KENYA INSURANCE COMPANIES' FINANCIAL PERFORMANCE DETERMINANTS

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the Research Project contains no material previously published or written by another person except where due reference is made in the Research Project itself.

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DEDICATION

To my family who taught me to pursue my dreams.

ABSTRACT

The insurance firm is an integral aspect of Kenya's financial system, which is vital to the economy. With the growing need to be insured against various risks and the emergence of different technological products, the insurance companies still have a low contribution to the GDP. For this study, we are establishing the factors that determine the financial performance of insurance companies across the general line, the life and combined line of business. The internal factors such as leverage, liquidity, loss ratio, underwriting risk, retention ratio and size of the firm were regressed against Return on Assets. The study shows that the loss ratio and leverage are important factors in the financial performance of general insurance firms, and they should improve on the leverage and reduce the loss ratio. The retention ratio, underwriting risk and firm size all have a role in life insurance businesses' financial performance which should be enhanced, and loss ratio decreased. The liquidity and loss ratio have a substantial impact on the profitability of insurance companies with both lines of business. In companies that have both lines of business, they should reduce the loss ratio and increase the liquidity.

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ABBREVIATIONS LIST

Return on Assets (ROA)

Return on Equity (ROE)

Insurance Regulatory Authority (IRA)

Gross Domestic Product (GDP)

Association of Kenya Insurers (AKI)

Leverage (LEV)

Loss Ratio (LR)

Liquidity (LIQ)

Size (SIZE)

Retention ratio (R)

Underwriting Risk (UWR)

Kenya Shillings (KES)

United States Dollars (USD)

Least Square Dummy Variables (LSDV)

KENYA INSURANCE COMPANIES' FINANCIAL PERFROMANCE DETERMINANTS

CHAPTER ONE: INTRODUCTION

1.0 Information on the Background

In Kenya's financial system, insurance companies play a critical role. Market risk, which defines how an insurance firm can grow via market changes while competing with other insurance firms, must be tackled for any firm to succeed in the economy. As a result, all established insurance businesses have relied on their own strategy and business talents to stay ahead of the Financial Industry. A company with little or no risks is essentially doing nothing in the industry. Because each insurance business has its own strategy, the financial performance drivers of Kenyan insurance businesses must be identified. This will aid new and current stakeholders in understanding how insurance businesses make money, which is especially important in our developing country.

Those in the business and strategic sectors have been paying close attention to financial performance. The insurance industry is significant in the financial sector since it reflects the economy's success or failure. Years have passed with no conclusive answers to the topic of what factors influence financial performance in insurance companies. With the insurance sector and businesses growing, it is more important than ever to figure out what drives financial performance to improve and the economy to thrive.

Several studies have been conducted by various scholars to investigate the factors that influence the financial success of Kenyan insurance companies. However, different outcomes as well as various factors have been obtained, making the findings inconclusive. The fact that different research employed different

characteristics as predictors of insurance businesses' financial performance raises more problems. Two dependent variables that can be used to evaluate financial performance are Return on Assets (ROA) and Return on Equity (ROE).

1.1 Financial Results

Profitability, liquidity, and solvency are all factors that can be used to evaluate a company's financial success. Profitability is a crucial indicator since it indicates how much profit a company generates from its production variables. The ability of a corporation to meet short-term obligations without affecting its routine operations is referred to as liquidity. The ability of a firm to repay its debts by selling its assets is referred to as "solvency."

Because there are numerous financial ratios that demonstrate the level of earnings relative to the company's investment, it is easier to measure a company's profitability. The measurements used to measure financial performance can be classified in two ways: Both profit and investment performance are tracked. Money profits, which are the difference between revenues and expenditure, are included in profit performance. Investment performance can be divided into two categories. The first is the return on non-cash assets used in the firm, and the second is the return-on-investment operations of the cash surplus gained on various levels of operations. The Return on Assets (ROA) and Return on Equity (ROE) are the two most prevalent profit erasures (ROE)

1.1.1 Factors Influencing Insurance Companies' Financial Performance

Both internal and external factors have an impact on the profitability of life and non-life insurers. External factors focus on macroeconomic issues and the industry as a whole, whereas internal factors focus on the insurer's individual qualities. Size, age, debt-to-asset ratio, leverage, accounts receivable, net result, efficiency, and ownership structure are all microeconomic elements that affect a corporation.

External influences include GDP growth rate, interest rate, inflation rate, and exchange rate, according to (Egbunike, C.F. and Okerekeoti, C.U. (2018).

As a result, while evaluating the financial performance of insurance businesses, the following elements are considered:

Total liabilities divided by total shareholder equity yields the debt-to-equity ratio. A low debt to equity ratio shows that the company relies on debt from lenders rather than equity from shareholders to fund its operations. A greater percentage shows that borrowing is used to get the majority of the company's funds.

Liquidity is a measure of a company's capacity to satisfy short-term financial obligations without the need for outside funding. This information is provided by the current ratio, which is the ratio of current assets to current liabilities. This means that cash and bank balances should be sufficient to cover immediate liabilities for claims that are due but not yet paid.

The retention ratio is the portion of a firm's net income that is utilized to grow the company instead of paying dividends. It also refers to the amount of business that is not transferred to reinsurers once it has been underwritten. Insurer performance is likely to increase if the retention ratio is higher and the claims ratio is lower. This information is provided by the ratio of net premiums to gross premiums.

The size of a company is a firm-specific element that is thought to influence financial performance. The logarithm of the company's total assets determines this. This is a crucial metric since it has a broad impact on financial performance.

Another key issue is underwriting risk, which represents the underwriter's chance of losing money. This could be due to a faulty risk assessment, the insurance policy writing process, or uncontrollable variables. This is entirely contingent on the risk appetites of the insurers. The benefit-to-net-premium ratio is used to compute it.

The Loss Ratio, which is calculated by dividing the net claims incurred by the net earned premium, provides a high-level picture of the company's financial performance. A loss ratio of more than 60% indicates that the company is not profitable, whereas a loss ratio of 60% or less indicates that the company can break even.

1.2 Kenyan Insurance Companies

According to the 2019 IRA annual report, there are 56 businesses in Kenya's general and life insurance industry (Jubilee Health, Jubilee Life and Jubilee General had to be combined for easier data analysis). This industry also employs two hundred and twenty (220) licensed insurance brokers, ten thousand, four hundred and seventy-one (10,471) insurance agents, one hundred forty-four (144) investigators, one hundred thirty-eight (138) motor assessors, thirty-one (31) loss adjusters, eight (8)

claims settling agents, eleven (11) risk managers, and thirty-three (33) insurance surveyors.

According to the Association of Kenya Insurers, the total industry premium in 2018 was KES 231.30 billion, up from KES 216.11 billion the previous year. Life insurance has a gross written premium of KES 97.85 billion, an increase of 12.14 percent over 2018, while non-life insurance has a gross written premium of KES 133.45 billion, an increase of 3.57 percent over 2018. Total investments and other revenue increased by 39.07 percent to KES 69.85 billion. Total commissions and expenses were KES 76.36 billion in 2019 compared to KES 69.63 billion in 2018, a 9.66 percent increase, with commissions and expenses increasing by 4.46 percent and 12.05 percent, respectively, from 2018.

Ceded reinsurance premiums increased 6.10 percent to KES 46.68 billion, up from KES 43.99 billion. In 2019, the after-tax profit increased from KES 3.0 billion to KES 12.69 billion. The life business profit, which increased to KES 8.09 billion from a loss of 491.17 million in 2018, was primarily responsible for the gain. KES 117.30 billion was spent on net claims in 2019, a 5.67 percent increase from KES 111.01 billion in 2018. The rate of return on capital increased from 3.68 percent in 2018 to 15.05 percent in 2019. Total assets in the industry increased by 8.77 percent in 2019 to KES 686.02 billion, up from KES 630.72 billion in 2018.

Insurance markets play a critical role in the global financial system. The global insurance industry plays a critical role in risk management, assisting and facilitating business operations. Insurers are also important institutional investors. Large and mature insurance markets generate massive premium flows and capital pools.

According to the Swiss Re Sigma No.4/2020 report, total global direct premiums written increased by 2.9 percent in 2019 to USD 6,292 billion from USD 6,149 billion in 2018. Long-term insurance premiums increased by 2.2 percent in 2019 to USD 2,916 billion, up from 2.6 percent in 2018. In 2019, the general insurance market increased by 3.5 percent to USD 3,376 billion. The global insurance premium was more than 7.2 percent of global GDP, highlighting the importance of insurance in promoting global sustainable development. On the other hand, the COVID-19 outbreak is expected to send the global economy into a tailspin. As a result, demand for insurance will fall, particularly for long-term insurance.

Three countries dominate the global insurance business, accounting for 56.3 percent of worldwide premium, according to the research. The United States accounted for 39% of worldwide insurance premium income (USD 2,460 billion), China accounted for 10% (USD 617 billion), and Japan contributed for 7.3 percent (USD 459 billion).

Africa's insurance premium in 2019 was USD 68.16 billion, accounting for 1.08 percent of global insurance premium, according to the Swiss Re Sigma No. 4/2020 report. Premiums decreased by 1.8 percent in 2019 compared to the previous year. Long-term insurance premiums in Africa declined 2.0 percent in real terms to USD 46.20 billion (2018: USD 47.13 billion) due to the adverse economic environment, while general insurance premiums declined 1.8 percent to USD 21.95 billion (2018: USD 22.25 billion).

1.3 Problem Statement

A company's financial performance is influenced by a variety of factors, which vary among economies, countries, and regions. The insurance firm is an integral aspect of Kenya's financial system, which is vital to the economy. In many economies, insurance companies, in addition to banks, play an important part in the financial intermediation process. As a result, their success is synonymous with the success of the economy, and their failure is synonymous with the failure of the economy (Murigu, 2014). Identifying key business success indicators can contribute to the formulation of policies that can help the insurance industry become more profitable (Murigu, 2014). Furthermore, given the many business methods implemented by insurance companies, this research could aid in the development of answers that demonstrate the overall approach adopted. Kenyan scholars have undertaken several studies on the factors that influence insurer profitability, however some of them have been inconclusive. As a result, the research will aim to understand the relationship between financial performance of insurance firms and the variables that influence it.

1.4 Research Goal

1.4.1 Overall Goal

The project's goal is to identify the financial performance determinants in Kenyan insurance companies.

1.4.2 Specific Goal

The project's goal is to answer the following question:

What factors influence the financial performance of insurance companies in Kenya?

1.5 The significance of the research

The research is important to the government and policymakers since it will aid policymakers in determining the factors that influence financial performance and whether tighter regulations are required. The study will be beneficial to insurance

business executives, particularly actuaries, because it will aid in the long-term economic stability of the organization through the utilization of long-term investments. Investors and stakeholders must be aware of the variables affecting the financial status of their insurance firm. They will be able to make the best decisions at the correct moment and cut losses, when necessary, as a result of this. The research will be valuable to interested researchers by shining light on the determinants of insurance firm financial success and adding to the literature. Academics, regulators, and industry participants value it because it provides a multifaceted view of financial performance, improves life and general insurance practices, and influences policy.

CHAPTER TWO: LITERATURE REVIEW

2.1 THEORY AND APPLICATION FRAMEWORK

2.1.1. Theoretical Framework

The performance of various organizations can be measured in three ways:

1. Theoretical Framework of Dynamic Capability

In reaction to quickly changing conditions, Teece (1997) defines dynamic capability as a company's ability to integrate, build, and reconfigure internal and external skills. Employees and organizations must be able to learn new skills fast and develop strategic assets. New strategic assets, such as capability, technology, and customer feedback, must be integrated into the company. It will be necessary to reuse or redesign existing strategic assets. Learning, creating new assets, and transforming old assets are all part of an organization's dynamic capability.

Teece (2009) claims that over time, a corporation's assets might become co-specialized, meaning that they are only valuable when employed jointly. When a company's physical assets, human resources, and intellectual property complement one another, this is known as synergy. As a result, buying such co-specialized assets in bulk is more cost-effective than buying them separately.

The dynamic capabilities point of view is preoccupied with the challenge of surviving in today's rapidly changing business environment. It is concerned with

the development of methods for successful firms' senior management to adapt to significant discontinuous change while maintaining basic competency levels to ensure competitive survival.

2. The Open Systems Theory

According to Bastedo (2004), the term "open systems theory" merely refers to the premise that organizations are highly influenced by their surroundings. Other organizations that impose diverse economic, political, or social factors on the organization, as well as critical resources that keep the organization running and contribute to transformation and survival, make up the environment (Bastedo 2004). Following WWII, open systems theory emerged as a counterpoint to previous organizational theories such as Elton Mayo's human relations viewpoint and Henri Fayol's administrative theories, both of which saw the organization as largely self-contained (Bastedo 2004).

According to the open system theory of management, organizations alter and modify their external environments while being influenced by external changes in local and global settings as they carry out their activities (Chaharbaghi and Lynch, 1999). This two-way influential change is referred to as change adaptive. Organizations and communities are open systems that alter and interact with one another on a regular basis.

3. Take a Resource's Point of View

A resource-based view of a firm, according to Mahoney and Pandian, explains its ability to generate long-term competitive advantage when resources are handled in such a way that their outputs cannot be reproduced by competitors, resulting in a positive barrier to entry (1992). The criteria for valuing resources, according to Barney (1991), are VRIN, which stands for Valuable, Rare, Inimitable, and Non substitutable. Businesses must create distinct, firm-specific core competences, according to the RBV, in order to surpass competitors by doing things differently.

Makadok (2001) distinguishes capabilities from resources by describing capabilities as a firm-specific organizationally embedded non-transferable resource whose principal function is to boost the productivity of the firm's other resources. Many management researchers are interested in the RBV, and there are numerous studies on the issue. A resource-based approach explains a company's ability to build long-term competitive advantage, which occurs when resources are handled in such a way that the outcomes of those resources cannot be replicated by competitors, resulting in a competitive barrier. Mahoney and Pandian (Mahoney and Pandian, 1992)

2.1.2. Empirical Foundation

Mwangi (2013) used a descriptive survey to look at the elements that influence Kenyan insurance companies' financial performance. He wanted to figure out what elements had the most impact on insurance firms' financial success and how much of an impact they have. His conclusions on the impact of interest rates on financial performance have ramifications in both directions, since they alter both borrowing and investment rates. Insurance businesses can engage in worthwhile businesses while avoiding dangerous ones since they are profitable. Competition has an impact on pricing and new product development. Because liquidity is vital, they have liquid investments to assist in the settlement of claims if their underwriting income

is insufficient to cover them. He emphasized the importance of interest rate variations, liquidity, and competitiveness in influencing financial performance, and he utilized profitability as a financial performance metric. He did not, however, identify the link between the factors in his study.

Mutugi (2012) investigated the variables of financial success of life assurance enterprises by conducting a descriptive study on 23 organizations utilizing both primary and secondary data. Capital structure, organizational culture, innovation, and ownership structure were all factors considered in this study. A company's capital structure has an impact on its financial expenses and responsibilities, but organizational culture has an impact on performance since it influences how people behave. His findings revealed that innovation, capital structure, and organizational culture are all predictors of financial performance, but he did not investigate the relationship between the financial-dependent and independent variables.

Onsongo (2013) investigated the factors that influence Kenyan life insurance companies' financial performance. Insurance leverage had a weak positive relationship with financial success, whereas diversification and investment ratios had a strong positive relationship. The retention ratio had a marginally positive but strongly inverse relationship with the solvency margin. Firm size and premium growth have a marginally positive relationship. Finally, the findings highlighted the significance of life insurance companies diversifying their business lines, allocating more funds to investments, and maintaining reasonable investment and retention ratios.

Mwangi and Iraya (2014) investigated the factors influencing Kenyan general insurance underwriters' financial performance. They discovered a link between earnings management and ownership concentration. The loss and expense ratios were inversely related to financial performance. Increases in premiums, retention

ratios, and underwriter size had no impact on financial performance. Investment operations, underwriting performance, and efficiency are all concerns in general insurance.

Murigu (2014) evaluated the factors of insurance firm financial success using a descriptive study approach with secondary data on 23 general insurance businesses. She concluded that the management competency index, leverage, and equity capital all had a positive and significant impact on profit. General insurers' ownership structure and business size have a negative and significant impact on their performance. Liquidity has a negative and marginally significant impact on the financial performance of general insurance firms. In contrast, the firm's age has no bearing on its success. Her study was conclusive because the variables she used revealed whether the relationship was positive or negative. She believes that more research into the factors that influence financial performance for both life and general insurance firms is required.

2.2 Knowledge Deficiency

Insurance firms have shown to be essential not just to businesses but also to people in ensuring their recovery once a specific danger has happened. Kenya's insurance sector, on the other hand, is failing when compared to that of most developed countries. Although theoretical frameworks such as Dynamics Capability Theory, Open Systems Theory, and Resource Based View Theory attempt to put a framework in place through which the characteristics that boost insurance business performance may be understood, research have not proven definitive.

The underlying elements have produced varied findings, with no clear consensus on what factors influence how insurance businesses function. This could be because

the organizations have vastly different resources and organizational structures. Furthermore, depending on whether the insurance businesses were in the life or non-life sectors, research undertaken locally, notably in the insurance sector, showed diverse results. The goal of this research was to address a knowledge vacuum by analyzing what factors affect the performance of Kenyan insurance businesses, both life and non-life.

CHAPTER THREE: METHODOLOGY

3.1 Research Design

The researcher utilized a descriptive design. According to Mugenda and Mugenda (2003), descriptive research is a systematic, empirical examination in which the researcher has no direct influence on independent factors that have already manifested or cannot be significantly modified. In order to make conclusions regarding variable relationships, concomitant variables were used. The research design was utilized instead of just collecting and describing data since the goal of the study was to determine the existence of specific correlations among the research variables (Mugenda and Mugenda, 2003).

3.2 Sample and Population

A population is defined by Cooper and Schnidler (2001) as the whole collection of elements from which we seek to draw conclusions. All 56 Kenyan general and life insurance companies were included in this study's population. Data from the four fiscal years 2016 to 2019 were used in the study.

3.3 Data Gathering and Analysis

Secondary data is information collected from a source other than the user (Donald and McBurney, 2009). According to Bryman and Bell, secondary data sources for social science include censuses, surveys, organizational records, and data gathered through qualitative procedures or qualitative research (2007). Primary data, on the other hand, is gathered by the researcher himself.

Secondary data analysis saves time spent acquiring data and, in the case of quantitative data, results in databases that are larger and of greater quality than any single researcher could collect on their own. Furthermore, specialists in social and economic development believe that secondary data is essential because it is impossible to conduct a new survey that fully reflects prior change and/or advancements (Corti and Bishop) (2005).

Data from a four-year insurance study that was available at the time was used in the study. The information was acquired from the database of the Association of Kenya Insurers, as well as public disclosures and annual reports from the companies in question. As a result, the content analysis of the company's annual reports provided a valuable source of information for the study. Murigu (2014) used the return on assets (ROA) as the study's performance metric, which was the dependent variable Y.

Variable	Notation	Formula
Return on Assets	ROA	Profit(Loss) After Tax/Total Assets
Leverage	LEV	Total debt/Total Equity
Retention Ratio	R	Net Earned Premium/Gross Earned Premium
Liquidity	LIQ	Current Assets/ Current Liabilities
Loss Ratio	LR	Net Claims Incurred/ Net Earned Premium
Underwriting Risk	UWR	Benefits Paid/Net Premium Earned
Size	SIZE	Logarithm of total assets

Table 1: Variables table

Leverage (LEV), Retention ratio (R), Liquidity (LIQ), Underwriting Risk (UWR), Loss Ratio (LR), and Size (SIZE) were estimated independently using data from the business' annual reports and the Association of Kenya Insurers database (Murigu 2014). Murigu (2014), Mwangi (2013), Mwangi and Iraya (2014), Onsongo (2013), and Mutugi (2012), for example, researched the Kenyan insurance industry, hence the independent variables in this study were chosen based on that. Using the formulas in the table below, the dependent and independent variables were calculated from the content analysis data.

Panel data will be utilized to evaluate the determinants of insurance businesses in Kenya over a four-year period due to the multidimensionality of the data. The analysis included determining which of the identified investment possibilities had the biggest impact on the financial performance of long-term insurance businesses by estimating the various coefficients of correlation marked by the symbol "" in the model.

The relationship between the elements that affect the financial performance of Kenyan insurance businesses was depicted for the purposes of this study using the expression for a general panel data.

$$Y_{it}=\alpha+\beta_1X_{1t}+\beta_2X_{2t}+\beta_3X_{3t}+\beta_4X_{4t}+\beta_5X_{5t}+\beta_6X_{6t}+\varepsilon_{it}$$

$$ROA_{it}=\alpha+\beta_1LIQ_{1t}+\beta_2R_{2t}+\beta_3LEV_{3t}+\beta_4UWR_{4t}+\beta_5LR_{5t}+\beta_6SIZE_{6t}+\varepsilon_{it}$$

Where X is the independent variable at different times, the Y intercept is the dependent variable, β is the coefficient and ε_{it} is the error term.

Fixed Effects

In a fixed effect model, individual traits do not change over time and might be associated or uncorrelated with dependent variables. In the fixed effect model,

constants are handled as a group, and different variables can be utilized for each constant in the group. This model is also known as the LSDV estimator. Least square dummy variables (LSDV) are an acronym for least square dummy variables. To choose the test to employ in the researcher's study, the Wu-Haussman test was used.

Random Effects Model

A strategy that differs from the fixed effect model is the random effect model. The distinction between random effects and fixed effects models is that the latter regards constants as random parameters for each section rather than fixed values. The random effect model outperforms the fixed effect model in terms of effectiveness. Because the random effect model has fewer parameters to estimate than the fixed effect model. Additional explanatory variables can be added to the random model, and they are given equal weight.

Hypothesis Test

H_0: Liquidity, retention ratio, leverage, underwriting risk, loss ratio, and firm size do not have a substantial impact on the profitability (ROA) of Kenyan general insurance companies.

H_1: Liquidity, retention ratio, leverage, underwriting risk, loss ratio, and firm size have a substantial impact on the profitability (ROA) of Kenyan general insurance companies.

H_0: Liquidity, retention ratio, leverage, underwriting risk, loss ratio, and firm size do not have a major impact on the profitability (ROA) of Kenyan life insurance businesses.

H_2: Liquidity, retention ratio, leverage, underwriting risk, loss ratio, and firm size have a major impact on the profitability (ROA) of Kenyan life insurance businesses.

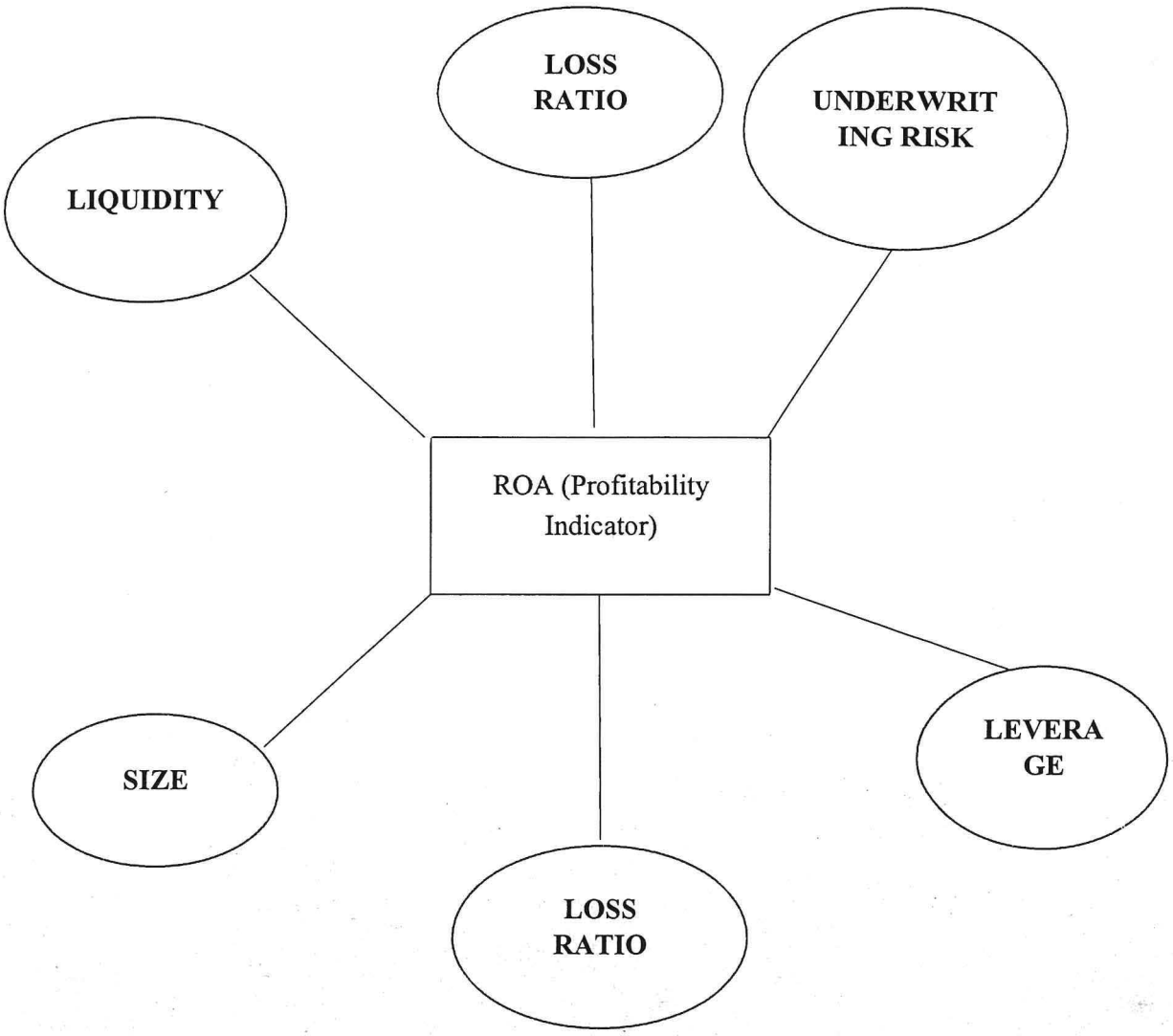
H_0: Liquidity, retention ratio, leverage, underwriting risk, loss ratio, and firm size do not have a substantial impact on insurance companies' profitability (ROA) in Kenya's life and general lines of business.

H_3: Liquidity, retention ratio, leverage, underwriting risk, loss ratio, and firm size have a substantial impact on insurance companies' profitability (ROA) in Kenya's life and general lines of business.

CHAPTER FOUR: COLLECTION AND ANALYSIS OF DATA

4.1. Introduction to the chapter

The chapter is divided into the Descriptive analysis, the Regression analysis and Findings. Data was gathered from 54 life and non-life insurance companies for the study. This was after Jubilee Health, Jubilee Life and Jubilee General were dropped and merged into one company to make the data analysis better. This was decided because in the data from 2016 to 2017, Jubilee was under one name.



4.2. Descriptive Analysis

The descriptive analysis aids in describing, displaying, or summarizing data in a meaningful way that reveals trends or patterns. It presents a brief overview of the data set and summarizes it. Which can be used to represent the whole set of information. There are two types of measures: variability measures and data central tendency measures. The lowest and maximum variables, as well as the standard deviation, variance, kurtosis, and skewness, are all referred to as "variability." Central tendency is calculated using the mean, median, and mode. This study can also be used to determine the normality of a distribution.

For General Insurance companies, the mean value of the profitability indicator (0.04) is positive from values ranging from -0.29 and 0.11. While the standard deviation which shows the dispersion or he differentiation from the return on assets figures is low at 0.063 or 6.3%. In Life Insurance companies, the mean value of ROA is negative (-0.016) from values ranging from -0.410 and 0.100. The standard deviation shows a less dispersion on the return on assets of 0.086. While for insurance companies in both life and general insurance companies, the mean value is positive (0.01) from values ranging from -0.12 to 0.07. The standard deviation also shows a less dispersion on the return on assets of 0.034.

Measure	ROA	LEV	LIQ	LR	R	SIZE	UWR
mean	0.004	2.245	1.588	0.588	0.693	6.486	0.969
median	0.020	1.945	1.500	0.590	0.735	6.610	0.575
standard deviation	0.063	7.023	0.840	0.221	0.214	1.106	3.513
minimum	-0.290	-38.540	0.000	0.000	0.000	0.000	0.000
maximum	0.110	52.920	9.340	1.750	0.980	7.250	38.320
IQR	0.053	1.425	0.380	0.173	0.300	0.460	0.223

Table 2: General Insurance Companies Summary

Measure	ROA	LEV	LIQ	LR	R	SIZE	UWR
mean	-0.016	6.844	1.250	11.538	0.782	6.851	2.002
median	0.010	5.675	1.175	0.950	0.830	6.950	0.650
standard deviation	0.086	14.427	0.307	44.822	0.220	0.623	5.257
minimum	-0.410	-76.810	0.120	0.000	0.080	5.670	0.200
maximum	0.100	73.850	2.080	269.950	0.980	7.970	29.700
IQR	0.033	4.148	0.115	0.510	0.210	0.858	0.513

Table 3: Life Insurance Companies Summary

Measure	ROA	LEV	LIQ	LR	R	SIZE	UWR
mean	0.010	3.940	1.401	0.826	0.748	6.925	0.589
median	0.015	2.640	1.380	0.655	0.785	6.825	0.595
standard deviation	0.034	3.020	0.269	0.403	0.157	0.541	0.145
minimum	-0.120	0.860	1.080	0.410	0.410	6.280	0.340
maximum	0.070	11.980	2.160	1.970	0.990	7.990	0.970
IQR	0.030	2.420	0.273	0.343	0.165	0.637	0.178

Table 4: Both Insurance Companies Summary

4.3. Matrix of correlations

The correlation matrix is a table that shows the correlation coefficient between individual variables. The correlation matrix shows how closely the variables are related to one another. If there are any correlations between variables. In addition, the correlation matrix shows whether the link is positive or negative. Any correlation between 0 and 0.5/-0.5 is weak, but any connection between 0.5/-0.5 and 1/-1 is significant.

General insurance companies show UWR to LIQ has a positive strong relationship of 88% and SIZE to R of 51%. The variables that show positive weak relationships are LIQ-LR (30%), LR-SIZE (42%), LEV-R (21%), ROA-R (6%), ROA-SIZE (10%), LR-R (40%), LEV-SIZE (3%) and UWR- LR (14%). The remaining variables show a negative weak correlation. The variables that show a significant effect on the correlations include ROA-LR, LIQ- UWR, R-UWR, LIQ- LR, LIQ- SIZE, R-SIZE, LR-SIZE, R-LEV, UWR-LR.

Life insurance companies show that those with strong positive correlations is UWR-LR with 99%. Those with negative weak correlations are ROA-LIQ(-29%), ROA-R(-13%), LIQ-UWR(-14%), LIQ-LR(-16%), LIQ-LEV(-38%), R-LEV(-29%), UWR-SIZE(-2%). Those with negative strong correlations include R-UWR(-77%), R-LR(-75%) and LIQ-SIZE(-55%). The rest have a positive weak correlation with other variables. The variables that have significant correlations to the variables include ROA-LIQ, LIQ-R, R-UWR, ROA-SIZE, LIQ-LEV, R-LR, UWR-LR, UWR-LR, UWR-LEV, LR-LEV, LEV-SIZE, LIQ-SIZE, R-LEV.

For companies in both lines of businesses variables that show a strong positive correlation include LR-LEV(91%), LR-SIZE(76%) and LEV-SIZE(82%). Those with a positive but weak correlation include ROA-R (1%), LEV-ROA(1%), SIZE-ROA(4%), LIQ-R(44%), LIQ-UWR(11%), R-LR(1%). Those that negative strong correlations include LIQ-LR(-55%), LIQ-LEV(-74%), SIZE-LIQ(-70%), UWR-SIZE(-55%). The remaining variables have a negative weak correlation. The variables that show a significant effect on the correlations include LIQ-R, LIQ-LR, LIQ-LEV, LIQ-SIZE, UWR-SIZE, LR-SIZE, LR-LEV, LR-SIZE and LEV-SIZE.

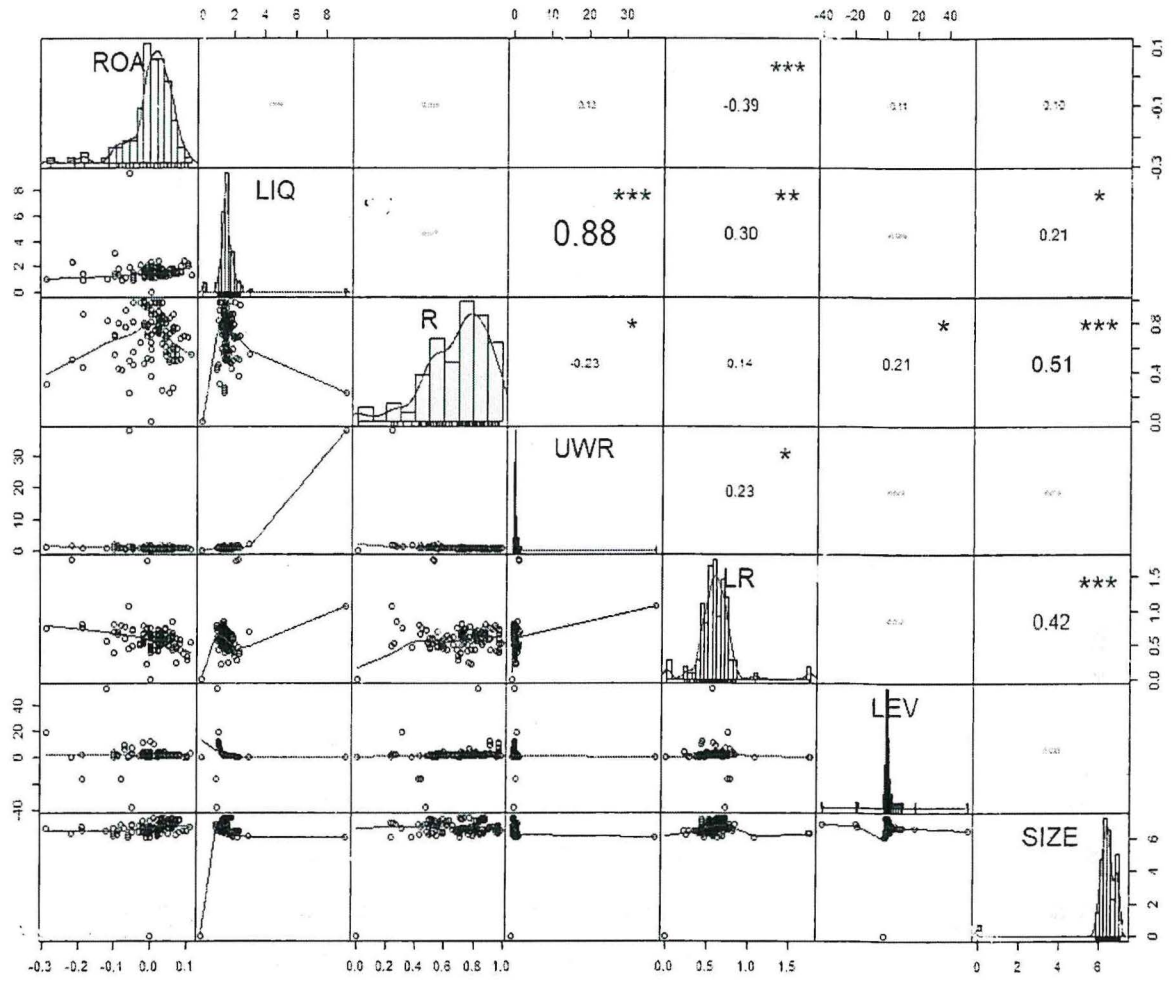


Figure 1: General Correlation Matrix

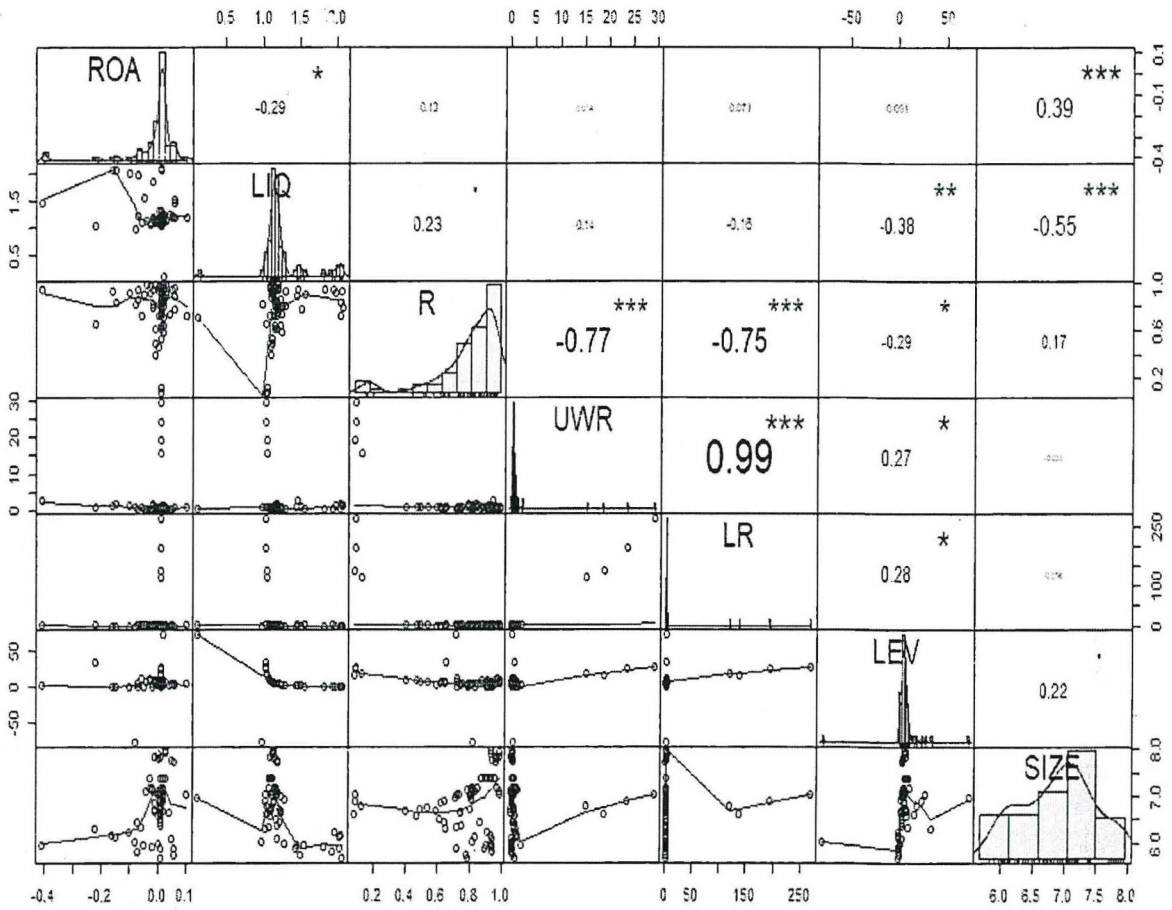


Figure 2: Life correlation matrix

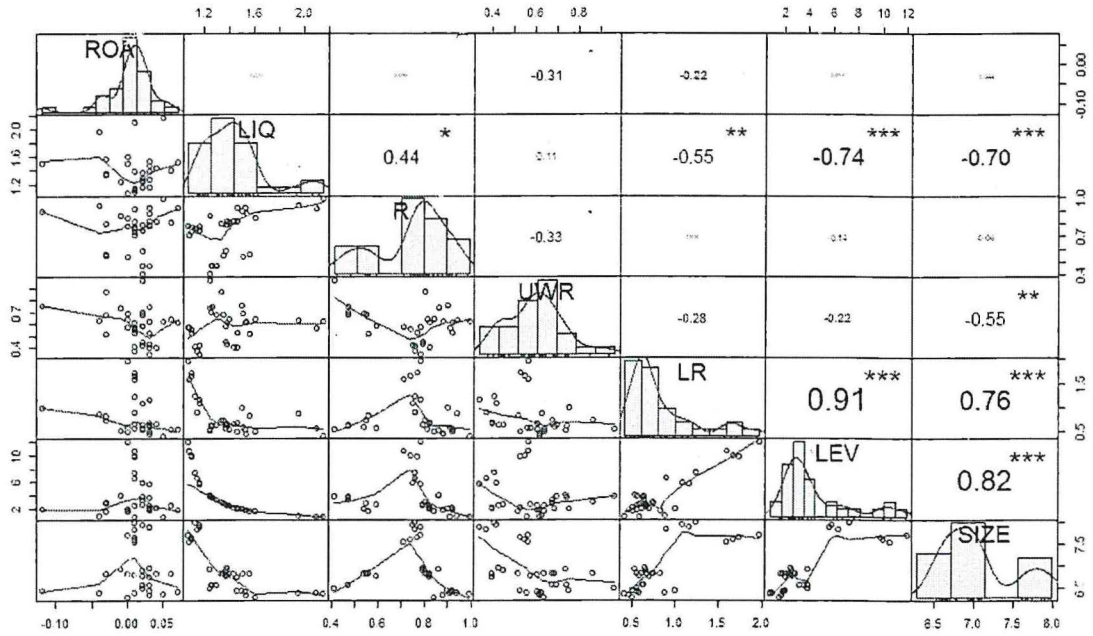


Figure 3: Both correlation matrix

4.4. Fixed effect model overall findings

The coefficient correlation R^2 of the General insurance companies are 33% for liquidity, leverage, retention ratio, underwriting risk, loss ratio and the size of the firm on the impact of Return on Assets(ROA). The coefficient correlation r of the Life insurance companies is 40% for liquidity, leverage, retention ratio, underwriting risk, loss ratio and the size of the firm on the impact of Return on Assets(ROA). The coefficient correlation r of the Both category of insurance companies is 74% for liquidity, leverage, retention ratio, underwriting risk, loss ratio and the size of the firm on the impact of Return on Assets(ROA). These values represent the variation between the return on assets with the independent variables. The model is significant as observed from the p-values.

Type	p-value	R^2
General	9.8233e-06	33%

Life	0.00060312	40%
Both	0.00018004	74%

Table 5: Fixed effects p-values and R^2

In the case of general insurance businesses, liquidity, underwriting risk, and firm size all have a positive impact on the dependent variable, but loss ratio, retention ratio, and leverage all have a negative impact on return on assets. Furthermore, the loss ratio and leverage have a considerable negative impact on ROA. When it comes to life insurance firms, it is worth noting that liquidity, loss ratio, and firm size all have a favourable impact on return on assets, but leverage, retention ratio, and underwriting risk have a negative impact. The return on assets is influenced by the retention ratio, business size, loss ratio, and underwriting risk. Liquidity, retention ratio, and firm size all have a beneficial impact on organizations with both lines of business, whereas loss ratio, underwriting risk, and debt all have a negative impact. Furthermore, liquidity and the loss ratio have a major impact on the return on assets.

	Estimate	Std. Error	t-value	Pr(>|t|)	
LIQ	0.00698496	0.02685614	0.2601	0.7955	
R	-0.01079771	0.05753410	-0.1877	0.8516	
UWR	0.00010904	0.00537797	0.0203	0.9839	
LR	-0.11672616	0.02594895	-4.4983	2.264e-05	***
LEV	-0.00282563	0.00065478	-4.3154	4.470e-05	***
SIZE	0.01449893	0.01035953	1.3996	0.1655	

Table 6: ROA coefficients- General

	Estimate	Std. Error	t-value	Pr(>|t|)	
LIQ	0.03678469	0.05151034	0.7141	0.4788395	
R	-0.28687370	0.09127009	-3.1431	0.0029563	*
UWR	-0.06968996	0.01907705	-3.6531	0.0006736	*
LR	0.00721498	0.00218741	3.2984	0.0019056	*
LEV	-0.00037239	0.00075163	-0.4954	0.6227021	
SIZE	0.05995376	0.02204074	2.7201	0.0092417	*

Table 7: ROA coefficients -Life

	Estimate	Std. Error	t-value	Pr(>|t|)	
LIQ	0.1220660	0.0463036	2.6362	0.016770	*
R	0.3173863	0.1733849	1.8305	0.083779	
UWR	-0.0170474	0.0663755	-0.2568	0.800220	
LR	-0.1034489	0.0347581	-2.9763	0.008092	**
LEV	-0.0028023	0.0093640	-0.2993	0.768170	
SIZE	0.0563222	0.0822658	0.6846	0.502294	

Table 8: ROA coefficients- Both

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

4.5. Random Effects Overall Findings

The coefficient correlation r of the General insurance companies is 29% for liquidity, leverage, retention ratio, underwriting risk, loss ratio and the size of the firm on the impact of Return on Assets(ROA). The coefficient correlation r of the Life insurance companies is 42% for liquidity, leverage, retention ratio, underwriting risk, loss ratio and the size of the firm on the impact of Return on Assets(ROA). The coefficient correlation r of the Both category of insurance companies is 58% for liquidity, leverage, retention ratio, underwriting risk, loss ratio and the size of the firm on the impact of Return on Assets(ROA). These values represent the variation between the return on assets with the independent variables. The model is significant as observed from the p-values.

Type	p-value	R^2
General	5.9347e-08	29%
Life	7.8227e-08	42%
Both	3.9559e-06	58%

Table 9: Random effects p-values and R^2

In the case of general insurance firms, liquidity, retention ratio, and firm size all contribute to a positive return on assets, but underwriting risk, loss ratio, and leverage all contribute to a negative return on assets. For general insurance companies, the loss ratio and leverage have a substantial impact on the return on assets. Liquidity, loss ratio, and firm size all have a favourable impact on return on assets in life insurance businesses, but leverage, retention ratio, and underwriting risk all have a negative impact on return on assets. The return on assets is influenced by the loss ratio, underwriting risk, retention ratio, and business size. Liquidity and leverage have a positive impact on return on assets for companies with both lines of business, whereas retention ratio, loss ratio, underwriting risk, and firm size have a negative impact. The return on assets is heavily influenced by underwriting risk, loss ratio, and leverage.

	Estimate	Std. Error	z-value	Pr(>|z|)
(Intercept)	-0.02386524	0.02898981	-0.8232	0.4103779
LIQ	0.02373455	0.01780007	1.3334	0.1824018
R	0.00069664	0.03565885	0.0195	0.9844134
UWR	-0.00371844	0.00381953	-0.9735	0.3302873
LR	-0.13422508	0.02444043	-5.4919	3.976e-08 ***
LEV	-0.00218166	0.00063724	-3.4236	0.0006179 ***
SIZE	0.01195442	0.00697213	1.7146	0.0864185 .

Table 10: ROA coefficients- General

	Estimate	Std. Error	z-value	Pr(>|z|)
(Intercept)	-0.19424842	0.14360384	-1.3527	0.1761615
LIQ	0.02659632	0.03763438	0 7067	0.4797511
R	-0.24488958	0.06880387	-3.5592	0.0003719 ***
UWR	-0.06739244	0.01459302	-4.6181	3.872e-06 ***
LR	0.00714062	0.00165471	4.3153	1.594e-05 ***
LEV	-0.00043050	0.00064942	-0.6629	0.5073965

SIZE	0.05728255	0.01816567	3.1533	0.0016141 **

Table 11: ROA coefficients- Life

	Estimate	Std. Error	z-value	Pr(>|z|)
(Intercept)	0.2684618	0.1753018	1.5314	0.1256641
LIQ	0.0394162	0.0326291	1.2080	0.2270442
R	-0.0136732	0.0358170	-0.3818	0.7026458
UWR	-0.1525031	0.0459279	-3.3205	0.0008986 ***
LR	-0.1496545	0.0300388	-4.9820	6.292e-07 ***
LEV	0.0230110	0.0050878	4.5228	6.103e-06 ***
SIZE	-0.0260460	0.0205322	-1.2685	0.2046037

Table 12: ROA coefficients- Both

4.6. Regression analysis and findings

Once different models were created to show the different effect, the pFtest was employed to show whether the pooled OLS should be used or the fixed effects model. The null hypothesis states that the fixed effects model should be used since the sample is from different companies while the alternate hypothesis states that pooled OLS should be used since the sample is different and collected from different years. The null hypothesis is accepted for the life insurance companies and rejected for general insurance companies as well as companies in both lines of businesses.

pFtest	P-value
Fixed effect vs pooled effect (general)	8.7e-09
Fixed effect vs pooled effect (life)	0.9984
Fixed effect vs pooled effect (both)	0.01949

Table 13:pFtest

The researcher used a pooled OLS (Ordinary least squares) model on the data, followed by a fixed and random effect model, and then a Hausman test. For life insurance businesses, the probability value obtained after using the Hausman test is larger than 5%. This means we cannot reject the alternative hypothesis for life insurance firms that use the fixed effect model while accepting the null hypothesis that the random effect model is adequate for general insurance and companies in both categories.

The Hausman test (phtest) is used to evaluate which of the two models is preferred: random effects or fixed effects. The random effect model is chosen if the null hypothesis is accepted, whereas the fixed effect model is favoured if it is rejected. The fixed effect model is favoured for both insurance businesses and general insurance companies with a p-value less than 0.05, but the random effect model is chosen for life insurance companies with a p-value greater than 0.05. For the fixed effects model, it is necessary to test the two-way effects. The null hypothesis suggests that there are two ways for time and individual influences to interact. For life insurance companies and corporations with both lines of business, the null hypothesis is accepted. For general insurance businesses, the hypothesis is denied.

phtest	P-value
Fixed effect vs random effect (general)	2.69e-06
Fixed effect vs random effect (life)	0.9964
Fixed effect vs random effect (both)	0.0001598

Table 14: phtest

The null hypothesis in the Durbin-Watson test for serial correlation is that the errors have autocorrelation, while we reject the null hypothesis if the p-value is less than

0.05. The null hypothesis for general, life, and insurance firms with both lines of business is rejected in this example since the data shows no link with itself.

Durbin-Watson test	P-value
general	0.1671
life	0.7037
both	0.2844

Table 15: Durbin-Watson test

The Wooldridge autocorrelation test is useful in the study since it requires minimal assumptions and is simple to implement. It is simulated in a variety of scenarios, including random, pooled, and fixed effect models, to ensure that it is effective. There is autocorrelation in the errors, according to the null hypothesis, and serial correlation in the errors, according to the alternative hypothesis. The null hypothesis is accepted in the fixed effects model for insurance companies with both lines of business, but it is rejected for life and general insurance companies. In both the life, general, and companies random effects models, the null is acknowledged.

Breusch-Godfrey/Wooldridge test for serial correlation in panel models(random)	P-value
general	0.4411
life	0.05515
both	0.6815

Table 16: Wooldridge test random effects

Breusch-Godfrey/Wooldridge test for serial correlation in panel models(fixed)	P-value
general	7.591e-07
life	0.003833
both	0.1962

Table 17: Wooldridge test fixed effects

The Breusch-Pagan test for homoscedasticity for the three lines of business reveals that there is homoscedasticity for life and general insurance businesses, indicating that the random variables have the same limited variance. We reject the null hypothesis in the case of organizations that have both life and non-life insurance businesses, implying that there is no homoscedasticity.

Breusch-Pagan test for homoscedasticity	P-value
general	1.923e-12
life	8.872e-13
both	0.0868

Table 18: Breusch-Pagan test for homoscedasticity

In macro panels with lengthy time series, cross sectional dependence is a concern. This is not an issue for micro panels, which have a huge number of instances and a short lifespan. In the B-P/LM and Pasaran CD tests for independence, the null hypothesis is that residuals across entities are uncorrelated. Cross-sectional dependence might cause test results to be skewed (also called contemporaneous correlation). For fixed, random, and pooling effects models, the null hypothesis is accepted using the B-P/LM test in organizations with both life and general insurance firms. For fixed, random, and pooling effects models, the null is rejected for life and general insurance businesses. In the Pasaran CD test, the null hypothesis is accepted in all three effects models.

Breusch-Pagan LM test for cross sectional dependence(fixed effect)	P-value
general	5.181e-07
life	0.03241
both	0.3495

Table 19: Breusch-Pagan LM test

Pasaran CD test for cross sectional dependence(fixed effect)	P-value
general	0.673
life	0.378
both	0.9315

Table 20: Pasaran CD test

The Least Squares Dummy variable model was used to analyze the data. Dummy variables are binary variables with a 1 or 0 value that are often employed in regression analysis to study group and time effects. An approach of accounting for the sector's uniqueness is to use the least square dummy variable. Allowing the intercept to vary for each sector while presuming that the slope coefficients remain constant across sectors or time periods accomplishes this. In the first scenario, controlling the company effect and adding it as a dummy variable, the leverage and loss ratio of general insurance companies, as well as Allianz and Resolution, have a considerable impact on the return on assets. In the case of life insurance firms, retention ratio, underwriting risk, loss ratio, and size all have a substantial impact on return on assets, giving the industry its distinct identity. Liquidity and loss ratio have a substantial impact on the return on assets for both life and general insurance firms.

The time effect was controlled and inserted as a dummy variable in the second scenario. Liquidity, underwriting risk, loss ratio, and company size all have an impact on the return on assets for general insurance businesses. For life insurance firms, retention ratio, underwriting risk, loss ratio, and company size all have a substantial impact on return on assets. Underwriting risk, loss ratio, and leverage have a substantial impact on the return on assets for organizations having both lines of business.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of the Findings

The goal of the research was to discover the factors that influence the financial performance of Kenyan insurance companies. Liquidity, retention ratio, leverage, underwriting risk, loss ratio, and company size were all put to the test. Secondary data was gathered from AKI annual reports and structured in an Excel spreadsheet before being loaded into RStudio for analysis.

The formula used for the analysis was:

$$ROA_{it}=\alpha+\beta_1 LIQ_{1t}+\beta_2 R_{2t}+\beta_3 LEV_{3t}+\beta_4 UWR_{4t}+\beta_5 LR_{5t}+\beta_6 SIZE_{6t}+\varepsilon_{it}$$

The random effects model: In the case of general insurance firms, liquidity, retention ratio, and firm size all have a positive impact on return on assets, whereas underwriting risk, loss ratio, and debt all have a negative impact. For general insurance companies, the loss ratio and leverage have a substantial impact on the return on assets. Liquidity, loss ratio, and firm size all have a favourable impact on return on assets in life insurance businesses, but leverage, retention ratio, and underwriting risk all have a negative impact on return on assets. The return on assets is influenced by the loss ratio, underwriting risk, retention ratio, and business size. Liquidity and leverage have a positive impact on return on assets for companies with both lines of business, whereas retention ratio, loss ratio, underwriting risk, and firm size have a negative impact. The return on assets is heavily influenced by underwriting risk, loss ratio, and leverage.

$$ROA_{it}=\beta_1 LIQ_{1t}+\beta_2 R_{2t}+\beta_3 LEV_{3t}+\beta_4 UWR_{4t}+\beta_5 LR_{5t}+\beta_6 SIZE_{6t}+\varepsilon_{it}$$

The fixed effects: In the case of general insurance businesses, liquidity, underwriting risk, and firm size all have positive effects on the dependent variable, whereas loss ratio, retention ratio, and leverage all have negative effects on return on assets. Furthermore, the loss ratio and leverage have a considerable negative impact on ROA. When it comes to life insurance firms, it is worth noting that liquidity, loss ratio, and firm size all have a favourable impact on return on assets, but leverage, retention ratio, and underwriting risk have a negative impact. The return on assets is influenced by the retention ratio, business size, loss ratio, and underwriting risk. Liquidity, retention ratio, and firm size all have a beneficial impact on organizations with both lines of business, whereas loss ratio, underwriting risk, and debt all have a negative impact. Furthermore, liquidity and the loss ratio have a major impact on the return on assets.

The Hausman test was used to assess which of the impacts is appropriate for insurance firms' various lines of business. Because the effects are random, the random effects model should be utilized for general insurance companies and corporations in both lines of business. Because the effects are contained within the entities, the fixed effects model was appropriate for life insurance firms.

5.2 Conclusions and Recommendations

All of the variables included in the analysis are significant in influencing insurance company financial performance:

The study shows that the loss ratio and leverage are important factors in the financial performance of general insurance firms. As a result, general insurance businesses should strive to achieve an adequate or break-even loss ratio in order to increase profitability. The higher the loss ratio, the less profitable the company will be since there will be insufficient funds to cover shareholder returns, expenses, and underwriting profits. Furthermore, leverage should be improved while

simultaneously being monitored to ensure that it does not harm the company's bottom line.

The retention ratio, underwriting risk, loss ratio, and firm size all have a role in life insurance businesses' financial performance. To ensure that organizations function financially, the retention ratio should be enhanced, and the firm's size should be improved. The underwriting risk reflects the insurer's risk appetite for life insurance policies that may be risky or have large outstanding premiums in order to ensure higher investment returns. It is recommended that the loss ratio be kept below 60%.

The liquidity and loss ratio have a substantial impact on the profitability of insurance companies with both lines of business. The loss ratio, on the other hand, has a negative impact on the return on assets, whereas liquidity has a favourable impact. This implies that businesses should concentrate on enhancing liquidity by allocating capital to resolve claims.

5.3. Limitations of the Study

The data did not include essential information/variables like gross written premium and net written premium because it was gathered from AKI publications. As a result, the gross earned premium, and net earned premium were used to calculate the loss ratio and retention ratio. Liquidity was also evaluated as the total assets minus the whole liabilities.

Because the data was acquired from multiple entities and time periods, it had to be analyzed using a panel data framework. Since a result, the model analysis was lengthy and in-depth, as it also included a separate analysis because the lines of business are distinct.

5.4. Suggestions for Further Research

More research should be done on the same criteria, but this time considering external elements that could affect insurance company profitability. Furthermore, ROE should be included as a driver of insurance company financial performance, and a study should be conducted to highlight the differences between ROA and ROE as profitability indicators.

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16. Panel Data using R (princeton.edu)

APPENDICES

Appendix I

No of companies	Companies	Type of Business
1	AAR	General
2	AIG	General
3	Allianz	General
4	Amaco	General
5	APA Insurance	General
6	APA Life	Life
7	Barclays Life	Life
8	Britam General	General
9	Britam Life	Life
10	Capex Life	Life
11	CIC General	General
12	CIC Life	Life
13	Corporate	Both
14	Directline	General
15	Fidelity Shield	General
16	First Assurance	Both
17	GA Insurance	General
18	GA Life	Life
19	Geminia	Both
20	Heritage	General
21	ICEA LION General	General
22	ICEA LION Life	Life
23	Intra Africa	General
24	Invesco	General
25	Jubilee	Both
26	Kenindia	Both
27	Kenya Orient General	General
28	Kenya Orient Life	Life

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No of companies	Companies	Type of Business
1	AAR	General
2	AIG	General
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5	APA Insurance	General
6	APA Life	Life
7	Barclays Life	Life
8	Britam General	General
9	Britam Life	Life
10	Capex Life	Life
11	CIC General	General
12	CIC Life	Life
13	Corporate	Both
14	Directline	General
15	Fidelity Shield	General
16	First Assurance	Both
17	GA Insurance	General
18	GA Life	Life
19	Geminia	Both
20	Heritage	General
21	ICEA LION General	General
22	ICEA LION Life	Life
23	Intra Africa	General
24	Invesco	General
25	Jubilee	Both
26	Kenindia	Both
27	Kenya Orient General	General
28	Kenya Orient Life	Life

29	Kenyan Alliance	Both
	KUSCO Mutual	
30	Assurance	Life
31	LibertyLife	Life
32	MadisonGeneral	General
33	MadisonLife	Life
34	Mayfair	General
	Metropolitan Cannon	
35	General	General
	Metropolitan Cannon	
36	Life	Life
37	MUA	General
38	Occidental	General
39	Old Mutual Life	Life
40	Pacis	General
41	Pioneer General	General
42	Pioneer Life	Life
43	Prudential Life	Life
44	Resolution	General
45	Saham	Both
46	Sanlam General	General
47	Sanlam Life	Life
48	Takaful	General
49	Tausi	General
50	The Monarch	Both
51	Trident	General
52	UAP General	General
53	UAPLife	Life
54	Xplico	General

**Type of business is denoted as general, life or both (where the company is involved in both general and life business).*

Appendix II: Data from General Insurance Companies

Company	Year	ROA	LIQ	R	UWR	LR	LEV	SIZE
AAR	2019	0.11	1.29	0.55	0.49	0.54	3.47	6.68
AAR	2018	-0.07	1.17	0.77	0.38	0.77	5.85	6.59
AAR	2017	-0.10	1.22	0.71	0.34	0.81	4.50	6.56
AAR	2016	0.04	1.24	0.81	0.30	0.68	4.17	6.71
AIG	2019	0.03	1.36	0.25	1.65	0.52	2.77	6.90
AIG	2018	0.05	1.36	0.23	1.51	0.49	2.74	6.91
AIG	2017	0.06	1.42	0.27	1.19	0.84	2.41	6.85
AIG	2016	0.04	1.51	0.61	0.56	0.63	1.98	6.75
Allianz	2019	-0.02	1.80	0.48	0.97	0.54	1.25	6.35
Allianz	2018	-0.09	1.86	0.43	1.47	0.66	1.17	6.19
Allianz	2017	-0.10	3.05	0.55	2.05	0.69	0.49	6.10
Allianz	2016	-0.06	9.34	0.23	38.32	1.07	0.12	6.04
Amaco	2019	-0.02	1.58	0.81	0.66	0.55	1.72	6.60
Amaco	2018	0.01	1.61	0.75	0.65	0.50	1.64	6.61
Amaco	2017	-0.01	1.49	0.79	0.53	0.64	2.03	6.66
Amaco	2016	-0.02	1.50	0.78	0.62	0.56	2.01	6.66
APA Insurance	2019	0.05	1.50	0.72	0.43	0.70	2.00	7.18
APA Insurance	2018	0.03	1.47	0.71	0.45	0.66	2.11	7.18
APA Insurance	2017	0.04	1.58	0.70	0.47	0.67	1.71	7.21
APA Insurance	2016	0.04	1.48	0.74	0.38	0.72	2.10	7.21
Britam General	2019	-0.02	1.29	0.80	0.57	0.67	3.46	7.08
Britam General	2018	0.00	1.33	0.82	0.54	0.60	3.02	7.08
Britam General	2017	0.04	1.40	0.84	0.50	0.59	2.49	7.07
Britam General	2016	0.04	1.39	0.84	0.47	0.58	2.54	7.01
CIC General	2019	0.02	1.45	0.86	0.38	0.72	2.22	7.13
CIC General	2018	0.03	1.48	0.86	0.38	0.66	2.10	7.11
CIC General	2017	0.03	1.44	0.87	0.44	0.67	2.28	7.12
CIC General	2016	0.00	1.50	0.88	0.47	0.65	2.00	7.08
Directline	2019	-0.05	1.14	0.97	0.48	0.72	7.36	6.75
Directline	2018	-0.02	1.21	0.97	0.48	0.66	4.82	6.75
Directline	2017	0.02	1.21	0.97	0.40	0.60	4.79	6.79

Directline	2016	0.03	1.22	0.97	0.44	0.59	4.60	6.71
Fidelity Shield	2019	-0.01	1.50	0.73	0.47	0.73	1.99	6.54
Fidelity Shield	2018	0.02	1.57	0.74	0.46	0.63	1.76	6.54
Fidelity Shield	2017	0.00	1.47	0.71	0.55	0.63	2.11	6.57
Fidelity Shield	2016	0.01	1.56	0.74	0.59	0.59	1.77	6.51
GA Insurance	2019	0.08	1.58	0.51	0.55	0.52	1.73	7.14
GA Insurance	2018	0.08	1.52	0.51	0.56	0.57	1.93	7.09
GA Insurance	2017	0.07	1.46	0.50	0.55	0.59	2.16	7.06
GA Insurance	2016	0.05	1.37	0.51	0.55	0.59	2.73	7.03
Heritage	2019	0.06	1.58	0.61	0.62	0.43	1.72	6.97
Heritage	2018	0.04	1.50	0.57	0.64	0.53	1.98	6.96
Heritage	2017	0.07	1.54	0.55	0.68	0.48	1.86	6.95
Heritage	2016	0.07	1.54	0.59	0.67	0.44	1.86	6.86
ICEA LION General	2019	0.07	1.61	0.50	0.69	0.44	1.64	7.12
ICEA LION General	2018	0.04	1.58	0.54	0.62	0.54	1.71	7.08
ICEA LION General	2017	0.06	1.50	0.59	0.51	0.59	2.02	7.11
ICEA LION General	2016	0.03	1.41	0.63	0.59	0.60	2.42	7.07
Intra Africa	2019	0.03	1.82	0.87	0.47	0.55	1.22	6.32
Intra Africa	2018	0.05	1.85	0.85	0.46	0.51	1.18	6.28
Intra Africa	2017	0.02	1.86	0.84	0.47	0.54	1.17	6.27
Intra Africa	2016	0.02	1.88	0.84	0.43	0.58	1.13	6.24
Invesco	2019	0.00	1.08	0.91	0.58	0.43	11.78	6.61
Invesco	2018	-0.02	1.09	0.97	0.53	0.57	11.38	6.60
Invesco	2017	-0.07	1.11	0.91	0.55	0.59	8.90	6.61
Invesco	2016	0.01	1.10	0.97	0.59	0.42	10.31	6.59
Kenya Orient General	2019	-0.12	1.02	0.83	0.74	0.55	52.92	6.41
Kenya Orient General	2018	-0.19	1.38	0.88	0.60	0.81	2.60	6.42

Kenya Orient General	2017	0.00	1.34	0.88	0.51	0.60	2.94	6.48
Kenya Orient General	2016	0.02	1.37	0.90	0.46	0.57	2.69	6.52
MadisonGeneral	2019	0.00	1.32	0.91	0.34	0.74	3.16	6.69
MadisonGeneral	2018	-0.02	1.37	0.94	0.34	0.79	2.71	6.69
MadisonGeneral	2017	0.02	1.38	0.97	0.31	0.71	2.65	6.61
MadisonGeneral	2016	-0.01	1.42	0.95	0.36	0.75	1.53	6.55
Mayfair	2019	0.05	1.74	0.58	0.59	0.55	1.35	6.83
Mayfair	2018	0.05	1.74	0.49	0.62	0.51	1.35	6.80
Mayfair	2017	0.06	1.71	0.55	0.58	0.47	1.41	6.73
Mayfair	2016	0.06	1.59	0.50	0.63	0.46	1.69	6.69
Metropolitan Cannon General	2019	0.02	1.39	0.86	0.58	0.66	2.59	6.51
Metropolitan Cannon General	2018	0.03	1.37	0.81	0.56	0.60	2.69	6.50
Metropolitan Cannon General	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Metropolitan Cannon General	2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MUA	2019	0.00	1.94	0.59	0.88	0.44	1.07	6.25
MUA	2018	-0.06	1.92	0.50	1.28	0.45	1.09	6.24
MUA	2017	-0.01	2.17	0.52	1.54	1.73	0.86	6.27
MUA	2016	-0.22	2.36	0.51	1.46	1.75	0.73	6.27
Occidental	2019	0.06	1.57	0.74	0.50	0.63	1.77	6.63
Occidental	2018	0.06	1.50	0.76	0.51	0.61	1.99	6.60
Occidental	2017	0.02	1.42	0.72	0.51	0.68	2.36	6.58
Occidental	2016	0.04	1.47	0.68	0.44	0.75	2.11	6.52
Pacis	2019	-0.09	1.36	0.80	0.65	0.70	2.79	6.44

Pacis	2018	0.02	1.71	0.75	0.64	0.41	1.40	6.41
Pacis	2017	0.02	1.71	0.78	0.70	0.42	1.41	6.36
Pacis	2016	0.02	1.80	0.80	0.71	0.42	1.26	6.31
Pioneer General	2019	0.02	1.99	0.79	0.55	0.57	1.01	6.15
Pioneer General	2018	-0.01	1.98	0.70	0.80	0.62	1.02	6.08
Pioneer General	2017	0.00	2.36	0.37	1.51	0.47	0.73	6.02
Pioneer General	2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Resolution	2019	-0.08	0.94	0.42	0.79	0.78	-16.90	6.84
Resolution	2018	-0.05	0.97	0.47	0.71	0.71	-38.54	6.80
Resolution	2017	-0.19	0.94	0.44	0.88	0.75	-16.05	6.67
Resolution	2016	-0.29	1.05	0.31	1.29	0.75	19.61	6.63
Sanlam General	2019	0.00	1.42	0.65	0.56	0.61	2.36	6.55
Sanlam General	2018	0.03	1.42	0.71	0.57	0.51	2.39	6.55
Sanlam General	2017	0.02	1.32	0.73	0.54	0.52	3.15	6.50
Sanlam General	2016	-0.01	1.24	0.78	0.88	0.21	4.21	6.42
Takaful	2019	0.00	1.26	0.59	0.84	0.49	3.90	6.39
Takaful	2018	-0.05	1.32	0.57	1.10	0.48	3.10	6.33
Takaful	2017	-0.10	1.45	0.70	1.22	0.39	2.25	6.27
Takaful	2016	0.07	1.67	0.76	0.84	0.24	1.50	6.23
Tausi	2019	0.09	2.41	0.70	0.65	0.36	0.71	6.48
Tausi	2018	0.10	2.28	0.69	0.67	0.27	0.78	6.42
Tausi	2017	0.10	2.08	0.69	0.69	0.33	0.93	6.41
Tausi	2016	0.08	1.99	0.68	0.61	0.42	1.01	6.34
Trident	2019	-0.01	1.52	0.93	0.78	0.72	1.93	6.70
Trident	2018	-0.05	1.51	0.82	0.90	0.71	1.96	6.73
Trident	2017	-0.03	1.57	0.65	0.82	0.50	1.74	6.75
Trident	2016	0.00	1.71	0.51	0.88	0.52	1.41	6.72
UAP General	2019	0.06	1.81	0.88	0.36	0.67	1.24	7.20
UAP General	2018	0.01	1.91	0.88	0.38	0.66	1.10	7.19
UAP General	2017	0.06	1.87	0.77	0.39	0.62	1.15	7.22
UAP General	2016	0.03	1.74	0.85	0.37	0.69	1.35	7.25
Xplico	2019	-0.02	1.77	0.98	0.58	0.52	1.29	6.44
Xplico	2018	-0.03	2.12	0.97	0.59	0.53	0.90	6.38

Xplico	2017	0.02	2.44	0.95	0.61	0.41	0.69	6.36
Xplico	2016	0.00	2.06	0.97	0.68	0.39	0.94	6.32

Appendix III: Data from Life Insurance companies

Company	Year	ROA	LIQ	R	UWR	LR	LEV	SIZE
APA Life	2019	0.01	1.12	0.54	0.89	1.44	8.64	6.77
APA Life	2018	-0.01	1.12	0.49	0.96	1.34	8.69	6.73
APA Life	2017	-0.01	1.11	0.40	1.05	1.58	9.49	6.67
APA Life	2016	0.00	1.10	0.47	1.07	1.11	9.68	6.60
Barclays Life	2019	0.02	1.26	0.59	0.81	0.63	3.87	6.67
Barclays Life	2018	0.01	1.19	0.61	0.86	0.59	5.14	6.52
Barclays Life	2017	0.01	1.23	0.64	0.81	0.62	4.26	6.45
Barclays Life	2016	-0.22	1.03	0.65	0.87	0.95	35.46	6.29
Britam Life	2019	0.03	1.13	0.98	0.66	0.72	7.95	7.94
Britam Life	2018	-0.01	1.11	0.98	0.55	0.78	8.72	7.85
Britam Life	2017	0.00	1.16	0.97	0.63	0.67	6.29	7.80
Britam Life	2016	0.06	1.20	0.96	0.75	0.00	5.06	7.72
Capex Life	2019	-0.05	1.56	0.90	0.50	0.97	1.79	5.94
Capex Life	2018	-0.02	1.83	0.94	0.49	0.75	1.20	5.91
Capex Life	2017	-0.07	1.95	0.94	0.49	0.90	1.05	5.83
Capex Life	2016	0.01	2.08	0.79	1.23	0.65	0.93	5.67
CIC Life	2019	0.01	1.16	0.81	0.47	0.72	6.24	7.16
CIC Life	2018	0.00	1.20	0.82	0.44	0.71	4.92	7.09
CIC Life	2017	0.02	1.25	0.80	0.55	0.62	4.06	7.01
CIC Life	2016	0.01	1.30	0.81	0.52	0.63	3.33	6.92
GA Life	2019	0.01	1.04	0.09	29.70	269.95	28.47	7.05
GA Life	2018	0.01	1.04	0.09	24.13	193.40	24.72	6.89
GA Life	2017	0.01	1.05	0.13	15.62	120.04	19.80	6.78
GA Life	2016	0.01	1.06	0.08	19.17	137.45	16.73	6.62
ICEA LION Life	2019	0.03	1.15	0.93	0.50	2.14	6.65	7.97
ICEA LION Life	2018	0.00	1.14	0.93	0.48	2.84	7.32	7.90

ICEA LION Life	2017	0.01	1.17	0.96	0.25	1.95	5.88	7.85
ICEA LION Life	2016	0.05	1.20	0.94	0.42	1.05	5.06	7.76
Kenya Orient Life	2019	0.05	1.21	0.94	0.42	0.58	4.82	6.11
Kenya Orient Life	2018	0.00	1.30	0.93	0.50	0.62	3.32	6.00
Kenya Orient Life	2017	0.06	1.45	0.89	0.64	0.32	2.21	5.87
Kenya Orient Life	2016	0.06	1.51	0.78	0.74	0.38	1.97	5.74
KUSCO Mutual Assurance	2019	0.01	2.04	0.72	0.42	0.65	0.96	5.90
KUSCO Mutual Assurance	2018	0.00	0.00	0.00	0.00	0.00	0.00	0.00
KUSCO Mutual Assurance	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00
KUSCO Mutual Assurance	2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LibertyLife	2019	0.01	1.13	0.93	0.64	1.33	7.80	7.39
LibertyLife	2018	0.01	1.13	0.93	0.58	0.88	7.64	7.37
LibertyLife	2017	0.02	1.13	0.89	0.78	1.28	7.95	7.39
LibertyLife	2016	0.01	1.11	0.87	0.83	1.21	9.32	7.37
MadisonLife	2019	-0.03	1.08	0.97	0.34	1.09	12.11	7.16
MadisonLife	2018	-0.04	1.14	0.98	0.30	1.31	7.36	7.10
MadisonLife	2017	0.02	1.20	0.98	0.36	0.74	5.01	7.02
MadisonLife	2016	0.02	0.12	0.71	0.42	1.01	73.85	6.98
Metropolitan Cannon Life	2019	-0.06	1.09	0.72	1.05	1.63	11.35	6.34
Metropolitan Cannon Life	2018	0.01	1.20	0.75	0.84	1.47	4.94	6.39

Metropolitan Cannon Life	2017	-0.07	1.23	0.86	0.57	0.95	4.33	6.44
Metropolitan Cannon Life	2016	-0.08	0.99	0.82	0.71	0.77	-76.81	6.02
Old Mutual Life	2019	0.02	1.18	0.85	1.16	1.00	5.57	7.19
Old Mutual Life	2018	0.02	1.18	0.81	0.67	0.96	5.71	7.15
Old Mutual Life	2017	-0.02	1.16	0.82	1.31	1.58	6.27	7.17
Old Mutual Life	2016	-0.02	1.18	0.79	1.68	1.16	5.64	7.13
Pioneer Life	2019	0.02	1.15	0.64	0.34	0.84	6.54	6.88
Pioneer Life	2018	-0.01	1.15	0.62	0.47	0.75	6.70	6.85
Pioneer Life	2017	0.01	1.23	0.80	0.23	0.86	4.43	6.72
Pioneer Life	2016	0.04	1.26	0.74	0.20	0.82	3.81	6.65
Prudential Life	2019	-0.10	1.98	0.91	1.18	0.45	1.02	6.25
Prudential Life	2018	-0.16	2.06	0.93	1.41	0.63	0.94	6.17
Prudential Life	2017	-0.15	2.05	0.83	1.59	0.48	0.95	6.14
Prudential Life	2016	-0.41	1.47	0.94	2.45	1.12	2.13	5.97
Sanlam Life	2019	0.03	1.12	0.90	0.51	0.96	8.00	7.39
Sanlam Life	2018	-0.03	1.10	0.91	0.38	1.12	10.53	7.39
Sanlam Life	2017	0.01	1.11	0.91	0.36	0.96	9.38	7.40
Sanlam Life	2016	0.02	1.09	0.95	0.32	1.04	10.70	7.39
UAPLife	2019	0.01	1.19	0.83	0.96	1.08	5.23	7.10
UAPLife	2018	0.02	1.20	0.81	0.73	0.85	5.01	7.05
UAPLife	2017	0.10	1.19	0.73	0.82	0.89	5.32	7.04
UAPLife	2016	0.00	1.13	0.72	1.05	0.92	7.50	7.03

Appendix IV: Data from Insurance companies with both lines of businesses

Company	Year	ROA	LIQ	R	UWR	LR	LEV	SIZE
Corporate	2019	-0.12	1.50	0.90	0.76	0.99	2.00	6.44
Corporate	2018	-0.04	1.96	0.94	0.63	0.88	1.04	6.38

Corporate	2017	0.01	2.10	0.91	0.56	0.58	0.91	6.38
Corporate	2016	0.05	2.16	0.99	0.62	0.41	0.86	6.37
First Assurance	2019	0.02	1.38	0.59	0.58	0.58	2.64	6.78
First Assurance	2018	-0.03	1.36	0.55	0.68	0.74	2.81	6.84
First Assurance	2017	0.00	1.51	0.54	0.69	0.60	1.95	6.82
First Assurance	2016	-0.03	1.57	0.56	0.52	0.83	1.75	6.84
Geminia	2019	0.03	1.39	0.79	0.43	0.64	2.55	6.96
Geminia	2018	0.02	1.38	0.79	0.45	0.65	2.64	6.91
Geminia	2017	0.04	1.44	0.82	0.40	0.66	2.27	6.83
Geminia	2016	0.03	1.47	0.82	0.40	0.69	2.11	6.75
Jubilee	2019	0.01	1.13	0.76	0.41	1.23	7.45	7.99
Jubilee	2018	0.02	1.17	0.75	0.42	1.08	5.94	7.95
Jubilee	2017	0.03	1.17	0.78	0.34	1.15	5.72	7.90
Jubilee	2016	0.01	1.15	0.76	0.37	0.89	6.52	7.84
Kenindia	2019	0.00	1.08	0.00	0.00	0.00	0.00	7.72
Kenindia	2018	0.01	1.10	0.00	0.00	0.00	0.00	7.65
Kenindia	2017	0.01	1.10	0.00	0.00	0.00	0.00	7.61
Kenindia	2016	0.01	1.09	0.00	0.00	0.00	0.00	7.56
Kenyan Alliance	2019	-0.01	1.25	0.00	0.00	0.00	0.00	6.92
Kenyan Alliance	2018	-0.03	1.34	0.00	0.00	0.00	0.00	6.84
Kenyan Alliance	2017	0.06	1.40	0.00	0.00	0.00	0.00	6.84
Kenyan Alliance	2016	0.01	1.39	0.00	0.00	0.00	0.00	6.80
Saham	2019	0.02	1.30	0.47	0.68	0.63	3.30	6.57
Saham	2018	0.03	1.27	0.47	0.75	0.61	3.68	6.57
Saham	2017	0.02	1.26	0.47	0.70	0.63	3.92	6.58
Saham	2016	0.02	1.25	0.41	0.97	0.55	3.95	6.48
The Monarch	2019	0.03	1.47	0.92	0.53	0.50	2.12	6.45
The Monarch	2018	0.07	1.53	0.92	0.61	0.55	1.87	6.41
The Monarch	2017	0.03	1.54	0.88	0.62	0.46	1.84	6.33
The Monarch	2016	0.00	1.61	0.84	0.64	0.50	1.65	6.28

Appendix V

Correlation for general Insurance Companies	ROA	LIQ	R	UWR	LR	LEV	SIZE
ROA	1	-0.00845	0.055085	-0.12809	-0.3873	-0.11093	0.104825
LIQ	-0.00845	1	-0.04674	0.882429	0.301237	-0.05917	0.210043
R	0.055085	-0.04674	1	-0.23118	0.141546	0.214942	0.505847
UWR	-0.12809	0.882429	-0.23118	1	0.227769	-0.02896	-0.01834
LR	-0.3873	0.301237	0.141546	0.227769	1	-0.05158	0.421855
LEV	-0.11093	-0.05917	0.214942	-0.02896	-0.05158	1	0.032903
SIZE	0.104825	0.210043	0.505847	-0.01834	0.421855	0.032903	1

Appendix VI

Correlation for Life Insurance companies	ROA	LIQ	R	UWR	LR	LEV	SIZE
ROA	1	-0.2904	-0.1259	0.01368	0.07098	0.09137	0.39417
LIQ	-0.2904	1	0.23225	-0.1372	-0.1623	-0.3849	-0.5484
R	-0.1259	0.23225	1	-0.7691	-0.7477	-0.289	0.17205
UWR	0.01368	-0.1372	-0.7691	1	0.99267	0.27224	-0.0229
LR	0.07098	-0.1623	-0.7477	0.99267	1	0.28169	0.01563
LEV	0.09137	-0.3849	-0.289	0.27224	0.28169	1	0.22176
SIZE	0.39417	-0.5484	0.17205	-0.0229	0.01563	0.22176	1

Appendix VII

Correlation for both	ROA	LIQ	R	UWR	LR	LEV	SIZE
ROA	1	-0.03428	0.00735	-0.311	-0.22174	0.011393	0.044022
LIQ	-0.03428	1	0.437396	0.111329	-0.55189	-0.74201	-0.6998
R	0.00735	0.437396	1	-0.33051	0.005357	-0.14491	-0.05966
UWR	-0.311	0.111329	-0.33051	1	-0.28083	-0.21781	-0.54912

LR	-0.22174	-0.55189	0.005357	-0.28083	1	0.908675	0.760831
LEV	0.011393	-0.74201	-0.14491	-0.21781	0.908675	1	0.815771
SIZE	0.044022	-0.6998	-0.05966	-0.54912	0.760831	0.815771	1