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*Corresponding author: Thabiso Sthembiso Msomi, Department of Management Accounting, Faculty of Accounting and Informatics, Durban University of Technology, South Africa
E-mail: mndayithabiso@gmail.com

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Macroeconomic and firm-specific determinants of financial performance: Evidence from non-life insurance companies in Africa

Thabiso Sthembiso Msomi^{1*}

Abstract: This study aimed to examine the macroeconomic and firm-specific determinants of financial performance using 121 listed non-life insurance companies from 48 African countries for the period 2008–2019. Panel data of 1452 observations were examined using both ordinary least squares and two-step System Generalised Method of Moments estimators. The findings of this study show that lagged return on assets, equity capital, operational efficiency and leverage, investment capability and gross domestic product are the statistically significant determinants of financial performance in African non-life insurance companies even though equity capital, operational efficiency and leverage are inversely significant. It is concluded that insurance industries, policymakers, government and investors should take into consideration these significant factors in taking decision and improving their performance. Also, it is recommended that the capital structures of the sector should be restructured to maintain a favourable balance in the equity and debt of the companies. Also, mechanisms such as automated systems that can reduce operational cost should be adopted such that financial performance can be enhanced.

Subjects: Economics; Finance; Business, Management and Accounting

Keywords: African insurance companies; non-life insurance; macroeconomic; firm-specific; financial performance; two-step estimator; System Generalised Method of Moments; regression

JEL classification: C3; G1; G22

1. Introduction

The insurance industry is an important financial institution that stimulates economic growth and development. The insurance industry not only helps people out from bad things happening to them by protecting them but also helps the economy grow by bringing in more money. Researchers care most about making a profit, therefore. To put it another way, a financially sound economy is more secure when supported by a financially sound financial institution. The non-life insurance industry is crucial to the economic growth of both advanced and developing nations (Trinh et al., 2016). The current changing climate has led to an increase in global risk. According to a Swiss survey, many claims filed by policyholders are due to damage sustained by their houses, companies, or other assets because of natural disasters. As a result, insurers have started necessitating non-life

insurance coverage to protect themselves against the insureds' hedged risks. There is a mad dash for non-life insurance as insurance firms struggle under the weight of the debt.

The profitability of the African non-life insurance industry has been a hallmark in recent years. Notwithstanding this, over 60% of non-life insurance executives say that falling rates, increased claims, and growing expenses have contributed to poor profitability for insurances. Thus, it is crucial to look at how profitable non-life insurance firms are. According to Asongu (2020), the expansion of the non-life insurance industry in Africa has been considerably affected by the increase in infrastructure spending during the previous decade. Interestingly, this trend is expected to continue because of the region's abundant natural resources, rapidly improving economic indicators, robust potential for insurance expansion, youthful and energetic population, and constantly developing insurance regulations. African non-life insurances increased their gross written premiums by 20% per year on average between 2011 and 2020 (Korir, 2020). This success is especially noteworthy considering that most national currencies are now experiencing substantial devaluation versus the dollar. South Africa's rand and Nigeria's naira, for example, have lost value by 55% and 64% during the previous decade (Avielele, 2020). Although non-life insurance premiums are expected to climb by 1% in 2020, the insurance market has slowed down again because of the COVID-19 problem.¹

Given the challenges posed to the insurance industry by factors such as globalization, market liberalization, and intense competition, it is of paramount importance to shed light on the key elements influencing the financial performance of non-life insurance, a key component to the ultimate effectiveness of the insurance industry. It is critical to understand what factors markedly determine the financial performance of African non-life insurance firms in order for them to maintain up with the growth forecast and continue to be a major support for the economic advancement of the continent, given the average solid growth discovered in African non-life insurance notwithstanding the myriad of detrimental circumstances affecting insurance sector in the continent. It has been proven by Öner Kaya (2015), among others, that a successful insurance industry will keep increasing even though the financial performance is just one of the many factors that determine a firm's growth and financial performance.

Primarily, Africa is deemed significant for this research because of the distinctive nature of the insurance environment and the enormous development potential in the insurance industry. There remains substantial potential for growth even though there are limitations to entry in insurance markets as a result of stricter local regulations. In addition, there are other strange operating conditions, such as volatile oil prices, rising inflation rates in most economies, increased competitive pressure, and local currency depreciation, among other internal problems. Despite the fact that the primary objective of financial management is to maximize the wealth of owners, financial performance continues to be an essential aim of fiscal management. Due to the fact that financial performance is one of the primary variables that determine a company's financial performance, effectiveness, and growth, it is crucial to do research on the factors that influence the financial performance of insurance firms in Africa.

Therefore, the planned expansion will not be in jeopardy if the key elements affecting financial performance are well understood and meticulously tracked. Non-life insurance that generates a profit boosts the company's public perception, which in turn increases the number of insurers willing to do business with it Return on investment (ROI). Financial performance is a real factor that may sway a person to ensure their business, property, or life with a company that in turn gets non-life insurance by a financial performing company. To ensure that the continent's gross written premium can catch up with the rapid expansion that is expected to endure, understanding the variables that determine the financial performance of non-life insurance companies is crucial.

Many elements that affect a company's financial performance have, without a doubt, been the subject of a great deal of study. As a matter of fact, the financial performance problem is a crucial

and ever-present phenomenon that has, and will continue to have, a widespread academic interest. In the insurance industry, the drivers of financial performance are variables influencing financial performance of insurance firms. The robustness of any firm takes the role of increasing the market value of that particular firm, coupled with the role of leading to the growth of the entire industry, which ultimately leads to the overall success of the economy. The fact that the stability and financial health of insurance sector contribute to economic growth has made the study of both macro-economic and firm-specific determinants of the financial performance of the African insurance industry imperative. Various studies are ongoing on the drivers of financial performance of insurance companies, including Burca and Batrinca (2014), Murigu (2014), Omasete (2014), Sandada et al. (2015), and Omasete (2014). None of these studies, however, focused on the African context. Taking it from a regional view will hopefully result into unanimous findings and put an end to the contentious findings in previous studies. This calls for urgent attention of researchers. If what determines their financial performance can be ascertained, efforts will be directed towards ensuring that those factors enhance their penetration rate, and their share of world market will inadvertently be increased.

This study expands upon the earlier empirical studies in a variety of different ways. To begin, the emphasis of this study is on non-life insurance firms in Africa, which places it in a more advanced position compared to other research that also examined non-life insurance companies. Due to their pervasive influence on the ongoing viability of insurance firms, insurance firms' financial well-being is of critical significance. Second, this research will simultaneously take into account three distinct dimensions of elements (both firm-specific and macroeconomic) that have the potential to influence the financial performance of a company. Since Sidhu and Verma's earlier study in India (from 2017) concentrated only on elements that were unique to specific companies, the model that was developed for this study is an improvement over their work. Camino-Mogro and Bermudez-Barrezueta (2019) have suggested that firm-specific factors and macroeconomic factors are both very significant variables that affect the financial performance of the insurance sector. Whilst also firm-specific factors are essential, Camino-Mogro and Bermudez-Barrezueta (2019) have also posited that macroeconomic factors are very valuable. As a consequence of the fact that this model is distinctively sufficient to have contained all three dimensions of components, it will provide a more accurate representation of the financial performance of non-life insurance firms in Africa.

These key issues motivated the researcher to make some kind of contribution to the variables that have an impact on the financial performance of insurance companies. While taking into account the importance of factors determining the financial performance of the insurance industry, this study sought to examine specific macroeconomic and firm-specific factors that have an impact on the financial performance of Africa. The study intends to provide a general insight into this issue at hand in developing countries in Africa, and given that no study has been conducted on the same subject in African continent, it will contribute to the topic as a new understanding related to determinants affecting the performance of insurance companies in the world. In addition to the findings of the study, it will be relevant to strengthen understanding of the particular insurance business in the continent. Therefore, this study aims to fill the above-mentioned gaps by providing information on determinants which affect financial performance in the African continent.

1.1. Literature review

1.1.1. Overview of insurance sector in Africa

Africa is gradually moving towards a prosperous future and increasing support for the insurance industry in the development and growth of the economy. African insurance market reached a value of US\$ 61.1 billion in 2019.² The African region consists of several underdeveloped and developing economies, with the insurance industry remaining largely staggering in terms of growth. However, the overall economic growth in the region witnessed over the past decades is steadily creating growth opportunities for the insurance market in the region (Alhassan, 2016). The

insurance industry throughout Africa continues to be among the most disrupted, but at the same time, industry continues to evolve and adapt to take full advantage of the many growth opportunities that are also emerging. In the years following the global financial crisis, the continent's political and economic uncertainties decelerated economic and insurance growth. Even through this, the insurance market in Africa remains the least penetrated in the world, and the opportunities for growth are enormous (Calderon et al., 2020). African insurance industry is facing more disruption than any other industries, posing challenges for some and setting new business opportunities for others (Ehiogu & Eze, 2018). The speed of progress in the insurance industry has been faster than originally anticipated and will stimulate further. As a result, the insurance sector plays a key role in managing assets for different companies and contributing substantial inflows to economic and financial growth (Calderon et al., 2020). The insurance sector is seen as entrenched on the off chance that it has the capacity to reconcile the economic emergency related to such money, thereby strengthening the economic system of each nation.

2. Hypothesis development: macroeconomic determinants affecting financial performance of insurers

Interest rates: The term interest rate was defined by Ismail et al. (2018) as the price which the borrower will pay for using borrowed funds from the lender or the fee paid on the loaned assets. The financial performance metrics used by insurance companies was the return on assets (ROAs) which decreased against macro-economic variables of real exchange rate (USD/Ksh), change in money supply (M3), GDP growth rate, average annual lending interest rates as calculated by CBK, and inflation measured by annual percentage shifts in consumer price index (CPI) (Otambo, 2016). According to Murungi (2014), the lower interest rates will improve the overall liquidity in the general sector and therefore lead to "increased investment and consumption". The study used ROAs as a measure of the financial performance of the insurance company, which is not a direct measure of the return on shareholders and ignores the financial structure of the company as well as the costs associated with other funding sources other than equity. In addition, the study combines non-life and life insurers who are very different firms from the structural to financial perspective, and it can therefore lead to inaccurate results. Moreover, the study only considered macro-economic factors and disregarded the influence of the firm's specific factors.

Hypothesis 1 (H01): *Interest rate does not determine financial performance of insurers in Africa.*

Inflation rate: Inflation refers to a prolonged increase in the overall price level of the economy over time. Medium and low inflation rates in a country can have a positive impact on the business sector by acting as an incentive for production and investment (Durguti, 2020). Inflation surely plays an important role in insurance and has a negative effect on various aspects of insurance operations, such as claims, technical provisions, and expenses. In anticipation of inflation, the payment of claims increases as well as the reserves required in expectation of higher claims, thereby lessening the technical result and financial performance (Suheyli, 2015). The CPI measures the change in the price level of the consumer goods and services basket purchased by households (Simiyu & Ngile, 2015).

Hypothesis 2 (H02): *Inflation rate does not determine financial performance of insurers in Africa.*

Gross domestic product (GDP) growth rate: GDP is the total market value of goods and services produced by a country's economy during a specified period of time (Konchitchki & Patatoukas, 2014). It includes all final goods and services, that is, those that are produced by the economic agents located in that country regardless of their ownership and that are not resold in any form. According to Brynjolfsson and Collis (2019), GDP is a most commonly used macroeconomic indicator to measure the total economic activity within an economy; its growth rate reflects the

state of the economic cycle. It is used throughout the world as the main measure of output and economic activity. In economics, the final users of goods and services are divided into three main groups: households, businesses, and the government. Sinha and Sharma (2016) also documented a positive relationship between financial performance and GDP in India, while Trujillo-ponce (2013) on a sample of banks in Spain reported a positive impact of GDP growth on ROA.

Hypothesis 3 (H₀₃): *GDP does not determine financial performance of insurers in Africa.*

Exchange rate: According to Business Dictionary, exchange rate is the price for which the currency of a country can be exchanged for another country's currency. Egbunike, C. F., & Okerekeoti, C. U., (2018) described exchange rate as the value of two currencies relative to each other. It is the price of one currency expressed in terms of another currency. It is the price at which the currency of one country can be converted into the currency of another. Exchange rates are either fixed or floating. Fixed exchange rates are decided by central banks of a country, whereas floating exchange rates are decided by the mechanism of market demand and supply (The Economic Times, 2017). The factors that influence exchange rate include interest rates, inflation rate, general state of economy, trade balance, political stability, internal harmony, and quality of governance. Akkaş (2016) showed that understanding the impact of foreign exchange risk is a critical element for purposes of firm valuation and risk management. The study by Barnor (2014) found a significant positive effect of exchange rate on stock market returns of the listed firms in Africa.

Hypothesis 4 (H₀₄): *Exchange rate does not determine financial performance of insurers in Africa.*

Money supply (M3): Money supply is the sum of foreign currency and deposit liabilities of commercial banks (CBKs, 2012). The CBK was targeting the monetary aggregate (broad money M3) in its policy decisions, meaning that CBK responded in periods of high inflation or optimistic production by the money supply. Rozeff (1974) evaluated the effectiveness of the US stock market in terms of money supply and demonstrated that there is really no causal relationship between money supply and stock return. Ndegwa (2016) argues that money supply would have a substantial impact on the return on the stock market if only a change in money growth can change the aspirations of the stock market participants about future monetary policy. If there is information on the increase in money growth, this will lead to a tightening up of the monetary authorities' policy in the future. Among the most valuable tools for absorbing excess money in the economy is the interest rate, and as a result of an increase in interest rates, the discount rate will rise and lead to a decline in stock prices. The economic activity will also decline and will have a further negative impact on stock prices. Money supply (M3) was found to be significantly related to the financial performance of companies in the aviation sector (Ndegwa, 2016).

Hypothesis 5 (H₀₅): *Money supply does not determine financial performance of insurers in Africa.*

3. Hypothesis development: firm-specific determinants of financial performance of insurers

Equity capital: Once these liabilities have been paid, equity capital, or capital obtained from business owners, is the residual claimant or interest of the most junior class of investors in assets; if liabilities exceed assets, negative equity occurs. In finance, shareholders' equity is known as stockholders' equity, shareholders' funds, or shareholders' capital and is the surviving interest in an asset of the company distributed by many owners or shareholders of common or preferred stock; a pessimistic shareholders' equity is commonly referred to as a beneficial shareholders' shortfall. More money will allow the company to widen and create more outlets, which might contribute to stronger and, perhaps, economy of scale, and therefore greater financial efficiency. Ng and Rezaee

(2015) and Too and Simiyu (2019) observed that equity capital does not determine the financial performance of insurance company. On the other hand, insurance financial performance was linked to equity capital in a positive way (Mwangi and Murigu, 2015).

Hypothesis 6 (H₀₆): *Equity capital does not determine financial performance of insurers in Africa.*

Age of insurers: The age of insurers is another specific determinant. Obviously, older firms are more experienced, have benefited from learning, are not prone to newness liabilities, and can therefore appreciate superior performance (Lingesiya, 2020). Older firms may benefit from reputation effects that allow them to gain a higher margin of sales. On the other hand, older firms are prone to inefficiency and bureaucracy ossification that goes together with age; they may have developed routines that are out of touch with changes in market conditions, in which case an inverse relationship between age and financial performance or growth could be observed (Kaur, 2019).

Hypothesis 7 (H₀₇): *Insurers' age does not determine financial performance of insurers in Africa.*

Size of the insurers: The insurers' size is also another important factor in determining the financial performance of the insurance company. The size of the firm tends to affect its financial performance in a number of ways. Large firms can exploit economies of scope and scale, making them more efficient compared to small firms. The size is defined by the net premium, which is the premium earned by the insurance company after deduction of the reinsurance granted. The premium base of the insurers determines the amount of policy liabilities to be borne by them (Teece, 2016). Net premium is conveyed as the total premium earned less the non-life insurance granted. According to Malik (2011), and Almajali et al. (2012), the size is statistically important and positively related to ROA. The findings obtained by Almajali et al. (2012) indicate that insurance companies will raise their asset volume due to the positive relationship between size and financial performance in order to achieve the best financial performance.

Hypothesis 8 (H₀₈): *Insurers' size does not determine financial performance of insurers in Africa.*

Underwriting of risk: The other factor that determines financial performance is the underwriting of risk that reflects the adequacy or otherwise of the underwriting performance of insurers (AlAli et al., 2019). Sound underwriting guidelines are central to the financial performance of the insurer. The risk of underwriting depends on the risk appetite of the insurers. The ratio of benefits paid to net premium is a measure of systematic risk of underwriting.

Hypothesis 9 (H₀₉): *Underwriting risk does not determine financial performance of insurers in Africa.*

Operational efficiency: The performance mediates the association between the strategic effectiveness and the operational effectiveness of a specific firm. The main objective of the company is to strengthen production processes, product, services, and market management (Erdemir, 2019). The financial success of any firm is linked to the financial performance of the firm. The firm's financial performance can be measured in a number of different ways, such as the gross margin rate, ROAs, and return on equity. The operational efficiency aspect of any type of business is essential, and management needs to be considered in order to achieve sound and sustainable financial performance. Operational efficiency is the ability of a corporation to reduce unwelcome and maximize resource capabilities in order to deliver quality goods and services to customers

(Ndolo, 2015). According to Trinh, Nguyen and Sgro (2016), the financial performance of the insurance industry is essential for various stakeholders, including agents and policymakers.

Hypothesis 10 (H₀10): *Operational efficiency does not determine financial performance of insurers in Africa.*

Claims ratio: This ratio measures the amount of compensation incurred plus commission paid by the company in comparison to the amount of its premiums earned and commission received from non-life insurance (Abdeljawad et al., 2020). One of the key determinants of underwriting financial performance is claims ratio, and this study thus assessed the claims ratio as a firm-specific factor affecting the performance of an insurance company. Shiu (2020) and Bishaw et al. (2019) found out that claims ratio was a significant determinant of insurers' financial performance.

Hypothesis 11 (H₀11): *Claims ratio does not determine financial performance of insurers in Africa.*

Leverage: Leverage refers to the proportion of debt to equity in the capital structure of a firm (Padmavathi, 2016). It strives to measure what portion of the total assets is financed by debt funds. Leverage ratios are used to measure business and financial risks of a firm (Padmavathi, 2016). Studies have shown a positive significant relationship between leverage and firm size (Anton, 2016; Ibhagui & Olokoyo, 2018; Ifeanyi et al., 2020; Zuhroh, 2019). Leverage is the amount of debt used to finance other capital expenditure that can improve firm financial performance (Maina & Ishmail, 2014). Debt leverage is measured by the ratio of total debt to equity (debt/equity ratio). This ratio reflects the degree to which a business uses borrowed money. It represents the ability of insurance companies to maintain their economic exposure to unforeseen events. This ratio shows the potential impact on capital and the surplus of reserve deficiencies due to the financial claims (Adams & Buckle, 2003).

Hypothesis 12 (H₀12): *Leverage does not determine financial performance of insurers in Africa.*

Liquidity: The level of liquidity is another determinant of financial performance. Insurance liquidity refers to the ability of the insurer to fulfil its immediate obligations to policyholders without having to increase profits from underwriting and investment activities and/or liquidate financial assets (Kariuki & Nguyo, 2020). Cash and bank balances shall be maintained adequate to meet the instant obligations in respect of claims due for payment but not paid. A different result was achieved by Malik (2011) as the liquidity was negatively related to financial performance. On the other hand, the findings of the study done by Boadi et al. (2013) suggest that while the relationship is positive, it is negligible because a shift in the liquidity would have a weak impact on financial performance since all is equal.

Hypothesis 13 (H₀13): *Liquidity does not determine financial performance of insurers in Africa.*

Investment capability: Investment plays a very crucial part in the financial performance of the company. Organizations are investing their resources in order to make a return that will encourage them to improve their financial performance. This position has been confirmed by Njeru (2018) who maintains that there is a positive relationship between investment and the level of financial performance achieved by the company. He argues that the effect of the investment on the financial performance of a firm may not be long-lasting but temporary, which may last for a short period of time. Njeri (2016) also exposes that both interest and interest-free investments complement each other in strengthening the financial performance of the

organization. However, Rajapathirana and Hui (2018) point out that investment should also be seen from a research and development perspective as what a firm spends on research and development have the potential to improve the investment as well as the financial performance of the firm. They argue that research and development expenditure increases the company's future earnings.

Hypothesis 14 (H₀14): *Investment capability does not determine financial performance of insurers in Africa.*

4. Theoretical framework: resource-based theory

This theory argues that organizations with strategic capabilities and resources are able to create a competitive advantage which leads to positive performance over organizations that do not (Egbunike & Okerekeoti, 2018). Egbunike and Okerekeoti (2018) confirm that these resources are used by organizations to maximize their strengths and to minimize weaknesses in order to build a competitive advantage. Halawi et al. (2005) argue that the theory assumes that businesses create value-added additional capabilities and that it has been developed to show how businesses obtain a sustainable competitive advantage. Murigu (2014) affirms that the theory explains why several firms have distinct levels of financial performance. He also points out that those firms that have stronger resource management spend less money and give high-quality products and services and thus sustainable economic growth. Businesses that possess strategic skills and resources have the potential to generate a competitive advantage, which, in turn, results in increased financial performance when compared to businesses that do not possess such capabilities and resources. The hypothesis of the theory is that successful companies have competitiveness edge over other types of businesses. The selection process for each variable included in this study was guided by pertinent theories, an empirical evidence evaluation, and the availability of data. The following paragraphs describe, in order, the theoretical justifications for each of the variables that were used in this investigation.

4.1. Empirical model, data, and methodology

This study used the secondary data from 2008 to 2019. The year 2008 was chosen because Africa's insurance sector has been besieged since the 2008 global financial crisis.³ The firm-specific data required were drawn from S&P CapitalIQ, Refinitiv Eikon, and annual reports of the respective companies, while the macro-economic data were drawn from World Bank database and International Financial Statistics. Thus, a content analysis on the company's annual reports was a major source of the data for the study. This is a regional study and unbalanced panel study of 1,452 observations of 121 insurers from 48 African countries for 12 years. Panel study was justified and preferred based on its ability to cater for behavioural differences across time period, cross-section, or both, manage heterogeneity problems, and allow for more estimation of parameters (Greene, 2003; Hsiao, 2014; Kutu & Ngalawa, 2016). The companies used are selected purposively due to data availability for the period of study.

Specifically, both static and dynamic panel analyses were used in estimating the model for this study. The ordinary least square (OLS) method and the two-step system generalized method of moments (GMM) initiated by Blundell and Bond (1998) were used as estimating techniques. Two-step SYS-GMM was used based on its ability to cater for cross-sectional dependency problems and endogeneity issues and the fact that it is suitable for a data set with larger cross section (N) and smaller time period (T) (Wintoki et al.,). Two estimators, one-step and two-step estimators, were proposed by Arellano and Bond (1991). The two-step SYS-GMM integrates a covariance matrix for the disturbance term determined by using the remains of the one-step estimator. Also, two-step estimator is affirmed to be optimal and more efficient; thus, two-step SYS-GMM was employed to estimate the coefficients of the determinants of financial performance of listed non-life insurance

companies in Africa. With the use of fewer samples in two-step SYS-GMM, the asymptotic standard errors are biased in a plunging manner (Bond et al., 2001).

Furthermore, the serially correlated errors are catered for using the Arellano and Bond 1 and 2 tests for autocorrelation in the idiosyncratic disturbance term as incorporated in the two-step GMM estimator. Also, the reliability of the estimation in this study is justified using Hansen or Sargan test, which is the test used for the instrument validity check.

Model specification: The relationship between the internal and external factors that affect financial performance of African insurance companies was depicted using the below expression:

The linear relationship between dependent and independent variables is shown as follows:

$$Y_{it} = \alpha + \beta' X'_{it} + \mu_{it}. \quad (1)$$

Based on the fact that there are two categories of determinants (firm-specific and macro-economic), the model will lead to:

$$Y_{it} = \alpha_0 + \beta_i X_{Ait} + \beta_j X_{Bit} + \mu_{it}. \quad (2)$$

where X_{Ait} denotes macroeconomic variables and X_{Bit} denotes the firm-specific variables.

Explicitly,

$$Y_{it} = \alpha_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{5t} + \beta_6 X_{6it} + \beta_7 X_{7it} + \beta_8 X_{8it} + \beta_9 X_{9it} + \beta_{10} X_{10it} + \beta_{11} X_{11it} + \beta_{12} X_{12it} + \beta_{13} X_{13it} + \beta_{14} X_{14it} + \mu_{it}. \quad (3)$$

where X_{Ait} is represented as $X_1 - X_5$ and X_{Bit} is represented as $X_6 - X_{14}$.

The dynamic panel model of the determinants of financial performance of African non-life insurance sector is stated below:

$$Y_{it} = \alpha_i + \delta Y_{it-1} + \beta' X'_{it} + \gamma_t + \vartheta_i + \mu_{it}. \quad (4)$$

where Y_{it} is the dependent variable; γ_t is the time-specific effect which can be related to the global shocks, ϑ_i is the company-specific effect, and $\mu_{it} = \gamma_t + \vartheta_i$ is the error term.

$$ROA_{it} = \beta_1 ROA_{1it-1} + \beta_2 GDP_{2t} + \beta_3 INT_{3t} + \beta_4 EXR_{4t} + \beta_5 INF_{5t} + \beta_6 MOS_{6t} + \beta_7 CLR_{7it} + \beta_8 LEV_{8it} + \beta_9 LIQ_{9it} + \beta_{10} lnEQC_{10it} + \beta_{11} INV_{11it} + \beta_{12} lnAGE_{12it} + \beta_{13} lnSIZ_{13it} + \beta_{14} UNR_{14it} + \beta_{15} OPE_{15it} + \mu_{it} \quad (5)$$

X_{1it-1} denotes the lagged performance measure, which signifies the dynamic dimension of the model. The study used the ROAs as the dependent variable (Y) to measure financial performance. $X_2 - X_6$ are the macroeconomic independent variables, and $X_7 - X_{15}$ are the firm-specific independent variables. $\beta_1 - \beta_{15}$ are the coefficients, and μ_{it} is the composite error term; it denotes it is a panel study. The independent variables were chosen based on the previous studies such as Sambasivam and Ayele (2013), Zainudin et al. (2018), and Zainuddin et al. (2017). α_0 is the intercept.

The variables used in this study are explicitly defined as shown in Table 1:

Thus, the model to be estimated in this study is stated as follows:

$$ROA_{it} = \beta_1 ROA_{1it-1} + \beta_2 GDP_{2t} + \beta_3 INT_{3t} + \beta_4 EXR_{4t} + \beta_5 INF_{5t} + \beta_6 MOS_{6t} + \beta_7 CLR_{7it} + \beta_8 LEV_{8it} + \beta_9 LIQ_{9it} + \beta_{10} lnEQC_{10it} + \beta_{11} INV_{11it} + \beta_{12} lnAGE_{12it} + \beta_{13} lnSIZ_{13it} + \beta_{14} UNR_{14it} + \beta_{15} OPE_{15it} + \mu_{it} \quad (6)$$

4.2. Empirical result and discussion

4.2.1. Descriptive statistics

Table 2 contains a presentation of the descriptive statistics for the variables that were utilized in this study.

Table 2 shows the descriptive result of the determinants of financial performance in African non-life insurance companies. Financial performance was measured by ROAs, and the determinants examined are both macroeconomic and firm specific. The number of observations reveals that the panel is unbalanced as none of the variables have up to 1,452 as expected. The result reveals average values of 0.0228178, 2.682895, 1.333708, 3.305809, 0.7012148, 1.552689, 0.7405357, 4.650519, 0.21063, 0.5575952, 18.25703, 284.7941, 29.70056, 33.98836, and 3.603197 for ROAs, equity capital, insurer's age, insurer's size, underwriting risk, operational efficiency, claims ratio, leverage ratio, liquidity ratio, investment capabilities, interest rate, inflation rates, GDP, exchange rate, and money supply. The values of standard deviation are 0.0524069, 0.9551059, 0.247498, 1.115611, 0.4164824, 2.769584, 1.347034, 4.859315, 0.1957694, 0.1977935, 12.09157, 285.0299, 58.77085, 65.77404, and 1.27789 for variables ROAs, equity capital, insurer's age, insurer's size, underwriting risk, operational efficiency, claim ratio, leverage ratio, liquidity ratio, investment capabilities, interest rate, inflation rates, GDP, exchange rate, and money supply. This shows the rate of deviations of the variables from the expected ratios. The minimum and maximum values are -0.317531 and 0.4461032; 0.3881811 and 4.56672; 0.30103 and 1.892095; 0.8725677 and 5.62538; 0 and 4.333817; 0.0395623 and 27.31277; -0.1248122 and 18.1057; 0.0887884 and 29.72468; 0 and 0.9460995; 0.0004911 and 1.823402; 4 and 65.4175; 0.92353 and 926.7605; 0.19 and 5.68.5; 0.4456431 and 58.6; and 1.114778 and 7.994872 for ROAs, equity capital, insurer's age, insurer's size, underwriting risk, operational efficiency, claims ratio, leverage ratio, liquidity ratio, investment capabilities, interest rate, inflation rates, GDP, exchange rate and money supply, respectively.

Table 1. Variable definition and measurement

Definition	Notation	Formula	A priori
Return on assets	Y	Profit after tax/total asset	
Lagged return on assets	X1/ROA _{t-1}		+
GDP growth rate	X2/GDP		+
Interest rate	X3/INT		-
Exchange rate	X3/EXR	Countries rate to USD	+
Inflation rate	X4/INF	CPI	-
Money supply	X6/MOS	M3	+
Claims ratio	X7/CLR	Claims paid/gross written premium	+
Leverage ratio	X8/LEV	Total debt/total equity	-
Liquidity ratio	X9/LIQ	Current asset/current liability	+
Equity capital	lnX10/EQC	Log of equity capital	+
Investment capability	X11/INV	Investment income/total assets	+
Age of the companies	lnX12/AGE	Log of the number of years since establishment	+
Size of the insurers	lnX13/SIZ	Log of net premium	+
Underwriting risk	X14/UNR	Benefit paid/net premium	+
Operational efficiency	X15/OPE	The ratio of expenditure to gross written premiums	+

Table 2. Descriptive statistics

Variable	Observation	Mean	Std. deviation	Minimum	Maximum
ROA	1,437	0.0228178	0.0524069	-0.317531	0.4461032
EQC	1,438	2.682895	0.9551059	0.3881811	4.56672
AGE	1,439	1.333708	0.247498	0.30103	1.892095
SIZ	1,437	3.305809	1.115611	0.8725677	5.62538
RIS	1,387	0.7012148	0.4164824	0	4.333817
OPE	1,283	1.552689	2.769584	0.0395623	27.31277
CLR	1,276	0.7405357	1.347034	-0.1248122	18.1057
LEV	1,438	4.650519	4.859315	0.0887884	29.72468
LIQ	1,433	0.21063	0.1957694	0	0.9460995
INV	1,437	0.5575952	0.1977935	0.0004911	1.823402
INT	1,121	18.25703	12.09157	4	65.4175
INF	1,404	284.7941	285.0299	0.92353	926.7605
GDP	1,368	29.70056	58.77085	0.19	568.5
EXR	815	33.98836	65.77404	0.4456431	58.6
MOS	1,322	3.603197	1.27789	1.114778	7.994872

5. Correlational analysis

The correlation coefficients presented in Table 3 and 4 show the degree of relationship that exists between the determinants (macroeconomic and firm-specific) and financial performance of non-life insurance companies in Africa. From the result, it was revealed that insurer's age, insurer's size, underwriting risk, operational efficiency, claim ratio, leverage ratio, interest rate, and inflation rates are inversely correlated with ROAs to the tune of -0.108, -0.025, -0.177, -0.107, -0.098, -0.255, -0.004, and -0.087 having insurers' size insignificant. On the other hand, equity capital, liquidity ratio, investment capabilities, GDP, exchange rate, and money supply are positively correlated with ROAs to the tune of 0.075, 0.215, 0.168, 0.083, 0.027, and 0.016 having exchange rate and money supply insignificant. It was further discovered that insurer's age, insurer's size, underwriting risk, leverage ratio, liquidity ratio, investment capabilities, interest rate, inflation rates, and GDP are significantly correlated with equity capital, while operational efficiency and claim ratio are positively and insignificantly related to equity capital, but exchange rate and money supply are inversely and insignificantly related to equity capital. Furthermore, it was discovered that operational efficiency, liquidity ratio, and GDP are inversely and significantly related to insurers' age to the tune of -0.055, -0.152, and -0.057, while insurer's size, underwriting risk, leverage ratio, and exchange rate are positively and significantly related to insurers' age to the tune of 0.157, 0.087, 0.105, and -0.057. From the perspective of insurers' size, only investment capability has insignificant but positive relationship to the tune of 0.135. Also, inflation rate, exchange rate, and money supply have insignificant relationship with underwriting risk to the tune of 0.061, -0.027, and -0.020. Similarly, exchange rate and money supply have insignificant relationship with operational efficiency, claims ratio, liquidity ratio, investment capabilities, interest rate, inflation rate, and GDP to the tune of -0.048 and 0.015; -0.027 and -0.057; 0.148 and 0.006; 0.056 and 0.043; -0.129 and 0.3471; 0.129 and 0.250; and 0.005 and 0.113, respectively. In all, none of the correlation coefficient is near the 0.8 threshold, which indicates that there is no signal of multicollinearity among the variables examined in this study.

6. Regression analysis: OLS and two-step SYS-GMM

The discussion of this paper will be based on the two-step SYS-GMM based on the fact that SYS-GMM estimator has several advantages as follows: first, it controls for time-invariant company-specific effects; second, it deals with the endogeneity problem of lagged dependent variable; third, it permits a certain degree of endogeneity in the other regressors; and fourth, it optimally

Table 3. Correlation analysis

	ROA	EQC	AGE	SIZ	RIS	OPE	CLR	LEV	LIQ	INV	INT	INF	GDP	EXR	MO3
ROA	1.000														
EQC	0.075***	1.000													
AGE	-0.108***	0.123***	1.000												
SIZ	-0.025	0.964***	0.157***	1.000											
RIS	-0.177***	0.321***	0.087***	0.431***	1.000										
OPE	-0.107***	0.009	-0.055**	0.061**	0.166***	1.000									
CLR	-0.098***	0.031	-0.030	0.098***	0.107***	0.410***	1.000								
LEV	-0.255***	0.327***	0.105***	0.549***	0.542***	0.187***	0.252***	1.000							
LIQ	0.215***	-0.236***	-0.152***	-0.312***	-0.303***	-0.109***	-0.156***	-0.379***	1.000						
INV	0.168***	0.133***	0.039	0.135	0.235***	-0.039***	-0.068*	0.079***	-0.021***	1.000					
INT	-0.004***	0.006***	0.143	0.021***	0.144***	0.121***	-0.037***	0.065***	-0.155***	0.094***	1.000				
INF	-0.087***	-0.059**	0.169	-0.043***	0.061	0.053***	-0.018*	0.004***	-0.147***	0.035***	0.5622	1.000			
GDP	0.083***	-0.124***	-0.057**	-0.141***	-0.030***	-0.049***	-0.036***	-0.087***	0.029***	0.052***	0.0731	-0.023***	1.000		
EXR	0.027	-0.040	0.085*	-0.040***	-0.027	-0.048	-0.027	-0.046	0.148	0.056	-0.1029	0.129	0.005	1.000	
MOS	0.016	-0.050	0.001	-0.075***	-0.020	0.015	-0.057	-0.126***	0.006	0.043	0.3471	0.250	0.113	-0.155	1.000

***, **, and * mean significance level at 1, 5, and 10 percent significant levels.

combines information on cross-company variation in levels with that of within-company variation in changes (Fukase, 2010). From the two-step SYS-GMM, it was found that Lagged ROAs positively and significantly affect the ROAs, which confirms the dynamic nature of the model. This implies a direct and significant influence of the past year financial performance on the present year financial performance of the non-life insurance companies at 1% having an Z-statistic value of $3.13 > 2.58$. This conforms to the findings by Murigu (2014) and Otambo (2016).

Equity capital inversely and significantly affects non-life insurers' financial performance in Africa. This is an indicator that the capital structure of these companies is not balanced as the finding reveals the negative impact of using equity funding in financing their activities. This negative impact of equity capital on financial performance in Africa negates the findings by Ismail, Ishak, Manaf and Husin (2018) in Malaysia. Equity capital was significant at 5% such that the Z-statistics was $2.59 > 1.96$. On the other hand, operational efficiency was found to have a direct and significant effect on financial performance of African non-life insurers. The implication of this finding is that the higher the financial performance of the insurers, the higher their operational efficiency. Operational efficiency which is a measure of input to output was captured by the ratio of total expenditure to gross written premium. This finding revealed that the gross written premium of African non-life insurers covers their expenditure, which indicates a sustainable and consistent financial performance. This finding conforms to the study by Burca and Batrinca (2014) in Romania.

Leverage ratio has a negative and significant effect on financial performance of non-life insurance companies in Africa as $2.63 > 1.96$. This implies that the more the African non-life insurers use higher debt to run their operations, the lesser their financial performance. This finding negates the findings from the study by Adams and Buckle (2003) who found a positive effect of leverage ratio on Bermuda insurance market financial performance; Diara (2015) who found an insignificant effect of leverage on UK insurance companies; on a study conducted on Indonesia insurance company. Moreover, investment capability has a direct and significant effect on financial performance at 1% level of significance as $3.78 > 1.96$. This finding conforms to Njeru (2018) and Rajapathirana and Hui (2018). The more the capacity of investors to invest in a firm, the better the financial performance of such firm. The positive effect of investment capability on financial performance in African non-life insurance indicates the huge maximisation of investment opportunities by populace, and on the other hand, it indicates the wide creation of room to invest by the insurers, which greatly and significantly improves their financial performance. Also, GDP growth rate also positively and significantly affects the financial performance of the examined insurers at 10%. GDP which is used globally as the main measure of output and economic activity exhibits a significant effect on financial performance of general insurers in Africa. This finding is in tandem with Sinha and Sharma (2016), a study conducted in India, and Trujillo-ponce (2013), a study conducted in Spain.

However, size has a positive but insignificant effect on financial performance. The insignificance of size negates the findings by Malik (2011), Almajali et al. (2012). The size of the firm affects its financial performance directly because large firms can exploit economies of scale, which makes them more efficient and stable (Ahmed, 2010). Liquidity has a positive but insignificant effect on financial performance. This simply means the more liquid the insurers are, the better their financial performance even though it is insignificant in the African non-life insurers' context. This finding negates Malik (2011) in a study conducted in Pakistan. This implication of a positive effect of liquidity on financial performance of the examined insurers is that cash is well maintained to meet and settle the instant request for claims due for payment in African non-life insurance companies.

Interest rate and exchange rate have a positive but insignificant effect on financial performance. This indicates that these macroeconomic determinants contribute to better financial performance in African non-life insurers, but they are insignificant. However, exchange rate aligns with the *a priori* expectation, while interest rate is against the *a priori* expectation. A higher interest rate is

Table 4. Regression analysis

Variables	Two-step SYS-GMM		Pooled OLS		Decision on null hypotheses based on two-step SYS-GMM
	COEFF	STD ERR	COEFF	STD ERR	
ROAL1	0.4172599	0.1332178 (3.13)***			Reject
EQC	-0.0011165	0.0004315 (-2.59)**	0.1292063	0.019448 (6.64)***	Reject
AGE	-0.0022268	0.0089087 (-0.25)	0.0112565	0.0112432 (1.00)	Accept
SIZ	.0013519	0.0022193 (0.61)	-0.1134096	0.0198512 (-5.71)***	Accept
RIS	-0.0042083	0.0079135 (-0.53)	-0.0123929	0.0042052 (-2.95)***	Accept
OPE	0.0011165	0.0004315 (2.59)**	-0.0012706	0.0009645 (-1.32)	Reject
CLR	-0.0000697	0.0011699 (-0.06)	-0.0002599	0.001497 (-0.17)	Accept
LEV	-0.0011136	0.0004234 (-2.63)***	0.0021126	0.0010699 (1.97)**	Reject
LIQ	0.0056286	0.0126708 (0.44)	-0.0339242	0.0147673 (-2.30)**	Accept
INV	0.0218062	0.0057727 (3.78)***	0.0254305	0.0096345 (2.64)***	Reject
INT	0.0000529	0.0001556 (0.34)	-0.0001171	0.0002311 (-0.51)	Accept
INF	-2.60e-06	6.43e-06 (-0.40)	-1.67e-06	0.0000145 (-0.12)	Accept
GDP	0.0000429	0.0000224 (1.92)*	0.0000614	0.0000419 (1.47)	Reject
EXR	9.85e-06	0.0000116 (0.85)	0.000013	0.0000459 (0.28)	Accept
MOS	-0.0001031	0.0010702 (-0.10)	0.0002718	0.0023512 (0.12)	Accept
Constant	0.0000769	0.0000302 (2.55)***	0.022397	0.0121414 (1.84)*	

(Continued)

Table 4. (Continued)

Variables	Two-step SYS-GMM		Pooled OLS		Decision on null hypotheses based on two-step SYS-GMM
	COEFF	STD ERR	COEFF	STD ERR	
No. of observations		1169		1141	
No. of groups		121			
No. of instruments		93			
Wald $\chi^2(14)$		712.20 (0.000)***			
Hansen test		Prob > $\chi^2 = 0.847$			
Sargan test		Prob > $\chi^2 = 0.000$ ***			
AR 1		Pr > z = 0.000***			
AR 2		Pr > z = 0.535			
Prob > F					$F(14,1141) = 13.25$; $\text{corr}(u_i, Xb) = -0.4174$ 0.0000***
Adj. R^2					76%

***, **, and * mean significance level at 1%, 5%, and 10% significant levels.

expected to reduce the financial performance because higher interest rate is expected to reduce the sector's liquidity that will limit investment and financial performance (Murungi, 2013).

On the other hand, age has a negative and insignificant effect on financial performance. This is against the *a priori* expectation because an older insurer should benefit from reputation performance history. This finding nonetheless indicates the existence of unchanged routines, which are in slow pace with the changes in economic conditions and inefficiency. The finding aligns with Kaur (2019) in a study conducted in India. In the same manner, underwriting risk has a negative and insignificant effect on financial performance. This negates *a priori* expectation. This shows that the underwriting capacity of the African non-life insurers is very inadequate. It indicates that the net premium cannot cover the benefits claimed by the insured. Claims ratio also has a negative and insignificant effect on financial performance. This finding is against the findings by Bishaw et al. (2019) in a study conducted in Ethiopia and also negates the *a priori* expectation. This further reveal that the claims paid to the insured is very low compared to the total written premium derived. Also, the macroeconomic factors, inflation rate, and money supply have a negative and insignificant effect on financial performance. While the negative effect of inflation rate aligns with the *a priori* expectation, money supply disagrees with the *a priori* expectation. Payment of claims surges up during increased inflation, which is expected to lead to reduced financial performance. Equally, money supply which is the total sum of foreign currency and deposit liabilities is expected to improve insurers' financial performance. Money supply's insignificant effect on financial performance negates the findings by Ndegwa (2016).

Accordingly, the 1,169 number of observations reveals that the panel is unbalanced, and the fact that the number of instrument (93) is less than the number of group (121) reveals that the findings of the two-step SYS-GMM is reliable. Similarly, the probability value of 0.847 revealed by Hansen J statistic test shows the reliability of instruments specified and implies that there is no over-identification of instrument in the SYS-GMM. According to Roodman (2009), Heid et al. (2012), and Oseni (2016), only Hansen J test is relevant to determine the reliability of instrument specified in SYS-GMM; hence, Sargan J test is not required. Also, the probability values of the Arrelano-Bond first and second order of serial correlation are 0.000 and 0.535. This reveals that there is no serial correlation in the model specified.

6.1. Conclusion and policy implications

This study examines the macroeconomic and firm-specific determinants of financial performance in African non-life insurance companies. Specifically, 121 listed non-life insurance companies from 48 African countries for the period 2008–2019 were used. The findings from the two-step System Generalised Method of Moments revealed that lagged ROAs, equity capital, operational efficiency, leverage ratio, investment capability, and GDP are the significant determinants of financial performance of African non-life insurance companies, while age, size, underwriting risk, claim ratio, liquidity, interest rate, inflation rate, exchange rate, and money supply (M3) are insignificant. Hence, based on these findings, insurance industries, policymakers, government, and investors should take into consideration these significant factors in taking decision and improving their performance. It is recommended that the capital structures of the sector should be restructured to maintain a favourable balance in the equity and debt of the companies. In order for non-life insurance companies in Africa to boost their performance in terms of ROAs, they should work to increase their leverage. Also, mechanisms such as automated systems that can reduce operational cost should be adopted such that financial performance can be enhanced.

This study is limited by the inability to have a balanced panel as some data are missing, but this has not affected the potency of the findings in anyway. Also, further research should examine this same topic using the life insurance sector as a case study. This will enable the comparison of findings on both life and non-life insurance sectors in the future.

Author details

Thabiso Sthembiso Msomi¹

E-mail: mndayithabiso@gmail.com

ORCID ID: <http://orcid.org/0000-0003-3941-6815>

¹ Department of Management Accounting, Faculty of Accounting and Informatics, Durban University of Technology, South Africa.

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Notes

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