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ORIGINAL ARTICLE

Enterprise risk management and performance of the South African insurers: the moderating role of corporate governance

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Abstract

This study contributes to the literature by examining the effect of enterprise risk management (ERM) on insurers' performance (underwriting performance and Return on Assets) and investigating how corporate governance characteristics such as board size, board independence and gender diversity moderate the ERM-performance relationship. The study employs the generalised method of moments on a sample of 63 insurers in South Africa, covering 2015–2019. The study's findings agree with the literature that a positive relationship exists between ERM and insurers' performance. This was consistent with both performance indicators. Again, we find that board size, board independence, and gender diversity interact with ERM in affecting insurers' performance, and the relationship was significantly positive. This implies that corporate governance plays a significant role in promoting ERM effectiveness in affecting performance. Therefore, insurers interested in ensuring a robust ERM system should leverage these governance factors to appreciate the overall impact of ERM on performance.

Keywords Enterprise risk management · Corporate governance · Insurers performance

JEL Classification C2 · G3 · G22 · G32

Introduction

Over the past two decades, there has been an increase in the demand for improved risk management and corporate governance (CG) systems in business organisations. Due to the incongruity and risk oversight issues associated with the traditional risk

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management (TRM) system, businesses are now shifting to a new risk management paradigm known as Enterprise Risk Management (ERM). Enterprise Risk Management is a strategic business discipline that assists organisations in accomplishing their objectives by addressing all of their risks and managing the combined effect of these risks in an integrated manner (Horvey and Moloi 2024). Thus, ERM encourages the interconnections of several organisational risks and ensures that these risks are managed holistically (Hoyt and Liebenberg 2011). The impact of global pandemics, economic crises and corporate shortfalls have emphasised the importance of approaching ERM as a strategic process that creates value rather than just a regulatory requirement. Scholars argue that implementing and advancing ERM systems is believed to decrease the direct and indirect costs of financial distress, earnings volatility, and unfavourable shocks in the financial markets (Florio and Leoni 2017). This process ensures sustainability and growth in a firm's profitability and shareholder value (Lechner and Gatzert 2018; Horvey and Odei-Mensah 2023).

According to the Committee of Sponsoring Organisations of the Treadway Commission (COSO) (2017), ERM is the culture, capabilities, and practices effected by an entity's board of directors, integrated with the organisation's strategy and performance to manage risk in creating, preserving, and realising value. One of the key components of the 2017 COSO ERM framework is governance. COSO states that CG sets the tone for an organisation while providing oversight responsibilities for ERM (COSO 2017). Hence, an effective CG system provides the structure, risk oversight and resources required to integrate ERM practices throughout the organisation. Impliedly, CG complements ERM efforts in affecting performance. That is, the success of ERM hinges on good CG. Hence, organisations are required to coordinate their CG and ERM activities for an effective risk management system and to maximise profitability. Despite the importance of this relationship, empirical evidence to substantiate how the interplay between CG and ERM affects performance is hard to come by, which is the motivation of this study.

There is a growing body of literature on ERM and performance. However, the context has been primarily limited to the US and Europe (Hoyt and Liebenberg 2011; Florio and Leoni 2017; González et al. 2020), with very few studies on emerging markets (Silva et al. 2019; Horvey and Ankamah 2020). Hence, the understanding of ERM in emerging economies is uncertain and lacks empirical support. Silva et al. (2019) assert that organisational characteristics in developing countries differ from those in developed economies. They explain that emerging economies face several challenges, such as political and institutional risk and high volatility of interest rate and exchange rate risk, compared to the developed economy, which demands a robust risk management system. As a result, the necessity of conducting an empirical study on ERM in developing economies has significant promise. Therefore, this study considers the South African context because though it has the largest insurance market in Africa, it is not as developed as the US and European firms. Hence, it is yet to be known whether the implementation of ERM induces performance. Also, the insurance market in South Africa is intricate, globally engaged, very competitive and has multi-dimensional distribution options compared to the insurance market in other African countries (Horvey et al. 2024). Also, it has great appeal to the international community. This requires a robust risk management system to manage



the complexities in the environment and remain competitive in the global insurance market. As a result, in recent years, the South African insurance market decisions towards the integration of strong risk management practices in corporate governance (CG) rules have considerably grown, particularly following the global financial crises as well as the collapse and merging of insurance companies such as Avance Life and Alexander Forbes in South Africa. This has led to the introduction of the Solvency Assessment and Management (SAM) framework, which helps address shortcomings relating to corporate governance and risk management in the South African insurance sector. Pillar II of the SAM framework includes requirements for insurers pertaining to risk management techniques and good CG practices, which requires a new paradigm of risk management that takes an enterprise-wide approach to risk management, which must be consistent with the organisation's overall goals. Hence, this presents a good motivation to explore how the enforcement of CG and risk management practices influence insurer performance in South Africa. Against this backdrop, this study contributes to knowledge by investigating the impact of ERM within the insurance industry in South Africa.

Another notable concern found in the literature regarding ERM and its impact on performance revolves around the limited and contradictory results (Lin et al. 2012; Li et al. 2014; Eckles et al. 2014; Horvey and Ankamah 2020). We argue that the divergent results are due to certain moderating factors affecting the relationship. This argument is supported by the contingency theory of ERM, which states that the relationship between two factors is mostly influenced by another factor; hence, the success of ERM on performance is subject to a number of influences (Mikes and Kaplan 2014). Nevertheless, little academic research has been done on the possible moderating variables between ERM and performance. While there have been studies on how intellectual capital dimensions (Saeidi et al. 2021), CEO tenure and family involvement (Glowka et al. 2021), the role of the risk committee (Malik et al. 2020), ERM maturity (Farrell and Gallagher 2019), financial literacy (Yang et al. 2018), and five contingency variables (Gordon et al. 2009) moderate the ERM-performance relationship, we are still not aware of how CG affects this relationship. Gordon et al. (2009) explain that the ERM-performance relationship depends on several key firm-specific factors, including a strong CG governance system. As earlier presented, ERM is more effective when CG factors are considered because one of the major factors leading to a robust ERM system is good CG initiatives, of which board oversight is essential (Malik et al. 2020). However, the linkages among these variables are yet to be empirically tested. In line with this argument, this study contributes to empirical knowledge by addressing how CG characteristics affect the ERM-performance relationship.

This study responds to the call for further study on ERM, particularly from an emerging market perspective (Horvey and Odei-Mensah 2023), by contributing to the literature in several ways. Given that empirical investigation from an emerging market remains elusive, the findings could increase the international community's understanding of ERM, which will contribute to the development and global relevance of ERM. This will help address risk management issues from an emerging market perspective. Also, the study's findings offer support to regulators and industry practitioners in developing appropriate policies on ERM to promote its



effectiveness and performance. Again, this study provides new evidence by examining the moderating influence of CG on the ERM-performance relationship. In this light, we contribute to the sparse and conflicting arguments on the relationship between ERM and firms' performance. The study's findings offer actionable recommendations to businesses seeking to enhance overall performance and optimise their risk management practices in an increasingly uncertain business environment.

The rest of the chapter is structured as follows. The next section reviews selected literature detailing the relationship between ERM and insurance performance and how CG moderates the relationship between ERM and performance. Section three describes our methodology and data. Section four reports the empirical results and discussion. The final section concludes and provides policy recommendations.

Literature review and hypothesis development

Review of ERM and performance

The literature on ERM and performance is extensive, with inconclusive results. However, most studies have emphasised ERM's importance to organisations (Horvey and Odei-Mensah 2023). For instance, Farrell and Gallagher (2015, 2019) explored the valuation of ERM maturity on performance and revealed a significant positive relationship between ERM maturity and firm performance using a sample from Canada, Europe, the UK and the USA. This suggests that firms with higher levels of ERM maturity perform better. This affirms Hoyt and Liebenberg's (2011) claim that ERM significantly improves the performance of insurance companies in the US. These findings indicate that firms that have effectively incorporated ERM into their strategic and operational activities demonstrate a greater capacity to identify risk relationships and connections throughout the business, ultimately influencing their performance. Additionally, Nair et al. (2014) argue that a strong ERM system is associated with a reduction in the stock price during a downturn (during financial crises) and an increase in profitability during an upturn (after financial crises). Grace et al. (2015) explored which aspects of ERM create insurance value. They first conclude that ERM increases firm value. They further reveal that specific ERM indicators, such as economic capital models and a dedicated risk manager, improve operating performance. Bailey (2022) adds that Broad-based CRO expertise metrics are linked with ERM quality and company value. Additionally, risk and actuarial competence are connected with greater levels of return on assets (ROA), whereas financial knowledge, supervisory expertise, and an MBA degree are associated with higher levels of Tobin's Q. Further findings indicate that during the financial crisis, CRO job competence was very crucial.

While investigating this relationship among European insurers, Bohnert et al. (2019) support the argument that an advanced ERM is required to realise its potential impact and validate this with a significant positive relationship. Jurdi and AlGhnaimat (2021) support this finding by highlighting that implementing ERM enhances company value and performance among European insurers. Their argument was based on two assumptions. First, the advantages of implementing



ERM outweigh the costs; second, implementing ERM would enhance risk governance generally rather than being restricted to a reaction to pressure from regulatory or monitoring bodies. Also, Altuntas et al. (2020) focused on the property and liability insurers in Germany based on a sample of 95 insurance companies and showed a positive impact; however, this depends on the extent of the firms' level of ERM implementation. Lechner and Gatzert (2018) broadened the scope by considering banks, insurance, and the energy sector listed on the German stock exchange, and they found a significant positive relationship between ERM and shareholder value. Otero-González et al. (2022) provide an extended analysis of insurance companies in Europe, the Middle East and Africa (MEA) based on a sample of 150 companies. Their empirical findings demonstrate the benefits of high-quality ERM implementation on performance in insurance businesses in the MEA and Europe. However, they failed to find any significant impact on the market value.

While the preceding argument underscores the relevance of ERM on performance, other scholars present different opinions. For instance, McShane et al. (2011) highlight that a significant positive relationship between ERM and shareholder value among insurers listed on the New York Stock Exchange is only possible at the increasing level of silo-based risk management. However, moving from the traditional system to an ERM system does not add anything to shareholder value, as considered in the sample of insurers. The negative relationship between ERM and performance is explained by several factors, including environmental conditions, a possible distortion of the S&P ERM rating as reported by the media, and the likelihood of a long-run effect of ERM on performance. Similarly, Nguyen and Vo (2020) found a significant inverse relationship between ERM and the solvency of European countries. They explained this as a possibility when firms engage in aggressive risk-taking behaviour that does not align with their ERM maturity. Also, Aebi et al. (2012) reveal that ERM characteristics such as risk committee and CRO reports to the executive board/CEO have negative impacts. This supports Lin et al. (2012), who revealed that ERM implementation negatively impacts firm value and performance of the US property and casualty insurance industry. They indicated that poorly implemented ERM could negatively affect organisational performance. Hence, Li et al. (2014) recommend that insurers resort to a robust risk management system to appreciate the impact of ERM. According to Pagach and Warr (2011), adopting ERM merely in reaction to regulatory demands may have little to no effect, which explains the negative or insignificant effect. This is further expounded by Beasley et al. (2008), who argue that the relationship between ERM and performance is firm-specific and conclude that the relevance of ERM is not the same for all firms but depends on certain firm-specific characteristics; hence, the cost and benefit of ERM are firm-specific. When these contextual factors are considered, then the value implications of ERM will be realised.

The above premise tells that empirical studies on ERM and performance in advanced countries are becoming more abundant, offering divergent results. Still, evidence from an emerging context remains limited. Though previous studies offer conflicting results, there is enough argument to support the claim that ERM improves firms' performance. In light of this, this study seeks to provide new



evidence from an emerging market, particularly in South Africa, other than Europe and the US and hypothesis that:

H_1: A positive relationship exists between ERM and firm performance.

Empirical review on the moderating role of CG on the ERM-performance *Nexus*

The previous section indicates the importance of ERM on performance. In this section, we build on the contingency theory of ERM and argue that the success of ERM and its impact on performance will not be effective without a strong governance system (Mikes and Kaplan 2014). Corporate governance is defined as a set of clearly defined laws, policies, procedures, or rules and regulations that govern how a firm is managed, overseen, and regulated to improve performance, put risk management plans into place, and lower the likelihood of corruption and insolvency (Kafidipe et al. 2021). This implies a strong association between CG and ERM. Therefore, scholars have proposed combining these factors as the way forward to ensure an effective ERM system as they complement each other (Horvey and Odei-Mensah 2023). This supports the theoretical proposition made by COSO (2017) about the linkages between ERM and CG. According to COSO (2017 p. 6), 'Governance sets the organisation's tone, reinforcing the importance of, and establishing oversight responsibilities for, enterprise risk management.' COSO further posits that properly coordinating risk management and CG activities will ensure firm value creation as risk management evolves. By this, firms can harness the mutually symbiotic relationships between the two to increase their competitive advantage in the long term (Florio and Leoni 2017). This argument aligns with the Pillar II of the SAM framework for insurers in South Africa, which recommends an amalgamation of ERM and CG for insurers' performance. Hence, this study argues that the implementation of ERM may not be effective without integrating a strong CG system. However, this has yet to be subjected to a rigorous empirical analysis. Given this, this study contributes to the literature by exploring how CG interacts with ERM in affecting performance by considering specific CG features (such as board size, board independence and gender diversity). The rationale for selecting these factors is explained below.

Role of board size on ERM and performance

The theoretical proposition by COSO describes ERM as a process effected by an entity's board of directors to manage risk within its risk appetite and provide reasonable assurance regarding achieving entity objectives. This suggests that the board is an essential feature of a company's functionality and is very significant to ERM implementation due to its ability to influence management decisions and performance. Beasley et al. (2008) affirm this, suggesting that ERM cannot succeed without support from the board. This is because implementing an effective ERM system is initiated by the organisation's board. Fakir and Jusoh (2020) support this argument and narrate that the board of directors are explicitly tasked with ensuring successful ERM implementation under the COSO ERM framework. Similarly,



the agency theory proposes that the board presents ERM as a tool to manage financial distress and improve performance (Horvey and Odei-Mensah 2023). More so, the board provide an oversight role in monitoring management activities, including risk management within an organisation (Rashid et al. 2024). Thus, the smaller the board, the lower the monitoring and vice versa. Contrarily, Akmal et al. (2022) suggest that large boards are less capable of monitoring and supervising institutional operations, particularly risk management. This is due to the lack of consensus and other agency problems.

However, Sekerci and Pagach (2019) are of the view that large boards that are well coordinated can enhance ERM implementation and business success because they represent a governance tool that provides a foundation upon which the risk management agency cost is reduced through monitoring managerial actions. A large board would take the initiative to oversee and create committees with the required knowledge, such as a risk management committee (Abbas et al. 2021). Thus, large boards lead to better performance because they employ ERM for a better monitoring process. Beasley et al. (2008) further posit that the board encourages diversity to ensure greater risk transparency, intending to minimise the likelihood of fraud and improve performance. More so, the competency and size of the board of directors are connected to the efficiency of the board's oversight in managing the risk management system. The board of directors has the authority to oversee risk management and guarantee the company has a successful risk management strategy (Abbas et al. 2021). Hence, the successful implementation of ERM is associated with the level of monitoring by the board of directors, which in turn improves their performance (Gordon et al. 2009). However, to the best of our knowledge, the moderating influence of board size on the ERM-performance relationship has yet to be empirically determined. Hence, this study proposes that:

H_2: Board size has a moderating effect on the ERM-Performance relationship

Role of board independence on ERM and performance

Board independence denotes the number of non-executive directors on the board (Wu and Li 2015). The literature suggests a strong connection between board independence and risk management because they ensure transparency and control of the organisational risk decisions. They are mostly interested in their reputation; hence, they are more likely to work in the interest of the organisations, thereby ensuring that regulatory policies, particularly on risk management, are well observed (Switzer et al. 2018). According to the agency theory, independent directors successfully carry out their monitoring duty and provide an unbiased evaluation, which lowers agency costs and boosts a company's efficiency. Independent directors appear to be less influenced by senior management or may perhaps be dependent on them since they have non-financial, intangible interests in the organisation (Musallam 2020). As a result, highly trained, experienced, and committed independent directors are more inclined to adopt a robust risk management system to protect the organisation from adverse events, increasing asset portfolios as a source of return and lowering operating expenses (Matthew et al. 2018; Musallam 2020).



This argument is affirmed by Wu and Li (2015), who further highlight that independent directors on the board provide unbiased risk management monitoring, allowing them to carefully assess decisions, potentially leading to a robust risk management system and improved performance. On the other hand, Tai et al. (2020) indicate that a company's risk management strategy is unaffected by the presence of independent directors. However, Sekerci and Pagach (2019) posit that independent directors prioritise shareholders' interests and exercise higher managerial controls to build their reputations and establish their expertise in decision-making roles. As a result, independent directors are more likely to recommend ERM to the executive board to enhance their risk oversight responsibilities to overcome financial setbacks and improve firm performance. Hence, we argue that the presence of independent directors is likely to encourage ERM adoption, which might, to a large extent, lead to better performance. Therefore, the study hypothesises that:

H_3: Board Independence has a moderating effect on the ERM-Performance relationship

Role of gender diversity on ERM and performance

One distinguishing feature that characterises board composition is board diversity. Board diversity ranges from gender, nationality, and educational background. This study focuses on the gender diversity of board members, representing the ratio of females on the executive board. Gender diversity is considered one of the most effective board characteristics due to its influence on risk management and overall firm performance (Jouber 2024). When it comes to decision-making, women are known to be more engaged, committed, driven, and industrious than men. This ensures that the board operates more efficiently. Also, female directors increase the breadth of board decision-making by bringing varied and open-minded perspectives and understandings (Musallam 2020). Hence, it makes sense to suggest that, for several reasons, having a more gender-diverse board of directors might result in better ERM practices and better sustainability results (Fakir and Jusoh 2020). Having more female board members can give current and potential investors greater credibility. By promoting openness and moral responsibility in the boardroom, a higher proportion of female directors might ensure that regulatory policies like ERM are followed.

Therefore, female board members might encourage other board members to ensure that ERM is used effectively. Chen et al. (2016) explain that gender diversity in boardrooms enhances CG and risk management systems by attracting females who prioritise ethical and regulatory issues, leading to compliance with risk management policies and improved performance. Also, females, being risk-averse, are more likely to adopt risk management measures to protect the company from unforeseen circumstances and poor performance (González et al. 2020). Joecks et al. (2013) further argue that there is an increase in the performance of firms as more women are added to the board. This is because females adopt ERM to manage the risk activities of an organisation with their risk appetite level. Based on the above, we posit that having more females will increase the probability of ERM implementation, thereby enhancing performance.



H4: Gender diversity has a moderating effect on the ERM-Performance relationship

Methodology

Data and sample

The main focus of this study is first to examine the impact of ERM on insurers' performance and second to investigate how CG characteristics interact with ERM in affecting performance. The sample consists of 63 insurers from South Africa, for which detailed financial information was obtained. Information on CG characteristics was collected from individual insurers' CG reports, while information on the dependent and control variables was drawn from the Financial Service Conduct Authority (FSCA) database of South Africa. The study period was 2015–2019 because, in 2014, the South African insurance industry embraced Pillar II of the SAM framework, emphasising a robust risk management technique. The year ends in 2019 as the dataset's cut-off year to eliminate the COVID-19 pandemic's confounding effects on financial data and any potential biases in its skewing of the paper's major result. The insurance industry was chosen for this study due to the risk-bearing nature of its business operations (Attah-Kyei et al. 2023). They have various business structures and complexities and deal with multiple risk profiles. Therefore, the diversity of their business operations and the risks they face demand robust CG and risk management procedures (Horvey et al. 2024). Given this, scholars assert that insurers are more likely to embrace ERM than other industries because of the inherent risk exposure involved in their business operations. Furthermore, concentrating on the insurance sector avoids potential biases caused by industry-specific and inter-industry heterogeneity.

Description of variables

Dependent variables

The study measures performance by considering two variables that capture diverse aspects of insurers' performance—return on asset (ROA) and underwriting performance (Und_Perf). ROA is measured as the ratio of net profits to its assets. This variable captures historical performance and shows how well an insurer manages its assets to create revenue (Horvey and Ankamah 2020). While previous studies mostly consider ROA as a measure of insurance performance, no study, to the best of our knowledge, has sought to examine underwriting performance and its relationship with ERM. Hence, this study introduces this variable to explore how ERM influences the performance of insurers underwriting, which is the core activity of insurance companies. The reason for choosing these two measures is that insurance companies obtain profits from two main sources: investments and underwriting activities. Underwriting performance is measured as the ratio of net premiums



earned over total expenditure (claims incurred, management expenses and commission) (Horvey et al. 2024). Underwriting is the profit/loss on a portfolio of insurance policies before investment income is considered. Underwriting performance indicates the total profit/loss after deducting incurred claims and operating expenses from the premiums earned (Shim 2017).

Independent variable: enterprise risk management index (ERMI)

One major consideration in the literature is how to quantify ERM. Due to the lack of ERM disclosure on companies' websites and annual reports, most studies rely on the CRO appointment, the presence of a risk committee, or an ERM keyword search to establish a binary proxy for ERM (Silva et al. 2019). Other scholars rely on risk governance features (Florio and Leoni 2017; Horvey and Ankamah 2020). This study contributes to the ERM literature by widening the set of measures, thus adding more detailed characteristics to capture the sophistication of ERM implementation. The study used two approaches to create an ERM index. First, similar to previous studies, this study manually extracted information known as ERM indicators following Florio and Leoni's (2017) and Horvey and Ankamah's (2020) methodology. This led to a cluster of 12 ERM features collected from CG reports, annual reports and websites. Further, as Horvey and Odei-Mensah (2023) advised, we complement this approach by following González et al.'s (2020) survey technique to learn more about the ERM features in creating an index. The target population were insurers in South Africa, which consists of about 120 general and life insurers, according to the FSCA. The study used a purposive sampling technique to collect ERM information from the manager or anyone (such as the CRO/risk manager) with adequate information about the company's ERM practices. The aim was to obtain a broad factual picture of their ERM practices. The questionnaire was emailed, and follow-up messages were sent periodically as a reminder. Anonymous risk experts first helped with a pilot study to ensure the instrument's reliability. Of the 120 insurers engaged for data collection, 74 responded, and 63 were used upon closer inspection, representing a response rate of 52.5%. The survey questions indicate whether an insurer has an ERM programme and when it was implemented. Furthermore, specific questions about insurers' ERM activities were asked, including the year they initiated such programmes. Each feature is treated as binary, given the value of one in the year the firm adopts that ERM activity and cut off in the subsequent years.

The ERM index focuses on several features, captured into three broad categories: risk governance index (RGI), operational mechanisms index (OMI), and the quality of risk oversight index (ROI). Risk governance establishes the risk management system's structure, defining roles, responsibilities and accountability while setting the guidelines for making risk management decisions (Aebi et al. 2012; Malik et al. 2020). This category is fundamental as organisations require a well-governed system to determine the direction and control of a holistic risk management system. This category considered variables such as the presence of a CRO or risk manager, the presence of the CRO on the executive board, the presence of a risk management committee, whether the risk committee reports to the executive board and the firm's risk appetite level. The operating mechanism category explains the tools, techniques and procedures required for an



ERM implementation (Horvey and Ankamah 2020). The variables include the firm's risk assessment frequency, level, methodology, and risk management framework. For risk assessment frequency, we introduce a dummy variable equal to 1 if the company performs their risk assessment procedure at least biannually (Florio and Leoni 2017). The risk assessment method is also treated binary, equal to 1 if the company employs both qualitative and quantitative methods of risk assessment. The last category, the risk oversight index (ROI), reveals the quality of risk oversight. The ERM features included in this category are the existence of an active risk committee, the risk committee's experience, and the CRO's expertise. An ERM index was created for each category. In addition, an overall ERM index was created by combining the features under each category. While previous studies (Aebi et al. 2012; Florio and Leoni 2017) adopt a composite index by summing the dummy ERM features, this study uses Multiple Correspondence Analysis (MCA), which is more appropriate for creating an index for binary variables (Abdi and Valentin 2007). Using MCA helps examine the pattern of relationships among several categorical variables, thereby creating an index.

Moderating variable

The study includes three CG variables which interact with ERM in influencing performance. The first variable is board size (BS), representing the board's total number of executive and non-executive directors (Kosak et al. 2011; Sekerci and Pagach 2019). The next is board independence (BODIND), which represents the ratio of independent directors on the executive board (Wu and Li 2015). The other CG variable is gender diversity (GENDER), which measures the ratio of females to males on the executive board (Sekerci and Pagach 2019).

Control variables

The model includes four control variables: firm size, reinsurance, investment yield and leverage. Firm size (SIZE) is measured as the natural log of total assets (Beasley et al. 2008). The extent of a firm's risks is likely influenced by its size, as are the resources available for the ERM system (Florio and Leoni 2017). The diverse relationship between market evaluation and capital structure is controlled by financial leverage (LEV). This is calculated as total debts/liabilities divided by total equity (Florio and Leoni 2017). Reinsurance (REINS) is also measured as the ratio of reinsurance premiums to total premiums (Shim 2017). Reinsurance is a risk management strategy that enhances insurers' performance by transferring part of insurers' risk to reinsurance companies. Investment yield (INVYIELD) assesses the quality of the investment portfolio. This is also measured as the ratio of investment income to total investment.

Empirical model

This study adopts the generalised method of moments (GMM) estimator proposed by (Arellano and Bond 1991) to assess the relationship between ERM, CG and performance. This technique addresses endogeneity problems by exploiting the data's



time series variations and controlling for unobserved firm-specific effects. Arellano (2003) argues that endogeneity is introduced in the models by including the lags of the outcome variable, which is insurers' performance. It is important to note that incorporating the lagged term of the dependent variable in the regression model may cause endogeneity problems since the lagged dependent variable depends on the lagged error term, which is a function of the firm-specific fixed effects. As specified in the equations below, the one-period lag of the outcome variable is dependent on the error term, a function of the firm-specific effect. Using this method, the study confirms the usage of the dynamic system GMM estimator by building a model where the dependent variable depends on its lag and a vector of observations for the independent variables. Again, a possible endogeneity problem is suspected between ERM and performance. While ERM may influence performance, insurers' performance may affect the implementation of ERM (Lechner and Gatzert 2018; Abbas et al. 2021; Horvey and Ankamah 2020), therefore validating the adoption of the dynamic GMM estimator. Using this technique, the study set a model where the dependent variable depends on its lag and a vector of observations of the independent variables as specified in the equations below. Equation (1) addresses the direct impact of ERM on insurers' performance, whereas Eq. (2) examines how CG features such as board size, board independence, and gender diversity interact with ERM in affecting insurers' performance.

$$\mathrm{PERF}_{it} = \beta_1 \mathrm{PERF}_{it-1} + \beta_2 \mathrm{ERM}_{it} + \beta_3 X_{it} + \mu_{it} \tag{1}$$

$$\mathrm{PERF}_{\mathrm{it}} = \beta_1 PERF_{it-1} + \beta_2 \mathrm{ERMI}_{\mathrm{it}} + \beta_3 \mathrm{CG}_{\mathrm{it}} + \beta_4 (\mathrm{ERMI{*}CG})_{\mathrm{it}} + \beta_5 X_{\mathrm{it}} + \mu_{\mathrm{it}} \tag{2}$$

$$\mu_{it} = \mu_i + \lambda_t + \varepsilon_{it}$$

Note: Subscripts i and t denote individual insurance company and time, respectively; PERF represents performance and $PERF_{it-1}$ represents the one-period lag of performance. ERM denote the overall enterprise risk management index (ERMI) and its categories, which include the risk governance index (RGI), operating mechanism index (OMI), and risk oversight index (ROI); CG represents the three corporate governance features; X is a vector of control variables (i.e., firm size, leverage, reinsurance and investment yield); The beta 's (β) are the parameters to be estimated; μ_{it} denotes the error terms where μ_i represents the individual insurance-specific effect; λ_t represents the symmetric time effect, while ε_{it} represents the idiosyncratic time effect. Year dummies were included in the model to capture the variations in insurers' performance over the period.

It is important to note that the accuracy of the GMM approach in producing reliable outcomes is determined by its post-estimation testing, which is taken into account. We use Hansen's test of over-identification to assess the validity of the instrument (Horvey et al. 2024). The basis of the Hansen test is the null hypothesis, which states that there is no correlation between the residuals and the detected instruments. Consequently, the precision of our computations and the suitability of the instruments are determined by our failure to reject the null hypothesis. The instruments are not resilient if the null hypothesis is rejected since reliance on the



instruments leads to invalid restrictions. The post-estimation tests for further evaluating the validity of our estimates include (i) the presence of first-order and absence of second-order serial correlation (ii) the significance of the Wald test and (iii) the number of instruments must be less than the number of groups.

Concerning the interaction between ERM and CG in Eq. (2), the study follows the conditions specified by Brambor et al. (2006) to test for the joint significance of the constitutive and interaction terms to arrive at the net effect of these factors on insurers performance. For instance, in Eq. (2), the hypothesis that the impact of ERM on performance is conditioned on CG is tested by the joint coefficients. The net effect is derived by taking the first derivative of the constitutive and interactive terms with respect to ERM in Eq. (2). This is stated as follows:

$$\frac{\partial \text{PERF}}{\partial \text{ERMI}} = \beta_2 + \beta_4 \text{CG}_{it} = 0 \tag{3}$$

Results

Descriptive statistics

Table 1 presents an overview of the variables included in the study. Underwriting performance averages 7.316, with a standard deviation of 1.844, showing huge variations in underwriting performance among insurers in South Africa. Also, about 42% of insurers' earnings come from their assets (ROA). For the corporate governance variables, the average board size is 11, with 24% of board members being female, implying some level of diversity on the board. The independent ratio is 57%, showing that over half of the board members are independent directors. The average for independent directors is explained by the CG code regulations, which state that more than half of the board members must be independent directors. This also aligns with the recommendations of the Pillar II SAM framework, which presents that the majority of the board members in South Africa should be non-executive directors.

Table 1 Descriptive statistics

Variable	Obs	Mean	Std. Dev	Min	Max
Und_Perf	315	7.316	1.844	2.041	13.516
ROA	315	0.416	0.368	0.000	2.897
ERMI	315	0.001	1.002	− 1.209	3.438
BS	315	11.914	3.870	5.00	24.000
BODIND	315	0.569	0.134	0.000	14.000
Gender	315	0.239	0.132	0.000	10.000
Size	315	14.571	2.336	10.008	20.298
REINS	315	0.344	0.331	− 2.574	0.988
INVYIELD	315	2.446	6.414	− 6.694	64.101
LEV	315	0.654	0.643	− 2.574	9.948

This ensures appropriate balance and authority, reduces the possibility of conflict of interests and promotes objectivity. The South African insurance industry has a positive total asset, recording an average of 14.571, with 65% financial leverage, a reinsurance premium of 0.341, and a positive investment yield of 2.446. Table 2 shows a correlation matrix for model variables, indicating no multicollinearity among the independent variables, which supports their inclusion in the regression model.

ERM features

Table 3 records the distribution of the ERM features across the five years. The study reveals that while the number of insurers practising ERM features is increasing, some still lack most of these features. The table indicates that a risk committee is more present, with about 91% having a risk committee. This is plausible given that firms with an ERM system mostly have a dedicated risk committee, which implies greater attention to risk management and better coordination of the risk management system and induces the integration of ERM within an organisation (Florio and Leoni 2017). Also, a risk committee promotes risk management activities and enhances the monitoring and implementation of a robust management system (Malik et al. 2020). About 76% of insurers have a CRO/risk manager appointment, which suggests that most risk committees are headed by individuals with requisite expertise and knowledge in risk management. This also ensures the centralisation of the risk management oversight. However, only 14% of the CRO/risk managers are among the executive board members, implying that CROs have less than a 50% engagement rate on the executive board. Having the CRO as an executive board member is important because it gives the risk manager great influence and power to influence risk decisions (Aebi et al. 2012). The absence of the CRO on the board can significantly impact organisational risk decisions. About 86% of the risk committee report to the board of directors, aligning with the recommendations of the SAM framework. About 91% indicated that they perform their risk assessment biannually. Of these, 84% perform risk assessment across all levels, while 67% employ qualitative and quantitative approaches.

Empirical results and discussion

ERM and performance

The first part of this study examines the overall impact of ERM on insurers' performance. The estimated results are reported in Table 4. The breakdown of the effects of the ERM categories thus, risk governance index (RGI), risk oversight index (ROI) and operational mechanism index (OMI) are presented in models (1)–(4) and (6)–(9) for underwriting performance and ROA, respectively. The essence of this is to understand the value of each category in affecting performance. Models (5) and (10) present the empirical information for the impact of the overall ERM index on underwriting performance and ROA, respectively. The assumptions regarding the use of GMM are satisfied. Table 4 reveals positive and



Table 2 Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Und_Perf	1.000									
(2) ROA	0.104	1.000								
(3) ERMI	0.010	0.051	1.000							
(4) BS	− 0.201	− 0.282	− 0.057	1.000						
(5) BODIND	0.123	0.228	− 0.141	0.092	1.000					
(6) GENDER	− 0.135	− 0.208	0.056	0.054	0.232	1.000				
(7) SIZE	− 0.223	− 0.487	− 0.138	0.455	0.065	− 0.034	1.000			
(8) REINS	0.395	− 0.060	− 0.010	− 0.171	− 0.140	− 0.041	− 0.096	1.000		
(9) INVYIELD	− 0.118	0.243	0.081	− 0.045	− 0.038	− 0.102	− 0.081	− 0.257	1.000	
(10) LEV	− 0.020	0.020	− 0.001	− 0.029	− 0.066	− 0.040	0.282	0.083	0.014	1.000

Table 3 Distribution of ERM features

Distribution of erm features over the years (2015–2019)														
ERM features	2015		2016		2017		2018		2019		Freq(2015–2019)		%(2015–2019)	
	0	1	0	1	0	1	0	1	0	1	0	1	0	1
CRO/risk manager appointment	17	46	16	47	14	49	14	49	14	49	61	191	24.21%	75.79%
CRO executive	56	7	55	8	53	10	53	10	53	10	217	35	86.11%	13.89%
Risk committee	7	56	7	56	5	58	4	59	4	59	22	230	8.73%	91.27%
Risk appetite	7	56	7	56	7	56	5	57	5	58	26	225	10.32%	89.29%
Risk com'te report to board	10	53	9	54	8	55	8	55	8	55	35	217	13.89%	86.11%
Risk assessment frequency	7	56	6	57	5	58	4	59	4	59	22	230	8.73%	91.27%
Risk assessment level	12	51	11	52	9	54	8	55	8	55	40	212	15.87%	84.13%
Risk assessment method	23	40	21	42	21	42	18	45	18	45	83	169	32.94%	67.06%
Risk framework	9	54	9	54	7	56	5	58	5	58	28	224	11.11%	88.89%
Active risk committee	29	34	29	34	29	34	29	34	29	34	116	136	46.03%	53.97%
Directors with insurance exp	8	55	7	56	7	56	6	57	6	57	28	224	11.11%	88.89%
CRO expertise	20	43	19	44	18	45	18	45	6	57	75	177	29.76%	70.24%

Table 4 Enterprise risk management and insurers performance

Variables	Underwriting performance					Return on assets				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Lag of DV	0.335***	0.314***	0.307***	0.333***	0.326***	0.315***	1.127***	1.132***	1.092***	1.109***
	(0.052)	(0.051)	(0.052)	(0.065)	(0.048)	(0.105)	(0.275)	(0.231)	(0.257)	(0.254)
Size	0.095**	0.100**	0.103**	0.109*	0.102**	0.060***	0.007	0.007	0.010	0.008
	(0.044)	(0.046)	(0.044)	(0.058)	(0.045)	(0.011)	(0.019)	(0.016)	(0.016)	(0.018)
Reins	1.414***	1.329**	1.260***	1.423***	1.353***	0.014	0.064	0.059	0.064	0.065
	(0.501)	(0.502)	(0.474)	(0.508)	(0.493)	(0.073)	(0.047)	(0.045)	(0.043)	(0.046)
Inv_Yield	0.010*	0.010*	0.009*	0.007	0.010*	0.010***	0.020***	0.020***	0.020***	0.020***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
Lev	0.054	0.041	0.027	0.342	0.042	0.125***	0.163***	0.164***	0.163***	0.162***
	(0.120)	(0.120)	(0.118)	(0.376)	(0.120)	(0.018)	(0.019)	(0.020)	(0.017)	(0.018)
RGI	0.162*			0.225**		0.003**			0.020**	
	(0.087)			(0.149)		(0.012)			(0.012)	
ROI		0.096		0.175			0.023*		0.020	
		(0.091)		(0.176)			(0.014)		(0.016)	
OMI			0.000	0.036				− 0.006	− 0.007	
			(0.059)	(0.124)				(0.023)	(0.022)	
ERMI					0.101					0.004
					(0.076)					(0.016)
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	252	252	252	252	252	252	252	252	252	252
Number of firms	63	63	63	63	63	63	63	63	63	63
AR(1)	0.004	0.005	0.016	0.001	0.008	0.003	0.012	0.002	0.011	0.001
AR(2)	0.294	0.288	0.288	0.269	0.292	0.874	0.435	0.440	0.430	0.431
Hansen	0.478	0.385	0.352	0.459	0.451	0.007	0.459	0.466	0.457	0.457

Table 4 (continued)

Variables	Underwriting performance					Return on assets				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
No. of instruments	11	11	11	13	11	11	11	11	13	11

Standard errors in parentheses

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

significant coefficients for the lagged dependent variable, indicating strong inertia in insurers' performance over time, indicating that previous years' performance affects current performance, justifying the dynamic GMM's appropriateness.

Among the individual ERM categories in South Africa, the coefficient for the RGI on underwriting performance and ROA is significantly positive. The coefficient result reveals that risk governance is important in driving underwriting performance. This supports Malik et al.'s (2020) findings, stating that risk governance significantly impacts performance. Risk governance greatly influences how insurance companies operate throughout the underwriting process because it establishes strict rules and procedures for effective risk management. Effective governance facilitates the identification, assessment, and determination of risk appetite levels (Lundqvist 2015). This helps insurers determine the type and level of risk they are ready to accept, aiding in more informed underwriting decisions. Also, ROI shows positive impacts on underwriting performance and ROA. The positive relationship can be explained by the fact that risk oversight warrants the implementation of a strong ERM system, which ensures its integration into the underwriting and operational activities, leading to improved performance (Horvey and Odei-Mensah 2023). However, OMI reveals a mixed relationship, indicating a positive impact on underwriting performance and, inversely, on ROA; however, both relationships were insignificant. The insignificant results illustrate each category's minimal power in affecting performance. This aligns with Grace et al. (2015), which suggests a lower impact of individual characteristics on performance. Hence, recommend an integrated risk management technique.

The impact of the overall ERM index (ERMI) on performance is consistent for both measures (i.e., return on assets and underwriting performance). The positive coefficient indicates that an integrated risk management system is essential for insurance performance. This indicates that the more integrated ERM features are, the higher the performance (Lechner and Gatzert 2018). Farrell and Gallagher (2019) support this claim by explaining that firms that have effectively incorporated ERM into their strategic and operational activities demonstrate a greater capacity to identify risk relationships and connections throughout the business, ultimately influencing their performance. Also, we find that ERM influences not only firm-level performance but also underwriting performance because it establishes guidelines and procedures for prudent risk management and risk-taking decisions, which has the propensity to reduce underwriting losses. Therefore, insurers must ensure a robust risk management technique to reduce underwriting losses. The positive result aligns with most empirics who find a positive relationship between ERM and performance (Hoyt and Liebenberg 2011; Altuntas et al. 2020; Otero-González et al. 2022, Bailey 2022). Jurdi and AlGhnaimat (2021) support the argument that ERM enhances insurance performance because implementing ERM outweigh the costs and enhances risk governance generally rather than being restricted to a reaction to pressure from regulatory or monitoring bodies. The insignificant result could be attributed to the fact that the concept of ERM is a recent phenomenon in the industry and may take time to gain momentum and relevance among insurers in these countries. Silva et al. (2019) claim



that ERM implementation in emerging economies is still embryonic and may take time to realise its potential benefits.

Regarding the control variables, the study reveals a significant positive relationship between size and performance. This implies that large insurers are more likely to generate higher profits than smaller insurers due to the benefit of economy of scale. The positive relationship confirms the results of González et al. (2020), who indicate that firm size significantly affects insurers' performance. In most cases, financial leverage also presents a significant positive impact on performance, suggesting that leverage increases firm value by reducing the generation of cash flows (Bohnert et al. 2019). Investment yield positively impacts ROA. Reinsurance premiums reveal a significant positive impact on underwriting performance. This is plausible since reinsurance helps insurers to reduce the risk associated with their underwriting portfolio. However, it revealed no significant impact on ROA.

The moderating role of CG on the ERM-performance relationship

Following the discussion in subSection "ERM and Performance", the study further explored how the three CG factors moderate the ERM-performance nexus as reported in Table 5. Models (1)–(3) and (7)–(9) show the unconditional effect of the independent and moderating variables on underwriting performance and ROA, respectively. Models (4)–(6) reveal the impact of their interaction between ERM and CG (board size, board independence and gender diversity) on underwriting performance, while models (10)–(12) provide the same analysis, introducing ROA as the outcome variable. The study discloses strong empirical evidence on the moderating influence of board size on the ERM-performance relationship, suggesting a significant positive relationship further affirmed by its net effects. This implies that the existence of an executive board induces ERM implementation, which affects performance. This is consistent with Sekerci and Pagach's (2019) and COSO's (2017) argument that ERM cannot succeed without support from the board. This is because the board are mostly tasked with ensuring successful ERM implementation under the COSO ERM framework (Fakir and Jusoh 2020). They oversee risk management and guarantee the company has a successful risk management strategy (Abbas et al. 2021). Again, well-coordinated boards can enhance ERM implementation because they represent a governance tool that provides a foundation upon which the risk management agency's cost is reduced through monitoring managerial actions. When such actions are taken, they can identify the potential threats to the organisation's performance. By introducing ERM as a monitoring tool, they can reduce risks, protect shareholder value, and ultimately improve the organisation's overall performance and volatility resistance.

We also find that the presence of independent directors reinforces the impact of ERM on performance. The significant positive relationship evidences this. The results suggest that independent directors contribute to better risk management practices, leading to a robust system and boosting performance (Wu and Li 2015). The argument that board independence interaction increases the effect of ERM on performance supports the assertion by Beasley et al. (2008) that independent directors are more likely to recommend ERM to the executive board to enhance their risk



Table 5 The moderating influence of CG on ERM-performance

Variables	Underwriting performance						Return on assets					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Lag of DV	0.343***	0.334***	0.358***	0.336***	0.332***	0.353***	1.242***	1.402***	1.090*	1.186***	1.329***	1.137**
	(0.052)	(0.058)	(0.060)	(0.054)	(0.058)	(0.063)	(0.294)	(0.290)	(0.575)	(0.357)	(0.313)	(0.557)
Size	0.090**	0.100**	0.087**	0.092**	0.104**	0.088**	0.004	0.001	0.010	0.007	0.006	0.007
	(0.043)	(0.044)	(0.042)	(0.044)	(0.045)	(0.043)	(0.018)	(0.018)	(0.036)	(0.023)	(0.020)	(0.035)
Reinsurance	1.303***	1.333***	1.292***	1.355***	1.396***	1.289***	0.070	0.075	0.068	0.071	0.076	0.068
	(0.475)	(0.484)	(0.450)	(0.484)	(0.487)	(0.445)	(0.051)	(0.053)	(0.048)	(0.053)	(0.055)	(0.049)
Inv-yield	− 0.010*	− 0.010*	− 0.010**	− 0.010*	− 0.011**	− 0.010**	0.021***	0.022***	0.021***	0.021***	0.022***	0.021***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.003)	(0.005)	(0.005)	(0.003)
Leverage	0.030	0.037	0.028	0.029	0.039	0.028	0.169***	0.182***	0.166***	0.167***	0.180***	0.167***
	(0.119)	(0.121)	(0.101)	(0.119)	(0.122)	(0.100)	(0.027)	(0.027)	(0.019)	(0.026)	(0.026)	(0.020)
ERMI	0.069	0.084	0.035	− 0.183	0.234	0.141	0.011	0.027	0.003	− 0.022	0.020	0.014
	(0.073)	(0.078)	(0.073)	(0.316)	(0.169)	(0.141)	(0.020)	(0.021)	(0.030)	(0.130)	(0.054)	(0.039)
BS	0.013			0.013			0.015*			0.005		
	(0.018)			(0.018)			(0.006)			(0.006)		
BODIND		0.036			− 0.005			0.020**			0.019**	
		(0.024)			(0.024)			(0.009)			(0.009)	
Gender			0.044**			− 0.043			0.034*			0.025
			(0.030)			(0.032)			(0.020)			(0.021)
ERMI*BS				0.023**						0.013		
				(0.027)						(0.010)		
ERMI*BODIND					0.056*						0.028**	
					(0.029)						(0.007)	
ERMI*Gender						0.059**						0.103**
						(0.024)						(0.003)

Table 5 (continued)

Variables	Underwriting performance						Return on assets					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Net effects				0.091**	0.265**	0.115**				0.133	0.035***	0.038*
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	252	252	252	252	252	252	252	252	252	252	252	252
Number of firms	63	63	63	63	63	63	63	63	63	63	63	63
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR(1)	0.005	0.009	0.002	0.000	0.014	0.003	0.010	0.007	0.017	0.007	0.012	0.008
AR(2)	0.295	0.293	0.292	0.295	0.301	0.291	0.473	0.518	0.342	0.454	0.506	0.357
Hansen	0.447	0.435	0.440	0.484	0.501	0.444	0.373	0.235	0.352	0.380	0.269	0.323
Number of instruments	12	12	12	13	13	13	10	10	10	11	11	11

Standard errors in parentheses

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

oversight responsibilities. Sekerci and Pagach (2019) support this claim, explaining that having more independent directors leads to more effective oversight because independent members are more objective in their management decisions. Since their primary concern is maintaining their reputation, they are more inclined to act in the organisation's best interests, which helps to ensure that regulatory policies, particularly those pertaining to risk management, are properly followed (Switzer et al. 2018). Given this, highly trained, experienced, and committed independent directors are more inclined to adopt a robust risk management system to protect the organisation from adverse events, increasing asset portfolios as a source of return and lowering operating expenses (Matthew et al. 2018; Musallam 2020). Hence, this study posits that the presence of independent directors fosters a culture of a strong risk management system, leading to high performance.

For gender diversity, the study also finds a significant positive relationship with performance. This suggests that females on the board reinforce the nexus between ERM and performance. This is not surprising as the literature explains that females are more concerned about ethical and regulatory issues than men and are likely to encourage firms to comply with risk management policies, which will eventually enhance performance. Therefore, they commit to an effective ERM system to respond to these issues (Chen et al. 2016). Also, the agency theory narrates the risk-averse nature of females makes them encourage risk management. Therefore, they are more likely to adopt ERM to protect the firm from uncertain events, ensuring business stability and performance (González et al. 2020). Given this, the study presents that having a more gender-diverse board of directors might result in better ERM practices and better sustainability results (Fakir and Jusoh 2020).

The significant positive net effect validates the argument that CG promotes the pragmatic impact of ERM on performance. Thus, CG reinforces the nexus between ERM and insurers' performance. This supports the argument that the impact of ERM becomes more substantial when moderated by firm-specific factors (Farrell and Gallagher 2019), in this case, corporate governance because the board defines an organisation's risk management system, risk controls and subsidiaries as well as the risk appetite and strategy (Florio and Leoni 2017). This agrees with Gordon et al. (2009), who contend that the impact of ERM on performance depends on the linkage between ERM factors such as the executive board. One interesting thing from this study is that the unconditional effect of ERM on both performance measures was insignificantly positive. However, in the presence of the CG factors, their impact is enhanced due to their significant impacts. This strengthens the linkage between ERM and performance; hence, insurers can appreciate the benefits of ERM by ensuring proper CG structures. This is because the impact of ERM on performance becomes substantial when moderated by CG factors. The relevance and uniqueness of this finding is that, though ERM spurs insurers' performance, its effect is more remarkable in the presence of CG (board size, board independence and gender diversity). The empirical findings are consistent with the contingency theory, which stresses that the impact of ERM on performance is based on certain parameters; therefore, firms must choose from these parameters to obtain an 'ERM-mix' suitable for insurers (Mikes and Kaplan 2014).



Conclusion and recommendations

In recent years, the implementation of ERM has received great attention among scholars and practitioners. This has led to a growing body of literature on ERM and how it affects performance, leading to inconclusive results. Scholars argue that the successful implementation of ERM and its impact on performance is contingent on a strong corporate governance system. However, empirical evidence explaining how CG moderates the ERM-performance relationship remains nonexistent. Given this, this study sought to examine the impact of ERM on insurers' performance and how CG moderates the ERM-performance relationship between 2015 and 2019. An ERM index was constructed based on twelve features categorised into risk governance, operating mechanisms, and the quality of risk oversight. Based on the analysis, the baseline result identifies a positive nexus between ERM and the two performance measures (i.e., underwriting performance and return on assets). The positive relationship shows that ERM helps improve insurers' underwriting performance and profitability. Also, the study found that risk governance and oversight positively impact performance. This suggests the importance of these factors to corporate performance. Hence, firms interested in achieving higher performance must ensure a strong governance and risk oversight system. On the other hand, ERM operating mechanisms reveal mixed findings. The insignificant result could be attributed to the fact that the concept of ERM is still a recent phenomenon among insurers and may take time to gain momentum and relevance. This is justified by the fact that some insurers lack some of the features used in measuring ERM. Another possible reason for the insignificant relationship could be because of some contingency factors affecting this relationship. Hence, when insurers ensure the robust implementation of ERM by considering relevant factors, its significant impact will likely be evident.

Delving deeper into the impact of ERM on performance, the second objective investigates the moderating influence of CG (board size, board independence and gender diversity) on the ERM-performance nexus. The motivation for this study is that CG sets the tone and supports effective risk management. Empirically, the interaction between ERM and the CG factors reveals a significant positive impact on underwriting performance and ROA. This result indicates that the effectiveness of ERM engagement is heightened by a strong CG system. In addition, the positive net effects evince that CG complements the efforts of ERM in promoting insurers' performance. In a nutshell, these findings confirm the argument that the impact of ERM on performance is conditional on the presence of CG factors. This indicates that the relationship between ERM and performance is not solely direct due to other factors affecting the relationship. This argument supports the contingency theory of risk management, which suggests that firms must consider contextual factors to implement ERM successfully. Given the findings of this study, it is recommended that insurers ensure the proper integration of CG and ERM to improve their efficiency in enhancing performance.

Given that ERM practice, though incipient, is gaining recognition in emerging markets, this study has policy recommendations. First, insurance regulators



must emphasise the practice of ERM due to its positive impact on performance. To ensure its value implications, insurers should not see ERM as a regulatory policy but as a tool which provides a competitive advantage and achieves corporate objectives. Moreover, the implementation of ERM must be integrated into the operational and underwriting process of insurers due to its impact on underwriting performance. Further, to ensure the effectiveness of ERM, regulators and practitioners should observe its principles and procedures. This includes paying attention to its specific categories: risk governance, risk oversight, and operating mechanism, as these factors are essential elements of a robust ERM practice. Again, policymakers should recognise the importance of CG in driving the effectiveness of ERM on performance. Policymakers may help firms enhance the board's supervision of ERM by offering best practices and standards for governance frameworks and procedures. This should include the momentous rise of females on the board and appointment of independent directors with risk experience and knowledge, setting up clear reporting channels for risk supervision, and ensuring that the board's effectiveness in risk management is routinely assessed. There is also a need to integrate ERM principles into CG codes, encouraging CEOs and board members to get risk management training and providing incentives for businesses to implement proactive risk management techniques.

Regarding the limitations, the study created a comprehensive ERM index through content analysis and survey, but the sample size was limited due to firms' decision to participate. Hence, we recommend that similar research be carried out with a much larger sample. Also, the survey was based on respondents' knowledge of insurance firm risk practices, which may not be valid for all insurers. To address this, many respondents could verify the survey response in subsequent studies. Despite this, the study's results offer valuable insights into ERM literature and serve as a basis for further empirical investigation in emerging markets. Also, the features for measuring ERM are not exhaustive. Hence, future studies could include more ERM features, considering the updated COSO and ISO frameworks. Further, a comparative analysis between ERM and non-ERM firms could be explored to determine if there is any significant difference. Additionally, considering CG factors like CEO duality, ownership, board meetings, and board diversity can provide insights into how other CG factors moderate the ERM-performance relationship. Scholars should also consider how ERM influence firm sustainability. Again, future studies could explore how environmental, social and governance (ESG) indicators moderate the ERM-performance relationship.

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