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**Article**

## Risk management and financial performance of insurance firms in Kenya

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## ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

# Risk management and financial performance of insurance firms in Kenya

Isaac Kibet Kiptoo<sup>1</sup>, Samuel Nduati Kariuki<sup>1</sup> and Kennedy Nyabuto Ocharo<sup>2</sup>

**Abstract:** This study examined the relationship between risk management and the financial performance of insurance firms in Kenya over the period 2013–2020. The data was collected from 51 Insurance firms licensed to operate in Kenya as of 31 December 2020. Regression analysis was used and the results showed that risk management significantly affects the financial performance of insurance firms. In particular, the results indicate that credit risk negatively and significantly affects financial performance. The results suggest that firms with a higher proportion of non-performing receivables than total receivables perform poorly. Insurance firms should therefore put in place credit management strategies to ensure receivables are collected within the stipulated time to avoid cases of non-performing receivables and thus improve performance. The results also showed that market risk management positively and significantly affects financial performance. The findings imply that sound investment decisions result in an increase in investment income, which in turn increases financial performance. Insurance firms should therefore ensure proper management of their investments to boost performance. The findings also indicate that operational risk management positively and significantly affects

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### PUBLIC INTEREST STATEMENT

The insurance industry plays a pivotal role in providing innovative solutions to the significant social, economic, and environmental challenges the country faces. Despite the contribution of the sector, insurance firms face various financial risks. The many risks and challenges facing the insurance industry in Kenya prompted the insurance regulatory body to establish a comprehensive risk management guideline for the insurance sector. However, cases of failure of insurance firms persist despite the introduction of risk management guidelines. This then raises the question of the effectiveness of the introduced risk management guidelines. This study contributes to the literature by investigating the effect of the various risk management strategies on the performance of insurance firms in Kenya. The findings indicated that credit risk negatively affected the financial performance of insurance firms, whereas market risk, operation risk, and liquidity risk management positively affected the financial performance of insurance firms. Appropriate risk management strategies should thus be put in place to enhance financial performance.

financial performance. The findings suggest that proper management of firms' operations results in reduced operating costs, which in turn result in an increase in net premiums and positively impact the performance of a firm. Insurance firms should thus implement proper operations management strategies to reduce costs and enhance financial performance. The results also indicate that liquidity risk management positively and significantly affects financial performance. The results imply that proper liquidity management ensures an increase in the proportion of current assets to current liabilities and in turn enhances the performance of a firm. Firms should thus ensure there is sufficient liquidity to discharge obligations when due to enhanced performance. This study demonstrates that risk management significantly affects the performance of insurance firms. Therefore, we recommend that directors and other stakeholders should put in place proper risk management strategies to boost financial performance. We also recommend that regulators and policymakers should come up with policies and regulations that will ensure firms adopt appropriate risk management strategies to enhance performance. The study contributes to the risk management literature by providing an empirical examination of the effect of the various risk management strategies adopted by insurance firms and gives recommendations that can be utilized by policymakers in assessing and reviewing risk management mechanisms. The study also gives recommendations to managers and other stakeholders regarding risk management mechanisms that can be adopted to boost the performance of a firm.

**Subjects: Economics; Finance; Business, Management and Accounting**

**Keywords: Risk management; credit risk management; market risk management; operation risk management; liquidity risk management; financial performance**

## 1. Introduction

The insurance industry plays a crucial role in achieving sustainable growth of an economy by facilitating financial security, capital formation, and funding development initiatives, as well as promoting trade and commerce (Authority, 2017). Despite the vital role it plays, the insurance sector has been recording poor performance globally. In the US, insurers have been registering underwriting losses, decreasing premiums, and an overall decline in net income. In Europe, there has been a negative effect of the continued low-interest-rate environment on the insurance industry, which has led to poor investment returns. In Africa, return volatility and underwriting losses have been experienced across all countries. Insurance penetration is also low averaging 3% compared to a world average of 6%. Africa's life insurance premiums have also stagnated over the years (Re, 2016).

In an ever dynamic and uncertain world, insurance firms continuously face risks that emerge in all fields conceivable. It is thus extremely hard, if not impossible, for an insurance firm to triumph unless proper risk mitigation measures are put in place. The emergence of pandemics such as the recent COVID-19 has impacted and continues to adversely affect the performance of insurance firms globally. COVID-19 has increased challenges to the sector, which include limitations in operations, financial distress and regulatory issues (Baumann, 2020). Stock returns in various countries, especially in developing countries, have been negatively affected by COVID-19 thus negatively affecting the performance of insurance firms (Farooq et al., 2021). In China, the impact of COVID-19 has led to decrease in insurance premium income, lowered the growth rate of premium, decreased the insurance depth and insurance density (Wang et al., 2020). In Kenya, COVID-19 has adversely impacted the insurance firms through decreased returns from funds

invested in capital markets, decrease in premiums and increase in claims in some insurance classes like medical (Authority, 2020). Risky decisions are thus necessary for every institution, and a firm may not realize its objectives without taking risks (Fama & MacBeth, 1973; Mushafiq et al., 2021). Risk is the possibility that an event will occur and adversely affect the achievement of objectives, creates financial loss, and arises from uncertainties of given situations plus certainties of exposing oneself to such situations (Shafiq & Nasr, 2010). The risk from the financial service sectors like the Insurance firms has contributed to large-scale bankruptcies, institution failures, government intervention, and rapid consolidation (Quon et al., 2012). The major risks facing the insurance firms are credit, liquidity, market risks, and operational risks (OECD, 2014)

The persistence of risks and their effects in the insurance industry prompted the creation of regulatory bodies to oversee the performance of insurance companies and come up with policies and guidelines that assist in mitigating the risks. The U.S. National Association of Insurance Commissioners (NAIC) was established to offer standard-setting and regulatory support to all states. In Europe, the European Insurance and Occupational Pension Authority (EIOPA) is mandated to promote a sound regulatory framework and supervision of the insurance industry. In South Africa, the insurance sector is supervised and regulated jointly by Prudential Authority (PA) and Financial Sector Conduct Authority (FA). In Kenya, the Insurance Regulatory Authority (IRA) was established to develop, supervise and regulate the insurance sector. The efforts made by the various regulatory bodies to ensure insurance firms put in place proper risk management practices have, however, not fully mitigated cases of financial distress or failures in insurance firms. Some of the firms that have had financial distress in the recent past include AIG, Consec, Executive Life Insurance Company, and Penn Treaty Network America Insurance, among others in the USA. In Europe, some of the firms that have collapsed include Horizon Insurance, Enterprise Insurance, Alpha Insurance, Qudos Insurance and Gable Insurance. In Kenya, there have been cases of customer complaints due to the inability of insurance firms to honor customer claims. Some insurance firms were also put under statutory management for instance, United Insurance, Blue Shield Insurance, Concord Insurance, and Standard Assurance (Authority, 2017).

The continued failures of insurance firms have motivated studies to examine the effectiveness of the various risk management guidelines and risk management practices adopted by insurance firms. The results of the studies are, however, inconclusive and give mixed results. Most of the studies have also focused on enterprise risk management practices, which include risk identification, risk analysis, risk monitoring, and risk management committee (Santomero & Babbel, 1997; Wang & Faber, 2006; McShane et al., 2011; Akotey et al., 2011; Hoyt & Liebenberg, 2011; Eckles et al., 2014; Jabbour & Abdel-Kader, 2016; Kokobe & Gemechu, 2016; Nguyen & Vo, 2020), while minimal efforts have been made to analyze the effect of the various risks on the financial performance of insurance firms. The studies also did not adequately reveal the strategy adopted in managing the specific risks and the effect of those risks on the performance of insurance firms. This study thus attempts to address this gap by examining the effect of risk management on the financial performance of insurance firms in Kenya. Specifically, the study investigated the effect of credit risk, liquidity risk, market risk, and operational risk on the performance of insurance firms in Kenya.

The study contributes to the risk management literature in various ways. First, the study provides empirical evidence on the effect of specific risks (credit risk, market risk, liquidity risk, and operational risk) on the financial performance of the insurance sector in Kenya. The findings thus provide insight into the effect of the various risks on performance, contrary to other studies, which focused on risk management practices, which include risk identification, risk analysis, risk monitoring. Second, the study covers a period of 8 years (2013–2020) which is the period that has elapsed since the introduction of comprehensive risk management guidelines in the insurance sector in Kenya. The guideline identified credit risks, liquidity risk, market risk, and operational risk as some of the various risks that need to be managed by insurance firms. To the best of our knowledge, no study has been done to determine the implementation of the risk management

guidelines and the effect of the various risks on the performance of insurance firms. This study thus provides an empirical examination of the effect of the various risks and gives recommendations that can be utilized by policymakers in assessing and reviewing the risk management policies. Thirdly, the study gives recommendations to managers and other insurance stakeholders regarding risk management strategies that can be adopted to boost the performance of insurance companies.

The rest of this paper is structured as follows: background of the study is presented in section 2, theoretical review in section 3, empirical review, and hypotheses development in section 4. Research design is presented in section 5, empirical results and discussion is presented in section 6, summary and conclusion are presented in section 7.

## 2. Background

The Insurance Regulatory Authority (IRA) regulates the insurance industry in Kenya. The number of registered insurance firms in Kenya as of December 2020 was 55 firms. As one of the key pillars of the financial services sector in Kenya, the insurance industry is central to the realization of financial services goals as set out in the Kenyan Vision 2030 economic blueprint. The insurance industry plays a pivotal role in providing innovative solutions to the significant social, economic, and environmental challenges the country faces. Despite the contribution made by the insurance sector to the Kenyan economy, the penetration of insurance in Kenya is 2.73% which is low in comparison with the global average of 6.28% (Re, 2016).

There are also many challenges facing the insurance industry in Kenya with the most recent being the COVID-19 pandemic. COVID-19 has reduced the income from investments in capital markets, reduced premiums and increased claims in some insurance classes such as medical. To mitigate the impact of COVID-19, IRA issued some guidance notes to insurance firms. Some of the guidelines include the requirement that insurers to consider granting policyholders a grace period of 3 months to avoid lapses in insurance policies. The firms were also required to promptly pay commissions to brokers and agents, submit a scenario and stress testing report, update liquidity strains and capital adequacy calculations. The insurers were also required to inform policyholders the policies that are likely to be affected by coronavirus and expeditiously settle all COVID-19 related claims. The insurers should also seek approval from IRA before withdrawing or suspending some products offered to policyholders (Authority, 2020). Other challenges that have been facing the sector include structural weaknesses, fraud by both clients and employees, high claims, delays in claim settlement, delayed premium collection, lack of liquidity leading to collapse of some firms, low economic growth, poor governance, low penetration and industry saturation (AKI, 2013). The many risks and challenges facing the insurance industry in Kenya prompted the insurance regulatory body, IRA, to establish a comprehensive risk management guideline for the insurance sector. The guideline identified credit risks, liquidity risk, market risk, and operational risk as some of the various risks that need to be managed by an insurance firm (Authority, 2013).

Despite the efforts by IRA, customer complaints against the insurance firms persist. Complaints related to the delayed settlement of claims, underpayment of claims, declined claims, and mis-selling of insurance products. Some of the insurance firms have also been reporting losses, for instance, in the year 2016, the underwriting loss for the sector was Kes 2.1 Million, Kes 1.02 Million in the year 2017, Kes 2.5 Million in the year 2018, Kes 3.1 Million in the year 2019 and Kes, 1.1 million in 2020. The return on assets has also been decreasing for instance, in the year 2016 the ROA was 3.6% which decreased to 3.2% in the year 2017, 2.3% in 2018, 2.3 in 2019 and 1.75 in 2020. Some of the insurance companies have also collapsed, while some have been put under statutory management due to their inability to honor customer claims (Authority, 2020). This then raises the question of whether the insurance firms have implemented the provisions of the IRA risk management guidelines and what effect do these provisions have on the performance of the

insurance firms. This study thus attempts to determine the risk management strategies adopted by the various insurance firms in Kenya and how it affects the performance.

### **3. Theoretical literature review**

This study adopted credit risk theory, modern portfolio theory, Keynesian liquidity theory, and resource-based theory.

#### **3.1. Credit risk theory**

Merton (1974) introduced the credit risk theory, which asserts that the default event derives from a firm's asset evolution modeled by a diffusion process with constant parameters. Merton proposed a model for assessing the credit risk of a company. The model assumes that a company has a certain amount of debt that will become due in a future time. A firm can be able to detect the possibility of default if the value of its assets is less than the promised debt repayment at a specified time.

Extant literature indicates that several studies have adopted this theory to assess credit risk using the ratio of non-performing debt to total debt (Ekinci, 2016; Gadzo et al., 2019; Isanzu, 2017; Munangi & Bongani, 2020; Saleh et al., 2020; 2014). This study adopts the theory to determine credit risks using the ratio of non-performing receivables to total receivables for each of the various insurance firms and establish the effect it has on the financial performance of the firms.

#### **3.2. Modern portfolio theory**

Modern Portfolio Theory is comprised of Markowitz's Portfolio Selection theory, first introduced in 1952, and William Sharpe's contributions to the theory of financial asset price formation, which was introduced in 1964 and came to be known as the capital asset pricing model. Essentially, MPT is an investment framework for the selection and construction of investment portfolios based on the maximization of expected returns of the portfolio and the simultaneous minimization of investment risk. The theory is based on the idea that risk-averse investors can construct portfolios to optimize or maximize expected return based on a given level of market risk, emphasizing that risk is an inherent part of higher reward. The theory suggests that it is possible to construct an efficient frontier of optimal portfolios, offering the maximum possible expected return for a given level of risk. Studies support the modern portfolio theory and indicate that market risks significantly affect performance (Kim et al., 1995; Pervan & Pavic', 2010; Shiu, 2004). This study analyses how various insurance firms have managed their investment portfolio and its effect on their performance

#### **3.3. Keynesian liquidity preference theory**

The theory was advanced by Keynes (1936) and identified three reasons why liquidity management is vital to a firm. The theory asserts that liquidity is required for speculative, transaction, and precautionary motives. A precautionary motive is the need for a constant supply of cash and a financial reserve. The speculative motive is the necessity to hold cash to take advantage of investment opportunities. The transaction motive is the need to have cash on hand to discharge daily operations. A firm should thus manage its liquid assets in a way that there is sufficient cash to discharge its daily operations, invest any surplus to gain income, and still have some amounts that can be accessed easily when unexpected events occur. Studies have indicated that liquidity significantly affects the financial performance of a firm (Ahmed et al., 2010; Chen et al., 2018; Onsongo et al., 2020; Saleh et al., 2020). However, the studies do not indicate the optimal liquidity that a firm should maintain. This study will investigate the effect of risk management on the financial performance of insurance firms.

#### **3.4. Resource-based theory**

The resource-based theory asserts that variations in performance between firms from the same industry can be explained by the differences in their endowments of resources (Wernerfelt, 1984). Resources are assets, either tangible for instance, machinery or intangible like brands that a firm

uses to conceive of and implement its strategies (Barney, 2001). To create a competitive advantage, the management of a firm should integrate and combine these resources into groups forming capabilities (Hoskisson et al., 1999). The resource-based theory focuses managerial attention on the firm's internal resources to identify those assets, capabilities, and competencies with the potential to deliver superior competitive advantages. In the resource-based view, strategists select the strategy or competitive position that best exploits the internal resources and capabilities relative to external opportunities. The theory is therefore relevant as it explains the influence of proper management of firms' resources to attain a competitive edge and better performance. This study thus investigated the effect of operation risk on performance.

The theory also explains that firm characteristics like size, age, and liquidity, if utilized well, can lead to better financial performance. The study thus investigated the effect of liquidity risk on performance and size and age were used as control variables.

#### **4. Literature review and hypotheses development**

##### **4.1. Credit risk**

The Insurance Regulatory Authority (IRA) of Kenya identified credit risk as one of the risks that insurance companies should manage. IRA noted that insurance firms rely on being paid by third parties, including the company's reinsurers and investment counterparties. The counterparties may not be able to pay their ongoing obligations at all or within the stipulated time (Authority, 2013). This exposes the firms to credit risks due to non-performing receivables. The insurance firms may thus experience financial distress if proper measures are not put in place to ensure receivables are collected in time. The guideline concurs with the views of credit risk theory by Merton (1974) which asserted that the default event derives from a firm's asset evolution modeled by a diffusion process with constant parameters. The theory emphasizes that a firm can be able to detect the possibility of default if the value of its assets is less than the promised debt repayment at a specified time. Extant literature indicates that studies have adopted this theory and affirmed that credit risk negatively affects the financial performance of a firm (Ekinci, 2016; Gadzo et al., 2019; Isanzu, 2017; Munangi & Bongani, 2020; Saleh et al., 2020). We, therefore, hypothesize that;

H<sub>01</sub>: There is a negative relationship between credit risk and the financial performance of insurance firms in Kenya.

##### **4.2. Market risk**

Insurance firms participate in pooling funds from policyholders and investing them to generate income. The firms are thus faced with market risks that relate to the degree of risk inherent in the investment portfolio. Insurance firms should therefore manage their portfolio by investing in low-risk assets and avoiding risky investments. Risk levels are further influenced by the quality of individual investments (Authority, 2013). The guideline affirms the views of Modern Portfolio Theory that risk is inevitable, but it is possible for a firm to construct an efficient frontier of optimal portfolios, offering the maximum possible expected return for a given level of risk (Markowitz, 1952). Empirical studies also affirm that market risks negatively affect the performance of firms and need to be properly managed (Akotey et al., 2013; Charumathi, 2012; Chen & Wong, 2004; 2011; Ekinci, 2016; Kim et al., 1995; Kramer, 1996; Pervan & Pavic', 2010; Shiu, 2004).

The performance of an investment, as reflected by the ratio of investment income to average income, discloses the efficiency and effectiveness of investment decisions. As such, the performance of investments is critical to the financial strength of an insurer (Chen & Wong, 2004). Sound investment decisions thus guarantee investment returns and better financial performance in line with modern portfolio theory. We thus hypothesize that:



H<sub>02</sub>: There is a positive relationship between market risk management and the financial performance of insurance firms in Kenya.

#### **4.3. Liquidity**

Liquidity risk is the inability of the insurer to draw on sufficient cash to meet its liabilities as and when they fall due. Insurance firms primarily undertake payments of claims and benefits to policyholders. The company must therefore have processes in place to convert investments and other assets into sufficient cash, as needed to meet its liabilities (Authority, 2013). The guideline is in line with Keynesian Liquidity Preference Theory, which emphasized that liquidity is vital for a firm to for speculative, transaction, and precautionary motives (Keynes, 1936). A firm should thus manage its liquid assets in a way that there is sufficient cash to discharge its daily operations, invest any surplus to gain income, and still have some amount that can be accessed easily when unexpected events occur. However, extant literature on the relationship between liquidity and profitability is ambiguous. Some studies suggest that there is a negative relationship between liquidity and profitability of an insurance firm (Ahmed et al., 2010; Carson & Scott, 1997; Chen et al., 2018; Onsongo et al., 2020; Saleh et al., 2020). The studies argue that if a firm maintains high levels of liquid assets, translating to a higher liquidity ratio, usually does not add value to the company but increases maintenance cost and the opportunity cost of investment income it would have generated if it were invested. Other studies indicated that there is a negative relationship between liquidity and profitability (Lee and Urrutia, 1996; Bourke, 1989; Camino-Mogro et al., 2019; Charumathi, 2012; Chen & Wong, 2004; Wani & Ahmad, 2015). The studies indicate that due to uncertainty related to the frequency, severity, and timing of insurance benefits or claims, it is vital for the firms to plan their liquidity prudently to achieve higher profitability.

We thus hypothesize that:

H<sub>03</sub>: There is a positive relationship between liquidity risk management and the financial performance of insurance firms in Kenya.

#### **4.4. Operational risk**

Operational risk refers to all the risks associated with the operating units of an insurance company, such as the underwriting, claims, and investment departments. It relates to the risk of direct or indirect loss due to failed or inadequate internal processes, systems, and people (Authority, 2017). The guideline is in agreement with the resource-based view theory, which asserts that variations in performance between firms from the same industry can be explained by the differences in their endowments of resources (Wernerfelt, 1984). The theory focuses managerial attention on the firm's internal resources to identify those assets, capabilities, and competencies with the potential to deliver superior competitive advantages. To create a competitive advantage, the management of a firm should integrate and combine these resources into groups forming capabilities (Hoskisson et al., 1999). Empirical studies have affirmed that operational risk negatively affects financial performance (Ahmed et al., 2011; Akotey et al., 2013; Camino-Mogro et al., 2019; Charumathi, 2012; Hrechaniuk et al., 2007; Kozak, 2011; Pervan & Pavić, 2010). Proper management of operational risks will thus curb operational losses and increase net premiums. We thus hypothesize that:

H<sub>04</sub>: There is a positive relationship between operational risk management and the financial performance of insurance firms in Kenya.

## 5. Research design

### 5.1. Sample selection and data sources

The data was obtained from the audited financial reports of the insurance companies in Kenya. The target population for the study was all the 55 insurance companies licensed to operate in Kenya by IRA as of 31 December 2020. The data required for analysis were obtained from the audited financial report for a period of 8 years (2013 to 2020). Insurance in Kenya and the period of 8 years were chosen because this was the period that had elapsed since risk management guidelines for insurance firms were introduced in Kenya by IRA. To the best of our knowledge, no study has been done to determine the implementation of the risk management guidelines in Kenya and the effect of the various risks on the performance of insurance firms. This study thus provides an empirical examination of the effect of the various risks and gives recommendations that can be utilized by corporate managers and policymakers in assessing and reviewing the risk management policies. Studies on risk management in developing countries are also scanty. The findings thus provide insight on the effect of risk management on performance from a developing country perspective

The final sample of the firms used in the study was 51 insurance firms that met the criteria of complete audited financial reports for the period from 2013 to 2020. This ensures that the data meets the requirements for panel data analysis.

### 5.2. Research model and measurement of variables

The study adopted regression analysis to determine the relationship between the variables. The dependent variable was financial performance, while the independent variables were four risk management variables, namely: credit risk management (CR), market risk management (MR), operation risk (OR), and liquidity risk (LR). To effectively measure the relationship between the dependent and independent variables and following similar studies (Hunjra et al., 2020; Kafidipe, 2021) firm characteristics, which were the age of the firm (AGE) and size of the insurance firm (SIZE) was used as the control variables. The correlations between the independent variables and the dependent variables may be spurious if control variables are not included in the regression model (Wooldridge, 2015). The summary of how the variables were operationalized is presented in Table 1.

The following model was used to determine the relationship between the variables:

**Model:**

$$ROA_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 MR_{it} + \beta_3 OR_{it} + \beta_4 LR_{it} + \beta_5 AGE_{it} + \beta_6 SIZE_{it} + \varepsilon \quad (1)$$

**Where:**

$ROA$  is the return on assets,  $\theta_0$  is the regression constant,  $i$  is 1, . . . , 51 firms,  $t$  is 1, . . . , 6 years,  $\beta_1, \dots, \beta_7$  are coefficients estimated, CR is credit risk, MR is market risk, OR is operation risk, LR is liquidity risk, AGE is the age of the firm, SIZE is the size of the firm and  $\varepsilon$  is the error term.

## 6. Empirical results and discussion

### 6.1. Descriptive statistics

The descriptive results of risk management and financial performance are presented in Table 2. The results show that the return on assets was between -4.71 and 5.96 with a mean of 1.66. This implied that the majority of the insurance firms in Kenya registered positive returns. Credit risk was between 0.03 and 0.57 with a mean of 0.34. This implied that all the firms experienced cases of non-performing loan which varied from one firm to another. The results also confirm the presence of credit risks facing the insurance firms. The findings also showed that market risk was between 0.03

**Table 1. Operationalization of the variables**

| Variable    | Indicator (s)             | Operationalization   | Reference  |
|-------------|---------------------------|--|--|
| Dependent   | ROA                       | $\frac{\text{Net profit after tax} * 100}{\text{Total Assets}}$      | Malik (2011)   |
| Independent | Credit risk               | $\frac{\text{Non performing receivables}}{\text{Total receivables}}$ | Noman et al. (2015)                                    |
| Independent | Market risk               | $\frac{\text{Investment Income}}{\text{Average Investments}}$        | Pervan & Pavic', 2010                                  |
| Independent | Operation risk            | $\frac{\text{Net Earned Premiums}}{\text{Total Assets}}$             | Ahmed et al., 2011                                     |
| Independent | Liquidity risk            | $\frac{\text{Current Assets}}{\text{Current Liabilities}}$           | Alzorqan (2014), Marozva (2015)                        |
| Control     | Age of insurance firm     | The number of years since incorporation                              | Kusi et al., 2019; Hunjra et al., 2020; Kafidipe, 2021 |
| Control     | Size of an insurance firm | Log of total assets.   | Kusi et al., 2019; Kafidipe, 2021                      |

**Table 2. Descriptive statistics**

| Variable           | Indicator                 | Mean  | Maximum | Minimum | Std. dev. | Observations |
|--------------------|---------------------------|-------|---------|---------|-----------|--------------|
| <b>Dependent</b>   | Return on Assets          | 1.66  | 5.96    | -4.71   | 2.28      | 400          |
| <b>Independent</b> | Credit risk               | 0.34  | 0.57    | 0.03    | 0.10      | 400          |
| <b>Independent</b> | Market risk               | 0.35  | 0.71    | 0.03    | 0.12      | 400          |
| <b>Independent</b> | Operation risk            | 0.22  | 0.50    | 0.03    | 0.08      | 400          |
| <b>Independent</b> | Liquidity risk            | 0.39  | 0.79    | 0.06    | 0.14      | 400          |
| <b>Control</b>     | Age of insurance firm     | 35.59 | 100.00  | 2.00    | 23.98     | 400          |
| <b>Control</b>     | Size of an insurance firm | 7.10  | 14.0    | 0.34    | 2.18      | 400          |

and 0.71 with an average of 0.35. The results indicate that the firms are registering varying rates of investment income, which could imply that the firms have adopted different investment strategies to counter market risks. In terms of operational risk, the proportion of net earned premiums to total assets was between 0.03 and 0.50 with an average of 0.22. This implies that some firms are managing their operations better than others, thus registering a high ratio of net premiums to net assets of 0.50 compared to those registering a ratio of 0.03. The results also indicate that liquidity risk was between 0.06 and 0.79 with a mean of 0.39. This suggested that the insurance firms had adopted different liquidity management strategies.

### 6.2. Correlation and diagnostic test results

The correlation results in Table 3 indicate that the correlation between return on assets and credit risk management is negative and significant ( $r = -0.475$ ,  $p\text{-value} < 0.01$ ). The results suggest that when the proportion of non-performing receivables to total receivables increases, the return on assets decreases. The correlation results also show that the correlation between ROA and market risk is positive, but not significant ( $r = 0.029$ ,  $p\text{-value} > 0.01$ ). The results imply that an increase in the proportion of investment income to average investments leads to an increase in ROA. The correlation between return on assets and operation risk is positive and significant ( $r = 0.253$ ,  $p\text{-value} < 0.01$ ). The results imply that an increase in the proportion of net premiums earned for total assets increases ROA. Similarly, the correlation between liquidity risk and return on assets is positive and significant ( $r = 0.160$ ,  $p\text{-value} < 0.01$ ). The results suggest that increasing the proportion of current assets to total assets increases ROA.

**Table 3. Pearson correlation matrix**

| Variable    | Indicator              | ROA       | CR      | MR      | OR      | LR      | SIZE   | AGE    |
|-------------|------------------------|-----------|---------|---------|---------|---------|--------|--------|
| Dependent   | Return on Assets (ROA) | 1.0000    |         |         |         |         |        |        |
|             |                        | ---       |         |         |         |         |        |        |
| Independent | Credit Risk (CR)       | -0.4759** | 1.0000  |         |         |         |        |        |
|             |                        | 0.000     | ---     |         |         |         |        |        |
| Independent | Market Risk (MR)       | 0.0299    | 0.587** | 1.0000  |         |         |        |        |
|             |                        | 0.5507    | 0.000   | ---     |         |         |        |        |
| Independent | Operation Risk (OP)    | 0.253**   | 0.297** | 0.223** | 1.0000  |         |        |        |
|             |                        | 0.000     | 0.000   | 0.000   | ---     |         |        |        |
| Independent | Liquidity Risk (LR)    | 0.160**   | 0.156** | -0.051  | 0.311** | 1.0000  |        |        |
|             |                        | 0.001     | 0.001   | 0.308   | 0.000   | ---     |        |        |
| Control     | Firm Age (AGE)         | -0.178**  | 0.006   | 0.039   | -0.110* | -0.053  | 1.0000 |        |
|             |                        | 0.000     | 0.904   | 0.430   | 0.026   | 0.289   | ---    |        |
| Control     | Firm Size (SIZE)       | 0.420**   | 0.029   | 0.151** | 0.632** | 0.189** | -0.067 | 1.0000 |
|             |                        | 0.000     | 0.557   | 0.002   | 0.000   | 0.001   | 0.178  | ---    |

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\*. Correlation is significant at the 0.05 level (2-tailed).

The correlation between the age of the firm and the return on assets is negative and significant ( $r = -0.178$ ,  $p$ -value  $< 0.01$ ). The results suggest that the older the firm gets, the lower the ROA. The correlation between the return on assets and the size of the firm is positive and significant ( $r = 0.420$ ,  $p$ -value  $< 0.01$ ). The results imply that increasing the size of the firm results in an increase in ROA. The results of the correlation matrix also show that the correlation between the variables is below 0.80. The results imply that there is no multi-collinearity problem. Gujarati (1995) suggested that when the correlation between variables exceeds 0.80, then there may be a problem of multi-collinearity.

Variance inflation factor (VIF) is also generated for the variables to determine further if there is multi-collinearity. The results presented in Table 4 further shows that the VIF values were below 10, suggesting that there is no multi-collinearity problem.

To determine whether pooled OLS, random-effects or fixed-effects model was appropriate, Breusch and Pagan Lagrangian multiplier test was carried out. The null hypothesis is that the pooled OLS is appropriate. The null hypothesis is rejected when the  $p$  value is significant (Breusch & Pagan, 1980). The results indicated that the  $P$  value was 0.000 which was less than 0.05 thus the null hypothesis that there are no effects was rejected suggesting that random-effects or fixed-effects model was appropriate (Wooldridge, 2010). Hausman (1978) test was further carried out to determine whether the random or fixed-effects model was appropriate. The null hypothesis for Hausman test is that the random effects model is appropriate. The null hypothesis is rejected when the  $p$  value is significant ( $p < 0.05$ ). The results in Table 5 show that the  $p$ -value is 0.6890 which is insignificant ( $p > 0.05$ ), thus failing to reject the null hypothesis suggesting that the random effects model is appropriate (Wooldridge, 2010). The results in Table 6 also show that there is a difference between the values of fixed effect and random effect models. The random-

**Table 4. Variance inflation factors**

| Variable    | Indicator       | VIF             | 1/VIF  |
|-------------|-----------------|-----------------|--------|
| Independent | Credit Risk     | 1.779962        | 0.5618 |
| Independent | Market Risk     | 1.652852        | 0.6050 |
| Independent | Operation Risk  | 2.021585        | 0.4947 |
| Independent | Liquidity Risk  | 1.163900        | 0.8592 |
| Control     | Firm Age        | 1.017138        | 0.9832 |
| Control     | Firm Size       | 1.798701        | 0.5560 |
|             | <b>Mean VIF</b> | <b>1.572356</b> |        |

**Table 5. Hausman test cross-section random effects**

| Test summary         | Chi-Sq. statistic | Chi-Sq. d.f. | Prob.  |
|----------------------|-------------------|--------------|--------|
| Cross-section random | 3.909145          | 6            | 0.6890 |

**Table 6. Cross-section random effects test comparisons**

| Variable    | Indicator      | Fixed      | Random     | Var. (Diff.) | Prob.  |
|-------------|----------------|------------|------------|--------------|--------|
| Independent | Credit Risk    | -17.083797 | -17.172648 | 0.008939     | 0.3473 |
| Independent | Market Risk    | 6.248889   | 6.297457   | 0.001006     | 0.1257 |
| Independent | Operation Risk | 4.035713   | 4.232866   | 0.014317     | 0.0994 |
| Independent | Liquidity Risk | 2.967016   | 2.975511   | 0.000362     | 0.6551 |
| Control     | Firm Age       | -0.012719  | -0.012848  | 0.000000     | 0.1672 |
| Control     | Firm Size      | 0.293582   | 0.283845   | 0.000032     | 0.0852 |

effect model was thus used in estimating the effect of risks management on performance. A histogram normality test was also carried out to determine normality. The null hypothesis for this test is that the residuals are normally distributed. If the residuals are normally distributed, the histogram should be bell-shaped, and the Jarque-Bera statistic should not be significant (Jarque & Bera, 1980). The test results indicated that the histogram was bell-shaped and the p-value for Jarque-Bera statistic was 1.5196 with a probability of 0.467 which was insignificant at a 5% level of significance, suggesting that the data was normally distributed. Scatter plots of the residuals were also generated which confirmed that there was no linearity problem.

### 6.3. Regression results and discussion

The regression results in Table 7 show that credit risk negatively and significantly affects the financial performance of insurance firms ( $\beta = -17.172$ ,  $p < 0.5$ ). The results suggest that firms with a higher proportion of non-performing receivables than total receivables perform poorly. The results are in agreement with the findings by Ekinci (2016), Isanzu (2017), Gadzo et al. (2019), and Saleh et al. (2020), and Munangi and Bongani (2020). The findings also concur with credit risk theory by Merton (1974) which emphasized that a firm can be able to detect the possibility of default if the value of its assets is less than the promised debt repayment at the specified time. The hypothesis that there is a negative relationship between credit risk and the financial performance of insurance firms in Kenya is thus accepted.

**Table 7. Random effect model regression results**

| Variable    | Indicator               | Coefficient | Std. error | t-Statistic | Prob.  |
|-------------|-------------------------|-------------|------------|-------------|--------|
| Constant    | C                       | 1.619260    | 0.439939   | 3.680648    | 0.0003 |
| Independent | Credit Risk             | -17.17265   | 0.994390   | -17.26953   | 0.0000 |
| Independent | Market Risk             | 6.297457    | 0.737431   | 8.539720    | 0.0000 |
| Independent | Operation Risk          | 4.232866    | 1.327964   | 3.187485    | 0.0015 |
| Independent | Liquidity Risk          | 2.975511    | 0.545158   | 5.458066    | 0.0000 |
| Control     | Firm Age                | -0.012848   | 0.003124   | -4.112497   | 0.0000 |
| Control     | Firm Size               | 0.283845    | 0.047348   | 5.994880    | 0.0000 |
|             | R <sup>2</sup>          | 0.5627      |            |             |        |
|             | Adjusted R <sup>2</sup> | 0.5560      |            |             |        |
|             | F statistic             | 0.000       |            |             |        |

The dependent variable is Return on Assets.

The results also showed that market risk positively and significantly affects the financial performance of Insurance firms ( $\beta = 6.297$ ,  $p < 0.5$ ). The findings imply that sound investment decisions increase the proportion of investment income to average investments, which in turn increase financial performance. The results were consistent with the recommendation of other studies (Akotey et al., 2013; Charumathi, 2012; Chen & Wong, 2004; Ekinci, 2016; Kim et al., 1995; Kramer, 1996; Pervan & Pavić, 2010; Shiu, 2004). The findings also support the modern portfolio theory that it is possible to construct an efficient frontier of optimal portfolios, offering the maximum possible expected return for a given level of risk (Keynes, 1936). Therefore, the hypothesis that there is a positive relationship between market risk management and financial performance of Insurance firms in Kenya is thus accepted.

The results also show that operational risk management positively and significantly affects financial performance ( $\beta = 4.232$ ,  $p < 0.5$ ). The findings suggest that proper management of firms' operations results in reduced operating costs, which in turn result in an increase in the proportion of net premiums to total assets and positively impact the performance of a firm. The findings support the recommendation of other studies (Ahmed et al., 2011; Akotey et al., 2013; Camino-Mogro et al., 2019; Charumathi, 2012; Hrechaniuk et al., 2007; Kozak, 2011; Pervan & Pavić, 2010). The findings are also in agreement with the resource-based view theory, which asserts that management of a firm can integrate and combine its internal resources and utilize them to create competitive advantage and achieve superior performance (Wernerfelt, 1984). Therefore, the hypothesis that there is a positive relationship between operations risk management and the financial performance is thus accepted.

The results also show that liquidity risk management positively and significantly affects financial performance ( $\beta = 2.975$ ,  $p < 0.5$ ). The results imply that proper liquidity management ensures an increase in the proportion of current assets to current liabilities and in turn enhances the performance of a firm. The findings were consistent with the results by Bourke (1989), Lee and Urrutia, (1996), Chen and Wong (2004), Charumathi (2012), and Wani and Ahmad (2015), and Camino-Mogro et al. (2019). Keynesian Liquidity Preference Theory, which emphasizes that liquidity is vital to a firm to for speculative, transaction, and precautionary motives (Keynes, 1936). A firm should thus manage its liquid assets in a way that there is sufficient cash to discharge its daily operations, invest any surplus to gain income, and still have some amounts that can be accessed easily when unexpected events occur. Therefore, the hypothesis that there is a positive relationship between liquidity risk management and the financial performance of insurance firms in Kenya is thus accepted.

We also conducted a further analysis using different models to check the robustness of our findings. The results presented in Table 8 shows that the results generated by the different models are similar to the findings of the fixed effects model that we adopted. The results from all the models indicate that the relationship between market risk, operation risk, liquidity risk, firm size, and financial performance was positive. The results of all the models also show that the relationship between credit risk, firm age, and financial performance was negative.

## 7. Summary and conclusion

This study investigated the relationship between risk management and financial performance of 51 Insurance Firms in Kenya. The risk management variables were credit risk, market risk, operation risk, and liquidity risk, while financial performance was measured as ROA. Regression analysis was done to determine the relationship between the variables. The findings showed that credit risk negatively and significantly affects financial performance. The results suggest that firms with a higher proportion of non-performing receivables than total receivables perform poorly. Insurance firms should therefore put in place strategies to ensure receivables are collected within the stipulated time to avoid cases of non-performing receivables and better performance.

The results also showed that market risk management positively and significantly affects financial performance. The findings imply that sound investment decisions increase the proportion of investment income to average investments, which in turn increase financial performance. Insurance firms should therefore ensure proper management of their investments to boost performance. The findings also indicate that operational risk management positively and significantly affects financial performance. The findings suggest that proper management of firms' operations results in reduced operating costs, which in turn result in an increase in the proportion of net premiums to total assets and positively impact the performance of a firm. Insurance firms should thus implement proper operations management strategies to reduce costs and enhance financial performance. The results also indicate that liquidity risk management positively and significantly affects financial performance. The results imply that proper liquidity management ensures an increase in the proportion of current assets to current liabilities and in turn enhances the performance of a firm. Firms should thus ensure there is sufficient liquidity to discharge obligations when due and enhance performance.

This study demonstrates that risk management significantly affects the performance of insurance firms. Therefore, we recommend that regulators and policymakers should come up with policies and regulations that will ensure firms adopt appropriate risk management strategies to enhance performance. We also recommend that directors and managers should put in place proper risk management strategies to control credit, liquidity, operation and market risk in order to boost financial performance.

In particular, credit risk negatively and significantly affects financial performance. Managers of insurance firms should therefore ensure that receivables are collected within the stipulated time to avoid cases of non-performing receivables and thus improve performance. The results also showed that market risk management positively and significantly affects financial performance. Managers of insurance firms should therefore undertake sound investment decisions and diversify in order to mitigate investment risks and increase in investment income. Similarly, operational risk management positively and significantly affects financial performance. Management of insurance firms should therefore coordinate and monitor their operations in order to reduce operation costs and improve efficiency, which in turn results in an increase in net premiums and positively impact the performance of the firm. Liquidity risk management also positively and significantly affects financial performance. Managers should monitor the ratio of current assets to current liabilities and ensure that there are sufficient current assets to discharge current liabilities.

This study contributes to the risk management literature by providing an empirical examination of the effect of the various risk management strategies adopted by insurance firms and gives recommendations that can be utilized by policymakers in assessing and reviewing risk management

**Table 8. Robustness or additional regression analysis results**

| Variables               | Pooled OLS  | Generalized linear model | Random effect | Fixed effect | Robust least squares |
|-------------------------|-------------|--------------------------|---------------|--------------|----------------------|
| <b>C</b>                | 1.818965    | 1.818965                 | 1.619260      | 1.578791     | 2.639301             |
| (t-statistic)           | (4.4386)    | (4.4386)                 | (3.68064)     | (3.90951)    | (6.364517)           |
| (Z-statistic)           |             |                          |               |              |                      |
| <b>Credit Risk</b>      | -17.64209*  | -17.64209*               | -17.17265*    | -17.08380*   | -17.29030*           |
| (t-statistic)           | (-17.63851) | (-17.63851)              | (-17.2695)    | (-17.10304)  | (-17.08290)          |
| (Z-statistic)           |             |                          |               |              |                      |
| <b>Market Risk</b>      | 6.557581*   | 6.557581*                | 6.297457*     | 6.248889*    | 5.392492*            |
| (t-statistic)           | (8.66975)   | (8.66975)                | (8.53972)     | (8.466035)   | (7.045307)           |
| (Z-statistic)           |             |                          |               |              |                      |
| <b>Operation Risk</b>   | 5.270911*   | 5.270911*                | 4.232866*     | 4.035713*    | 5.054118*            |
| (t-statistic)           | (3.93493)   | (3.93493)                | (3.18748)     | (3.026761)   | (3.728591)           |
| (Z-statistic)           |             |                          |               |              |                      |
| <b>Liquidity Risk</b>   | 3.022486*   | 3.022486*                | 2.975511*     | 2.967016*    | 2.584484             |
| (t-statistic)           | (5.39572)   | (5.39572)                | (5.45806)     | (5.439176)   | (4.559387)           |
| (Z-statistic)           |             |                          |               |              |                      |
| <b>Firm Age</b>         | -0.013538*  | -0.013538*               | -0.012848*    | -0.012719*   | -0.013129*           |
| (t-statistic)           | (-4.2134)   |                          | (-4.112497)   | -4.069237    |                      |
| (Z-statistic)           |             | (4.2134)                 |               |              | (-4.038046)          |
| <b>Firm Size</b>        | 0.232689*   | 0.232689*                | 0.283845*     | 0.293582*    | 0.197025             |
| (t-statistic)           | (4.95565)   |                          | (5.99488)     | (6.156742)   |                      |
| (Z-statistic)           |             | (4.95565)                |               |              | (4.146603)           |
| F.Stat.                 | 83.57207    | -                        | 84.28720      | 43.43027     | -                    |
| Prob(F-Stat)            | 0.000       | -                        | 0.0000        | 0.00000      | -                    |
| Prob(LR-Stat)           | -           | 0.00000                  | -             | -            | -                    |
| Prob (Rn-squared. Stat) | -           | -                        | -             | -            | 0.000000             |
| R-Squared               | 0.560615    | -                        | 0.562713      | 0.593938     | 0.417063             |
| Adjusted R-Squared      | 0.553907    | -                        | 0.556037      | 0.580262     | 0.604112             |
| Durbin-Watson Statistic | 1.84067     | -                        | 1.764046      | 1.748191     | -                    |

\* = Significant at the 0.05 level.

**The dependent variable** is Return on Assets.

**Independent variables:** Credit risk, Market risk, Operation Risk, and Liquidity risk

**Control Variables:** Firm Age and Firm Size

mechanisms. The study also gives recommendations to managers and other stakeholders regarding risk management mechanisms that can be adopted to boost the performance of a firm. We suggest that future research may focus on data from different sectors and countries to compare and contrast the effect of risk management strategies adopted in the various sectors or countries.

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