated to shareholder returns but that of EVA is slightly superior to RoE.

In summary, prior to De Wet (2005), all studies undertaken in South Africa were supportive of EVA's superiority over traditional accounting metrics. De Villiers (1997) adjusted EVA for inflation to overcome one of its shortfalls; Hall and Brummer (1999) touched on inflation adjustment before confirming EVA as most correlated to MVA than accounting measures but also suggested using EVA as chief metric in combination with a few supporting metrics; Hall (2002) took EVA superiority as a starting point before analysing value drivers behind EVA; Geyser and Liebenberg (2003) introduced EVA as a potential superior measure of value to agribusiness and co-ops before Hall and Geyser (2004) cemented EVA's status as a measure of choice for co-ops. None of the studies attempted to study the insurance as a sector; in fact, no study covered any other financial services sector.

2.1.3 Research post Sharma and Kumar (2010) in South Africa

Post Sharma and Kumar (2010), several studies were undertaken in South Africa between 2008 and 2014. From our literature review above, we picked that early research in South Africa focused on four main themes, namely:

- Adjustments on EVA to improve its performance;
- EVA versus traditional accounting measures in explaining shareholder value creation;
- Analysis of value drivers behind EVA;
- Initial sector-specific studies with agribusiness, co-ops and industrials well represented.

In recent times, the focus has been on the latter three, EVA versus traditional accounting metrics, analysis of value drivers behind EVA and sector-specific studies. A new focus area of research is documentation of EVA implementation issues in South Africa.

Makhele (2014) added an interesting perspective to EVA versus accounting metrics debate by using EVA to measure post-acquisition performance of acquiring firms in South Africa. He also compared EVA to EPS, ROC, ROA and ROE. Interestingly, Makhele (2014) find that acquiring firms show marginal improvements than traditional measures but these are eroded when cost of capital is factored in. Within the life insurance sector in South Africa, Metropolitan merged with Momentum to form MMI Holdings in December 2010. Contrary to Makhele (2014), MMI Holdings has consistently generated positive EVAs since the merger.

De Wet (2012) examined the contentious issues of executive remuneration in South Africa by studying relationship between executive pay and EVA/MVA and also between executive pay and ROE/ROA. De Wet (2012) finds that though the relationship between executive pay and EVA/MVA is strong, it is relatively weaker than that between executive pay and ROE/ROA. In line with his findings, De Wet (2012) recommended that South African companies modify their executive incentive schemes to align with firm objective of creating and maximising shareholder value.

De Wet (2008) studied the effects of changes in company tax and secondary tax (STC) regimes on cost of capital and shareholder value. De Wet (2008) finds that, contrary to initial expectations, the introduction of STC (and lowering the company tax rate at the same time) did not decrease the cost of capital of South African organisations. The key take away from De Wet (2008) is that relationship between value drivers and external economic environment factors such as legislation and tax is non-linear. Scenario-type analysis needs to be performed in order to correctly model effects of changes in the outside environment. For a heavily regulated sector like life insurance where regulation and tax treatment keeps on changing, scenario-type analysis is paramount if we are to fully capture their effects on shareholder value.

Earlier studies, Geyser and Liebenberg (2003) and Hall and Geyser (2004) were the only sector-specific studies before Prinsloo (2010). Prinsloo (2010) did a comparative analysis of the big three (3) South African platinum producers in term of economic value added (EVA). The current study is similar to Prinsloo (2010) in that it compares the 5 South African life insurance companies listed on the JSE against each other.

Since De Villiers (1997), about 20 EVA studies have been undertaken in South Africa, majority of which confirmed EVA superiority over traditional accounting measures. Regardless of all this coverage and the general feel that EVA is superior and most suitable to align shareholder

and management interest, EVA is rarely implemented in South Africa, Van der Poll et al (2011). A focus group discussion of financial experts, established that **South African companies will benefit from using EVA in conjunction with other metrics**, Van der Poll et al (2011). This insight is consistent with Hall and Brummer (1999)'s recommendation a decade earlier. It is because of this insight that this research paper applies principal component analysis and variance analysis to see which value drivers could be used alongside the EVA in creating shareholder value.

2.2 Insurance-specific EVA research globally

Majority of studies undertaken between 1994 and 2008 were manufacturing and industrial-specific, Sharma and Kumar (2010). This presents a research gap to study the life insurance sector of the economy. Review of South African literature above revealed that not a single study has been undertaken to focus on life insurance in the country. This research paper filled this gap by studying the South African life insurance sector with an objective to see which value drivers behind EVA are the main determinants of EVA.

2.2.1 *Early research on insurance internationally (before 2000)*

One of the first articles on insurance is Skeunkel (1999) - a case study of an American life insurance company, Protective Life. One of the fundamental questions that Skeunkel addressed with this study was "how can EVA be applied to a life insurance company?" Skeunkel found that there are three ways that EVA can be effectively used in a life insurance company, namely:

- To assess the relative desirability of existing activities;
- To assess new business ventures;
- For compensation purposes.

The first point is vital in that it helps to see the who's who in terms of shareholder value creation in the company. Which divisions/business are EVA positive and which ones are EVA negative? The second one is important because EVA helps to embed some discipline into new business appraisal processes. As for the third insight, because management will always be interested in maximising take-home pay, it is important to align this interest with shareholder value creation through a compensation scheme.

Skeunkel (1999) then moved on to focus on value drivers behind EVA. For this, he said that there are four general ways for a life insurance company to increase EVA if it decides to adopt it. The four general ways as outlined by Skeunkel (1999) are:

- By increasing return on capital (ROC) – Skeunkel (1999) suggests that, if return on capital is negative, the objective could be to make it less negative or turn it positive. If return on capital is positive but small, the objective could be to make it a big positive.
- By deploying shareholder capital at a rate higher than cost of capital – Skeunkel logically argue that even if the additional capital is invested at a rate less than the current ROC, EVA will still increase for as long as capital is invested at a rate higher than cost of capital.
- Using less capital in businesses for which ROC is less than cost of capital – Skeunkel (1999) suggests that should the business not have other places to re-invest excess capital, they should either pursue a stock buy-back or pay-out a special dividend.
- Reducing the cost of capital – deploying more debt will reduce cost of capital since debt is cheaper than equity and interest on debt is tax deductible.

It would be interesting to perform a sector-wide study where one split's each company's EVA into these four "value drivers" and see which of them is the real force behind the top company in the sector. This presents a gap where future studies to focus on. Though this breakdown is insightful, this paper split EVA differently by splitting it into 14 value drivers.

Other early work on insurance EVA was panel discussion papers published by the Society of Actuaries in the late 1990s. In fact, most insights outlined in Skeunkel (1999) were initially discussed at Valuation Actuary Symposium hosted by the Society of Actuaries in 1996. At the 1998 panel, Erhardt (1998) said the following with regard to his experience interacting with insurance companies: *"We're also beginning to see management compensation, (other than the standard stock options) tied to EVA"*

At the 1998 symposium as well, Da Palo (1998) spoke of his personal experience implementing EVA at a mutual insurance company, The Guardian. Da Palo (1998) said the following regarding reasons as to why The Guardian wanted to implement EVA: *"One reason is that, in today's world, we want to link part of senior management's compensation to the increasing value of the company, so we needed a viable way to measure it"*

A common thread from this early coverage of EVA in insurance sector is the use of EVA for compensation purposes. This way of designing incentive schemes has potential to reduce the agency problem because shareholder and management interests are the same - increasing EVA. Insights from this paper can be used in a similar way – by linking the few important value drivers to compensation schemes.

2.2.2. Recent research on insurance internationally

Sharma and Kumar (2010) revealed than EVA research is split – with many supporting EVA and yet many disproving EVA's superiority over traditional measures. We saw this phenomenon in South Africa with De Wet (2005) producing data against purported EVA's superiority over accounting measures. Within the insurance sector, Acharyya (2008) found the Economic Value Added inadequate in measuring ERM (Enterprise Risk Management). Acharyya (2008) stated that shareholder value as one of key benefits to ERM. So this implies EVA was found inadequate in measuring shareholder value.

In summary, the insurance sector is generally underrepresented both in developed countries and emerging markets. This could be because the insurance sector is unique – in that products sold are long term in nature and hence profitability analysis is not straight forward. Another reason could be that since insurance is heavily regulated with a number of prescribed measures of value such as embedded value, researchers could be ignoring EVA in insurance. This underrepresentation however presents a good research area like as this one.

Chapter Three – Data and Research Methodology

3.1 Data Description and Sources

This study analyzed five (5) life insurance companies as listed on the Johannesburg Securities Exchange (JSE): Discovery Holdings Limited (Discovery); Liberty Holdings Limited (Liberty); MMI Holdings Limited (MMI); Old Mutual plc (Old Mutual); and Sanlam Limited (Sanlam). Discovery, Liberty and MMI have 30 June year end while Old Mutual and Sanlam have 31 December year end.

IFRS stands for International Financial Reporting Standards which is designed to give companies a common business language across the globe. All companies covered in this study publish their IFRS financial statements - this makes the figures comparable. IFRS 4 covers insurance contracts and came into effect 1 January 2005. This gives us at least 10 years' worth of data for each company except for MMI which was formed in December 2010 after the merger of Metropolitan and Momentum. This is sufficient for the purpose of this study.

All data used in this study was compiled from published annual financial statements. Annual financial statements of these five companies were accessed from their websites. There are a number of occasions where financial statements from previous years are restated in the subsequent years. In such situations, only restated numbers were captured in our database.

3.2 The Concept of EVA

Stewart (1991), introduced a new metric to measure true economic value created by companies. The basic idea behind EVA is that shareholders incur an opportunity cost when they choose to invest in any given company. Investors could have invested in other companies of similar risk and potentially earn a better return. This opportunity cost is measured as the minimum required return that investors expect from a given company – the weighted average cost of capital. The EVA formula takes the following form:

EVA = NOPAT – Opportunity Cost = NOPAT – Capital Employed * Cost of Capital = NOPAT – CE * WACC.

Where: ***NOPAT*** - Net profits after tax but before financing costs. We adjust for financing costs to avoid double counting cost of debt by including in both profits and WACC components of the

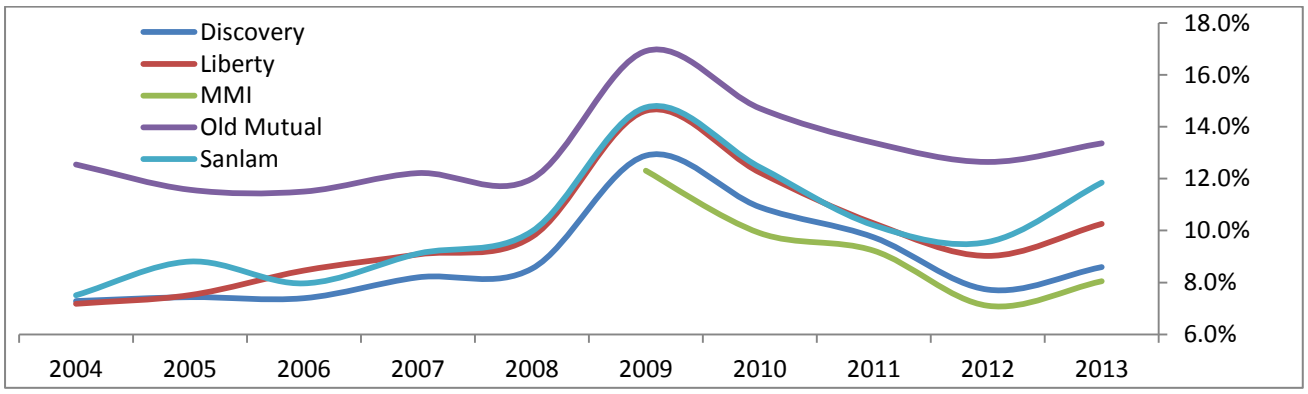
formula. This figure also excludes all non-operating items such as dividends and interest income from assets held outside the business.

Capital Employed (CE) - This is total amount of capital utilised in the company. This is a sum of equity and all interest bearing debt instruments on the balance sheet (both long and short-term liabilities).

Cost of Capital (CoC) - This is the weighted cost of capital (WACC) which reflects a weighted mix of equity and debt investors in the company. The Capital Asset Pricing Model (CAPM) is used to calculate ***Cost of Equity (K_e)*** for companies in the life insurance sector. The study uses the 6 months JIBAR (Johannesburg Interbank Rate) as a proxy for the **Risk Free Rates** in South Africa. 48 months' worth of daily returns prior to start of financial year is used to calculate beta for each company in this study. ***Equity risk premium*** – Biennially, PricewaterhouseCoopers (PwC) publishes Valuation Methodology Surveys covering Southern Africa. The document industry practise and assumptions used in setting discount rates and risk premiums for valuation purposes. PwC (2012) stated that historical returns approach is the most widely used in calculating equity risk premium in Southern Africa. PwC (2012) used data from 1900 to 2012 to show that average real equity returns were 7.2% versus bonds real return of 1.8%. Using this insight, this study uses a constant equity risk premium of 5.4% (7.2%-1.8%). **Cost of debt (K_d)** is calculated as a percentage of actual interest payments during the year to total opening debt capital. Interest includes amounts paid for both long-term and short-term debt. A similar approach is used to calculate **Cost of Preference shares (K_p)**.

In summary, Figure 1A below and Table 1D in Appendix contain computed **WACC** rates:

Figure 1A: WACC for South African life insurance companies



Source: Bloomberg Data, Own Calculation.

The key insight here is that the overall cost of capital rose sharply between the middle of 2008 to end of 2009. This coincides with the global financial crisis. This is because during financial crises, systematic risk in the market rise leading to investors asking for higher premium to part with their capital.

Tables 1A to 1D in the appendix contain all data used in calculating cost of capital.

3.1 Components of EVA – the "value drivers"

At a very basic level, EVA can be broken down into three drivers, namely: Net Earnings or NOPAT, Cost of Capital and Capital Employed. This study took this break down of EVA a step further by splitting Earnings further. In total, EVA was divided into fourteen (14) components:

(1) Net Earned Premiums; (2) Return on Assets; (3) Total Assets; (4) Fee and Commission Income; (5) Other Income; (6) Net Claims and Benefits Incurred; (7) Change in Contract Liabilities; (8) Interest Expense; (9) Acquisitions Costs; (10) General Marketing and Administration Expenses; (11) Other Items; (12) Income Tax Expense; (13) Cost of Capital; and (14) Capital Employed.

$$\mathbf{EVA = NEP + RoA*TA + FCI + OI - NCBI - CCL - AC - GMAE - OI2 - Tax - CoC*CE} \qquad \mathbf{(eq.1)}$$

Before we move into outlining methodology, below is a high level description of each of these components:

Net Earned Premiums (NEP) – This is the net amount that remains after paying reinsurers is called net earned premiums (NEP). ***Return on Assets (RoA)*** – Total investment income divided by total Assets under Management (AuM). ***Total Assets (TA)*** – This is AuM. . ***Fee and Commission Income (FCI)*** – Life insurers charge an asset management fee for managing third party and policyholder funds. They also earn commissions for financial advice to policyholders. ***Other Income (OI)*** – This is income that cannot be classified Net Earned Premiums or Fee & Commission Income. ***Net Claims and Benefits Incurred (NCBI)*** – This is all claims and benefits paid/allocated to policyholders. ***Change in Contract Liabilities (CCL)*** – Changes in liabilities due to passage of time and changes in underlying assumptions. ***Interest Expense (IE)*** – This is total expense incurred in paying interest and coupons on debt instruments or incurred in repaying principal on maturing debt instruments. ***Acquisitions Costs (AC)*** – This is sum of all direct costs incurred in writing life insurance policies for the

year. ***General Marketing and Administration Expenses (GMAE)*** – Indirect operating expenses fall into this category. ***Other Items (OI2)*** - To make the financial statements as comparable as possible, a number of small items were grouped together under "Other Items". These items will not change study insights if they are listed as stand-alone components of EVA. ***Income Tax Expense (Tax)*** – This is the effective Rand amount paid to tax revenue agencies for a particular year. ***Cost of Capital (CoC)*** - This is the weighted average cost of capital (WACC) rate for the company. ***Capital Employed (CE)*** – This is the sum of all debt, preference shares and equity employed by company to earn EVA.

3.3 Outline of Methodology

The methodology has two steps to it. The first one is variance analysis to see how sensitive is EVA to each of its 14 components. The second step is the principal component analysis which uses advanced statistical techniques to reduce the 14 dimensions of EVA into few significant ones – it will be interesting to see if the few significant dimensions are consistent with findings from the first step. Before these two steps are explored, the study analyzed basic descriptive statistics – this study explored central tendencies of the data. Each step is outlined below:

Step 1: Variance Analysis

To see how sensitive EVA is to each component, we compare changes in EVA as a result of changing one component at a time while fixing others. Let use NEP as an example. Suppose we are currently in year 0. Total EVA is calculated as follows:

$$\mathbf{EVA_0 = NEP_0 + RoA_0{*}TA_0 + FCI_0 + OI_0 - NCBI_0 - CCL_0 - AC_0 - GMAE_0 - OI2_0 - Tax_0 - CoC_0{*}CE_0} \quad \textbf{(eq.2)}$$

All else equal, suppose the life insurer increases NEP by R100 in year 1. Total EVA for year 1 becomes:

$$\mathbf{EVA_{1*} = NEP_0 + 100 + RoA_0{*}TA_0 + FCI_0 + OI_0 - NCBI_0 - CCL_0 - AC_0 - GMAE_0 - OI2_0 - Tax_0 - CoC_0{*}CE_0} \quad \textbf{(eq.3)}$$

In Rand terms, change in EVA due to change in NEP equals R100. ($EVA_{1*} - EVA_0 = 100$). In percentage terms, changes in EVA due to change in NEP is calculated as $\frac{EVA_{1*}}{EVA_0} - 1$. Repeated for all components of EVA, total changes in EVA are represented by the following identity:

$$\mathbf{\Delta EVA \equiv \Delta NEP + \Delta(RoA{*}TA) + \Delta FCI + \Delta OI - \Delta NCBI - \Delta CCL - \Delta AC - \Delta GMAE - \Delta OI2 - \Delta Tax - \Delta(CoC{*}CE)} \quad \textbf{(eq.4)}$$

EVA at the end of year 1 is calculated as:

$$\mathbf{EVA_1 = NEP_1 + RoA_1{*}TA_1 + FCI_1 + OI_1 - NCBI_1 - CCL_1 - AC_1 - GMAE_1 - OI2_1 - Tax_1 - CoC_1{*}CE_1} \quad \textbf{(eq.5)}$$

This study computes the delta both in Rands and in percentage terms. This is computed for each company in each year. Companies are aggregated to give industry level picture. Figures are presented to visualize how the components pull in different directions to influence total EVA. All this analysis was performed in an Excel template.

Step 2: Principal Components Analysis (PCA)

Just like the descriptive statistics in section 4.1, variance analysis is a basic statistical technique as well. To take the analysis a step further, the next step was the PCA. PCA is a dimension-reduction technique that uses powerful statistical techniques to reduce high-dimensional data down into a set of fewer linearly uncorrelated components (called principal components). PCA applies eigenvector statistics to compute these principal components. Principal components were computed one at a time as follows:

- **The First Principal Component (PC1)** is a linear combination of underlying variables that explain the maximum variation in observed data. This is the best linear combination of all possible linear combinations in explaining variation in the data. The equation for PC1 are of this form:

  $$\mathbf{PC1} = a_1(NEP) + a_2(RoA) + a_3(TA) + a_4(FCI) + \ldots + a_{14}(CE)$$

  Basically, the coefficients a_i are selected such that PC1 explains maximum variation. This is however subject to a condition that sum of squares of these coefficients equals 1. This constraint is necessary to make the answer unique.
- **The Second Principal Component (PC2)** is a linear combination that explains most of the remaining variation after PC1. Equation for PC2 will take the following form:

  $$\mathbf{PC2} = b_1(NEP) + b_2(RoA) + b_3(TA) + b_4(FCI) + \ldots + b_{14}(CE)$$

  Because we are trying to discover new dimensions (like new axes), correlation between PC2 and PC1 must be zero. To achieve this, two conditions are imposed on coefficients b_i. Coefficients are selected such that their sum of squares equal 1 plus correlation between PC1 and PC2 equals 0.
- **The Third and Subsequent Principal Components (PC3, PC4, etc)** – their equations take form similar to PC1 and PC2 and conditions are imposed on the coefficients such

that their sums of squares equal 1 while ensuring the new principal component has a correlation of 0 with all principal components already computed.

- This is repeated until a pre-determined percentage of observed variation (say 95%) is explained by these principal components or until contradictory results. Each principal component has an eigenvalue. The number of required principal components is determined by adding principal components until percentage cumulative eigenvalues to total eigenvalue of all principal components exceed threshold. **This research uses 95% threshold**.

The resulting principal components are viewed as the new reduced dimensions of the observed data. Interpretations of principal component equations depend on computation methodology used. There are two methodologies, namely: covariance matrix and correlation matrix methodologies:

- **The covariance matrix method** works well for variable measured in same units (say km/h) and values are closer to each other. It will work well if all measurements are measure in millions instead of some units being in millions while others are in hundreds. This method uses the covariance of the underlying variables to compute eigenvalues of principal components and coefficients of equations. Correlation coefficients between underlying variables and computed principal components are calculated and then used to interpret the equations.
- **The correlation matrix method** works well for variables measured in different units. Variables are standardized by subtracting mean values before dividing by standard deviation. Correlation matrix of these new standardised variables is used to compute eigenvalues and coefficients. Since the variables are standardised, the coefficients in the resulting PC equations are the same as correlation coefficients of variables to principal components – so they are interpret as they are.

For this study, principal component analysis is performed in three steps as outlined below:

- **Step 1:** Eigenvalue analysis of the Correlation Matrix. The first table contains 3 outputs:
  - eigenvalues for each PC,
  - portion of total variation a particular PC explains,
  - and cumulative variation explained by all PCs.

- **Step 2:** Analysis of Eigenvectors or components loadings. For PCs determined in Step 1 above, a table containing coefficients for each and every underlying variable is produced. For each PC, the top two or three are highlighted for interpretation.
- **Step 3**: Interpretation of variables displaying high coefficients for each PC.

In summary, this is how principal components analysis was applied to see which of the 14 value drivers are significant. PCA was performed at two level in this study, company and industry level. This study used the correlation matrix method because RoA and CoC are measured in percentage while the rest of the variables are measured in R millions. The study used GRTEL software to perform PCA.

Chapter Four – Results, Analysis and Discussions

4.1 Descriptive Statistics

Before moving on to variance analysis and principal component analysis, basic descriptive statistics were computed and analysed below. Table 2A below shows EVA broken down into value drivers for the life insurance industry as a whole. At industry level, the life insurance industry generated close to **R3.7 billion in economic profits per year** on average. This is significantly less than R18.4 billion average IFRS profits generated per annum. This means that **opportunity cost** for the life insurance industry is very high (measured as CoC*CE) at about R14.7 billion – 80% of accounting profits was required just to cover opportunity cost to shareholders.

Table 2A: Breakdown of total industry EVA into components per year plus averages

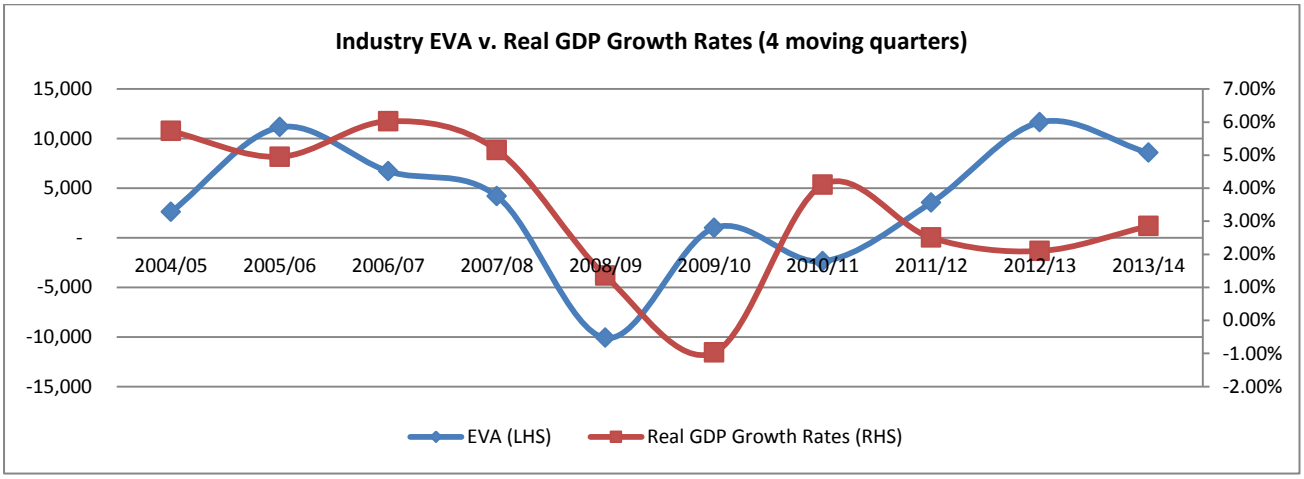
	EVA	NEP	INV	FCI	OI	NCBI	CCL	IE	AC	GMAE	OI2	Tax	CoC	CE
2013/14	8 561	133 345	229 975	30 057	5 705	185 715	100 356	1 779	19 597	48 776	7 973	10 729	10.6%	159 814
2012/13	11 643	132 481	220 024	24 433	3 528	171 755	99 225	1 799	19 130	40 185	8 255	11 507	9.9%	184 180
2011/12	3 540	113 906	121 474	21 123	2 956	110 040	59 641	2 011	16 564	35 322	6 305	8 516	11.1%	170 588
2010/11	-2 365	101 576	126 779	19 785	3 060	129 676	44 372	2 163	15 147	31 485	4 689	7 219	12.5%	162 705
2009/10	995	86 261	114 626	16 975	5 697	104 496	45 952	2 032	12 988	26 837	3 425	7 610	15.1%	136 641
2008/09	-10 200	69 868	9 510	13 407	-10 548	35 648	8 699	1 018	10 726	22 425	51	3 062	10.8%	107 242
2007/08	4 193	63 576	73 685	13 328	1 545	96 593	1 670	951	9 458	21 135	241	6 380	10.6%	115 556
2006/07	6 707	60 963	140 366	11 777	1 913	126 663	33 060	789	8 951	18 347	1 745	8 248	9.8%	113 143
2005/06	11 138	54 216	145 255	9 373	1 598	112 458	45 073	476	7 381	16 127	446	8 134	9.9%	96 901
2004/05	2 594	48 794	98 522	7 756	1 606	80 981	35 299	194	7 962	15 016	1 005	5 836	9.6%	82 556
Average	3 681	86 499	128 022	16 801	1 706	115 403	47 335	1 321	12 790	27 566	3 414	7 724	11.1%	132 933

*Source: Own Analysis. Abbreviations: EVA – Economic Value Added; NEP – Net Earned Premiums; INV – Investment Income or RoA*TA; FCI – Fees & Commission Income; OI – Other Income; NCBI – Net Claims & Benefits Incurred; CCL – Changes in Contract Liabilities; IE – Interest Expense; AC – Acquisition Costs; GMAE – General Marketing & Administration Expenses; OI2 – Other Items; Tax – Corporate Income Tax; CoC – Cost of Capital; CE – Capital Employed.*

From Table 2A, it is also visible that Investment Income (INV), Net Claims and Benefits Incurred (NCBI), Capital Employed (CE) and Net Earned Premiums (NEP) are the biggest components of EVA. It will not be surprising to see these four value drivers dominate variance analysis and principal components analysis in sections that follow. (Note: In some sections of this research paper, Investment Income is broken down into Return on Assets and Total Assets because these two are significant drivers of EVA on their own).

Overtime, industry EVA fluctuates between R10 billion loss and R12 billion economic profits. As expected, Figure 2A below suggests that industry economic profits are related to overall economic growth in South Africa. It seems that industry EVA leads country growth trajectory by about a year or so. The first potential explanation for this is that economic recessions are generally linked to financial crises in the economy. Just like the 2008/09 recession soon after the 2007/08 global financial crisis starting in the US. Since the life insurance sector is at the heart of the financial sector, it is not surprising that this sector make significant losses before all other sectors of the economy. The second potential explanation is that South Africa financial sector is strongly linked to the global financial sector as a whole. As a result, the financial crisis was transmitted from the US to South Africa through the financial sector. So this sector suffered first before the crisis was fully transmitted to other sectors of the economy.

Figure 2A: Industry EVA versus SA GDP growth rates for the past 10 years



Source: Statistics SA, Own Analysis.

Table 2B: Summary Statistics – Central Tendencies

Variable	Mean	Median	Minimum	Maximum
Discovery	814.589	617.960	329.153	1653.93
Liberty	1064.300	896.288	-1005.890	2580.47
MMI	109.396	350.262	-1182.920	825.033
Old_Mutual	-1239.862	-547.718	-9510.470	4813.71
Sanlam	2986.920	2307.170	-212.166	9428.76
Industry	4896.600	3866.720	-2365.290	11643.5

Table 2C: Summary Statistics – Dispersion

Variable	Std. Dev.	C.V.	Skewness	Ex. Kurtosis
Discovery	475.102	0.583242	0.642042	-1.01671
Liberty	1259.790	1.183690	-0.222871	-1.23017
MMI	800.508	7.317540	-0.89034	-0.612685
Old_Mutual	2842.240	118.88200	-0.0380684	-0.306665
Sanlam	2834.740	0.949049	1.10475	0.745987
Industry	4538.740	0.926918	0.153586	-0.992892

Source: Own Analysis

Table 2B and 2C above summarises of central tendencies and dispersion of EVA. Table 2C shows that the sector standard deviation is about R4.5 billion per annum. This means that the industry can swing a few billion Rands in either direction and it is still business as usual.

Discovery - The only company to **never** post a negative EVA. Their lowest EVA was R329 million positive EVA in 2006. Discovery is also the most stable generators of EVA over time – standard deviation for Discovery is only R475 million a year.

MMI – Of all companies covered, MMI was the most skewed towards negative EVAs. This means though its average EVA is positive, MMI was more likely to post an economic loss than a posting a gain for any particular year. (Note that the study used only 5 years' worth of data for MMI).

Liberty – This company had the highest excess kurtosis in the study. This means that Liberty was likely to post economic profits in the tails (a large loss or a large gain) relative to normal distribution. It also means that Liberty often post figures very close to its historical average.

Old Mutual – was the only company with negative average annum EVA of the five companies covered. They posted R1.2 billion average EVA over the last 10 years. Old Mutual also scored the lowest single-year EVA of R9.5 billion in 2010. This dismal performance by Old Mutual is partially because of high cost of capital. Its average cost of capital for Old Mutual was 13.1% versus industry average of 11.1%.

Sanlam – they generated the highest average EVA over the period at about R3 billion. They also generated the highest single-year EVA of R9.4 billion in 2005. On average, Sanlam and Old Mutual generate similar IFRS profits of R6.7–R6.8 billion per annum. But Sanlam uses only 73% of Old Mutual capital at a lower cost of capital of 10.35% versus 13.1% of Old Mutual.

In summary, all companies in the life insurance industry display special features relative to each other. Old Mutual seems to be drifting sideways; Sanlam is generating excessive economic profits; Discovery creates its profits in the most stable fashion; MMI is inclined to post a negative EVA than normal and Liberty is the most likely to surprise with a very high gain or a loss relative to normal and own history.

The main objective of this study is to see if some of the value drivers are more important that others in generating EVA. At a very basic level, one could study correlation between variables

(dependent included) to see if any ot them are strongly associated. If two variables are strongly correlated, then one of them could be eliminated from analysis and still be well represented by the other variable. Apart from finding out which variables are strongly correlated, a correlation matrix helps in justifying application of PCA. Figure 2C below is the correlation matrix for all variable and EVA.

Figure 2C: Correlation matrix for EVA components

EVA	NEP	RoA	TA	FCI	OI	NCBI	CCL	IE	AC	GMAE	OI2	Tax	CoC	CE	
1	0.1839	0.5672	0.2205	0.1724	0.0025	0.5218	0.5157	-0.2531	0.1257	0.1908	0.2457	0.6334	-0.5985	0.0744	EVA
	1	-0.1689	0.9834	0.9759	0.7072	0.7154	0.8238	0.8324	0.9966	0.9803	0.9648	0.6978	0.1828	0.9492	NEP
		1	-0.1201	-0.1954	-0.0374	0.4816	0.3614	-0.377	-0.2079	-0.1824	0.053	0.5374	-0.3528	-0.1854	RoA
			1	0.9954	0.7498	0.7775	0.8267	0.8031	0.9782	0.9933	0.95	0.7329	0.1691	0.9118	TA
				1	0.7593	0.7332	0.7867	0.8089	0.9756	0.9962	0.9234	0.6734	0.197	0.8939	FCI
					1	0.5878	0.6714	0.7338	0.7204	0.7429	0.7096	0.5585	0.6159	0.614	OI
						1	0.8549	0.4565	0.6869	0.7231	0.8046	0.953	-0.0785	0.6689	NCBI
							1	0.5021	0.8064	0.8106	0.9094	0.8835	-0.0449	0.7064	CCL
								1	0.8384	0.7833	0.7611	0.4289	0.641	0.9035	IE
									1	0.981	0.9598	0.659	0.2075	0.9395	AC
										1	0.9347	0.6729	0.1561	0.8847	GMAE
											1	0.8079	0.1234	0.916	OI2
												1	-0.0914	0.6697	Tax
													1	0.2773	CoC
														1	CE

Source: Own Calculations.

The correlation matrix suggests that there could be clusters of value drivers in this data. One possible cluster is total operational costs made up of Acquisition Costs, General Marketing and Administration Expenses Other Items. Another potential cluster is made up of Fees & Commission Income and Total Assets – this makes sense since asset management fees are levied on total assets under management. Net Claims & Benefits Incurred and Changes in Contract Liabilities could be another cluster – when a life insurer pays claims, it reduces both assets and liabilities. Another interesting insight is that RoA doesn't seem to be strongly correlated to assets under management – this implies investment returns doesn't depend on economies of scale.

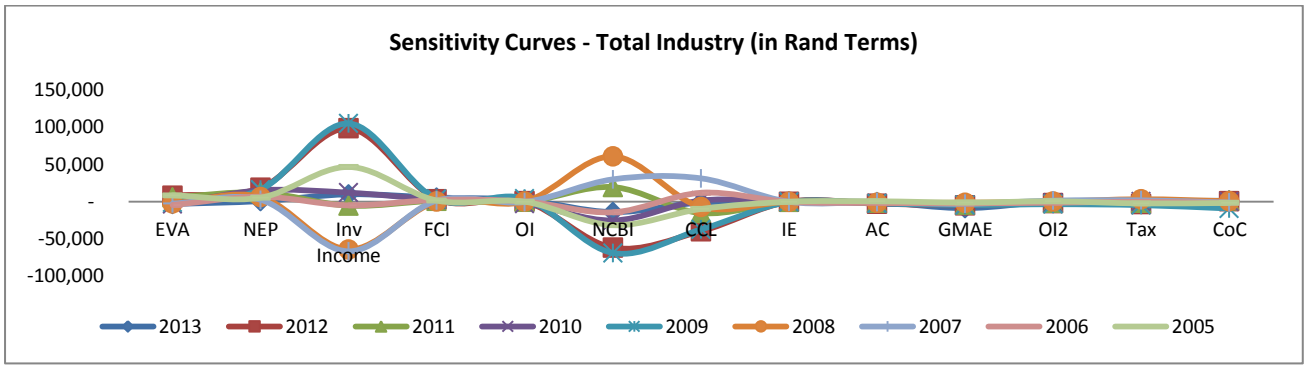
The 2-tailed critical value at 5% significance level is 0.6319. This means that though cost of capital and return on assets seem strongly correlated to EVA, their association with EVA is not very strong. This could be because of the way we split EVA. For example, when investment income (RoA*TA) is used instead of RoA and TA separately, the correlation coefficient is 0.64, implying a very strong relationship.

In summary, it seems a number of value drivers are strongly correlated to each other. This justifies application of dimension reduction techniques like PCA to reduce the number of variables down to few. The next section explores variance analysis to identify the main value drivers before the following section applies PCA to this data.

4.2 Variance Analysis

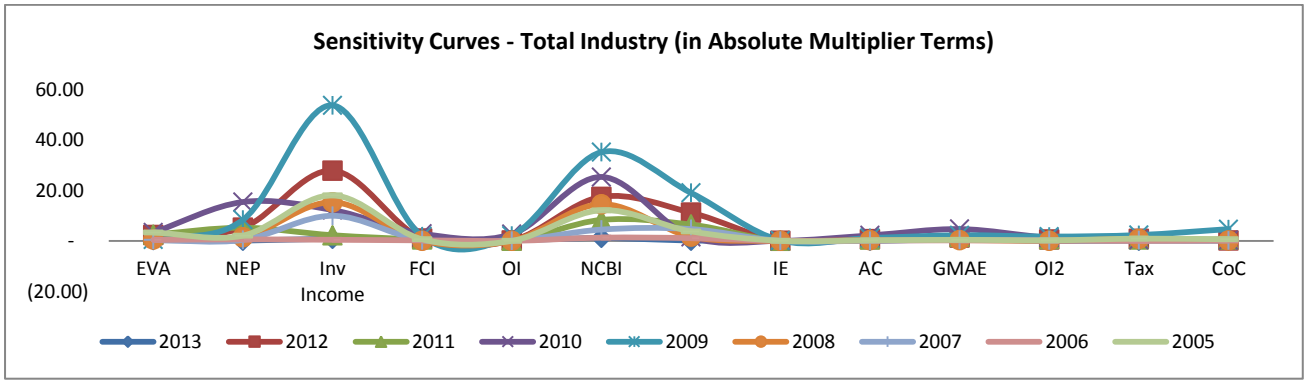
Industry level **–** Figure 3A and 3B below show how sensitive total EVA is to changes in the underlying value drivers at total life insurance industry level. Each curve on the figure represent each of the last 9 years.

Figure 3A: Sensitivity curves for total industry in Rand terms



Source: Own Analysis

Figure 3B: Sensitivity curves for total industry in Absolute multiplier terms



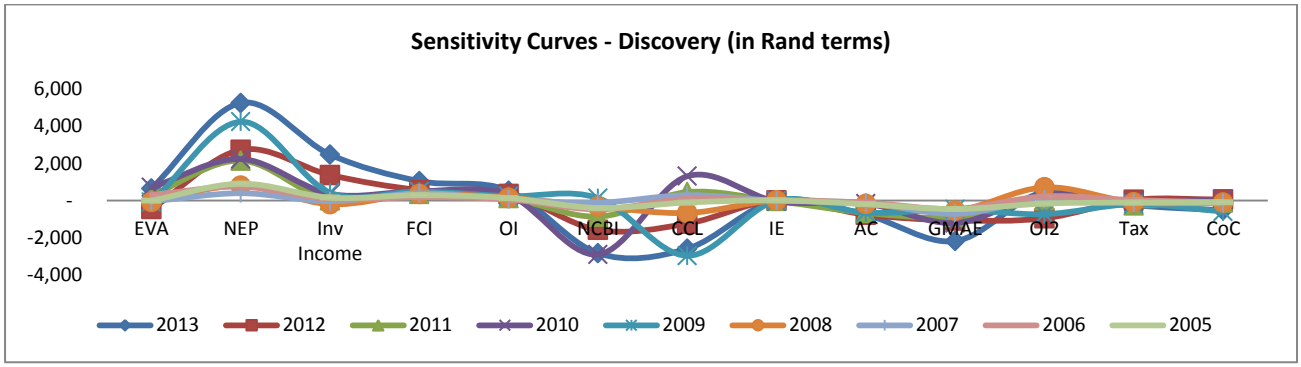
Source: Own Analysis.

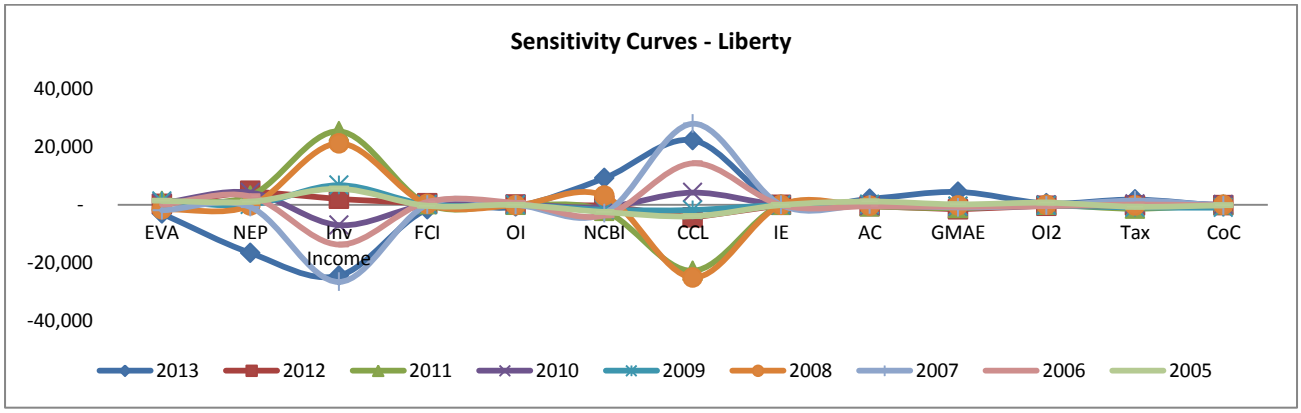
The general insight from the two Figures above is that Investment Income (RoA*TA) and Net Claims (NCBI) are by far the largest contributors to variation in EVA. These drivers are then followed by Net Earned Premiums and Changes in Contract Liabilities. General Marketing and Administration Expense and Rand cost of capital are also considerable contributors.

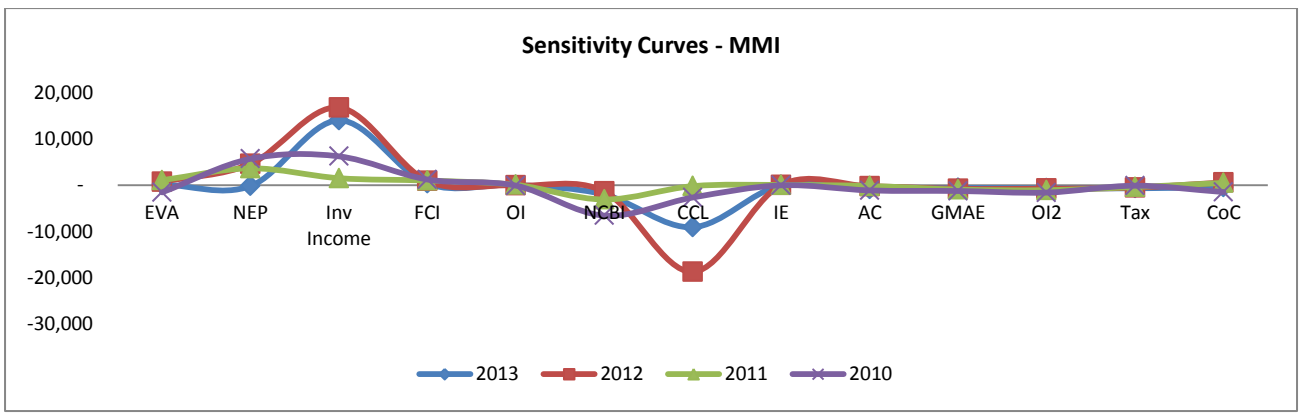
Average annual Net Earned Premiums over the last ten years is R86.5 billion or 1.8 times higher than Changes in Contract Liabilities of R7.3 billion. But on average, NEP contributed only R11.7 billion to variation in EVA versus R13.6 billion contributed by CCL. What is happening here is that CCL is smaller than NEP on average but CCL is a lot more volatile compared to NEP. So although size may seem like the only factor here, it is actually a combination of size and dispersion of underlying values that are responsible for variation in economic profits.

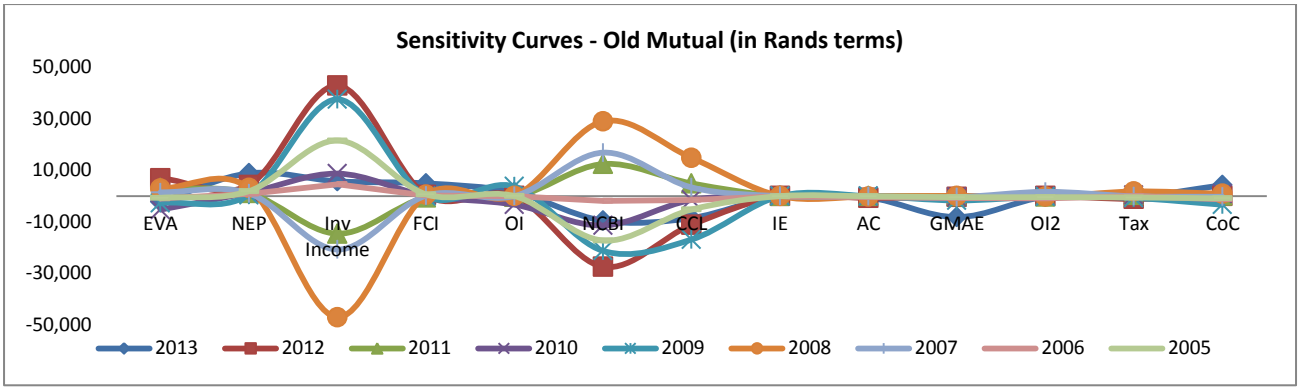
Company level – Similar Figure 3A above, the following five Figures show sensitivity curves for each of the five life insurance companies in South Africa.

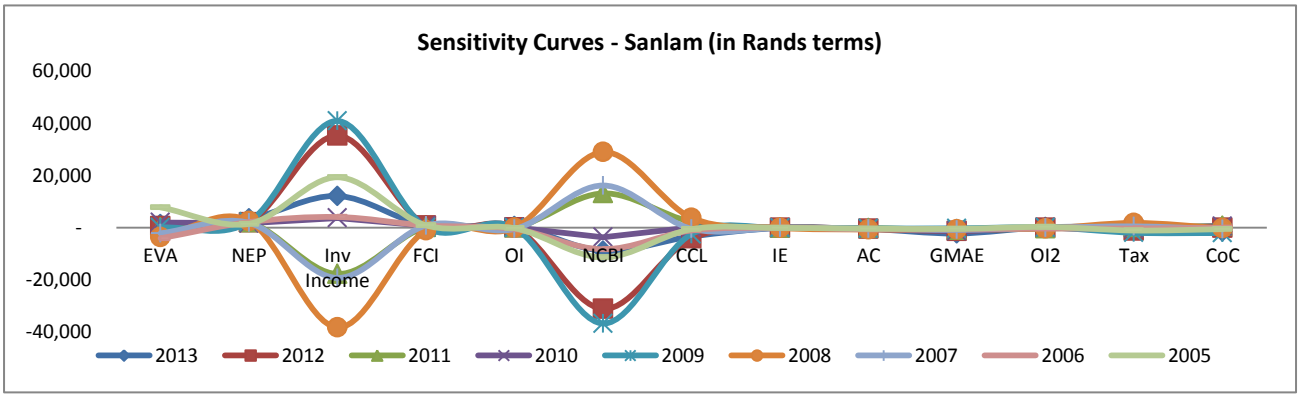
Figure 3C-G: Sensitivity curves for Discovery, Liberty, MMI, Old Mutual and Sanlam











(Discovery) Net Earned Premiums, Investment Income, Net Claims and Benefits Incurred, Changes in Contract Liabilities and GMAE are significant. What is interesting about Discovery is consistency – NEP and INV are positive consistent while NCBI, CCL and GMAE are negative consistent. (**Liberty)** Investment Income and Changes in Contract Liabilities are significant contributors. (**MMI)** Investment Income and Changes in Contract Liabilities are significant contributors. But similar to Discovery, these value drivers are consistent in their contribution to EVA. (**Old Mutual)** Investment Income, Net Claims and Benefits Incurred, Changes in Contract Liabilities and to some extent General Marketing and Administration Expenses are significant contributors to EVA variation. (**Sanlam)** Only Investment Income and Net Claims and Benefits Incurred are significant contributors.

In summary, Investment Income, Net Claims and Benefits Incurred, Changes in Contract Liabilities, Net Earned Premiums and General Marketing and Administration Expenses are the main contributors to variation in EVA. Size and dispersion of variables counts the most.

4.3 Principal Component Analysis

As outlined in the methodology section, PCA was performed in 3 steps. We start with company level below before we analyse aggregated industry figures.

Discovery - Step 1: Eigenvalue analysis of Correlation Matrix

Table 2A: Eigenvalue table for Discovery

Component	Eigenvalue	Proportion	Cumulative
1	10.4749	**0.7482**	0.7482
2	2.1100	**0.1507**	0.8989
3	0.8304	**0.0593**	0.9582
4	0.3648	0.0261	0.9843
5	0.1713	0.0122	0.9965

From the table above, we see that the first principal component (PC1) explains 74.82% of variation. The second principal component (PC2) explains 15.07% while PC3 explains 5.93% of total variation. The top three principal components explain 95.82% - which is more than the 95% threshold. We will only focus on these three PC for steps 2 and 3 below.

Step 2: Analysis of Eigenvector (component loadings)

Table 2B: Eigenvectors for the top 3 PCs – Discovery

VARIABLE	PC1	PC2	PC3
NEP	**0.309**	0.008	-0.034
RoA	-0.002	**0.626**	-0.257
TA	0.307	0.048	0.09
FCI	0.307	-0.048	0.001
OI	**0.308**	0.012	-0.001
NCBI	0.302	0.087	0.146
CCL	0.276	-0.005	**-0.447**
IE	0.262	0.010	0.398
AC	0.307	0.043	-0.007
GMAE	0.307	-0.015	0.055
OI2	0.052	**0.577**	-0.326
Tax	0.304	-0.099	0.026
CoC	0.082	-0.500	**-0.659**
CE	0.307	0.001	0.019

Step 3: Interpretation

PC1, NEP and OI are the top two variables. An increase in NEP together with increase in OI has resulted in higher EVA for Discovery over the last 10 years. OI is mainly Vitality – so interestingly, revenue from Vitality is a significant source of economic value for Discovery. **PC2**, RoA and OI2 are the top two variables. When other life insurers posted negative returns for 2008, Discovery posted a positive return on assets. This return on assets has consistently increased since then – generating significant economic profits. OI2/Other Items include items such as forex, puttable non-controlling interest fair value adjustments, amortization of intangibles from business combinations and other non-core items. **PC3**, CoC and CCL are the top two variables. An increase in cost of capital is associated with an increase with contract for

Discovery. These two items have a dilutive effect on EVA. Discovery could improve its economic value generation my reducing CoC which is likely to reduce CCL too.

In summary, Discovery should focus on revenue generation by selling more policies for premiums through Vitality. They should continue to increase return on assets and employ more debt to further reduce their cost of capital. [Significant Value Drivers: NEP, OI, CoC, RoA, OI2, CoC and CCL]

Liberty - Step 1: Eigenvalue analysis of Correlation Matrix

Table 3A: Eigenvalue table for Liberty

Component	Eigenvalue	Proportion	Cumulative
1	7.8849	**0.5632**	0.5632
2	2.7822	**0.1987**	0.7619
3	1.7153	**0.1225**	0.8845
4	1.1310	**0.0808**	0.9652
5	0.2461	0.0176	0.9828

Unlike Discovery, we need 4 PCs to get to 95% threshold for Liberty. PC1 explains just over 56%, PC2 explains just less than 20%, PC3 and PC4 together explain just over 20%. The top 4 PCs account for 96.52% of variation.

Step 2: Analysis of Eigenvector (component loadings)

Table 3B: Eigenvectors for the top 4 PCs – Liberty

VARIABLE	PC1	PC2	PC3	PC4
NEP	0.338	-0.154	0.089	-0.105
RoA	0.256	0.080	0.041	0.637
TA	0.164	0.482	0.235	-0.191
FCI	**0.340**	-0.089	-0.090	-0.080
OI	0.257	-0.383	-0.026	-0.090
NCBI	0.251	-0.366	-0.153	-0.177
CCL	0.292	-0.201	0.173	-0.372
IE	-0.142	-0.314	0.513	0.010
AC	0.330	-0.207	0.04	-0.260
GMAE	**0.344**	-0.012	-0.06	-0.199
OI2	0.307	0.184	-0.182	-0.261
Tax	0.306	0.032	0.174	0.334
CoC	0.008	0.157	**-0.704**	0.177
CE	0.165	0.455	0.211	-0.333

PC1 – Fees and commission income (FCI) and general marketing and administration expenses (GMAE) are the top two variables. This implies that Liberty was able to sell more fees and commission based products, they were able to reduce their general cost-to-income ratio resulting in EVA generation. **PC2** – Asset under management (TA) and Capital Employed are the top two variables. Shifting product mix from capital heavy life insurance to capital light investment products increases asset management fees and reduces capital requirements for

Liberty. So Liberty was able to earn more income for the same capital base and hence improved EVA. **PC3** – Cost of capital is the most significant variable for PC3. The gradual increase in cost of capital has eroded EVA for Liberty. Using more debt will not be very helpful for Liberty since its cost of debt is very high (averaging more than 11% over the last 10 years). Since this PC explains over 12% of total variation, it is important than Liberty finds innovative ways to reduce its cost of debt. **PC4** – Return on Asset (RoA) is the most significant variable for PC4. Over and above increasing asset under management, Liberty has been able to earn good returns on assets.

In summary, Liberty has been able to improve EVA by shifting product mix from capital heavy to capital light products which has allowed them to be cost efficient. The one thing they could focus on in future could be to find innovative ways to reduce cost of debt. [Significant Value Drivers: FCI, TA, CoC, and RoA]

MMI - Step 1: Eigenvalue analysis of Correlation Matrix

Table 4A: Eigenvalue table for MMI

Component	Eigenvalue	Proportion	Cumulative
1	11.6456	**0.8318**	0.8318
2	1.6901	**0.1207**	0.9525
3	0.4505	0.0322	0.9847
4	0.2139	0.0153	1.0000
5	0.0000	0.0000	1.0000

For MMI, only two PCs are enough to reach the 95% threshold. PC1 alone explains over 83% of total variation. PC2 explains over 12%.

Step 2: Analysis of Eigenvector (component loadings)

Table 4B: Eigenvectors for the top 2 PCs – MMI

VARIABLE	PC1	PC2
NEP	0.286	0.119
RoA	0.230	-0.384
TA	**0.290**	0.078
FCI	**0.290**	0.06
OI	0.145	**-0.579**
NCBI	0.282	0.177
CCL	0.269	-0.216
IE	-0.278	0.235
AC	0.281	0.096
GMAE	**0.291**	0.054
OI2	**0.290**	0.084
Tax	0.279	0.084
CoC	-0.271	-0.222
CE	0.220	0.49

PC1 – Four variables score highly for PC1. As expected, total assets (TA) and fees and commission income (FCI) tend to move together because majority of fees are levied on asset under management. MMI increased its return on assets from about 9.5% in 2010 to about 14% in 2014. At the same time MMI increased its total assets from R198 billion in 2010 to R414 billion in 2014 (over 20% CAGR). This has greatly contributed to MMI's economic profits. But as MMI increase fee based income, general and other expenses go up as well – however, since fees income increase faster than expenses for MMI, the net effect has been a net increase in economic profits. **PC2** – OI/Other Income is the only variable that is significant for PC2. For MMI, this item represents other comprehensive income which includes items adjustment to Metropolitan Staff Pension Fund, Land & Building revaluations and exchange differences in translating foreign operations. It is a bit worrying that a large part of variation in EVA could be as a result of these non-operating items in the income statement.

In summary, changes in MMI's economic profits has mainly been due to aggressive bulking up of assets under management and making good decisions in picking investments in the market. It is however worrying that some significant variation in EVA was due to below the line items such as land and building revaluation. [Significant Value Drivers: TA, FCI, OI2, and OI].

Old Mutual - Step 1: Eigenvalue analysis of Correlation Matrix

Table 5A: Eigenvalue table for Old Mutual

Component	Eigenvalue	Proportion	Cumulative
1	6.7274	0.4805	0.4805
2	3.6968	0.2641	0.7446
3	1.7231	0.1231	0.8677
4	0.7584	0.0542	0.9218
5	0.7199	0.0514	0.9733

For Old Mutual, a total of five PCs are required to explain 95% of variation in observed data. PC1 explains only 48.05% of total variation – this is the lowest of all companies covered in this study. Interestingly, PC2 accounts for 26.41% of total variation – this is the highest for all companies covered. PC3, PC4 and PC5 combined explained a little less than 23%.

Step 2: Analysis of Eigenvector (component loadings)

Table 5B: Eigenvectors for the top 5 PCs – Old Mutual

VARIABLE	PC1	PC2	PC3	PC4	PC5
NEP	0.358	0.048	0.087	0.304	-0.134
RoA	-0.185	0.444	-0.132	0.095	0.005

TA	**0.361**	0.146	0.114	0.077	0.102
FCI	0.337	-0.074	0.037	-0.293	0.266
OI	0.117	-0.092	**-0.675**	-0.264	0.061
NCBI	-0.055	**0.508**	-0.034	0.094	0.033
CCL	0.091	**0.467**	-0.233	0.223	0.031
IE	0.337	0.016	0.119	-0.471	0.205
AC	0.352	0.085	0.129	0.218	0.087
GMAE	**0.366**	0.067	-0.089	0.214	-0.17
OI2	-0.014	0.344	0.075	**-0.537**	**-0.671**
Tax	-0.218	0.32	-0.073	-0.189	0.589
CoC	0.197	-0.111	**-0.619**	0.061	-0.121
CE	0.332	0.209	0.128	-0.187	0.061

PC1 – TA and GMAE are the two most significant variables for PC1. Of all companies covered in this study, Old Mutual is the biggest in terms of assets under management with close to R600 billion invested. Though Old Mutual generates significant economic value this way, general marketing and administration expenses tend to dilute some of this value. **PC2 –** NCBI and CCL are strongly associated with the second dimension for Old Mutual. NCBI and CCL are linked to each other in that, as Old Mutual pay out claims, their obligations to pay more claims in future diminishes. PC2 is very important because it explains over a quarter to observed variation – this implies that economic value generated through investment income in the first dimension is further eroded when benefits are allocated to policyholder leaving small residuals for shareholders. **PC3 –** OI/Other Income and CoC are the two variables strongly associated with the third dimension for Old Mutual. Other Income includes items listed under "other comprehensive income" such as property revaluation, available-for-sale investments, shadow accounting and other related items. To demonstrate how sensitive Old Mutual EVA is to OI, in 2009 Old Mutual managed to generate a marginal positive EVA after posting R3.7 billion in other comprehensive income. With regard to CoC, Old Mutual has the highest cost of equity of all companies covered in this study. This is eroding significant economic profits for shareholders. **PC4 –** OI2/Other Items is the only variable strongly associated with the fourth dimension for Old Mutual. The main item in OI2 is collateral held against their hedging/trading activities. Interestingly, this item is much bigger than interest on long-term debt. The question here is whether hedging activities are economically viable for Old Mutual if it is going to cost R500 million or so in economic value per annum. **PC5 –** OI2/Other Items features again in the fifth dimension. To avoid contradiction, PC5 is excluded from analysis.

In summary, Old Mutual is able to generate economic profits by charging asset management fees. But most of this value is eroded by operational expenses, allocation of returns to policyholders, cost of capital and collateral held against hedging activities. As a result, very

little is left for shareholders. Old Mutual has resorted to other comprehensive income in the past to post a positive EVA. Over and above increasing assets under management, Old Mutual could improve economic profits by earning high RoA, or by reducing cost of capital via issuing more debt, or by reducing cost of holding collateral via shifting mix towards investment products. [Significant Value Drivers: TA, GMAE, NCBI, CCL, OI, CoC and OI2].

Sanlam - Step 1: Eigenvalue analysis of Correlation Matrix

Table 6A: Eigenvalue table for Sanlam

Component	Eigenvalue	Proportion	Cumulative
1	7.9634	0.5688	0.5688
2	3.8535	0.2753	0.8441
3	0.9082	0.0649	0.9089
4	0.5941	0.0424	0.9514
5	0.4263	0.0305	0.9818

For Sanlam, four PCs are required to get to the 95% threshold for this study. PC1 explains 57% of observed variation in EVA. PC2 explains close to 30% on its own while PC3 and PC4 explain just over 10% of total variation. More attention is afforded PC1 and PC2.

Step 2: Analysis of Eigenvector (component loadings)

Table 6B: Eigenvectors for the top 3 PCs – Sanlam

VARIABLE	PC1	PC2	PC3	PC4
NEP	0.344	-0.091	0.074	0.047
RoA	-0.030	**0.500**	-0.026	-0.159
TA	**0.350**	0.005	0.022	-0.086
FCI	0.340	0.011	0.081	-0.194
OI	0.027	0.372	0.388	**0.706**
NCBI	0.232	0.370	-0.077	-0.199
CCL	0.200	0.344	-0.098	0.128
IE	0.295	-0.223	-0.145	0.296
AC	0.338	-0.135	0.021	-0.025
GMAE	0.345	-0.017	0.180	0.157
OI2	0.147	-0.342	0.497	-0.236
Tax	0.208	0.363	-0.120	-0.409
CoC	0.197	-0.175	**-0.706**	0.249
CE	**0.352**	0.008	0.084	0.084

PC1 – Total assets under management (TA) and total capital employed (CE) are strongly associated with PC1. Though an increase in capital employed increases Rand cost of capital, this is not a problem for Sanlam as investment income earned to asset under management is large enough. This is because Sanlam product mix is skewed towards investment type. **PC2 –** Return on assets under management is the only variable strongly associated with the second dimension for Sanlam. So over and above doubling assets under management over the last 10

years, Sanlam has also improved return on assets to levels only seen before the 2007/2008 financial crisis. Return on assets explains close to 30% of variation in economic profits for Sanlam, so this is an important focus area for them. **PC3 –** Cost of Capital (CoC) is the only variable strongly associated with the third dimension. This dimension alone explains about 6.5% of observed variation. Sanlam cost of capital has been on a general upward trend, this trend is eroding shareholder value. **PC4 –** OI/Other Income is the only variable strongly associated the PC4. The main item included in OI is "equity-accounted investments" which is effectively Sanlam strategic investments such as Shriram Capital, Letshego, Pacific & Orient and Sanlam Personal Loans. Over the past 10 years, Sanlam generated an average R530 million earnings per annum from associates and join ventures. This is considerable economic value for shareholders.

In summary, Sanlam has been excellent in pulling a number of levers for value creation. They were able to double assets under management while improving return on investments. Though their cost of capital is on an upward trajectory, it is still relatively low at about 10% per annum. Sanlam also made good strategic investments in associates and joint ventures. [Significant Value Drivers: TA, CE, RoA, CoC and OI].

Industry Level - Step 1: Eigenvalue analysis of Correlation Matrix

Table 7A: Eigenvalue table for Total Industry

Component	Eigenvalue	Proportion	Cumulative
1	9.9791	**0.7128**	0.7128
2	2.3779	**0.1699**	0.8826
3	1.0432	**0.0745**	0.9572
4	0.3506	0.0250	0.9822
5	0.1716	0.0123	0.9945

At aggregate life insurance industry level, only three PCs are required to explain more than 95% of observed variation in EVA. The first PC explains close to 72%, the second one explains 17%. Table 7B below contains components loadings for each of the top 3 PCs.

Step 2: Analysis of Eigenvector (component loadings)

Table 7B: Eigenvectors for the top 3 PCs – Total Industry

VARIABLE	PC1	PC2	PC3
NEP	**0.310**	0.054	0.162
RoA	-0.010	**0.583**	-0.403
TA	**0.312**	0.022	0.120
FCI	**0.307**	0.067	0.138
OI	0.251	0.127	-0.467

NCBI	0.256	-0.331	-0.128
CCL	0.275	-0.261	-0.053
IE	0.262	0.312	-0.132
AC	**0.308**	0.081	0.163
GMAE	**0.307**	0.050	0.171
OI2	**0.309**	-0.067	0.059
Tax	0.249	-0.361	-0.156
CoC	0.075	0.454	**-0.654**
CE	0.294	-0.100	0.109

PC1 – Six variables are strongly associated to the first dimension but they can be grouped into four clusters. NEP is a cluster on its own and it represents **the traditional business** – selling policies to earn premium income. TA and FCI form the **asset management cluster** – creating economic profits by charging asset management fees and increasing asset under management base. AC and GMAE make the third cluster and they represent **cost management** – closely managing **cost-to-income ratios** to create value. The fourth cluster is represented by OI2 – it seems there are a number of items in **"other comprehensive income"** section of South Africa life insurance companies that significantly affect economic profits. **PC2 –** Return on Assets is the only variable strongly associated with the second dimension at industry level. This dimension alone explains close to 17% of observed variation – making it an important focus area. Return on Assets adds another lever to the asset management cluster mentioned in PC1 – economic profits can also be generated by originating great investment opportunities in the marketplace. This is over and above the two levers which are charging asset management fees and increasing asset under management. **PC3 –** Cost of Capital is the only variable strongly associated with the third dimension. Rising cost of capital for the industry as a whole is gradually eroding shareholder value. The financial crisis of 2007/2008 indirectly shocked cost of equity through risk free rates, and directly shocked cost of debt funding. In times like these, it is rather difficult to reduce cost of capital – but cost of debt is generally lower than cost of equity so employing a bit more of debt is always a good idea as long as it doesn't create financial distress for the company.

In summary, economic value drivers for Life Insurance Company can be categorized into few clusters, namely: (1) Traditional underwriting where levers are selling are profitable policies in well considered mix for premiums. (2) Asset management business where the three main levers are charging asset management fees, increasing assets under management and asset origination. (3) Managing cost-to-income ratios. (4) Reducing cost of capital. (5) And managing once-off items under Other Income or Other Items.

5 Summary and Conclusions

5.1. Research Summary

The debate about EVA versus traditional measures is on-going and will continue long into the future. The general feel from literature is that EVA is superior to traditional accounting measures. Rather than adding to this broad debate, this study took EVA's superiority as a starting point and sought to analyze value drivers and their levers behind EVA instead.

5.2. Conclusions

Overall, we found that Net Earned Premiums, Assets under Management, Fees & Commission Income, Return on Assets, General Marketing & Administration Expenses, Acquisition Costs, Cost of Capital, and Other Income are the main value drivers. These value drivers can be grouped into five clusters. NEP is a cluster on its own and it represents **underwriting cluster**. TA, FCI and RoA form the **asset management cluster**. AC and GMAE make the third cluster and they represent the **cost cluster**. The fourth cluster is represented by COC – **opportunity cost cluster**. Other Income represents **"strategic investment cluster".** In the **underwriting cluster**, management can create value by designing, marketing and selling profitable life insurance products. Another lever here is to sell the right mix of capital-light and capital-heavy products. In the **asset management cluster**, management has three levers available to them, namely: (1) increasing assets under management, (2) charging asset management fees and fees income and (3) increasing return on investment by originating great investment opportunities. In the **cost cluster**, the company must manage its cost-to-income ratios and benchmark against peer. In the **opportunity cost cluster**, management can reduce cost of capital by employing cheaper debt without exposing company to financial distress risks. We saw that most life insurance companies earn some sort of "other comprehensive income". So in the **strategic investment space**, managers can create value by making value-accretive investments in associated companies and joint-ventures.

Sanlam proved to be the star performers of the life insurance sector over the past 10 years. Sanlam created value by focusing on three clusters. In the asset management space, they managed to double assets under management by selling more investment-type products while improving return on assets. In the opportunity cost, they were able to source cheaper debt

versus sector average. On the strategic investments space, they have a number of profitable investments in associated companies and joint ventures.

The main implication for a company trying to improve shareholder value is that they should focus on the five clusters. For each cluster, management has two to three levers they can pull to generate value. Insights from analyzing top performers in the sector are that focusing on asset management, the opportunity costs of shareholder and profitable strategic investments could be the secret formula to shareholder value creation.

Appendix

Table 1A: The 6 months JIBAR rate history – used as the risk free rate in this study

DATE	Dec 2003	June 2004	Dec 2004	June 2005	Dec 2005	June 2006	Dec 2006	June 2007	Dec 2007	June 2008	Dec 2008
6 MM JIBAR	7.57%	8.31%	7.42%	6.93%	7.20%	7.84%	9.38%	10.10%	11.53%	12.90%	10.88%
DATE	June 2009	Dec 2009	June 2010	Dec 2010	June 2011	Dec 2011	June 2012	Dec 2012	June 2013	Dec 2013	June 2014
6 MM JIBAR	7.58%	7.68%	6.79%	5.69%	5.80%	5.83%	5.69%	5.33%	5.43%	5.64%	6.42%

Source: Bloomberg Data

Table 1B: History of betas for South African life insurance companies

	Discovery	Liberty	MMI	Old Mutual	Sanlam
Dec 2003	0.31	0.54	0.41	1.08	0.81
Jun 2004	0.23	0.46	0.40	1.09	0.67
Dec 2004	0.24	0.45	0.36	1.11	0.64
Jun 2005	0.25	0.43	0.34	1.12	0.66
Dec 2005	0.30	0.46	0.40	1.09	0.66
Jun 2006	0.38	0.50	0.49	1.02	0.76
Dec 2006	0.39	0.49	0.44	0.94	0.79
Jun 2007	0.44	0.48	0.44	0.86	0.84
Dec 2007	0.43	0.51	0.44	0.86	0.81
Jun 2008	0.45	0.47	0.51	0.86	0.86
Dec 2008	0.43	0.31	0.49	0.88	0.70
Jun 2009	0.43	0.36	0.51	1.04	0.69
Dec 2009	0.43	0.37	0.52	1.07	0.68
Jun 2010	0.42	0.38	0.51	1.10	0.65
Dec 2010	0.44	0.38	0.52	1.11	0.64
Jun 2011	0.43	0.38	0.52	1.11	0.63
Dec 2011	0.44	0.35	0.53	1.12	0.68
Jun 2012	0.43	0.36	0.52	1.16	0.66
Dec 2012	0.47	0.58	0.58	1.32	0.79
Jun 2013	0.51	0.59	0.66	1.09	0.90

Source: Bloomberg Data, Own Calculations

Table 1C: Equity risk premium for South African life insurance companies

Year	Discovery	Liberty	MMI	Old Mutual	Sanlam
2013	9.53%	10.78%	10.47%	14.15%	12.71%
2012	8.26%	9.26%	8.79%	12.95%	10.36%
2011	9.87%	10.54%	10.48%	13.74%	11.39%
2010	12.46%	12.69%	12.45%	15.17%	14.39%
2009	15.35%	15.47%	15.64%	17.52%	17.27%
2008	9.92%	9.52%	10.32%	12.36%	11.39%
2007	9.07%	8.82%	9.53%	12.55%	10.47%
2006	8.13%	7.84%	8.60%	11.79%	9.26%
2005	8.00%	7.64%	8.50%	11.73%	9.35%
2004	8.21%	8.61%	8.98%	12.54%	9.67%

Source: Bloomberg Data, Own Calculations

Table 1D: Weighted Average Cost of Capital (WACC) for South African life insurance companies

	Discovery	Liberty	MMI	Old Mutual	Sanlam
2013	8.6%	10.3%	8.0%	13.4%	11.8%
2012	7.7%	9.0%	7.1%	12.6%	9.6%
2011	9.7%	10.3%	9.2%	13.4%	10.2%
2010	10.9%	12.2%	9.9%	14.7%	12.4%
2009	12.9%	14.6%	12.3%	16.9%	14.7%
2008	8.5%	9.8%		12.0%	10.0%
2007	8.2%	9.1%		12.2%	9.1%
2006	7.4%	8.5%		11.5%	8.0%
2005	7.4%	7.5%		11.6%	8.8%
2004	7.3%	7.2%		12.5%	7.5%

Source: Bloomberg Data, Own Calculations

Company	Link to Financial Statements
Discovery	https://www.discovery.co.za/portal/individual/corporate-view-content?corporateNodeName=investor-relations
Liberty	http://www.libertyholdings.co.za/investor/Pages/Results-and-Reports.aspx
MMI	http://www.mmiholdings.com/en/investor-relations/reports-archive
Old Mutual	http://www.oldmutual.co.za/about-us/governance/company-financials.aspx
Sanlam	http://www.sanlam.com/investorrelations/financialresults/Pages/default.aspx

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