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2022
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Enterprise Risk Management, Corporate Governance, Performance and Risk-Taking Behaviour of the Insurance Industry: Empirical Evidence from Ghana and South Africa

By

Sylvester Senyo Horvey

Doctoral thesis submitted in fulfilment of the requirements for the award of Doctor of Philosophy

The Graduate School of Business Administration, Wits Business School
University of the Witwatersrand

Supervisor: Prof. Jones Odei-Mensah

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ABSTRACT

The growing complexities in the business environment have led to the adoption of enterprise risk management (ERM). ERM is a new approach to managing organisational risks holistically to achieve its goals. Regardless of the diversities in the business environment, ERM has become an essential factor for businesses and is believed to enhance shareholder value. Despite the growing number of studies on ERM, literature suffers some limitations regarding its proxies and inconclusive results between ERM and performance. This study adopts a more comprehensive measurement of ERM, which captures various characteristics (such as risk governance, operational mechanisms, and quality of risk oversight) within the risk ecosystem. The study uses a panel regression technique on a sample of 33 and 63 insurers from Ghana and South Africa, respectively, covering 2015-2019. This thesis is centred on four thematic papers. Each focuses on a specific subject (s) at the heart of the problems or research questions being investigated.

The first paper provides a comprehensive and systematic literature review on the measurement and performance of ERM. Google Scholar was the primary search tool for ERM literature spanning 2001 to 2020, and papers listed in SCImago journal ranking were discussed. The study finds that most studies rely on secondary sources, particularly the Chief Risk Officer's appointment, as a simple ERM proxy. This is widely adopted in the literature due to the difficulty in assessing ERM information. The study recommends that empirical measurement of ERM rely on both primary and secondary data as they complement each other and allow more insight and factors to be considered for a robust ERM measurement. In terms of performance, the ERM literature reveals mixed findings, but enough evidence supports the assertion that ERM enhances firm profitability and value. The study suggests that scholars consider examining the ERM-performance relationship in emerging economies as most of these studies centred on the US and European economies.

The second paper analyses the determinants of ERM adoption in Ghana and South Africa using a panel logistic regression technique. Building on the contingency theory, the study posits that several factors contribute to ERM adoption. The study finds that firm size, ownership, leverage, industrial diversification and the type of audit firm are positively associated with ERM adoption in both countries. Findings from the quantile regression also highlight that the initial levels of size, profitability and leverage reduce ERM adoption, and an extreme increase in these factors promotes

ERM adoption, which implies a nonlinear direct U-shape relationship. On the contrary, the study sees an inverted U-shape for return on assets and leverage for Ghana. Industrial diversification, Big4 audit companies and ownership show consistent patterns of a significant positive effect on ERM adoption at different quantiles for both samples. The findings support the fact that insurers could improve their risk management system by considering the factors that significantly affect them.

The third paper first examines the impact of ERM on insurance performance (underwriting performance and Return on Assets) and second investigates how corporate governance (CG) characteristics such as the board size, board independence, and gender diversity interact with ERM in affecting insurance performance. The major findings are summarised as follows: (1) a positive relationship exists between ERM and insurance performance for both countries; and (2) board size, board independence and gender diversity interact with ERM in affecting underwriting performance and return on assets. This was mostly positive and significant in both samples. The study suggests that insurers interested in ensuring an effective ERM system should leverage these corporate governance factors to appreciate the overall impact of ERM on performance.

In the final paper, the study examines the linear and non-linear effects of ERM and CG on risk-taking behaviour. The result from the linear regression elicits a significant positive relationship between ERM and risk-taking for both countries, implying that insurers with a strong ERM system are more likely to pursue higher risks. The empirical evidence also suggests that board size and board independence have a significant positive impact on risk-taking for both samples. In contrast, gender diversity shows an inverse relationship with risk-taking. Using the dynamic panel regression by Seo et al. (2019), the study confirms non-linearities between ERM, CG and risk-taking. Evidence from the South African sample indicates that ERM significantly increases insurers' risk-taking beyond the threshold level. Again, the South African sample shows significant threshold levels for board size, gender diversity and board independence at 10.03, 0.274 and 0.547, respectively. The Ghanaian sample also documents significant threshold levels at 7, 0.286, and 0.692. The study recommends that insurers consider the significant threshold levels to determine the optimum level of risk that must be pursued.

Keywords: Enterprise Risk Management, Determinants, Adoption, Corporate Governance, Threshold, Moderators, Performance, Insurance, Risk-Taking.

JEL Classification: C2, C35, C36, G3, G22, G32

PUBLICATIONS AND RESEARCH OUTPUT

Prior to the submission of this thesis, portions of the thesis and other related areas have been published in peer-reviewed journals, while others are under review.

Peer-reviewed journal publications

Horvey, S. S., and Ankamah, J. (2020). Enterprise risk management and firm performance: Empirical evidence from Ghana equity market. *Cogent Economics & Finance*, *8*(1), 1840102.

Papers submitted/under peer-review

Horvey, S. S. and Odei-Mensah, J. The Measurements and Performance of Enterprise Risk Management: A Comprehensive Literature Review. *Journal of Risk Research* (221445852)

Horvey, S. S., Odei-Mensah, J. and Mushai, A. Th Determinants of Life Insurance Profitability in South Africa: New Evidence from a Dynamic Panel Threshold Estimation Technique. *International Journal of Emerging Markets* (IJOEM-08-2022-1225).

Horvey, S. S., Mushai, A. and MacGregor, A. The Determinants of Firm-Level Enterprise Risk Management Adoption: Literature Review and Future Directions. *Risk Management (*RMGT-D-21-00163).

Dube, A. and **Horvey, S. S.** Institutional quality and renewable energy capital flows in Sub–Saharan Africa. *Journal of Energy in Southern Africa* (12297).

Quaye, E. S., Ngcamu, L., **Horvey, S. S.** and Jarava, D. C. Personality traits, money attitudes, and consumer decision-making styles as predictors of investment products choice in South Africa. *Journal of Consumer Behaviour* (JCB-22-375)

Conference(s)

Horvey, S. S., and Odei-Mensah, J. (2022). Enterprise Risk Management and Insurance Performance in Ghana and South Africa: The Moderating Role of Corporate Governance. 6th International Conference on Applied Theory, Macro and Empirical Finance, Thessaloniki, Greece, 18-19 April 2022.

Horvey, S. S., and Ouma, N. W. (2022). Retail Philanthropy: Point of Sale Giving in South Africa

3rd African Philanthropy Conference, Johannesburg, South Africa, 2-4, August, 2022.

Horvey, S. S., Odei-Mensah, J. and Mushai, A. (2022). The Determinants of Life Insurance Profitability in South Africa: New Evidence from a Dynamic Panel Threshold Estimation Technique. 17th Economics & Finance Conference, Istanbul, Turkey, 5-7, September, 2022, upcoming event.

Research Awards

2021	**Third Prize** Centre on African Philanthropy and Social Investment, October 4-9.
2021	**Runners-up Award** Wits PhD Seminar, University of the Witwatersrand, August 30-31.

DECLARATION

I, **Sylvester Senyo Horvey,** with student number 2395495, hereby declare that this research report is my own work except as shown in the references and acknowledgements. It is submitted in fulfilment of the requirements for the award of Doctor of Philosophy at the University of the Witwatersrand, Johannesburg, South Africa. It has not been submitted before for any degree or examination in this or any other university.



…….

Sylvester Senyo Horvey

Signed at: Wits Business School

On the 8th August 2022

DEDICATION

To my late dad (Richard Kofi Horvey), mother(s) (Rosca Adwoa Mansah Jones, Leticia Horvey), sisters (Dela, Leticia and Rosca) and in-laws (Ernest and Rufai).

ACKNOWLEDGEMENTS

My ultimate gratitude goes to God the Father and our Lord Jesus Christ for His enabling ability and abundant grace bestowed on me. The PhD journey has been a long and extremely challenging one, but His perfect love towards me has brought me this far. For by strength shall no man prevail, but with God, all things are possible. I owe it a duty to extend my sincere appreciation to my supervisor, Prof. Jones Odei-Mensah, for all his support, tutelage and brotherly love throughout my doctoral journey. His profound encouragement at every stage of my study provided the yardstick that kept me going even when the going was tough. His unselfish mentorship and constructive feedback on every draft brought me this far. Your suggestions were superb, and words alone cannot show my appreciation to you, but I wish above all things that you may prosper and be in good health even as your soul prospers. I am also thankful to Prof Odongo Kodongo (PhD Director, Wits Business School) and Prof Paul Imhotep Alagidede for their unflinching support. I sincerely appreciate the selfless kindness and support from Dr George Tweneboah (Senior Lecturer, Wits Business School), Dr Arthur Linke (University of Stellenbosch), Dr Albert Mushai (Head of Insurance and Risk Management division, Wits University), Mrs Agata MacGregor (Lecturer, School of Business Sciences), Prof Robert Vivian (Professor, School of Business Sciences). I also thank Dr Eric Ofosu-Hene (De Montford University, United Kingdom), Prof Godfred A. Bokpin (Dean of Students, University of Ghana), and Dr Albert Gemegah (Dean of Graduate School, Wisconsin International University, Ghana) for the guidance and encouragement.

I have also received vast support from the Wits Business School writing retreat team. I want to use this special opportunity to thank Dr Pia Lamberti (Coordinator), Prof Terry Carmichael (Wits Business School), and Mrs Jean Moore (Wits University) for their diverse support in writing this thesis.

I also acknowledge the financial support from the University of the Witwatersrand through the Postgraduate Merit Award and the Bradlow Foundation PhD Scholarship. A big thanks go to Mrs Mmabatho Leeuw (PhD Programme Manager, Wits Business School), Ms Jennifer Mgolodela (Faculty Officer, Wits Business School), and all staff at the Wits Business School.

I say a big thank you to Dr Emmanuel Silva Quaye (Wits Business School), Mr Emmanuel Kwame Korsah, Dr Dennis Osei Boahene, Mr Prince Akomiah Sekyi, Mr Jacob Ankamah and Mr Raynold

Techie Menson, who have been true friends, brothers, and a source of encouragement. God bless you for the support. I also thank Dr Maurice Omane Agyepong (Ghana) for his support. To my friends, Raymond Agyepong Antwi, Bismark Opoku Appiah, Dr Elvis Okoffo Dartey, Partison Dartey, Richard Asare Boateng, Edmund J. Mbreku, Dr Samuel Nunoo (University of Ghana), Emmanuel Quarshie, Dr Disraeli Ohene Darko, Gabriel Teye-Ali, Dr Baah Aye Kusi, Mr Ebenezer Emmanuel Owusu, Dr Daniel Kwayisi (University of Ghana), Mr Isaac Brobbey (PENSA Ghana Coordinator), Mrs Deborah Cudjoe, Mr Senyo Kofi Cudjoe, Mr Jakubose Sibanda, Ms Evelyn Nyarko, Dr Monica Cudjoe and Mrs Gifty Akutek and husband.

I will also like to acknowledge Aps M. C. Asiedu, Aps Alexander Boakye Yiadom, Prophet Don Stewart, Pastor Matthew Owusu, Pastor Ebenezer Hagan, Pastor Ebenezer Korankye Agyapong, Pastor Kwadwo Obeng, Pastor Bernard Boakye Anyimadu, Elder(s) Foli, Johnson Akpabli, Enoch and Ernest Nyarko, Mr Frimpong and their wives for their prayers and encouragement throughout this journey.

Finally, to all those who have contributed in diverse ways towards my education until now, whom I have not named here, I say a very big thank you to all of you. I pray the Almighty GOD to shower you with His eternal grace and blessings.

The usual caveat applies.

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LIST OF ABBREVIATIONS

Abbreviations	Meanings
CAS	Casualty Actuarial Society
CEO	Chief Executive Officer
CG	Corporate Governance
COSO	Committee of Sponsoring Organisations of the Treadway Commission
CRO	Chief Risk Officer
ERM	Enterprise Risk Management
ERMI	Enterprise Risk Management Index
ESG	Environmental, Social and Governance
FSCA	Financial Sector Conduct Authority
GLS	Generalised Least Square
GMM	Generalised Method of Moments
GRC	Governance, Risk and Compliance
IM	Impact Factor
ISO	International Organisation for Standardisation
ME	Marginal Effect
NIC	National Insurance Commission
NPV	Net Present Value
OP	Operating Mechanism
OPI	Operating Mechanism Index

POLS	Pooled Ordinary Least Square
QRO	Risk Oversight
RBS	Risk-Based approach to Supervision
RE	Random Effect
RG	Risk Governance
RGI	Risk Governance Index
RIMS	Risk Management Society
RO	Risk Oversight
ROA	Return on Assets
ROE	Return on Equity
ROI	Risk Oversight Index
S&P	Standard and Poor's
SEM	Structural Equation Modelling
SJR	SCImago Journal Ranking
SSA	Sub-Saharan Africa
TRM	Traditional Risk Management
UK	United Kingdom
UNEP	United Nations Environment Programme
US	United States
VIF	Variance Inflation Factor
VUCA	Volatile, Uncertain, Complex, Ambiguous

DEFINITION OF KEY TERMS

Corporate Governance:	Corporate governance is a set of rules, policies, and practices that govern how a company's board of directors manages and supervises its operations.
Enterprise Risk Management:	A process, effected by an entity's board of directors, management and other personnel, applied in a strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objective
Risk Governance:	Establishes the risk management system's structure, defining roles, responsibilities and accountability while setting the guidelines for making risk management decisions
Risk Oversight:	Reveals the quality of risk oversight provided by the committee
Risk-Taking:	These are actions or decisions that involves danger or risks in order to achieve a goal
Operating Mechanism:	Explains the tools, techniques and procedures required for an ERM implementation

CHAPTER ONE
INTRODUCTION

1.1 Background of the study

Globalisation, an increasing number and magnitude of natural disasters, conflicts, human and social issues have contributed to the economic, business, and risk environments becoming more Volatile, Uncertain, Complex, and Ambiguous (VUCA) around the world (Gatzert & Martin, 2015). Organisations, therefore, are faced with an increasingly VUCA portfolio of risks, difficult to quantify and mitigate, which must be managed holistically whilst keeping the strategic objectives of the organisation in mind (COSO, 2017). The dynamic changing environment has led many companies to assume certain risks, such as technological changes, cyber risks, new laws and regulations, which have increased their risk-taking behaviour and risk appetite levels, leading to poor performance (Arena et al., 2010). Enterprise Risk Management (ERM) is a system that helps an organisation measure, assess and manage risk holistically, thereby protecting the firm from loss and generating value (Grace et al., 2015). Linke and Florio (2019) highlight that ERM increases the overall risk awareness of firms, leading to better results in operational and strategic decision-making processes.

Unlike historical silo-based risk management, ERM is promulgated to increase firm value and performance. It enables managers to assess their risk portfolio well and determine emerging risks and opportunities for better decision-making (Gatzert & Martin, 2015; Liebenberg & Hoyt, 2003). However, this also comes with an associated cost through the employment of human resources, financial resources, and IT systems (McShane et al., 2011). ERM is closely linked to the need for Governance, Risk and Compliance (GRC) as set out by global governance standards, as well as Environmental, Social and Governance (ESG) guidelines, for example, as put forward by United Nations Environment Programme (2019). Experts have called for the integration of these factors within the risk ecosystem (Bromiley et al., 2015). ESG presents new challenges to industries and the world at large. They influence risk factors and can have a major impact on an organisation's performance. To build a resilient industry, risks must be managed in a holistic and far-sighted manner while considering GRC issues. According to the Committee of Sponsoring Organisations of the Treadway Commission (COSO) (2017, pp. 6), "Governance sets the organisation's tone, reinforcing the importance of, and establishing oversight responsibilities for, enterprise risk

management." COSO further posits that as risk management evolves, it is very prudent to properly coordinate risk management activities and corporate governance for firm value creation.

So far, the context of empirical investigations on ERM has been limited to the US and European countries without any empirical evidence in developing economies, especially African economies. Compared to developed countries, the African market is faced with higher volatilities due to political risk, interest rate and exchange rate risk, and external risk. Insurers' activities are of high-risk nature, and the strength of risk management and its implementation thereof determines their growth and survival (Akotey & Abor, 2013). Insurance plays a key role in the economic growth and development of a country and helps protect organisations and society by mitigating risk (Liedtke, 2007). However, the insurance industry in Africa faces several challenges that are preventing its growth and development. PwC's (2018) report narrates some of these challenges as underinsurance, high level of business concentration, and risk management issues. They further reveal that urbanization, innovations, technological development and strengthening of the risk management system present new opportunities to broaden the insurance market.

According to a survey conducted by Deloitte (2019), the African insurance industry faces several challenges that make it lag behind. Their report revealed risk management as one of the key challenges. Deloitte (2019) further explained that Africa has the lowest insurance penetration rate in the world (2.7%), while sub-Saharan Africa (SSA) has the lowest literacy rate (59%) and the highest poverty level of about 42% (World Bank, 2018). In 2020, Africa's population was about 1.395 billion, which is 16.72% of the world's population. However, the penetration rate of insurance in Africa revolves around 2% on average, which is lower than the average emerging markets rate of 3.4% and the global rate of 7.3% (Swiss Re, 2020). This reveals that Africa is underinsured by showing low penetration and maturity of the insurance sector. Product development and innovation, resilient investment, and better risk management practices such as ERM will help broaden the scope of insurance penetration.

Based on the foregoing, it can be deduced that the ability of insurance companies to build resilience against the complexities and uncertainties, increase penetration, raise investor confidence, and enhance their performance and risk-taking behaviour is anchored on a robust risk management

technique. Failure to empirically establish the relationship between ERM, corporate governance, performance and risk-taking may have dire implications. First, it will impair risk governance and lead to poor risk management practices, which may affect their performance. Second, it may affect regulatory and board decisions on the policies that need to be made to enhance insurance performance and risk-taking decisions. Third, the survival of insurance companies may be in doubt amid uncertainties and economic crises. Fourth, failure to understand the relationship between ERM and risk-taking may lead to a wild west within an entity. Without a strong leadership (CG) available to establish and monitor the risk appetite and tolerance levels, managers will go for broke, which might result in goal incongruence, a major issue revealed in the agency theory.

One of the key players in the insurance industry in SSA is South Africa. The South African insurance industry is very competitive and has a well-developed insurance market compared to other African markets. It includes a variety of multi-channel distribution alternatives, including technology and digitalisation of insurance markets, which strong institutions and considerable legislative changes support. Nonetheless, there are issues of overregulation and the diversion of management attention from strategic growth opportunities (PwC, 2018). It has been recommended that significant regulatory changes and an effective risk management system will enrich the insurance market. Also, the Ghanaian insurance industry is seen as one of the fastest-growing industries in SSA. The industry has undergone several regulatory transformations, which presents growth opportunities. Some of these regulatory changes include the privatisation of state-owned insurance companies, separation of life from non-life companies, and the development of the risk-based supervision framework, which emphasises implementing a strong risk management system. On this note, this study concentrates on the insurance industry in Ghana and South Africa by examining the linkages between ERM, corporate governance, risk-taking and performance.

1.2 Overview of the Insurance Industry in Ghana and South Africa

This study aligns with prior empirical studies by examining two countries within the SSA context: Ghana and South Africa. The study chose the insurance industry because the concept of risk emanated from insurers, and they are in the business of managing the risks of others. Also, insurers operate in a highly regulated and competitive environment in which elements of ERM are largely required. The motivation for these two countries is because they have experienced an improvement

in their corporate governance practices and market capitalisation in recent years, and several regulatory policies on risk management have been conducted.

First, the Ghanaian insurance industry represents one of the growing insurance industries in SSA, with a penetration rate of about 1.1%. The insurance industry in Ghana has undergone several regulatory developments over the past years as a form of risk management. Some of these include the 'No Premium No Cover' policy, compulsory fire insurance for private commercial buildings, reinsurance premium transfers, and others. The choice of this country is further motivated by the fact that ERM has been adapted into insurers' risk framework in recent years. The National Insurance Commission (NIC) in 2014 issued a new solvency framework and, as part of measures put in place, adopted the Risk-Based approach to Supervision (RBS) of Insurers. A key issue in the RBS is for firms to adopt robust risk management practices to make regulated entities more efficient. These developments were made due to the recent financial crises in the banking and insurance industry, which led to the collapse and merging of companies such as Star Assurance, Starlife and Microinsurance into Star Assurance Group Limited and Regency Alliance and NEM Insurance. The NIC developed a corporate governance and risk management framework to guide the operational activities of insurers and enhance the effective supervision of the insurance companies. The new solvency framework guideline uses a risk-sensitive approach to determine the solvency of insurance companies. The risk-based approach provides a proactive assessment of risk facing an organisation. It serves as a tool for identifying and managing risks and ensures the effective management of organisational resources. Regulated entities are to ensure that robust risk management measures are embedded into their operations.

Second, South Africa has the biggest insurance industry in SSA, with a penetration rate of about 16.99%. The market is competitive compared to other insurance markets on the continent, as seen by many companies and diversified product offerings. In 2019, the insurance industry was made up of 74 life companies and 91 non-life companies. Attention to risk management and corporate governance has greatly increased following various financial scandals like Guptas' Oakbay and KPMG, which occurred in 2016 due to compliance and audit failures (Holtzblatt et al., 2020). One issue in the insurance industry was the "premium misappropriation" scandal by Insure group managers and the ghoulish fraudulent and dishonest claims from the life insurance industry in

2018. In response, several amendments were made, including revising risk management procedures and internal control processes, corporate governance changes and compliance controls. The South African insurance sector (both life and non-life) is regulated by the Financial Sector Conduct Authority (FSCA). The Registrar of life and non-life insurance in South Africa has developed guidelines on corporate governance and risk management for insurers which took effect in the second decade of the 21st century. These guidelines largely encapsulate the provisions of the King III code, which takes key interest in corporate governance, risk management and compliance. The King III code presents significant opportunities to firms that embrace its principles.

The introduction of the new solvency framework and corporate governance guidelines in Ghana and South Africa was to ensure that the regulation of insurers is in line with international best practices and that insurers are more efficient in their activities. As the Ghanaian and South African insurance industries have different characteristics compared to the rest of the world, the findings of this study advance knowledge of ERM within a new context. In light of the above premise, this study seeks to contribute to the body of knowledge by examining the insurance industry in Ghana and South Africa. Table 1.1 presents an overview of the insurance industry in Ghana and South Africa.

Table 1. 1 Stylised facts about the life and non-life insurance market in Ghana and South Africa

Ghana (GHS M)	**Industry**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Balance sheet							
Total Assets	Life	1,384	1,744	2,241	2,889	3,123	3,852
	Non-Life	895	1,320	1,506	1,863	2,375	2,859
Total Liabilities	Life	6.4	3.8	1.4	2,003	2,280	2,711
	Non-Life	17.6	13.5	14.3	890	1,179	1,467
Income Statement							
Gross Premiums	Life	581	706	859	1082	1337	1,651
	Non-Life	659	854	1070	1347	1600	1,834
Investment Income	Life	177	284	378	2479	2619	3,188
	Non-Life	89	118	886	142	1417	1,684
Claims							
Total Claims	Life	243	256	159	224	301	284
	Non-Life	237	555	329	272	208	241
The Industry	Life	19	24	22	20	26	24

	Non-Life	26	27	29	28	28	29
South Africa (R M)	**Industry**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Balance sheet							
Total Assets	Life	2,414,726	2,567,147	2,652,277	2,914,534	2,993,436	3,054,223
	Non-Life	116,352	121,875	131,831	152,498	149,882	201,453
Total Liabilities	Life	2,273,451	2,416,090	2,498,443	2,757,373	2,630,845	2,786,406
	Non-Life	72,202	76,742	82,350	86,394	85,097	99,0245
Income Statement							
Gross Premiums	Life	447,442	468,595	485,610	475,935	134,362	504,567
	Non-Life	98,962	109,901	116,722	128,557	29,407	46,772
Investment Income	Life	283,834	198,593	164,206	16,343	-76,999	673,003
	Non-Life	5,665	6,281	7,759	8,283	366	9,456
Claims							
Total Claims	Life	14,998	16,073	16,521	415,388	106,426	306,576
	Non-Life	43,679	44,581	46,840	49,067	12,083	37,034
The Industry	Life	73	74	72	71	65	74
	Non-Life	92	90	90	89	70	91

Source: Extracted from the annual reports of the NIC and FSCA

1.3 Problem Statement

1.3.1 ERM determinants

Following the big financial scandals and 2008 global economic crises, there have been several regulations on how firms should operate. Ghana and South Africa are no exception. The collapse and merging of financial institutions (for example, the acquisition of Alexander Forbes by Momentum Metropolitan, merging of Star Assurance, Starlife and Microinsurance into Star Assurance Group Limited, and Regency Alliance and NEM Insurance), corporate crises, and organisational scandals (example, Guptas' Oakbay) in these countries have introduced some regulations on risk management and corporate governance. Adopting a robust and dynamic approach to risk management has become critical to every business; hence, businesses are beginning to adopt an ERM system within their risk ecosystem. Despite the regulatory policies, there are firm-specific factors that drive their ERM adoption. To establish the influence of ERM on performance, one must first understand the factors that led to their ERM adoption (Bromiley et al., 2015). This is in line with the contingency theory, which says that the successful implementation of a system within an organisation is dependent on certain firm-specific factors (Woods, 2009). These are the causative factors that affect the behaviour of risk management. These factors can change over time and across events. Knowing these drivers will enhance management

decisions on how to manage them. This ensures the proper management and growth of these factors. This study focuses on the insurance market in South Africa and Ghana, where ERM is still gaining prominence. Besides the growing regulatory demand on the need for an integrated risk management system, this study aims to examine firm-specific factors that might have led to ERM adoption.

The question about what factors drive ERM adoption is scarce in the literature; hence there is not enough evidence as to why organisations adopt an ERM system. Identifying the determinants of ERM is very important so that in future crises, these factors can be properly managed to sustain organisations' viability. In recent years, maintaining organisational performance has been a major problem for most insurers in South Africa and Ghana. As indicated earlier, most insurers are experiencing underwriting losses while others are unable to sustain their business, resulting in the collapse and merging of some insurance companies. Therefore, it is important to identify some of these critical areas to ensure that the implementation of ERM is successful in these areas (Zhao et al., 2013). Moreover, previous studies have revealed mixed results on the various factors that affect ERM adoption. This may be because of differences in environmental characteristics (Lechner & Gatzert, 2018) and regulatory issues, as some organisations are more exposed to risks than others. So, empirical findings are not expected to be homogenous. For instance, Baxter et al. (2013) explained that insurers and banks are more interested in ERM implementation because they face a higher risk than others.

In addition, empirical studies conducted in this area have focused on Europe (Bohnert et al., 2019; Lechner & Gatzert, 2018); Malaysia (Golshan & Rashid, 2012; Razali & Tahir, 2011); and the US (Hoyt & Liebenberg 2008, 2011; Beasley et al., 2005; Pagach & Warr, 2011) without any empirical evidence from developing countries such as Ghana and South Africa. According to Lechner and Gatzert (2018), generalisations of empirical findings may impose a lot of limitations and challenges due to differences in dataset and environmental characteristics. Therefore, results that are valid for one country may not necessarily be applied in another context. There is, therefore, the need to further investigate the determinants of ERM in an emerging market context. Based on these arguments, this study seeks to examine the factors influencing the adoption of ERM among insurers in Ghana and South Africa. Another potential factor that has been ignored in the literature

is the level at which the determining factors influence ERM adoption. While previous studies considered a linear regression approach to examine the determinants of ERM adoption, the impact of the determining factors on ERM adoption at different levels is still lacking in the literature. This paper contributes to the literature by addressing such issues using the quantile regression technique.

1.3.2 ERM, Corporate Governance and Performance

Despite the various literature on ERM, empirical studies on the ERM-performance relationship remain limited and diverse (Florio & Leoni, 2017; Farrell & Gallagher, 2014). In addition, most of these studies are centred on the developed economies (Florio & Leoni, 2017; Lechner & Gatzert, 2018), with few (Silva et al., 2019; Horvey & Ankamah, 2020) empirical evidence from emerging markets. Hence the understanding of ERM among emerging economies is unclear and lacks empirical support. Silva et al. (2019) assert that organisational characteristics in developing countries are different from developed economies. He explained that emerging economies face several challenges and uncertainties that demand a strong risk management system. A report by PwC (2018) reveals that the insurance industry in Africa faces issues such as low penetration, underinsurance, high level of literacy and technological issues. They disclosed that technological innovations, good corporate governance and a robust risk management system present new potential to extend the insurance business. Therefore, this study contributes to knowledge by investigating the impact of ERM within the SSA context, particularly on insurance companies in Ghana and South Africa.

In addition, there have been inconclusive results in the literature concerning the relationship between ERM and performance. According to the literature, some studies reveal that ERM improves performance (Hoyt & Liebenberg, 2008, 2011; McShane et al., 2011) and enhances the value of the firm (Grace et al., 2015; Eckles et al., 2014). However, Lin et al. (2012) and Li et al. (2014) argue that a negative relationship exists between ERM and performance, while Beasley, Pagach and Warr (2008) and Pagach and Warr (2010) found no evidence of the ERM-performance relationship. The inconclusive results may be because of certain moderating factors affecting the relationship. However, 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., 2020), the role of the risk committee (Malik et al., 2020), financial literacy (Yang et al., 2018), and ERM maturity (Farrell & Gallagher, 2019) moderate the ERM-performance relationship, we are still not aware of how corporate governance moderate this relationship.

Literature has shown that ERM is more effective when integrated with other factors such as corporate governance (Gordon et al., 2009). This supports the contingency theory, which states that the relationship between two factors is mostly influenced by another factor; hence the impact of ERM on performance is subject to a number of influences (Woods, 2009). The 2017 COSO ERM framework is greatly concerned with the alignment of risk management with corporate governance. This is because ERM is a framework that is incorporated into the corporate governance system of a firm. Caldwell (2012) affirms that one of the major factors leading to a strong ERM system is the existence of proper corporate governance initiatives, of which board oversight is an essential attribute. However, the linkages among these variables have not been empirically tested, as studies have mostly focused on the direct relationship between ERM and performance. Regardless of the growing volume of academic literature on ERM, the relationship between ERM and firm performance will not be complete without examining its linkages with corporate governance. In line with these arguments, this study contributes to empirical knowledge by addressing the combined effect of ERM and corporate governance on performance.

1.3.3 ERM, Corporate governance and firm risk-taking

Risk-taking is very critical to the success of every organisation. Although organisations seek to minimise their risks, insurers cannot succeed if they do not take risks that are ex-ante profitable. Over the past two decades, the extant ERM literature has focused on the value of ERM, the driving force for ERM, and its implementation within an organisation. Despite the growing literature on ERM, empirical evidence regarding the impact of ERM on insurers' risk-taking decisions is inchoate. Therefore, there is a need to deepen the understanding of how ERM affects insurers' risk-taking behaviour because the essence of implementing ERM is to ensure that firms are proactive and have adequate resources to manage and control their risk. However, it remains in doubt whether ERM influences firms to take more, less or no change in their risk. Even though ERM supports firms in managing their activities within an acceptable risk appetite level, there are

certain situations where risk management fails to ensure that insurers take the right amount of risk. However, this is yet to be empirically examined.

Furthermore, Adams and Jiang (2016) highlighted that insurers were affected by the 2008 global financial crisis due to poor corporate governance systems and risk-taking decisions. Elamer et al. (2018) state that enhancing corporate governance among insurers will affect their risk decisions as a good corporate governance system is connected to good risk-taking of insurance companies. There have been studies on corporate governance and risk-taking (Elamer et al., 2018; Matthew et al., 2016; Su & Lee, 2013; Laeven & Levine, 2009; John et al., 2008). However, empirical evidence on how ERM and corporate governance affect insurers' risk-taking, especially in the Ghanaian and South African contexts, has been less explored. Given the significance of corporate governance and ERM, many assume that this may reduce firm risk-taking. Nevertheless, the complexity of insurance firms, attitudes of risk managers, and shareholders' interest might influence firms' risk-taking behaviour. In addition, empirical studies have failed to examine the threshold dynamics of these relationships. It is argued that when ERM and corporate governance factors fall below or above a certain threshold level, their impact changes (Aebi et al., 2012; Florio & Leoni, 2017; Horvey & Ankamah, 2020). However, the precise impact of these factors below or above the threshold level remains unclear in the literature. This study provides a detailed understanding of how these factors should be developed to enhance insurers' risk-taking from the policy perspective. In light of the above premise, this study investigates the linearity and nonlinearity between ERM, corporate governance and insurers' risk-taking.

1.4 Research Objectives

The central objective of this thesis is to examine the nexus between ERM, corporate governance, performance and risk-taking among insurers in Ghana and South Africa. Specifically, the study seeks to:

i. Examine the determinants of ERM adoption among insurers in Ghana and South Africa.
ii. Investigate the impact of ERM on insurers' performance. This objective also unearths the moderating effect of corporate governance on the ERM-performance relationship.
iii. Examine the linearity and nonlinearity between ERM, corporate governance and insurers' risk-taking.

1.5 Research Questions

The above objectives yield to the following research questions:

i. What are the determinants of ERM adoption among insurers in Ghana and South Africa?
ii. What is the impact of ERM on insurers' performance? Does corporate governance moderate the ERM-performance relationship?
iii. Does a linear and non-linear relationship exist between ERM, corporate governance, and insurers' risk-taking behaviour in Ghana and South Africa?

1.6 Justification

ERM has received great attention over the past two decades. Many businesses have started implementing ERM because it enhances the value and performance of an organisation. Over the years, studies on ERM have been centred on its implementation, value, and determinants. While some studies adopt a qualitative and a survey approach, others adopt a quantitative approach to investigating the value and influencing factors of ERM adoption. Despite the studies that have been conducted, empirical literature remains limited, especially within the African context. Also, empirical studies face measurement problems, with many relying on a binary approach to ERM measurement. This study introduces a comprehensive measurement for ERM, which seeks to capture its governance, oversight and operating mechanisms. The study follows the work by Florio and Leoni (2017) on ERM measurement while considering other variables which have not been factored in their model to make it more robust.

The first contribution of this study is to provide a review of the various measurements adopted in the literature to measure ERM and how it influences firm performance. It explores the empirical literature and introduces a missing link that serves as recommendations for further studies. The study argues that getting a comprehensive measurement for ERM will significantly contribute to the literature and be good for policymaking. In addition, the ERM-performance relationship could further be investigated by considering indirect factors that are likely to affect this relationship.

According to the research objectives, the second contribution is to examine the factors influencing ERM adoption in the insurance industry. The growing complexities of organisational risks have influenced firms to adopt a holistic approach to risk management. However, there are firm factors

that influence their ERM adoption; hence, this study employs both the linear and quantile regression approach to examine this phenomenon. The empirical literature on the determinants of ERM adoption remains inconclusive. Again, little is known about why insurers adopt ERM in Ghana and South Africa, which has not been done so far. Thus, an analysis of the drivers of ERM adoption is expected to advance our understanding of the under-investigated insurance market in Ghana and South Africa. This may be of support to industries and organisations that are addressing the new risk management requirements. Another justification for this study is that the linear regression is complemented by the quantile regression approach, which provides a more comprehensive picture of the determining factors at different levels. The quantile regression approach allows for variations in the coefficients for the entire distribution (Bassett & Koenker, 1978).

Researchers have conducted studies on ERM from diverse perspectives with emphasis mostly on Europe, Malaysia, and the US. However, empirical evidence from the context of developing economies remains limited. As Lechner and Gatzert (2018) stated, generalisations of empirical findings across industries and geographical locations may impose a lot of limitations due to the differences in characteristics. Following the number of regulatory interventions stressing the relevance of risk management in corporate organisations, studies on ERM in Ghana and South Africa could still be undertaken to make justifiable contributions to the empirical literature. In doing so, this study contributes to the diverse argument on ERM and performance relationship in a new context. More so, the complex relationship between ERM and performance may be moderated by some other factors. It is argued in the literature that there is an indirect linkage between ERM and performance through corporate governance (Sekerci & Pagach, 2019; Gordon et al., 2009); however, empirical studies remain silent about this. Corporate governance plays a key role in ERM implementation and its relevance. The board of directors sets the tone and provides resources for an efficient ERM system (Lundqvist, 2015). Sekerci and Pagach (2019) support this argument by stating that an improved CG enhances ERM adoption because CG helps in risk management monitoring. The second objective contributes to knowledge by considering an indirect approach to the ERM-performance nexus by making a case for corporate governance as a moderating factor. This study highlights which corporate governance variable contributes to the ERM process. This supports the theoretical proposition made by COSO (2017) about the linkages

between ERM and corporate governance. The findings of this study are important for policy implementation. It supports organisations that need further directives on ERM implementation and firms that seek to adopt a holistic approach to implement risk management.

Finally, just as literature on ERM and performance keeps growing, empirical studies on how ERM and corporate governance affects risk-taking decisions remain limited. While literature states that firms with high risk adopt a risk management system (Hoyt & Liebenberg, 2008, 2011; Pagach & Warr, 2011), no study, to the best of the researcher's knowledge, seems to look at how the adoption of ERM affects firms risk-taking decisions. The success of insurance firms depends on how they take risks. Insurers' ability to manage risks leads to an increase in shareholders' value. For risk-taking to increase shareholders' value and profitability, there must be an improved ERM system and good corporate governance structures (Sekerci & Pagach, 2019). The relationship between ERM, CG and firm risk-taking has many implications. This is an important gap in the literature that will provide insight into how ERM influences risk-taking, which will also provide insight into the necessary policy decisions that need to be made. To deal with the endogeneity problem, the study employs the generalised method of moments (GMM), which considers the lag of the dependent variable to examine how previous risk-taking decisions affect current decisions. The findings of this study, without any doubt, are very important for policymaking. Again, the study examines the nonlinearity between ERM, CG and risk-taking, which has not received much attention. This study reveals the effect of these factors under two different regimes, thus below and above the threshold level. With this, the study proffers concrete policy recommendations for managing these relationships.

1.7 Thesis Structure

The thesis consists of six chapters.

Chapter Two: This chapter provides a comprehensive literature review on the measurements and impacts of ERM. Google Scholar was the main search engine used in collecting empirical works between 2001 and 2020. Articles listed in the Scimago journal ranking were chosen for the review. SCImago is a multidisciplinary database that provides index ratings for all journals based on Scopus/Elsevier's extracted data. This chapter provides fresh insight into the gaps in the literature and provides recommendations for future studies.

Chapter Three: This chapter foretells the various determinants of ERM adoption among insurers in Ghana and South Africa. The logistic panel and quantile regression techniques are used to examine this relationship. This is due to the binary nature of the dependent variable (ERM adoption). A sample of 96 insurance companies from both countries was examined between 2015-2018. It addresses the similarities and differences of the determinants between these two countries. Sensitivity and univariate analysis across the ERM status first compare the univariate differences between ERM firms (ERM=1) and non-ERM firms (ERM=0).

Chapter Four: This chapter first examines the impact of ERM and Corporate governance on the performance of the insurance industry. An ERM index was developed based on twelve main features categorised under risk governance, operating mechanism and the quality of risk oversight. A static model was chosen to examine the impact of the individual categories on performance. The overall ERM index was also examined to determine its relationship and significance. Also, the interactions between ERM and the corporate governance variables were assessed in relation to performance. The study followed the conditions specified in Brambor et al. (2006) to test for the joint significance of the constitutive and interaction terms to arrive at the net effect of the ERM and corporate governance factors on insurance performance.

Chapter Five: This chapter focuses on the linearity and nonlinearity between ERM, corporate governance and insurers' risk-taking behaviour. The study employed several techniques to assess these relationships. The generalised method of moments (GMM) proposed by Arellano and Bond (1991) was adopted to investigate the linear relationship. This technique was adopted due to the significance of the lagged dependent variable (Risk-Taking). Incorporating the lagged term may cause endogeneity problems that the GMM controls. There is a suspicion of a possible endogeneity problem between ERM and risk-taking. While ERM may influence risk-taking behaviour, insurers' risk-taking decisions may also influence the implementation of ERM. The study further employs the dynamic panel threshold model developed by Seo and Shin (2016) and Seo et al. (2019) to examine the non-linear relationship. This aspect sought to determine if nonlinearity exists in the model and to know the effect of the threshold variables below and above the threshold indicator.

CHAPTER TWO

THE MEASUREMENTS AND PERFORMANCE OF ENTERPRISE RISK MANAGEMENT: A COMPREHENSIVE LITERATURE REVIEW

2.1 Introduction

Enterprise risk management (ERM) has gained popularity among business practitioners and academics over the past two decades. Uncertainties, high volatilities, and complexities in the business environments have exposed the traditional risk management (silo) system's limitations. Global economic crises, coupled with pandemics, have triggered various risk factors affecting every aspect of an organisation. These have raised awareness, hence calling for the need for a comprehensive and robust risk management system for businesses since most of these risks cannot be treated in isolation (Hoyt & Liebenberg, 2011). ERM provides a shield to organisations by anticipating and providing resources to manage any unforeseen events. Before the development of ERM, businesses were managing risks in silos. This approach of concentrating on specific risks was not helpful due to issues associated with risk oversight, duplication of resources and its focus on internal risks. Enterprise risk management is the strategic process of planning, identifying, assessing, managing, monitoring, and communicating organisational risks in an integrated manner. ERM provides a top-down holistic strategic view of risks (Horvey & Ankamah, 2020). The Committee of Sponsoring Organization of the Treadway Commission (COSO) defines ERM as:

'A process, effected by an entity's board of directors, management and other personnel, applied in a strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives' (COSO, 2004).

Industries, professionals, regulators, rating agencies, international standard organisations and business consultants have been encouraged to implement ERM as its implementation is believed to enhance shareholder value and profitability (Lechner & Gatzert, 2018). Firms need to take advantage of this opportunity to overcome any financial uncertainties. Despite the relevance of ERM, there have been several arguments in the literature about the benefits and pitfalls of ERM. Theoretically, the implementation of a risk management system such as ERM could enhance firm

value. According to the modern portfolio theory, firms operate in an imperfect market; hence, risk management's value creation attribute can be enhanced when firms exploit the advantages in an imperfect market (Markowitz & Todd, 2000). Markowitz (1952) posits that shareholder's value is not enhanced by risk management because shareholders can, without much stress, spread their risk; hence, only the systematic risk is relevant. In view of that, all risk management practices have a negative net present value (NPV) and must, therefore, not be implemented. However, Beasley et al. (2008) explain that the hostile NPV project resulting from the firm's reduction of idiosyncratic risk is based on the notion that capital markets work devoid of resistances and deficiencies. When such resistances and deficiencies are introduced, it reveals the value creation activity of ERM. Meulbroek (2002) adds that a firm should not focus on an individual risk as this may create other types of risks that may affect the firm. Hence, when ERM is adopted, it enables the firm to manage all kinds of risks in an integrated manner. Thus, ERM supports the firm in identifying the full potential of risks and ways of eliminating unfavourable risks and hedging contracts that affect the natural hedging of risks within the portfolio (Eckles et al., 2014).

While some scholars argue that ERM is a problem-solving activity, others see it as part of the problem. According to Power (2009), ERM's security is illusory, which leads to the risk management of nothing. However, Farrell and Gallagher (2019) argue that ERM serves as a facilitator, which creates a competitive advantage for firms. The foredeal and afterdeal of ERM have been extensively discussed in the literature. One of the major obstacles in the ERM literature is non-disclosure, as many firms fail to disclose their ERM activity (Lundqvist, 2014). As a result, different methodological approaches have been employed to measure ERM. This phenomenon has created many inconsistencies in the result of ERM. Against this backdrop, this paper provides a comprehensive and systematic review of ERM measurement in the existing literature. It identifies the procs and cons of each measurement and makes suggestions for further studies. Again, the paper examines the value implications of ERM implementation. This is a response to the increased attention given to ERM in the 21st century. Google Scholar was the main search engine used in selecting the ERM literature. The search spanned a period of two decades, that is, from 2001 to 2020. The final criteria used in selecting ERM articles was that the paper must be indexed in the SCImago Journal Ranking (SJR) indicator. SCImago reveals the importance of scholarly journals

and citations received, which is explained by the H index. A total of twenty-nine (29) articles were used for the discussion on ERM

The findings from the systematic literature review reveal different approaches to ERM measurements. Scholars either use a survey approach or rely on secondary sources for their ERM information and measurements. According to the literature, most scholars rely on the appointment of the Chief Risk Officer (CRO) as a simple proxy for ERM adoption. This approach is widely used because of the difficulty in identifying ERM information. In the absence of the CRO, other scholars adopt the Standard and Poor's (S&P) risk management rating, COSO (2004) objectives, RIMS, and the survey approach. A comprehensive ERM measurement approach, which considers risk governance issues and operating principles, was also considered in some studies. These inconsistencies affect the value implications of ERM as scholars are comparing "apples to oranges."

Regarding performance, our findings show that the ERM literature cuts across different industries and geographical areas. Also, different estimation techniques, time periods, and performance measures are used to examine this relationship. Quantitative approaches and secondary sources of information were mostly adopted. Due to these diversities, the literature on ERM and performance reveals mixed findings; however, the study finds enough evidence that ERM enhances firm performance and shareholder value. Besides, a higher level of ERM maturity is found to significantly impact firm performance.

This chapter contributes to the ERM literature in several ways. First, it provides a comprehensive and up-to-date discussion on the various measures and value of ERM. It identifies the strengths and weaknesses of each approach in measuring ERM and provides suggestions for future research. Second, it serves as a reference point for researchers who are interested in having a detailed understanding of the ERM literature. Third, the paper provides trend analysis, geographical contexts, and different estimation techniques used to examine the relationship. This serves as an initial point for identifying research gaps for further studies.

The rest of the chapter is structured as follows: The second section discusses the methodological approach used in selecting empirical literature for the study. Section three presents empirical findings on the measurement of ERM. Section four presents empirical findings and discussions on the relationship between ERM and firm performance. The final section addresses the conclusion, limitations, and recommendations for further studies.

2.2 Methodology

This chapter presents a systematic and comprehensive review of ERM literature on the measurement and performance of ERM. Only published papers in peer-reviewed journals were selected to examine the impact and measurement of ERM. An advanced literature search was conducted on Google Scholar for peer-reviewed articles. A keyword search on the terms "ERM and firm performance" and "Value of ERM" were used to select empirical studies. The search period for the literature was two decades. That is, from 2001 to 2020 because empirical studies on Enterprise Risk Management were first seen in literature in 2001 (Dickinson, 2001). The first search was done on 17th March 2020, and the last on 20th December 2020. A search within the database produced over 2000 articles. Each page revealed ten articles. To ensure that more recent studies were included in the study, an advanced search was conducted to include articles published from 2015 to 2020. This was done to ensure that the study reveals current issues on the measurement and the ERM-performance relationship. Articles selected were based on the titles, abstracts and full text. The final sample of papers was twenty-nine (29).

2.3 Journal Credibility

The final criteria used in selecting peer-reviewed articles was that the paper must be listed in the SCImago Journal Ranking (SJR) indicator. SCImago is a multidisciplinary database that provides index ratings for all journals based on Scopus/Elsevier's extracted data. This is to ensure that relevant articles in the subject area were included in the review. SCImago reveals the importance of scholarly journals and citations received by that journal explained by the H index. SCImago corrects many of the factors criticised in the journal impact factors (IF) because of the inclusion of more journals, longer periods of citations (3 years), and limits self-citations. "It also weighs citations according to the importance of the journal where they were published, using an algorithm similar to that of Google PageRank" (Falagas et al., 2008, pp. 2623). Table 3 in the appendix

provides the details of the journals and their SCImago H index. The journal H index of the papers ranged from 3 to179. Figure 2.1 describes the subject area of the journals.

2.4 Subject Areas

The journals were grouped based on their subject areas in SCImago. It reveals the importance of scientific influence and the prestige of the journals. The subject areas are presented in Figure 2.1. The subject area with the highest journal publication was Business Management and Accounting, representing about 65.52% of the total papers used for the review, followed by Economics, econometrics, and finance, which had 20.69%. Decision Science, Psychology, Engineering, and Arts and humanities were the subject areas with the lowest journal publication, which had a score of 3.45%.

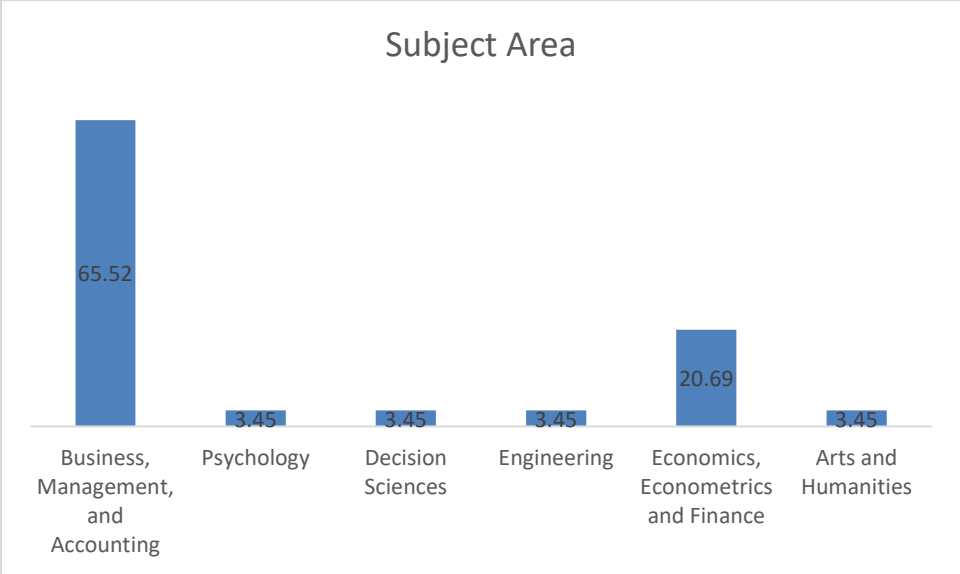


Figure 2. 1: Subject Areas for SCImago

2.5 Literature review on ERM measurement

The empirical literature on ERM measurement is multifaceted. This is as a result of the different approaches used in collecting ERM information. While some researchers preferred public data, others identified the presence of ERM through surveys. The section explains the various approach used in measuring ERM.

2.5.1 CRO/ERM Keywords:

Liebenberg and Hoyt (2003) were the first to adopt the CRO as a simple proxy to measure ERM. Many scholars followed the same approach by relying on the CRO or ERM keyword search on the company's profile for their ERM measurement. That is, CRO equals one if the firm has a CRO, otherwise zero (Beasley et al., 2005; Beasley et al., 2008; Hoyt & Liebenberg, 2011; Pagach & Warr, 2011; Golshan & Rashid, 2012; Lin et al., 2012; Eckles et al., 2014; Farrell & Gallagher, 2015; Lechner & Gatzert, 2018; Silva et al., 2019; Nguyen & Vo, 2020). Most studies rely on this simple proxy because of ERM measurement complexities (Pagach & Warr, 2011), and lack of disclosure of ERM requirements (Lundqvist, 2014). More so, this proxy is used because firms that have adopted an ERM system must have a risk expert or CRO (Pagach & Warr, 2011). It is also argued that a CRO's employment is a signal that firms have adopted an integrated approach to managing their risk (Beasley et al., 2005; Bohnert et al., 2019).

However, this approach is not without limitations. The challenge with this approach is that a single variable may not be a good predictor of ERM adoption because the hiring of an individual may not necessarily reflect a well-implemented and an effective ERM system (Lundqvist, 2014), especially, in situations where CRO may not correspond to an ERM system (Sekerci & Pagach, 2019). Again, a simple proxy makes it challenging to identify the extent of an ERM implementation (Gatzert & Martin, 2015). It is also possible that firms may create this position as 'window dressing' to comply with regulatory or corporate governance requirement; hence, most firms create this position to please regulators and the board. This implies that studies that focus only on the CRO may fail to provide a good impression of ERM implementation and performance. It is also possible that firms may employ a different expert, such as the internal auditor or the chief financial officer to perform the CRO's responsibilities.

2.5.2 RIMS Risk Maturity Model:

Instead of relying on the CRO, other scholars relied on a more sophisticated approach that gives a broader ERM measurement perspective. For instance, Farrell and Gallagher (2015, 2019) construct an ERM index using the seven attributes of the Risk and Insurance Management Society (RIMS) Risk Maturity Model. The performance of each attribute was measured based on specific competency drivers. These are ERM adoption-based approach (the level of support for ERM by

the board), ERM process management (the integration of ERM process into daily practices), risk appetite management (the risk portfolio view and risk-reward tradeoffs), root cause discipline (ability to identify specific trends to minimise adverse effects and maximise value creation), uncovering risk (ability to identify threats and opportunities for effective mitigation and exploitation), performance management (the ability to align strategy with risk management to execute business plans), and business resilience and sustainability (the ability to recover from business setbacks and maintain value).

Each of these attributes was classified into five maturity levels which are stated as, 1. *Ad hoc:* ERM depends on individuals with insufficient understanding. 2. *Initial*: where risk management is done in silos. 3. *Repeatable*: the approach to risk management is established with the help of risk framework. 4. *Managed*: ERM fully integrated into the management process), and 5. *Leadership:* risk-based discussions are embedded in the strategic process with clear understanding. Notwithstanding, Farrell and Gallagher (2015) relied on a dummy approach for their ERM measurement. ERM equals one if the firm's RIMS Maturity model is Ad hoc or Initial and zero otherwise if its RIMS Maturity model is either Repeatable, managed or Leadership. As compared to the S&P risk management rating, the RIMS index provides a comprehensive assessment of an organisation's risk attributes, including risk appetite and performance management. However, the RIMS index is based on survey data which is exposed to response bias.

2.5.3 S&P Rating:

Another approach to measuring ERM is the Standard and Poor (S&P) risk management rating. McShane et al. (2009) first adopted this approach to construct an ERM index with the S&P rating. The S&P rating is a risk management tool developed to assist in rating the insurance and banking companies (Linke & Florio, 2019). The results from their ERM rating were classified as: very strong, strong, adequate, and weak. Other studies followed a similar approach to investigate the dynamic capability and value of ERM (Quon et al., 2012; Baxter et al., 2013; Nair et al., 2014; Bohnert et al., 2019). The challenge with this approach is that the S&P rating is limited and not applicable to every firm but can only be applied by some selected firms (Insurance and banks) hence, there is the need for a proxy that can be broadly applied. Florio and Leoni (2017) note that the S&P rating is highly dependent on their definition of ERM and must be further evaluated for

its appropriateness for measuring ERM and content validity. Bailey (2019) further adds that the S&P rating does not include risk experts' expertise and ignores ERM quality variations. Farrell and Gallagher (2015) stress that the S&P rating is based on a limited number of subfactors rated as positive, negative, or neutral. They add that the S&P rating fails to investigate organisation risk management capabilities and practices thoroughly.

2.5.4 COSO Framework:

Gordon et al. (2009) pioneered an ERM index with the COSO framework's four main objectives (Coso, 2004). The objectives are strategy, reporting, operations, and compliance. Their index was constructed based on a combination of these factors. Information such as sales, total assets, number of employees, material weakness, auditor opinion, restatement, auditor fees and accruals were gathered from a secondary source to measure their ERM variables. Similarly, Malik et al. (2020) adopt this approach to examine the impact of ERM on firm performance in the UK. This approach describes how effective an organisation is in achieving its ERM objectives. However, this approach relies on the main objectives of ERM without explicitly looking at what goes into the ERM implementation. Non-ERM firms can achieve these objectives; hence a robust ERM measurement should consider the factors contributing to ERM implementation. Again, Lundqvist (2014) point out that these variables are used with different definitions from different sources; therefore, this measure should be developed from more related information to ERM. Besides, Callahan and Soileau (2017) use a survey approach in the form of a questionnaire to measure ERM based on the four output components of the COSO framework to examine how firms with a higher ERM maturity level affects achieve higher operating performance.

2.5.5 Survey:

To overcome the challenge of identifying ERM information from public sources, Mardessi and Arab (2015) relied on a survey approach to construct an ERM index by asking firms specific questions about their ERM implementation. The survey questions were based on the firms risk management process and the significant risks encountered by firms. Ping and Muthuveloo (2015) adopt this approach to examine the impact of ERM on performance. The survey questions are based on the four main objectives of the COSO framework. Furthermore, Grace et al. (2015) rely on Tillinghast Towers Perrin's survey information to identify specific aspects of ERM that

contribute to firm value. These factors were: economic capital model, dedicated risk manager, risk manager report to the board/CEO, risk committee, and the reflection of risk management in firms decisions. The survey approach provides detailed information about firm ERM practices and information which may not be found in the firm's public statements or reports. Nevertheless, the survey approach can lead to biased results, potentially misleading us since firms may be attempting to give a good impression of their ERM implementation.

2.5.6 Hazard Ratio:

Khan, Hussain and Mehmood (2016) used the hazard ratio, which is a combination of CRO announcement and the exact time of announcement. This is not sufficient as most firms do not disclose in their report when they made their first CRO appointment. Also, it is possible that a firm would implement ERM without hiring a CRO. A hazard approach to ERM measurement excludes the principles and dynamics of ERM (Bailey, 2019).

2.5.7 Risk Governance:

Recent studies in the literature adopt a more comprehensive approach to ERM measurement. Florio and Leoni (2017) resorted explicitly to governance-related and operational related ERM variables. Their governance-related variables were CRO, the risk committee's presence, frequency of risk committee report to the board, and the operational-related variables were Risk Assessment frequency, level, and method. An ERM score was given based on the sum of these variables. Aebi et al. (2012) use the presence of a risk committee to measure ERM. A risk committee is a body charged with managing and monitoring risk management activities within a company (Linke & Florio, 2019). The risk committee was based on specific characteristics such as the number of committee meetings, number of directors and the percentage of independent directors. A more recent study by Horvey and Ankamah (2020) constructed an index based on risk governance variables. Their index construction was based on the risk manager's title, risk committee, risk department, board independence, auditor type, ERM adoption and risk management plan.

In summary, empirical studies have revealed different approaches to measuring ERM. Researchers rely on publicly available information or primary information to measure ERM. These have led to inconclusive results on the value implications of ERM due to the different approach to collecting

ERM information. Each approach identified in the literature comes with its own limitations. To establish a better proxy for ERM, there must be a better understanding of what ERM is. Considering these, this study calls for ERM measures that include the ERM principles, process, maturity, and quality of risk oversight.

2.6 Literature review on the impact of ERM on firm performance

This session discusses the literature on the relationship between ERM and firm performance. The review was based on the methodology, geographical context, estimation techniques, and ERM performance. Different performance measures have been identified in the literature. A trend analysis was provided to indicate the growth of ERM literature over the years. Table 2.1 presents a summary of the literature on ERM and performance. The table presents information about the author, year of publication, scope, objective, methodology, ERM measurement, performance indicator, relationship, significance, and findings. The review is based on a discussion of twenty (22) papers.

2.6.1 Trend Analysis of ERM papers

Figure 2.2 reveals the trend analysis of ERM papers published within the period 2008-2020. It is noteworthy that the literature on ERM and performance has been growing since its first publication in 2008. However, publications across the years have been volatile, with 2020 recording the highest literature produced in a year. The trend of research into ERM is expected to increase because firms in other areas are resorting to ERM implementation. More so, the need to build resilience through a robust risk management system has been recommended by most regulators in different contexts.

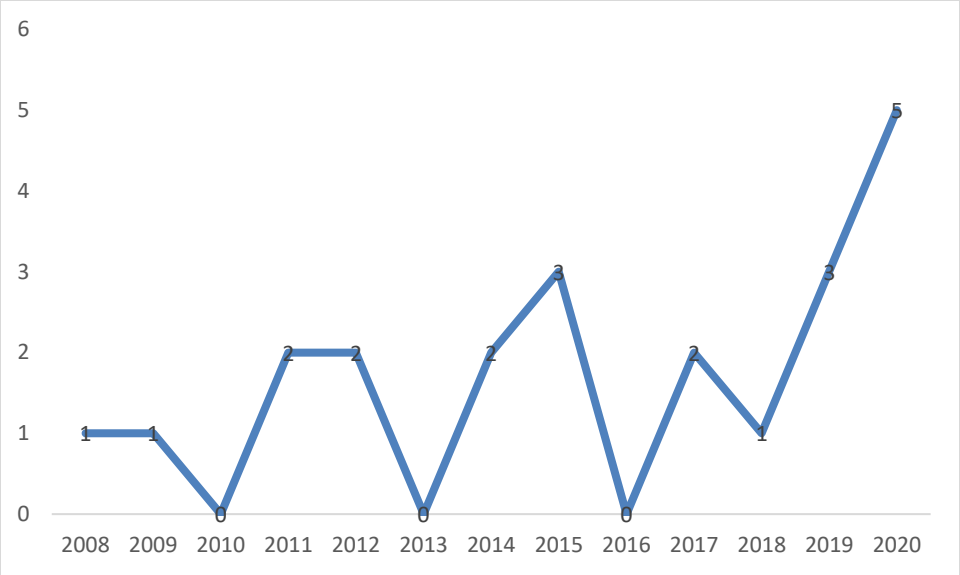


Figure 2. 2: Empirical studies from 2008 to 2020

2.6.2 Geographical context

The context of a study is vital in a scholarly article. This is due to the differences in the contextual details and boundary conditions. The geographical distribution also reveals the extent of practice, development and active contributors to ERM. Geographically, academic literature on ERM and performance was specific to individual countries except for Bohnert et al. (2019) and Nguyen and Vo (2020). They conducted a cross-country analysis for European countries, while Farrell and Gallagher (2015, 2019), using the RIMS database, analysed countries in Australia, Canada, UK and US. Figure 2.3 provides a summary of the geographical areas of ERM literature. It indicates that the US and European countries are the leading research productivity for ERM and performance, while other contexts have been less explored. This is not surprising since the concept of ERM evolved in the US and European countries; hence it is more likely to receive much attention in these areas. It also suggests that ERM has not received the global attention it deserves, which is very important because business uncertainties and risk exposures are inevitable and affect every organisation regardless of its geographic location. This is a great call to scholars to conduct further research on ERM, especially in emerging economies, as studies across geographical boundaries are not homogenous.

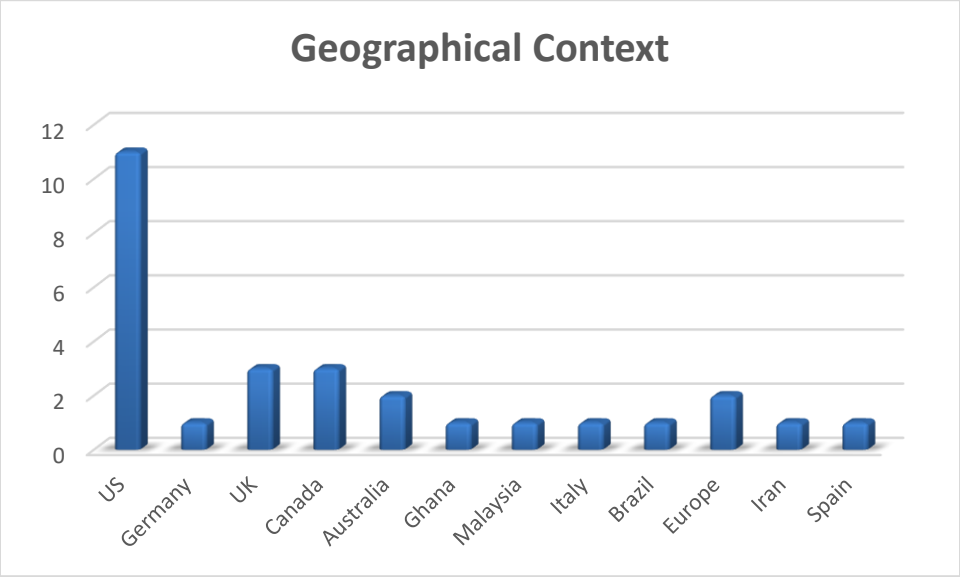


Figure 2. 3: Geographical Areas

2.6.3 Estimation Method

All the studies adopt a quantitative approach to examine the impact of ERM on performance. Different methodological approaches were used to examine this relationship, and information is generally gathered from secondary sources except for Ping and Mutheveloo (2015), Grace et al. (2015) and Saeidi et al. (2020). They used a survey approach for their data collection. Different estimation techniques were used to examine the relationship between ERM and performance in cross-sectional and panel data forms.

2.6.3.1 Ordinary least square estimation

Beasley et al. (2008) were the first to examine the relationship between ERM and performance. Their multiple regression was estimated using an ordinary least square (OLS) estimation technique to investigate how the market reaction to a CRO's hiring affects shareholders' value. More so, the OLS technique was adopted by Eckles et al. (2014), Florio and Leoni (2017) and Malik et al. (2020) to estimate this relationship. This estimation technique reduces collinearity and biases while increasing the degrees of freedom. Eckles et al. (2014) adopted the hackman two-step procedure to deal with the endogeneity problem. Malik et al. (2020) followed the hierarchical regression to test their hypothesis.

2.6.3.2 Maximum likelihood

A maximum likelihood method was used by (Hoyt & Liebenberg, 2011; Lin et al., 2012; Bohnert et al., 2019; Nguyen & Vo, 2020) to examine the impact of ERM on firm value. The maximum likelihood method is suitable for estimating model parameters and has robust asymptotic properties for large samples (Silva et al., 2015). It allows for the adjustment of the standard errors for firm-level clustering. The disadvantage of this approach is that it ignores potential selectivity bias resulting from the ERM choice's endogeneity (Hoyt & Liebenberg, 2011). To deal with the endogeneity of ERM adoption, they adopt the treatment effects to examine the impact of ERM.

2.6.3.3 Structural equation modelling (SEM)

Ping and Muthuvello (2015) and Saeidi et al. (2020) examined the ERM-performance relationship with the structural equation modelling. Eight components from the COSO (2004) framework were used to measure ERM implementation with each component having different items. Data was collected through a survey approach. SEM was used first to determine whether the questionnaire items effectively measure the constructs or factors proposed in the study. The SEM is appropriate for this approach because it allows researchers to test complex research models with different interrelationships at once (Hooper et al., 2008; Kline, 2015). Gonzalez et al. (2020) stress that SEM overcomes every weakness associated with first-generation techniques on multiple regression, logistic regression, and variance analysis. According to Henseler (2017), SEM is applied when relationships between theoretical constructs are under investigation, with the outcome of distinguishing between the theoretical construct and their underlying empirical measurement by multiple observable variables (Henseler, 2017).

2.6.3.4 Generalised least square estimation method (GLS)

Generalised Least Square (GLS) estimation method was used by Silva et al. (2019) and Horvey and Ankamah (2020). Gonzalez et al. (2020) followed different approach to estimate its panel data emphasising the random-effects GLS regression. GLS is a method for fitting coefficients of explanatory variables and producing an unbiased estimator and suitable for large samples. Silva et al. (2015) state that, 'the GLM has great flexibility because measurements that indicate an asymmetrical distribution, such as Tobin's q ratio, can be modelled using probabilistic distributions that adjust to their shape without the need for data transformations (to correct the

asymmetry and stabilise the variance of data), simplifying the interpretation of the results and ensuring greater precision by adjusting the data in its original scales'.

2.6.3.5 Linear regression

Another approach to examining the relationship is the linear regression which was adopted by Gordon et al. (2009); McShane et al. (2011), Nair et al. (2014), Farrel and Gallagher (2015, 2019), Callahan and Soileau (2017) and Lechner and Gatzert (2018). Authors adopt a different approach to ensure the robustness of the regression equation. Nair et al. (2014) used the west estimator to control for heteroskedasticity, while Callahan and Soileau (2017) used the variance inflation factor to correct multicollinearity. Lechner and Gatzert (2018) conduct a sensitivity analysis to ensure the robustness of the relationship. This was done through a step-by-step addition of the explanatory variables. Farrell and Gallagher (2015) posit that there is a chance of downward biases from survey responses. A two-step model proposed by Heckman was used to correct this problem.

2.6.4 Performance indicators

As revealed in Table 1, several performance indicators are used to examine the impact of ERM. The different measures explain how ERM affects organisational performance from diverse perspectives. Tobin's Q is used to examine the impact of ERM on the shareholder's value. In terms of financial performance, Return on Asset (ROA), Return on Equity (ROE) were the main variables of interest, whereas Earnings before interest and taxes (EBIT) represent accounting performance. ROE identifies shareholders return on equity. ROA tells how profitable a company's asset is generating revenue and can capture leverage effect, which ROE ignores while Tobin's Q reflects future managerial expectations and free from managerial manipulations. EBIT measures the changes in accounting performance. Gordon et al. (2009), Eckles et al. (2014) and Nair et al. (2014) emphasise the stock market returns as a proxy for performance. The essence of this variable is to measure the risk and return tradeoff. Nguyen and Vo (2020) examine the impact of ERM using the solvency margin of insurers. Solvency is measured as the ratio of the book value of equity to solvency margin are exposed to financial vulnerability. Furthermore, Grace et al. (2015) use the cost and efficiency ratio to assess how a firm can manage its resources. Other alternatives were the cumulative abnormal returns (Beasley et al., 2005); and sales that measure operational performance (Quon et al., 2012). Ping and Muthuveloo (2015) assessed the performance of a firm

using specific financial indicators from a survey. Saeidi et al. (2020), using a survey method, adopt specific financial (ROA, ROE, ROI, and ROS) and non-financial (balanced scorecard and competitive advantage) indicators to proxy firm performance.

2.7 Discussion of Empirical Studies

Generally, the empirical studies on the ERM-performance relationship are ambiguous. While some scholars found a positive relationship, others found an inverse relationship. However, there is enough evidence to support the argument that ERM enhances firm value and profitability at different significant levels. In some situations, this relationship is enhanced by certain firm-specific factors. In terms of shareholder value measured with Tobin's Q, we find a significant and positive relationship between ERM and firm performance (Hoyt & Liebenberg 2011). Lechner and Gatzert (2018) confirm a positive relationship between ERM and shareholder value, stating that ERM firms perform better than Non-ERM firms. This relationship was statistically significant at a one per cent significance level. This is consistent with the findings of Bohnert et al. (2019). They find that "insurers with high-quality risk management system (RM) system exhibit a Tobin's *Q* that on average is about 6.5% higher than for insurers with less high-quality RM after controlling for covariates and endogeneity bias" (pp. 2).

In line with prior empirical studies, Silva et al. (2019) focus on Brazil, an emerging market. They find that a positive relationship exists between firm value and the use of ERM. They state that the Brazilian market is incipient, volatile and focused on the short term. Organisations should enhance their risk management system to attract more investors. According to Malik et al. (2020), an effective ERM system is seen to improve performance significantly. They further argue that the board-level risk committee strengthens this relationship and increases the performance effect of ERM on firm value.

In the case of McShane et al. (2011), a positive relationship exists between firms with increasing levels of traditional risk management (TRM) ratings and firm value. However, there is no additional increase for firms with higher ERM ratings. On the other hand, Farrell and Gallagher (2015) and Florio and Leoni (2017) further expound that firms with an advanced ERM level exhibit higher performance. Florio and Leoni (2017) add that ERM improves the value of a firm and

enhances its profitability. This argument is supported by Farrell and Gallagher (2019), who state that a higher level of ERM maturity affects firm value and profitability. Nevertheless, this relationship becomes more substantial when impacted by moderating firm complexity, competition, innovation and knowledge. These findings are in sharp contrast to that of Lin et al. (2012), who find an inverse and a significant relationship between ERM and firm value. They explained that ERM is still in its initial stages; thus, its value implications remain uncertain. To get the best out of ERM, firms must adhere to the principles and practices of ERM while employing the required expertise.

In the Ghanaian case, Horvey and Ankamah (2020) examine how ERM affects listed firms' value and financial performance, adopting three performance measurements thus, ROA, ROE and Tobin Q. They find that ERM propels performance at both firm-level and market level. Furthermore, ERM has a significant and positive impact on firms' ROA and ROE. Their finding further reveals a significant and positive impact on financial firms' value but an insignificant and negative impact on non-financial firms. This can be attributed to the fact that most non-financial firms do not have a robust risk management system. Again, Horvey and Ankamah (2020) posit that a non-linear relationship exists between ERM and performance, but this relationship is based on the performance indicator being used. Using the same performance measures, Gonzalez et al. (2020) addressed how ERM affects non-financial firms in Spain. Their findings failed to support the results from Horvey and Ankamah (2020), highlighting that ERM adoption does not influence performance, nor does it reduce the chance of bankruptcy.

To investigate its impact on insurance solvency, Nguyen and Vo (2020) found a significant and inverse relationship between ERM adoption and solvency. This supports Lin et al. (2012) case, which also found an insignificant and inverse relation. According to Nguyen and Vo (2020), insurers with ERM implementation programs may trigger financial crises stating that the inverse relationship could be attributed to increased risk-taking and environmental uncertainties. Moreover, there is evidence that the European insurers' solvency depends on the actual business and the liabilities of insurers to their policyholders as it is positively linked to firm-specific characteristics such as financial leverage, ROA, combined ratio, and business type.

Among the studies that examined the impact of ERM on stock market return, Eckles et al. (2014) discovered that firms with ERM implementation experience lower volatility in their stock returns and this relationship become stronger over time. This argument is supported by Nair et al. (2014). They disclose that a strong ERM system is associated with a reduction in the stock price during a downturn and an increase in profitability during an upturn (after financial crises). They further argue that ERM has a dynamic capability. These are consistent with Gordon et al. (2009) findings who find a positive relationship between ERM and stock returns. Notwithstanding, this relationship is dependent on the appropriate match between ERM and five key variables, which comprise uncertainties in the environment, firm complexity, size, the board of directors monitoring and competition with the industry.

Beasley et al. (2008) also explored how a CRO's announcement affects the cost and benefits of firms. The performance was measured as the cumulative abnormal returns. They point out that there is no significant reaction to hiring a CRO for both financial and non-financial firms. However, the cost and benefits of ERM are based on individual firm-specific characteristics. For non-financial firms, an inverse relationship exists between leverage and cash ratio with CRO announcement and a positive relationship with firm size and earnings volatility, and CRO announcements.

Grace et al. (2015) additionally explored the relationship between ERM and the operating performance of the US's insurance industry. Specifically, they examined how ERM aspects affect firm value, which is measured as the cost and revenue efficiency. They underline that a combination of these factors: dedicated risk manager, economic capital model and report of the risk manager to the board improves the firm's value.

Among the studies that analysed the impact of ERM on accounting/operating performance, Callahan and Soelieu (2017) confirm that firms with mature ERM processes achieve greater operating performance than those with weak ERM processes. Their finding disagrees with Quon et al. (2012), who reveals that ERM information does not have any association with firms' operating and accounting performance. Ping and Muthuveloo (2015) used a survey approach to examine the impact of ERM on firm performance. Primary data in a questionnaire form was

gathered while a structural equation modelling approach was used to examine how ERM affects the financial and non-financial indicators. They conclude that the implementation of ERM has a significant effect on firm performance. Following the same data collection and estimation procedure, Saeidi et al. (2020) found similar results. They indicated that a positive and significant relationship exists between ERM and firm performance. They further highlight that information technology and knowledge had a significant moderating effect on the relationship.

In summary, the ERM literature cuts across different industries and geographical areas. However, most of the studies are limited to single countries or specific industries due to data availability. Different approaches to ERM measurement and performance indicators are found in the literature. Scholars adopt different estimation techniques to examine the ERM-performance relationship. Due to these diversities, the findings of the ERM-performance relationship partly differ. According to the review, most studies found a positive relationship between ERM and firm performance. This relationship was mostly found to be statistically significant.

Table 2. 1 Empirical Literature on the Performance of Enterprise Risk Management

Author(s) & year	Aims/Objectives & Industry	ERM measurement	Methodology	Measures of Performance	Rel/Sig	Findings
Beasley, Pagach and Warr (2008)	To identify the cost and benefits of ERM and whether ERM creates market value/Financial and Non-financial firms	Appointment of CRO	Multiple regression/1992-2003/120 firms	Cumulative abnormal Returns	+	ERM creates value. However, the cost and benefits of ERM are specific to the firm.
Gordon, Loeb and Tseng (2009)	To study the argument that ERM influences firm performance/ Firms on US Securities and Exchange commission	ERM index based on COSOs four objectives	Linear regression/ Secondary data/120 firms/2005	Excess stock market return	+	ERM and firm performance had a positive relationship, but this is dependent on the appropriate match between ERM and five key variables
Hoyt and Liebenberg (2011)	To assess the value implications of ERM/US Insurers	ERM/CRO key words	Maximum likelihood model/117 companies/1998–2005	Tobin Q	+***	There exists a positive relationship between ERM and firm value
McShane, Nair and Rustambekov (2011)	To identify the relationship between ERM and firm performance/Insurers on NYSE	S&P ERM rating	Linear regression/Secondary data/82 firms/2004-2008	Tobin Q	+	They found no support that ERM influences performance. They found a positive relationship between increasing levels of TRM but found no additional increase for ERM
Quon, Zeghal and Maingot (2012)	To examine the relationship between ERM and firm performance Non-financial firms/Non-financial firms listed on Toronto exchange market	S&P ERM rating	Secondary data/ 2007-2008/156	Sales, EBIT, Tobin Q	No Association	ERM information content does not have any effect on performance.
Lin et al. (2012)	This paper presents a theoretical basis to study the strategic determinants, risk integration, and value creation of ERM/ U.S. property and casualty insurance industry.	CRO/ERM keyword	Treatment effect model model/secondary data2000-2007/105 listed insurers	Tobin Q and ROA	-**	ERM displays a strong negative correlation with firm value and performance
Eckles, Hoyt, and Miller (2014)	To test the hypothesis that ERM reduces firms cost/ Insurance industry	CRO/ERM keyword	Heckman two-step procedure and	Stock return volatility	+**	ERM implementation support firms to maximise their profit incentives.

			OLS/secondary data/1992-2005			
Nair et al. (2014)	To examine whether ERM constitutes dynamic capability/ Insurance firms	S&P ERM rating	Linear regression/ Secondary data/2007-2011/60 companies	Stock price returns and ROA	+	A strong ERM system is associated with a reduction in the stock price during a downturn and an increase in profitability during an upturn (after financial crises)
Grace, Leverty, Phillips and Shimpi (2015)	To investigate the value of ERM/ Insurance industry	Survey	Panel regression/ secondary data/survey/	Cost and revenue efficiency	+***	ERM increases in firms value.
Farrell and Gallagher (2015)	To study the valuation implications of ERM/ Financial and Non-financial firms	RIMS ERM model	Linear regression/ Secondary data/2006-2011/225 firms	Tobin Q	+***	Firms with a higher level of ERM maturity exhibits higher performance.
Ping and Muthuveloo (2015)	To examine the impact of ERM on firm performance/ Listed companies on Bursa Malaysia	COSO 2004 framework	Cross-sectional/Partial Least square and SEM/103 Questionnaires	Financial and Non-financial indicators.	+**	Implementation of ERM has a significant effect on firm performance
Florio, C., and Leoni, G. (2017)	To establish the relationships between the extent of ERM implementation and firm performance/Non-financial listed companies in Italy	ERM index created	Multivariate OLS regressions/Secondary data/ 2011-2013	ROA and Tobin Q	+***	Firms with advanced levels of ERM implementation present higher performance.
Callahan and Soileau (2017)	To examine whether firms with mature ERM will achieve greater operational performance/Non-financial firms	ERM survey	Linear regression/ Secondary data/ Survey/2006-2008	Industry-adjusted ROA and ROE	+***	Firms with a mature ERM process achieve greater performance than their competitors.
Lechner and Gatzert (2018)	To study the impact of ERM on firm value/Listed companies on German stock exchange	Binary/ERM adoption	Linear regression /2013/secondary data	Tobin Q	+**	There is a significant positive relationship between ERM and shareholders value.
Bohnert, Gatzert, Hoyt and Lechner (2019)	To study the impact of ERM on firm value/Insurers	S&P ERM rating	Maximum likelihood treatment effect model/secondary data/2007-2015/41 companies	Tobin Q	+***	ERM has a positive and significant impact on firm value.
Silva, Silva and Chan (2019)	Enterprise risk management and firm value/ Brazil stock exchange	CRO/ERM keyword	GLM/Secondary data/2004-2013/93 listed companies	Tobin Q	+***	The findings revealed a positive and significant relationship between firm value and ERM.

Farrell and Gallagher (2019)	To examine the firm performance implications of ERM maturation and more specifically firm characteristics that serve to engender or inhibit these performance implications/ Financial and non-financial firms	RIMS risk maturity model	Linear regression/Secondary data/2006-2011	ROA and Tobin Q	+**	ERM maturation increases the firm value and return on assets, and the impact is moderated by stakeholder related factors such as innovation intensity and knowledge focused industry structures. Firm's complexity was found to moderate this relationship.
Horvey and Ankamah (2020)	To examine the linear and non-linear relationship between ERM and firm performance/ Ghana stock exchange	ERM index created	Generalised least square estimation technique/secondary data/2010-2016/30 listed companies	ROA, ROE and Tobin Q	+***	ERM enhances the performance of listed firms. However, this relationship is not monotonous, but there exists a non-linear relationship between ERM and firm performance.
Nguyan and Vo (2020)	The impact of ERM on insurers Solvency/Insurance	CRO/ERM keyword	simultaneous equations with treatment effects/secondary data/2007-2013/101 firms	Solvency	-***	There is a significant and inverse relationship between ERM adoption and solvency level which may trigger financial crises.
Malik et al. (2020)	The impact of board level risk committee on the relationship between ERM and firm/listed firms in UK	COSO (2004) framework	OLS/Secondary data/2012-2015/260 firms	Tobin Q	+**	We also find strong BLRC governance, complements this relationship and increases the firm performance effects of ERM. Our findings suggest the mere formation of a BLRC is not a panacea for ERM oversight; however, the existence of a structurally strong BLRC is crucial for effective ERM governance.
Saeidi et al. (2020)	The influence of enterprise risk management on firm performance with the moderating effect of intellectual capital dimensions	COSO (2004) framework Financial institutions of	Structural equation model/primary data/84	Financial and non-financial performance	+***	There is a positive and significant relationship between ERM and firm performance. Information technology and knowledge had a significant moderating effect on the relationship.
Gonzalez et al. (2020)	The effect of Enterprise Risk Management on the risk and the performance of Spanish listed companies	Risk committee, CRO, ISO, COSO, and risk map	Mutiple regression/ Secondary data/2012-2015/162 firms	ROA, ROE and Tobin Q.		ERM adoption does not have any influence on performance, nor does it reduce the chance of bankruptcy. Having CRO improves financial health, it reduces performance.

2.8 Conclusion

This chapter provides a comprehensive and systematic literature review on Enterprise risk management. It discusses the various approach to ERM measurement and the relationship between ERM and firm performance. Only studies listed in the SCImago journal ranking were used. According to the review, studies on ERM and firm performance differ in measurement, methods, estimation techniques, industries, data periods, and geographical contexts. First and foremost, this study points out that literature on ERM is common in the US and European countries; however, empirical investigation in other countries is minimal.

The literature on ERM measurement differs as there is no single proxy for ERM. Two methodological approaches were used to identify and measure ERM. Scholars either use a survey approach or rely on secondary sources for their ERM information and measurement. The majority of the studies relied on simple proxies such as the evidence of a CRO or specific ERM keywords to measure ERM. This approach was widely used due to the difficulty in assessing ERM information. In the case of the CRO, it is believed that it is a signal that a firm has adopted an integrated approach to managing its risk. In the absence of the CRO, other scholars adopt the S&P ERM rating, COSO (2004) objectives, RIMS, and a survey approach. A comprehensive approach to ERM measurement, which considers risk governance issues and operating principles, was considered by other scholars. The inconclusive results on the impact of ERM can be attributed to the different approaches to ERM measurement. The ERM measurement inconsistencies may be because of the difficulties in understanding ERM and its operating mechanism; consequently, scholars are comparing 'apples to oranges.' There is, therefore, the need for a more consistent approach to ERM measurement.

In terms of the performance of ERM, a total of twenty (22) empirical studies were examined. Different estimation techniques were used to analyse the relationship. Generally, a quantitative approach was used. Secondary data was the primary source of information, while few studies adopted a survey approach for their data collection. Different performance indicators such as Tobin's Q, ROA, ROE, EBIT, and stock returns were used to measure firm performance. As already stated, different approaches were used to measure ERM. The literature on ERM and firm performance reveals mixed findings; nevertheless, the study finds enough evidence to support the

argument that ERM positively affects firms' performance and shareholders' value. The impact of ERM was mostly seen to be statistically significant. The positive relationship is in line with the theoretical proposition that ERM enhances firm performance. In other instances, it was found that ERM improves insurers' solvency and reduces the volatility of firms. In a few cases, the study find that ERM has an inverse relationship with performance.

In contrast, in the Canadian and Spanish cases, it was revealed that ERM information does not affect performance. Again, matured ERM implementation system was found to improve firm performance. According to the review, the impact of ERM is not country-specific but enhances performance across industries and geographical contexts.

2.9 Limitations

This chapter provides a comprehensive and systematic literature review on the measurement and impact of ERM, but this is not without limitations. The first limitation is with regard to the methodological choice. This paper was limited to studies listed in the SCImago journal ranking, which is biased toward studies which are not in this journal ranking. Second, the selected keywords might have ignored other relevant papers. Future studies could enlarge the scope of the study to include other relevant articles.

2.10 Recommendations

While most scholars measure ERM from secondary sources, just a few rely on primary sources. The use of secondary data lacks a detailed qualitative procedure where primary information is assessed. The concept of ERM is dynamic and operates differently across organisations and regulatory bodies. This has contributed to the debate on what is the appropriate and robust measurement for ERM. Motivated by these facts, this paper concludes that, to ensure ERM measurement efficacy, further studies on the empirical measurement of ERM should rely on both primary and secondary data as they complement each other. This will provide more insight and allow for more factors to be considered for a robust ERM measurement. The essence of the primary data is to provide first-hand information and experience on how ERM is implemented within an organisation (Linke & Florio, 2019). This will augment the secondary data, which usually provides risk governance information from the firm's corporate governance report. To construct a better

proxy for ERM, future studies should consider other important features such as the ERM implementation process and the quality of risk oversight. Based on the assertion made in the literature, this paper recommends that financial and non-financial firms consider adopting ERM as it is likely to improve their performance and value. The impact of ERM on firm performance was found to be mostly centred in the US and European countries. This is a great call to scholars to investigate its impact in other geographic contexts, particularly emerging economies, as most firms within these economies are resorting to a robust approach to risk management. Data samples should be extended, and robust estimation techniques such as the generalised method of moments should be used to deal with endogeneity problems and measurement errors. Scholars should consider non-linear relationships and moderating factors in future studies. In addition, further studies should consider the intangible benefits of ERM. More so, firms should consider advancing their ERM system as a higher level of ERM implementation was seen to have a significant influence on performance.

Appendix

Table 2. 2: List of Journals, Subject Areas, and H index

Author(s), year & Setting	Journal	Subject Area	H index
Liebenberg and Hoyt (2003) US	Risk Management and Insurance review	Business management, and accounting	15
Beasley, Clune and Hermanson (2005) US	Journal of accounting and public policy	Business management, and accounting	70
Beasley, Pagach and Warr (2008) US	Journal of Accounting, Auditing & Finance	Business management, and accounting	47
Gordon, Loeb and Tseng (2009) US	J. Account. Public Policy	Business management, and accounting	70
Hoyt and Liebenberg (2011) US	The Journal of Risk and Insurance	Business management, and accounting	60
Pagach and Warr (2011) US	Journal of Risk and Insurance	Business management, and accounting	60
McShane, Nair and Rustambekov (2011) US	Journal of Accounting, Auditing & Finance	Business management, and accounting	47
Quon, Zeghal and Maingot (2012) Canada	Procedia - Social and Behavioral Sciences	Psychology	46
Lin et all (2012) US	North American Actuarial Journal	Decision Sciences Statistics, Probability and Uncertainty	41
Golshan and Rashid (2012) Malaysia	World Academy of science, engineering and technology	Engineering	26
Baxter, Bedard, Hoitash and Yezebel (2013)	Contemporary Accounting research	Business management, and accounting	90
Eckles, Hoyt, and Miller (2014) US	Journal of Banking & Finance	Economics, Econometrics and Finance	148
Nair et al. (2014) US	Managerial and Decision Economics	Business, Management and Accounting	50

Grace, Leverty, Phillips and Shimpi (2015) US	The Journal of Risk and Insurance	Business, Management and Accounting	60
Farrell and Gallagher (2015) Australia, Canada, UK, US, others	The Journal of Risk and Insurance	Business, Management and Accounting	60
Ping and Muthuveloo (2015) Malaysia	Asian Social Science	Arts and Humanities	25
Khan, Hussain and Mehmood (2016) France	Management Decision	Business management, and accounting	91
Florio and Leoni (2017) Italy	The British Accounting Review	Business management, and accounting	62
Callahan and Soileau (2017) US	Advances in Accounting	Business management, and accounting	27
Mardessi and Arab (2018) Tunisia	Journal of Financial reporting and accounting	Business, Management and Accounting	3
Lechner and Gatzert (2018) Germany	The European Journal of Finance	Economics, Econometrics and Finance	31
Bohnert, Gatzert, Hoyt and Lechner (2019) Europe	The European Journal of Finance	Economics, Econometrics and Finance	31
Silva, Silva and Chan (2019) Brazil	Emerging Markets Finance and Trade	Economics, Econometrics and Finance	23
Farrell and Gallagher (2019) Australia, Canada, UK, USA, others	Research in International Business and Finance	Business, Management and Accounting	35
Horvey and Ankamah (2020) Ghana	Cogent Economics & Finance	Economics, Econometrics and Finance	11
Nguyan and Vo (2020) European Union	Journal of Business Research	Business, Management and Accounting	179
Malik et al. (2020) UK	Journal of Contemporary Accounting and Economics	Business, Management and Accounting	18

Saeidi et al. (2020)	Economic Research-Ekonomska Istrazivanja	Economics, Econometrics and Finance	21
Gonzalez et al. (2020)	European Research on Management and Business Economics	Business, Management and Accounting	14

CHAPTER THREE

THE DETERMINANTS OF ENTERPRISE RISK MANAGEMENT ADOPTION AMONG INSURERS IN GHANA AND SOUTH AFRICA: A QUANTILE REGRESSION APPROACH

3.1 Introduction

Expectations that business leaders, including the C-Suite and board of directors, have regarding organisations' competencies to manage unfolding risks continue to increase due to the high volume and complicated risks in the business world. As a result, businesses are now deploying new tools and techniques to improve their risk management capabilities, known collectively as an Enterprise Risk Management (ERM) system. ERM is a new approach to managing the entire range of risks confronting an organisation in an integrated manner (Gordon et al., 2009). It provides resilience and support to organisations in managing the complexities and uncertainties in the business environment to achieve their goals and objectives (Linke & Florio, 2019). While businesses strive to improve their risk management efforts, it is prudent to emphasise, in the beginning, a strong understanding of what drives ERM activities. The goal of ERM is to identify those risks that are likely to significantly impact core business drivers. Hence, identifying the key factors that drive an organisation's ERM programme will improve the strategic initiatives, risk management processes and shareholders' value (Bohnert et al., 2019). The need for an enterprise risk management system is to identify those environmental factors that could prevent the sustainability of the core business drivers.

Theoretically, the adoption of ERM can be explained by several determinants built on the contingency and institutional theories. Contingency theory states that there is "no one best way" to integrate a system into an organisation (Fiedler, 1958; Galbraith, 1973). The best way is to explore that organisation's internal and external environmental characteristics (Galbraith, 1973). The contingency theory outlines a number of factors that influence the control system, classified under environments, technology, size, structure and strategy (Woods, 2009). According to this theory, many factors could determine a firm's decision to implement an ERM system, and these determinants may differ across organisations and industries.

Similarly, institutional/organisational theory suggests that a variety of contextual factors affect the systems and operations of an organisation (DigMaggio & Powell, 1983). In consonance with the institutional theory, organisations are required to execute ERM procedures in the context of a regulated environment so that their organisations are in line with external pressures (Powell & Klein, 1996). Pursuant to the theory, Mikes and Kaplan (2014) explain that the success of ERM adoption is contingent on the contextual factors and circumstances within an organisation. This study builds on these theories by considering a set of variables that influences insurers' decision to adopt an ERM system. It is crucial to establish the linkages between these firm-specific factors and ERM adoption to improve organisational performance. The use of contingency and organisational theories to explain these factors is based on the assumption that it acknowledges the influence of organisational contexts in decision-making (Waterhouse & Tiesssen, 1978; Woods, 2009; Maletic et al., 2018).

Given the speed with which the global business environment is changing, there have been several regulations on how firms should operate. For instance, the introduction of the Solvency II framework in Europe defines enterprise risk management as one of its integral components. Ghana and South Africa are no exception. The choice of the two countries was for many reasons. South Africa has the biggest insurance market in Sub-Saharan Africa (SSA), with a penetration rate of about 16%. On the other hand, Ghana has a growing insurance market in SSA with a penetration rate of about 2%. In addition, both countries have undergone several regulatory changes over the past decade, with much emphasis on a robust risk management technique. The collapse and merging of financial institutions such as Esich life, Beige Assure, Avance life, and Alexander Forbes in both countries have introduced several regulations on risk management and corporate governance. Some of these regulatory issues include the new solvency and risk management framework in Ghana and the King III corporate governance code in South Africa. One of the key components of these frameworks is the establishment of a risk management committee and the adoption of an enterprise risk management system.

Adopting a robust and dynamic approach to risk management has become critical to every business; hence, businesses are beginning to adopt an ERM system within their risk ecosystem. Despite the regulatory policies, the literature posits that there are other factors that determine ERM

adoption. These factors can stem from the internal and external environments. However, there is little empirical evidence as to why some organisations embrace ERM while others do not. To establish the impact of ERM, one must understand the factors that led to their ERM adoption (Bromiley et al., 2015). These are the causative factors that affect the behaviour of risk management. These factors can change over time and across events. Hence, knowing these factors will enhance management decisions on how to manage them. It also ensures the proper management and growth of these factors. Therefore, this study examines the determinants driving ERM adoption among insurers in Ghana and South Africa. The study anchors the insurance industry because their core business activity involves risk-taking amid uncertainties; hence they are more likely to adopt a robust risk management system. More so, insurers form part of the world-leading companies and play a vital role in the economic growth and development of a country.

The literature on ERM focuses on its performance (Hoyt & Liebenberg, 2011; Florio & Leoni, 2017; Horvey & Ankamah, 2020), and determinants (Pagach & Warr, 2011; Farrell & Gallagher, 2015) and the level of implementation (Altuntas et al., 2011). In spite of the empirical work on ERM, the question about what factors drive ERM adoption remains egregiously limited and still in its nascent stage. Hence there is not enough evidence as to why organisations adopt an ERM system. Identifying the determinants of ERM is very important so that in future crises, these factors can be properly managed to sustain organisations' viability. Moreover, previous studies have revealed mixed results on the various factors that affect ERM adoption. The conflicting results may be because of differences in environmental characteristics (Lechner & Gatzert, 2018) and regulatory issues, as some organisations are more exposed to risks than others; hence, empirical findings are not expected to be homogenous. For instance, Baxter et al. (2013) and Bohnert et al. (2019) explain that insurers are more interested in ERM implementation because they face higher risks than others. In addition, studies conducted in this area have focused on Europe (Bohnert et al., 2019; Lechner & Gatzert, 2018); Malaysia (Golshan & Rashid, 2012; Razali & Tahir, 2011); and the US (Hoyt & Liebenberg, 2003, 2008, 2010; Beasley et al., 2005; Pagach & Warr, 2011) without any empirical evidence from the developing countries such as Ghana and South Africa. According to Lechner and Gatzert (2018), generalisations of empirical findings may impose many limitations and challenges due to differences in dataset and environmental characteristics;

therefore, results that are valid for one country may not necessarily be applied in another context. There is, therefore, the need to further investigate the determinants of ERM in an emerging market context.

Studies on the determinants of ERM adoption have been conducted using a linear regression approach. Scholars focused on estimating parameters for averages while ignoring the fact that the determinants may vary across different levels. The quantile regression provides a broad description of the determining factors at different patterns of heterogeneity (Bassett & Koenker, 1978). However, to the best of our knowledge, empirical evidence as to whether all levels of the determining factors will influence ERM adoption remains non-existent. This paper contributes to the literature by addressing such issues using the quantile regression technique. This technique allows the coefficients to change across the entire distribution of ERM adoption. Based on these arguments, this study examines the factors influencing ERM adoption across quantiles by comparing insurers in Ghana and South Africa. This chapter uniquely contributes to the literature in several ways. It is the first study to go beyond the average effects of the determinants of ERM adoption by employing a quantile regression approach. Second, this study examines the determinants of ERM adoption within an emerging market, which to the best of the researcher's knowledge, has not been investigated, providing evidence that can be applied within this context. This is important because risk is a global issue and affects every organisation; hence, demands further investigation within different contexts for prudent decision-making. Third, it introduces a new variable (life insurers) that has not been empirically investigated in previous studies. Because of the long-term nature of their business, life insurers are said to be more prone to invest in ERM.

The empirical findings are consistent with the empirical literature revealing that firm size and financial leverage are positively associated with ERM adoption. Ownership was found to be positive and statistically significant for insurers in South Africa, while industrial diversification and type of audit firm were positive and statistically significant for both countries. The results also suggest that firm profitability and life insurers have adversarial relationships with ERM adoption; however, the relationship between the two countries differs based on significant levels. Unlike the Ghanaian insurers, the South African insurers found significant results. Findings from the quantile regression first highlight that the initial levels of size, profitability and leverage reduce ERM

adoption, and an extreme increase in these factors promotes ERM adoption, which implies a nonlinear direct U-shape relationship, indicating the enhancing effect of size, profitability, and leverage on ERM adoption. On the contrary, there is an inverted U-shape for return on assets and leverage for Ghana. The results further show that industrial diversification, the Big Four (Big4) audit companies (which represents the four largest international accounting and professional service firms such as Ernest & Young, Deloitte, PricewaterhouseCoopers and KPMG) and ownership show consistent patterns of a significant positive effect on ERM adoption at different quantiles for both samples, whiles life insurers showed differential impacts for both samples. These findings are important in many respects. One, the study highlights that several factors contribute to ERM adoption; hence insurers should ensure that the factors contributing to their adoption are properly maintained. Two, it is important to note that these determinants do not operate differently; hence, the holistic valuation of these factors may provide relevant information on how to manage them to ensure the success of an ERM system. In terms of theory, this paper suggests that the adoption of ERM is contingent upon the identified factors, but further studies are needed to test its relevance in other emerging markets.

The rest of the chapter is structured as follows: Section two discusses the literature on the evolution of ERM, its determinants and describes the research hypothesis. Section three explains the research design. Section four provides an analysis of the empirical results, while Section five discusses the results. Finally, Section six concludes and provides recommendations for further studies.

3.2 Literature review

3.2.1 Evolution of ERM

The concept of risk management has evolved for centuries. Some believe that risk management started during ancient times when people started playing games with dice and bones (Nanda & Rhodes-Kropf, 2016). These games evolved into chess and checkers. Gaming is thought to have spawned probability theory, which is very important in risk management. This led to the development of the game of chance in the 1600s by Blaise Pascal and Pierre de Fermat, which gave rise to the modern probability theory. However, according to the literature, risk management started during the period of World War II to the 1960s. Studies began when insurers started using insurance to manage risks. It was then proposed that such people should be called risk managers

(Barlow, 1993). Risk managers realised it was impossible to manage every risk with insurance, so the concept expanded to other disciplines like training and safety programmes (Nanda & Rhodes-Kropf, 2016). Robert Mehr, Bob Hedges and Robert Hedges introduced the concept "Risk management and business enterprise" in 1963, where they explain the procedure for managing risks (Mehr et al., 1963). The process includes risk identification, measurement, evaluation, selection, and monitoring. They further explain that risk could be managed through risk transfer, reduction and assumption (Mehr & Hedges, 1968).

In 1971, risk management was introduced at the annual insurance conference in Europe (Crockford, 1982). There were two main strands of risk management, and these included insurance risk and financial risk. In the 1970s, financial risk gained attention due to variations in exchange rates, stock prices, commodity prices, among others (Dickinson, 2001). Until the late 1970s, the primary focus of risk management was on reducing losses associated with pure risks (example Hazard risks) rather than losses associated with speculative risks, (example financial risks). Financial risk management was not helpful until finance academics developed the choosing pricing model (Black & Scholes, 1973; Merton, 1973). This aided the growth of the derivatives industry, which culminated in financial risk hedging. Risk was essentially handled in silos during this period.

The concept of risk widened in the 1990s, concentrating on financial, operational and strategic risks (Skipper, 2008). This was motivated by the various financial scandals such as Worldcom, Sunbeam, Quest Q, Bernard L. Madoff. Following these incidences, Enron declared that its financial statement could not be relied on due to the series of events that led to Bankruptcy. This affected the confidence of the public in financial institutions. In the late 1990s, risk management evolved from a silo perspective toward a holistic approach which suggests the management of the portfolio of risk of an organisation under one capital umbrella. In this sense, the term "Enterprise Risk Management" was created to distinguish between the holistic view of risk management and the traditional risk management view (Dickinson, 2001). In this regard, the Committee of Sponsoring Organisation of the Treadway Commission (COSO) developed a framework titled "Internal Control-Integrated Framework" in 2002, which called for the integration of risk management practices. The Sarbanes Oxley Act on corporate governance and risk management

was also developed in the same year (Khan et al., 2016). In 2003, the Casualty Actuarial Society issued its overview of ERM that outlines the best practices and principles for designing and implementing an effective ERM process (CAS, 2003). In 2004, COSO presented an official ERM framework that proposed a formal definition and implementation process for ERM. The framework was entitled "Enterprise Risk Management – Integrated Framework." This was further updated in 2017 under the theme "Enterprise Risk Management – Integrating with Strategy and Performance." COSO defines ERM as:

> *"a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of the entity's objectives" (*COSO, 2004, pp.2).

Following this, additional frameworks and professional bodies were established. These include International Organization for Standardisation – Risk Management Principles and Guidelines (ISO 31000:2009, 2018), Australian/ New Zealand Risk Standard (AS/NZ 4360:2004, AS/NZS ISO 31000, 2009), British Standard 31100:2011 Risk management code and guidance for implementation, Institute of risk management (IRM), Federation of European Risk Management Associations (FERMA), Association of Insurance and Risk Managers (AIRMIC), the United Kingdom Corporate Governance Code (UK, 2012) and the Tillinghast Tower Perrins ERM – Analytic Approach.

These bodies developed risk management guidelines for institutions to manage risks in all aspects of the organisation. Though the implementation of ERM comes with associated costs such as the appointment of the Chief Risk Officer (CRO), establishment of the risk committee, ERM training and development, development of risk culture (Bohnert et al., 2019; Hoyt & Liebenberg, 2011), the benefits that ERM brings to an organisation exceed its costs as it is believed to increase shareholders' value and profitability (Lechner & Gatzert, 2019; Horvey & Ankamah, 2020). It also ensures better coordination and proper economic decisions, which results in a positive net present value (Gatzert & Martin, 2015; Pagach & Warr, 2011), and generates competitive advantage in the long-term as compared to firms that manage risks in silos (Nocco & Stulz, 2006). Given that ERM can be beneficial to companies, the issue of what factors determines ERM implementation arises.

Against this background, this study examines the determinants of ERM in Ghana and South Africa, which is the first study to be conducted in Africa.

3.2.2 Hypothesis Development: The Determinants of ERM adoption

In literature, researchers have examined ERM from diverse perspectives. While some studies focus on a qualitative or a survey method, others focus on the quantitative aspect by investigating the value, profitability, and determinants of ERM. According to the literature, the factors determining ERM adoption have received much credence as it determines firm growth and survival. Despite the regulatory policies encouraging firms to adopt ERM, other factors influence firms' decision to adopt an ERM system. Identifying these factors support the need to integrate ERM in a firm's operations. Studies have shown that the factors that drive ERM adoption stem from the internal and external environments (Liebenberg & Hoyt, 2003). This is due to the broader scope of risk affecting an organisation. Scholars have examined the determinants of ERM from different contexts by considering different factors. However, to the best of the researcher's knowledge, no study has been conducted within the African context, giving credit to this study. Following the literature, the study hypothesises that the following firm characteristics influence ERM adoption.

3.2.2.1 Industrial Diversification

Industrial diversification refers to the number of business segments a firm operates. (Hoyt & Liebenberg, 2008, 2011; Lechner & Gatzert, 2018). Firms with more business segments are more complex and are more likely to adopt a robust risk management system to reduce any adverse effects. As suggested by Standard and Poor, diversified insurers are motivated to adopt ERM programs due to its benefit. Industrial diversification is believed to lead to higher performance (Hoyt & Liebenberg, 2008, 2011) and, in some cases, lead to loss of information (Lechner & Gatzert, 2018). Even though industrial diversification reduces the operational risks, firms with more business segments are seen to be very complex and are faced with higher risk; hence they are more likely to adopt ERM. Golshan et al. (2012) measured this variable as the number of business segments a firm have. However, the study follows the approach of other studies that used a dummy variable equal to 1 if the firm is industrially diversified and zero otherwise (Hoyt & Liebenberg, 2008, 2011; Farrell & Gallagher, 2015; Lechner & Gatzert, 2018). The results from the literature reveal that a positive relationship exists between industrial diversification and ERM

adoption, excepts in the case of Golshan and Rashid (2012), who found an inverse relationship. This difference may be because most of the firms within their sample did not have other business segments. Against this backdrop, the study hypothesises that:

H_1: Companies that are industrially diversified are more likely to adopt an ERM system.

3.2.2.2 Firm size

The size of a firm reveals the extent of growth in its business operations. As firms increases in size, the scope and complexities of their operations increases. This affects the nature and extent of risk activities of the firm. Lechner and Gatzert (2018) explained that a proportionate increase in firm size leads to an increase in the number of risks. Hence, an increase in firm size enhances the possibility of adopting ERM as it helps manage the risk associated with firm growth (Hoyt & Liebenberg, 2011; Gatzert & Martin, 2015). More so, larger firms have a greater ability to channel enough resources for their ERM implementation (Beasley et al., 2005). Firm size is generally measured as the natural logarithm of total assets except for (Beasley et al., 2005), who used firms revenue as a proxy for firm size. Most of the studies revealed that firm size has a positive and significant influence on ERM adoption. Firm size was mostly significant at a 1% significance level (Hoyt & Liebenberg, 2008, 2011; Pagach & Warr, 2011; Farrell & Gallagher, 2015; Lechner & Gatzert, 2018; Bohnert et al., 2019). This supports the hypothesis that:

H_2: Companies with increasing firm size are more likely to adopt an ERM system.

3.2.2.3 Auditor type

Another factor that motivates ERM adoption is the type of auditing company. It is believed that firms that are audited by the big four auditing firms (KPMG, Ernest and Young, Deloitte and PricewaterhouseCoopers) have a higher propensity to adopt ERM **(**Lechner & Gatzert, 2018; Beasley et al., 2005). The rationale behind this is that these auditors want to ensure transparency and reliability in their operations. They are also interested in maintaining their reputation and will ensure that the audited firm's financial system and internal controls are consistent with the generally accepted accounting principles. It is also possible that firms that engage these auditors are also more committed to a robust risk management system (Beasley et al., 2005). Following previous studies, this study measure auditor type as a dummy variable that takes the value of one if the firm is audited by any of the Big four auditing firms and zero otherwise. According to the

literature, a significant positive relationship exists between the big four auditing firms and ERM adoption (Beasley et al., 2005; Golshan & Rashid, 2012; Baxter et al., 2013; Lechner & Gatzert, 2018), indicating that the big four auditing firms are more likely to recommend ERM to their clients. The study, therefore, hypothesises that:

H_3: Companies audited by one of the Big four auditing firms are more likely to adopt an ERM system.

3.2.2.4 Institutional Ownership

Another factor identified in the literature as a determinant of ERM adoption is institutional ownership. This factor reveals the share ownership of the firm. That is, whether it is foreign-owned or not. Hoyt & Liebenberg (2011) explain that external stakeholders are a major determinant of ERM adoption. They further explain that firms with a majority of their shares owned by foreign institutions are more likely to implement an ERM system. This is because institutions have greater power and influence than individuals (Liebenberg & Hoyt, 2003). The result from previous studies reveals institutional ownership as a significant driver of ERM adoption (Hoyt & Liebenberg, 2008, 2011; Pagach & Warr, 2011). This relationship was statistically significant in most cases except in the case of Malaysia (Golshan and Rashid, 2012), which had an inverse and an insignificant relationship. To indicate institutional ownership status, this study uses a dummy variable that takes the value of 1 if owned by foreigners and zero otherwise. The study, therefore, assumes that:

H_4: Companies that foreigners own are more likely to adopt an ERM system.

3.2.2.5 Profitability

Firm profitability is generally defined as how well the firm can generate profits/revenue from its assets. Firm profitability is seen as a major contributing factor for ERM adoption. One reason stated in the literature is that companies with higher profitability can fund their ERM system (Farrell & Gallagher, 2015). Profitability is defined by different indicators such as Return on Asset (Razali & Tahir, 2011; Lechner & Gatzert, 2011), natural log of revenues (Beasley et al., 2005) was used to proxy for firm profitability. Khan et al. (2016) measure performance using the firms' earnings volatility and value chain. For this study, profitability is measured with ROA, which is defined as net income over total assets. Previous studies reveal mixed findings on the impact of profitability on ERM adoption. Lechner and Gatzert (2018) argue that firms with a higher level of

ERM maturity have improved performance while firms with a higher level of performance are more likely to adopt ERM; notwithstanding, their results revealed a significant negative relationship. Razali and Tahir (2011) also recorded an inverse relationship, implying that firms with low-performance levels adopt ERM to reduce financial distress, thereby enhancing their performance. On the contrary, Beasley et al. (2005) and Khan et al. (2016) found a positive and significant relationship. The difference may be a result of the different proxies used in measuring profitability. Hence, it is hypothesised that:

H_5: Companies with increasing profitability are more likely to adopt an ERM system

3.2.2.6 Industry type

Another factor found in the literature to be influencing ERM adoption is the type of industry. The type of industry is of much importance when it comes to ERM adoption. It is believed that some industries are more regulated than others. In a similar vein, while some industries face more complex risks and strong competition, others are less competitive and have a lower risk. Hence, firms operating in higher regulatory environments and with high complexity of risks are more likely to adopt ERM (Golshan & Rashid, 2012). According to the institutional theory, firms are required to implement ERM in a regulatory environment to withstand external influences (Powell, 1991). This variable was treated as binary. The focus of industry type was diverse and was stated as follows (Beasley et al., 2005- banking, education and insurance; Hoyt & Liebenberg, 2011 - life insurers; Golshan & Rashid, 2012 - banking, insurance, utilities and telecommunication; Mardessi & Arab, 2018 - banking; Lechner & Gatzert, 2018 - banking, insurance and energy).

According to the literature, the study find evidence that industry type is a major determinant of ERM adoption. This is because industry type has a positive relationship with ERM adoption, whereas (Beasley et al., 2005; Mardessi & Arab, 2018; Lechner & Gatzert, 2018) found this relationship to be statistically significant. This reveals that firms belonging to the banking, insurance, education, telecommunication, utilities and energy industry are more likely to implement an ERM system. Despite the various industries considered in the literature, no study indicates how the line of business for an insurance company (whether life or non-life insurer) affects their decision to implement an ERM system. It is argued that life insurers are more likely

to invest in ERM due to the long-term nature of their products. This study indicates a dummy variable of 1 to firms in the life insurance industry and zero otherwise and predict that:

H_6: Insurers belonging to the life insurance industry are more likely to adopt an ERM system.

3.2.2.7 Financial leverage

Firm leverage indicates how a firm finances its assets with debts. It is the use of a financial instrument such as borrowed capital to expand its assets. Studies have shown that financial leverage is a major determinant of ERM adoption as higher leverage firms face higher financial distress. On the other hand, firms may increase their leverage because of improved risk awareness (Bohnert et al., 2019). Firm leverage is defined as the ratio of total debt (liabilities) to asset capital (Hoyt & Liebenberg, 2011; Pagach & Warr, 2011; Lechner & Gatzert, 2018). Though leverage was found to be very significant, it had diverse relationships with ERM adoption. While some studies find a positive relationship (Liebenberg & Hoyt, 2003; Razali & Tahir, 2011; Golshan & Rashid, 2012; Khan et al., 2016), others find a negative relationship (Hoyt & Liebenberg, 2008, 2011; Pagach & Warr, 2011; Lechner & Gatzert, 2018; Bohnert et al., 2019). The positive relationship means that firms with high leverage are more likely to adopt ERM because high leverage firms have high-risk levels and a higher propensity to go bankrupt. In contrast, the negative relationship explains that firms with ERM may reduce their financial leverage because they want to reduce the probability of financial distress (Hoyt & Liebenberg, 2011). Despite the mixed findings, leverage is believed to influence the decision to adopt an ERM system. Consequently, it is hypothesised that:

H_7: Companies with increasing financial leverage are more likely to adopt an ERM system.

3.3 Conceptual Model

Based on the literature, we examine seven explanatory factors in this study: industrial diversification, firm size, type of auditing firm, institutional ownership, profitability, industry type and financial leverage. A binary approach is used to measure ERM adoption. The conceptual framework for this study is illustrated in Figure 3.1. The proxies and expectations of the independent variables are shown in Table 3.2.

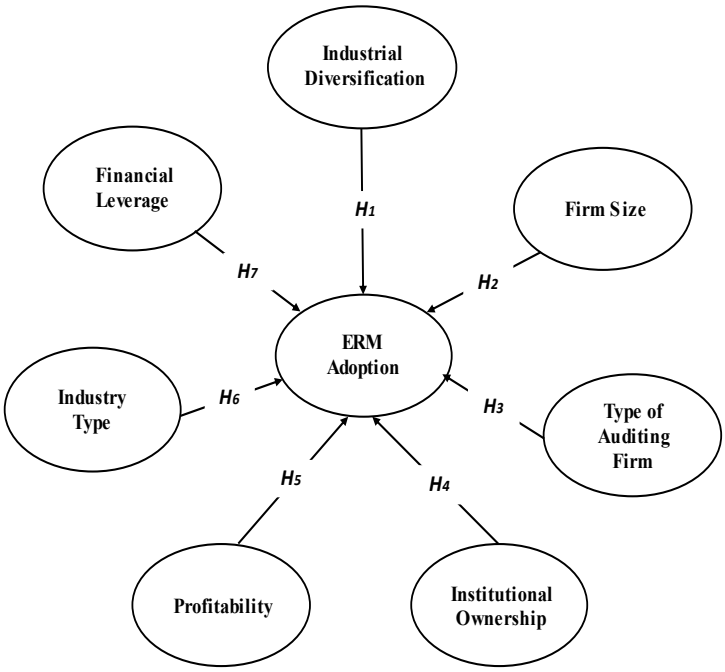


Figure 3. 1: Conceptual Framework

Table 3. 1: Summary of empirical findings on the determinants of Enterprise Risk Management

					Hypothesis (H)						
Author(s), year & Setting	**Journal**	**Methodology**	**Time Period**	**ERM Proxy**	***H_1***	***H_2***	***H_3***	***H_4***	***H_5***	***H_6***	***H_7***
Liebenberg and Hoyt (2003) USA	Risk Management and Insurance review	Logistic Regression, 26 Companies	1997-2001	Dummy		-*	+***	+		+	+**
Beasley, Clune and Hermanson (2005) USA	Journal of accounting and public policy	Ordinal Logistic regression, 123 companies	2004	ERM Stage		+**			+*	+***	
Hoyt and Liebenberg (2008) USA	Society of Actuaries	Maximum likelihood model, 125 companies	2000– 2005	ERM/CRO key words	+	+***		+***		+*	-***
Hoyt and Liebenberg (2011) USA	Journal of Risk and Insurance	Maximum likelihood model, 117 companies	1998– 2005	ERM/CRO key words	+	+***		+**		+	-**
Pagach and Warr (2011) USA	Journal of Risk and Insurance	Cox proportional hazard Model, 138 companies	1992 – 2005	CRO key words		+***		+**			-
Razali and Tahir (2011) Malaysia	Journal of Social and Development Sciences	Logistic regression, 528 companies	2007	Dummy		+	+**	+	-		+
Golshan and Rashid (2012) Malaysia	World Academy of science, engineering and technology	Logistic regression, 90 companies	Not specified	ERM/CRO key words	-	+		-		+	+*
Pooser and McCollough (2012) USA	American risk and insurance association	Logistic regression/ not specified	2009-2010	S&P ERM rating		+***	+***				
Baxter, Bedard, Hoitash and Yezebel (2013) USA	Contemporary Accounting research	Ordered logistic regression 165 firms	2006-2008	S&P ERM rating							-**
Farrell and Gallagher (2015) Canada, Europe, UK, USA, others	Journal of Risk and Insurance	Probit Model 225 companies	2006-2011	Dummy using RIMS model	-	+***					-

Khan, Hussain and Mehmood (2016) France	Management Decision	Cox-proportional hazard model 22 companies	1999-2008	CRO and time of announcement			+		+***		+**
Lechner and Gatzert (2018) Germany	The European Journal of Finance	Logistic and Hazard regression, 160 companies	2013/2009-2013	Dummy	+	+***			-**	+**	-
Mardessi and Arab (2018) Tunisia	Journal of Financial reporting and accounting	Logistic regression. 80 companies	2016	ERM Index		+**				+**	
Bohnert, Gatzert, Hoyt and Lechner (2019) Europe	The European Journal of Finance	Logistic regression 41 companies	2007-2015	Binary		+***					-***

NOTE: Significance levels include: ***p<0.01; **p<0.05; *p<0.10, Research hypothesis is represented by *H where* H_1=Industrial Diversification; H_2= Size; H_3=Auditor type; H_4=Institutional Ownership; H_5=Profitability; H_6=Industry type; H_7=Leverage

3.4 Method

3.5 Data Description and Source

This study focuses on the factors that determine ERM adoption among insurers. Our sample consists of 96 insurance companies (63 from South Africa and 33 from Ghana). There are about 135 insurers in South Africa and 54 insurers in Ghana. However, our sample is limited to insurers that have been in existence before the sample year period (2015-2018) and had sufficient data for the study. Focusing on the insurance industry prevents possible biases associated with industry-specific and inter-industry heterogeneity (Bohnert et al., 2019). A separate analysis was conducted to control for the regulatory and market differences between these two countries.

Data on the determinants were obtained from the Ghana National Insurance Commission and the South African Financial Sector Conduct Authority Databases. These databases provide a set of variables such as firm size, leverage, return on assets, line of business, and type of auditing company. Other relevant information regarding industrial diversification and ownership was obtained from the annual reports of individual firms. This helped identify various factors (determinants) that could influence a firm to adopt an ERM system. Due to the lack of ERM disclosure, two approaches were used to identify a firm's ERM adoption. First, the study follows Hoyt and Liebenberg's (2011) and Pagach and Warr's (2011) approaches by conducting a detailed search of the firm's financial reports and websites for evidence of ERM activity. Second, a survey approach is used to further validate the firms' ERM adoption. The survey was necessary to identify the year in which the firm adopted ERM since this information was not publicly available. In addition, the questionnaire specifically asked whether the firm has an ERM program. The study also includes detailed questions on a firm's ERM activities and risk management process.

3.6 Empirical Strategy

3.6.1 Linear Regression

A dummy approach was used to measure a firm's ERM adoption. For firm years starting with and subsequent to the first evidence of ERM adoption, ERM is given the value of 1, and for firm years before the first evidence of ERM adoption, ERM is given the value of 0 (Hoyt & Liebenberg, 2011). Hence, the study assumes a dichotomous dependent variable as specified in equation (1),

where an insurer is given the value of 1 if they have adopted ERM and zero otherwise. Our ERM variable is specified as:

$$Pr(ERM_{it)} = 1(ERM_{it}^{*} \geq 0) = \begin{cases} 1\ if\ ERM_{it}^{*} \geq 0 \\ 0\ if\ otherwise \end{cases} \quad (1)$$

Such that:

$$\Pr(ERM_{it} = 1/X_{it}) = Pr(X_{it}\beta + \varepsilon_{it}) \quad (2)$$

Where equation (2) represents the probability of ERM adoption or not, given the covariates X_{it} which consists of a vector of predictor values (determinants). The error term ε_{it} is assumed to be normally distributed with a mean of zero, and i and t represent individual firm and time, respectively.

The study employed panel logistic regression for its data analysis, in which the maximum likelihood approach was used to estimate the parameters. This panel logistic regression allows for testing dichotomous dependent variables and is useful for longitudinal data. The Panel data span the period from 2015 to 2018. Panel data aids in the monitoring of missing variables and insurance-specific effects and allows for both long-run and short-run effects, overcoming the limitations of cross-sectional and time-series estimation techniques (Wooldridge, 2009). The study finds that random effect is appropriate for the study due to too little within variations among insurers. The Hausman test further confirms this. Specifically, the Hausman test failed to reject the null hypothesis that the difference in coefficients is not systematic. This means that the issue of unobserved heterogeneity is unproblematic. This study turns to the literature to decide on the specification of the determinants. Hence, our general model is specified as:

$$ERM_{it} = f(Firm\ Complexity, Size, Big4, Own, ROA, Life, Lev)_{it} \quad (3)$$

3.6.2 Logistic Quantile Regression Model

The logistic quantile regression technique is used for many reasons. First, it provides a deeper understanding than any other method that considers a single summary measure (Bottai et al., 2010). Second, it can solve difficulties with small samples and overcome problems with outliers (Wei et al., 2006). Third, it provides a robust econometric technique for comparing multiple features of any form of result distribution across diverse covariate patterns more fully than the mean alone (Orsini & Bottai, 2011). The quantile regression model is specified as:

$$Q_{h(y_{it})}(p) = Q_{logit(y_{it})}(p) = x_{it}^{T}\beta_p \qquad (4)$$

We assume that for any quantile p, there exist a fixed set of parameters β_p and a known nondecreasing function h across the interval (y_{min}, y_{max}). X_{it} =($x_{it,1}^{T}$,….. $x_{it,p}^{T}$)^{T} is a vector of independent variables.

3.7 Description of the Determinants Variables

Firm size explains the extent of growth within the insurer's business operations and is measured as the natural logarithm of the insurer's total assets (Bohnert et al., 2019). Financial leverage assesses the diverse relationship between market evaluation and capital structure (Florio & Leoni, 2017). This is calculated as total debts/liabilities divided by total equity (Lechner & Gatzert, 2018). Return on Assets captures historical performance and shows how well an insurer manages its assets to create revenue (Hoyt & Liebenberg, 2011). This was proxied as the ratio of net profit to total assets (Hoyt & Liebenberg, 2011; Lechner & Gatzert, 2018). Another determinant factor considered is the Big four auditing company. This is measured as a dummy variable, equal to 1 if the firm is audited by one of the Big four auditing companies (KPMG, EY, Deloitte and PwC); otherwise, 0 (Golshan & Rashid, 2012). Industrial diversification outlines the number of business segments owned by the insurance company. This is also measured as a dummy variable equal to 1 if the firm diversifies; otherwise, 0 (Golshan & Rashid, 2012). The line of a business segment by the insurer is also considered. The study considers insurers belonging to the life industry to be more likely to adopt ERM due to the long-term nature of their business operations; hence this variable is measured as a dummy which takes the value of 1 if the firm belongs to the life industry and 0 otherwise (Hoyt & Liebenberg, 2011). Ownership shows whether the insurance company is foreign-owned or not. It is often argued that foreign investors are interested in receiving their return

within the shortest; hence are more likely to encourage firms to adopt ERM. This is measured as a dummy, which is equal to 1 if the firm is foreign-owned; otherwise, 0. The variables employed in the study are summarised in Table 3.2 below.

Table 3. 2: Definitions of Variables and their predicted signs

Variable	Symbol	Predicted Sign	Measurement	Source
ERM Adoption	ERM	N/A	Dummy variable = 1 if firm has ERM implementation otherwise 0	Hoyt and Liebenberg (200, 2011); Pagach and Warr (2011); Lechnes and Gatzert (2018)
Firm Size	Size	+	Natural log of total assets	Lechner and Gatzert (2018); Pagach and Warr (2010); Golshan and Rashid (2012)
Leverage	Lev	±	Measured as total liability/debt divided by asset capital	Lechner and Gatzert (2018); and Hoyt & Liebenberg (2011)
Return on Assets	ROA	±	Net Profit/Total Assets	Lechner and Gatzert (2018); Razali et al. (2011); Hoyt and Liebenberg (2008, 2011)
Big four Auditors	Big4	+	Dummy variable = 1 if the firm is audited by one of the Big four auditing companies (KPMG, EY, Deloitte and PwC) otherwise = 0	Golshan and Rashid (2012); Lechner and Gatzert (2018); Beasley, Clune and Hermanson (2005)
Industry Diversification	Ind_Div	+	Dummy variable = 1 if firm diversifies otherwise = 0	Golshan and Rashid (2012); Hoyt and Liebenberg (2011)
Life insurers	Life	+	Dummy variable = 1 if firm belongs to the life insurance industry otherwise = 0	Hoyt and Liebenberg (2008, 2011)
Ownership	Own	+	Dummy variable = 1 if firm is foreign-owned otherwise = 0	Hoyt and Liebenberg (2003); Golshan and Rashid (2012).

3.8 Empirical Results

3.9 Descriptive statistics

The descriptive statistics for all the variables used in the regression analysis are reported in Table 3.3, which are based on 252 and 132 firm-year observations for insurers in South Africa and Ghana, respectively. In terms of ERM adoption, South Africa had the highest mean of 76%, while Ghana had a mean of 59%, showing more insurers have an ERM system in South Africa than in Ghana. This is not surprising because the South African insurance industry is well developed and has the highest insurance penetration rate in Sub-Saharan Africa, whilst Ghana represents one of the growing insurance industries in SSA. Regarding the determining factors, the South African insurance industry has a positive total asset with an average of 35,300 billion South African Rand, whereas 95% of the insurers have other business segments. As many as 92% of the firms are audited by one of the big four auditing firms, and 27% of the firms used in the study are foreign owned. The return on asset shows that, on average, 42% of insurers earnings are generated from its assets. Forty-four per cent of the firms were from the life insurance company, while firm leverage had an average of 65%, showing that the insurers' assets are more than their debts.

In the Ghanaian case, the total asset of the sampled insurers is valued at an average of 117,000 million Ghana cedis. The results suggest an average return on assets of about 9%, showing that the South Africa insurance industry are able to generate more income from their assets than the Ghanaian insurance industry. Insurers audited by one of the big four and ownership registered an average value of 76% and 70%, respectively, indicating that most insurers are audited by one of the big four auditing companies and are foreign-owned. Forty-six per cent of the insurers sell life insurance products, and the mean value (91%) for leverage in Ghana was higher than in South Africa, indicating that insurers in Ghana depend a lot on debts to finance their business.

Table 3.4 presents the results of the Pearson correlation analysis between ERM and its determinants for both countries. The study further compute the variance inflation factors (VIFs) to test for multicollinearity. The results of the VIFs are depicted in Table 3.7. The VIFs are far below the critical value of 10, which shows that multicollinearity does not appear to be a concern in the regression analysis (Marquaridt, 1970; Mason & Perreault, 1991). Hence, the variables considered are deemed fit to be used in the model.

Table 3. 3: Descriptive Statistics

Variable	Obs	Mean	SD	Min	Max
South Africa					
ERM	252	0.758	0.429	0.000	1.000
Ind_Div	252	0.952	0.214	0.000	1.000
Size	252	35,346	11,135	2,220.00	653,435
Big4	252	0.921	0.271	0.000	1.000
Own	252	0.270	0.445	0.000	1.000
ROA	252	0.417	0.372	0.000	2.897
Life	252	0.444	0.498	0.000	1.000
Lev	252	0.647	0.675	-2.574	9.948
Ghana					
ERM	132	0.594	0.492	0.000	1.000
Ind_Div	132	0.765	0.426	0.000	1.000
Size	132	117,231	17,120	2,537.5	1,180,032
Big4	132	0.758	0.431	0.000	1.000
Own	132	0.697	0.461	0.000	1.000
ROA	132	0.091	0.132	0.010	1.310
Life	132	0.455	0.521	0.000	1.000
Lev	132	0.910	1.264	-0.452	12.512

Note: ERM represent enterprise risk management adoption; Ind_Div represents industrial diversification; Size represents the firm size, Big4 represents the big four auditing company; OWN represents ownership, ROA represents return on assets; Life represents insurers that belong to the life insurance industry and LEV represents financial leverage

Table 3. 4: Correlation Coefficients

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
South Africa								
(1) ERM	1.000							
(2) Ind_Div	0.221***	1.000						
(3) Size	0.194***	0.040	1.000					
(4) Big4	0.245***	-0.066	0.322***	1.000				
(5) Own	0.197***	0.137**	-0.107*	0.046	1.000			
(6) ROA	-0.155**	-0.047	-0.481***	0.018	-0.022	1.000		
(7) Life	-0.091	0.202***	0.345***	-0.210***	0.032	-0.293***	1.000	
(8) Lev	0.034	0.088	0.265***	0.088	0.164***	0.032	0.240***	1.000
Ghana								
(1) ERM	1.000							
(2) Ind_Div	0.3847***	1.000						
(3) Size	0.2135**	0.2059**	1.000					
(4) Big4	0.2940***	0.062	0.165*	1.000				
(5) Own	0.1325	0.140	0.0377	0.089	1.000			
(6) ROA	-0.1233	0.065	-0.3904***	-0.019	0.176**	1.000		
(7) Life	-0.0028	-0.111	-0.0389	-0.090	-0.205**	0.152*	1.000	
(8) Lev	0.1050	-0.005	0.0461	0.011	0.021	-0.113	0.151*	1.000

Notes: ***, ** and * denote statistical significance at 1%, 5% and 10% level, respectively.

3.10 Univariate Analysis

The study first compares the univariate differences of ERM firms (ERM=1) and non-ERM firms (ERM=0). Results from the descriptive analysis provides initial evidence that about 76% of insurers in South Africa have adopted ERM as compared to 59% from Ghana. This comes as no surprise given the large number of insurers in South African and the fact that they have a large sample size than the Ghanaian industry. The study calculate the means and medians for each of the ERM and non-ERM firms, and the variation between the two groups are tested. In the case of the mean difference, a two-sample t-test is employed whilst the statistical significance of the difference in medians is based on a non-parametric Wilcoxon rank-sum test. Generally, the average means of ERM firms are higher than non-ERM firms except for ROA and Life insurers. For instance, the mean of firm size (14.922, 18.066) for firms with ERM adoption is slightly higher than the mean (13.761, 17.454) of non-ERM firms for South Africa and Ghana, respectively. This result was found to be statistically significant for both countries. This suggest that ERM firms on average are large in size than non-ERM firms. This supports the hypothesis that large firms face many complexities and variety of risks; hence adopt ERM to manage these challenges. In addition, the mean values for Ind_Div, Big4 and Own are higher for ERM firms, both in Ghana and South Africa. However, their median values are the same. Each of these variables but Own are statistically significant. The results of the univariate analysis support the assumption that insurers with other business segments and are frequently audited by one of the Big four auditing firms, are more likely to adopt an ERM system. This is in line with the argument that audit firms are more devoted to good risk management practices and transparency of accounting reports; hence encourage their clients to adopt ERM. Also, firms with other business segments are exposed to group risk which is likely to influence their decision to adopt ERM. In terms of ownership, foreign-owned firms are more likely to have an ERM system than non-ERM firms, but this was statistically insignificant in the Ghanaian case, indicating that ownership does not

Concerning profitability, the mean difference of ROA for South African insurers was negative and statistically significant for both samples. The comparison further shows an insignificant negative difference in the median for both countries. The significant negative mean difference counter our hypothesis that profitable firms are more interested in ERM adoption. This result can be due to the fact that less profitable firms adopt ERM as a tool to manage any financial distress that is likely to

affect their returns. With respect to the remaining variables (Life and Lev), there are no statistically significant differences in the means and medians for the two countries. The mean difference for life insurers also represents ambiguous results.

Table 3. 5: Univariate Difference Across ERM Status

	ERM=1		ERM=0		Difference	
Variable	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**
South Africa						
Ind_Div	0.979	1.000	0.869	1.000	0.110***	0.000***
Size	14.822	14.573	13.761	12.815	1.061***	1.758***
Big4	0.958	1.000	0.803	1.000	0.155***	0.000***
Own	0.320	0.000	0.115	0.000	0.205***	0.000***
ROA	0.385	0.329	0.519	0.390	-0.134***	-0.061
Life	0.419	0.000	0.524	1.000	-0.105	-1.000
Lev	0.660	0.616	0.606	0.609	0.054	0.007
Obs	191		61			
Ghana						
Ind_Div	0.898	1.000	0.566	1.000	0.332***	0.000***
Size	18.066	18.158	17.454	17.499	0.612***	0.659***
Big4	0.861	1.000	0.604	1.000	0.257***	0.000***
Own	0.747	0.000	0.623	0.000	0.124	0.000
ROA	0.077	0.062	0.111	0.071	-0.034	-0.009
Life	0.456	1.000	0.453	1.000	0.033	0.000
Lev	1.019	0.752	0.749	0.694	0.272	0.058
Obs	79		53			

Notes: ***, ** and * denote statistical significance at 1%, 5% and 10% level, respectively.

3.11 Sensitivity Analysis

The study further conducts sensitivity analysis to confirm the robustness of the covariates. This was done with seven different regressions. The determinants variables are added step by step in the regression model to ensure the robustness of each covariate. The study adds one explanatory variable in our first model, while other variables were successively added in the subsequent models. The last model represents our holistic model, which is further explained in section 4.6. Table 6 reports the coefficients estimates of the sensitivity analysis using the panel logistic regression approach while holding the dependent variable constant. It is worth noting that the

results are consistent across all specifications confirming the robustness of each determinant on ERM adoption. Only in the South African case that firm size is significant in models 3 and 4 but shows insignificant and positive results in the other models.

Table 3. 6: Sensitivity Analysis Regarding the Determinants of ERM Adoption

Variables	ERM Adoption (South Africa)						
	ERM1	ERM2	ERM3	ERM4	ERM5	ERM6	ERM7
Ind_Div	14.66***	17.06***	17.32***	16.24***	14.85**	19.89***	18.98***
	(3.396)	(3.450)	(3.527)	(3.606)	(7.535)	(4.724)	(5.315)
Size		0.694	0.830**	1.385***	0.382	0.690	0.864
		(0.515)	(0.409)	(0.441)	(0.532)	(0.566)	(0.577)
Big4			14.30***	12.13***	17.14***	15.02***	10.15***
			(2.866)	(2.971)	(5.125)	(4.008)	(3.859)
Own				6.508**	5.704**	5.835*	6.389**
				(2.794)	(2.763)	(3.134)	(2.646)
ROA					-7.013**	-8.029***	-8.024***
					(2.842)	(2.508)	(2.798)
Life						-6.070**	-7.150**
						(2.708)	(2.928)
Lev							0.814
							(0.747)
Constant	-3.643	-14.08*	-31.94***	-37.89***	-23.72**	-27.88***	-25.57***
	(2.625)	(8.509)	(5.895)	(6.411)	(9.926)	(8.852)	(8.657)
Observations	250	250	250	250	250	250	250
Number of id	63	63	63	63	63	63	63
LR Test	150.26***	143.10***	137.68***	130.83***	132.79***	128.62***	127.98***
Wald Test of Ind Eq	18.64***	24.53***	66.17***	66.44***	30.54***	44.19***	55.82***
Variables	ERM Adoption (Ghana)						
	ERM1	ERM2	ERM3	ERM4	ERM5	ERM6	ERM7
Ind_Div	2.644***	2.503***	2.414***	2.354***	2.518***	2.543***	2.589***
	(0.848)	(0.886)	(0.776)	(0.782)	(0.807)	(0.810)	(0.743)
Size		0.344	0.269	0.265	0.154	0.152	0.0765
		(0.274)	(0.243)	(0.239)	(0.266)	(0.260)	(0.263)
Big4			1.804**	1.762**	1.869**	1.912**	1.898**
			(0.774)	(0.761)	(0.785)	(0.776)	(0.776)
Own				0.348	0.186	0.267	0.193
				(0.603)	(0.646)	(0.698)	(0.699)
ROA					-3.060	-2.820	-4.742
					(2.610)	(2.639)	(3.590)
Life						-0.350	-0.0903
						(0.677)	(0.683)
Lev							0.612

							(0.392)
Constant	-1.466**	-7.461	-7.479	-7.556*	-5.404	-5.343	-4.421
	(0.653)	(5.100)	(4.562)	(4.546)	(5.020)	(4.893)	(4.927)
Observations	132	132	132	132	132	132	132
Number of id	33	33	33	33	33	33	33
LR Test	7.20***	7.05***	3.58**	3.31**	3.52**	3.34***	2.33*
Wald Test of ind eq	9.72***	8.39***	12.33***	12.51**	13.09**	13.39**	17.01**

Notes: ***, ** and * denote statistical significance at 1%, 5% and 10% level, respectively.

3.12 Presentation of Empirical findings

3.12.1 Linear Regression Analysis

This study examines the firm characteristics that influence ERM adoption in South Africa and Ghana. A panel logistic regression was used to indicate the estimation results of the determinants. The study finds that the random effect is appropriate based on the Hausman test. The nature of our data was also suitable for simple pooled OLS analysis. The empirical findings are reported in Table 3.7. The first column lists the considered determinants. The second column reports the VIF, while the third, fourth and fifth column reports the estimated parameters of the Random Effects (RE), Marginal Effects (ME) and Pooled OLS (POLS), respectively.

The estimated results reveal that Industrial Diversification (Ind_Div) has a positive impact on ERM adoption. This was statistically significant at 1% for both South Africa and Ghana, confirming the hypothesis that insurers that are well diversified in their business operations are more likely to practice ERM. Concerning firm size (Size), the study finds that size has a positive influence on insurers decisions to adopt ERM. This was also consistent with the second hypothesis, but surprisingly, this relationship was statistically insignificant for the two countries.

As predicted in our hypothesis, the reports for both countries reveal that insurers that are frequently audited by one of the big four auditing firms (Big4) are more likely to adopt an ERM system. This argument is validated by the positive coefficient for both countries and the statistical significance at 1% and 5% significance levels for South Africa and Ghana, respectively.

In terms of ownership, the study finds a positive relationship between foreign-owned firms and ERM adoption in both cases. Hence, all things being equal, foreign-owned companies are more likely to adopt ERM. In the case of South Africa, the result was statistically significant at 5% significance level. More so, the empirical evidence for South Africa indicates that firms that are profitable and insurers belonging to the life industry are less likely to have an ERM system within their organisation. These relationships were statistically significant. This is the same for Ghana but albeit insignificant effect. The coefficients are in sharp contrast with their respective hypothesis.

The results further highlight that leverage (Lev) is positive but insignificant in determining ERM practices for insurers in Ghana and South Africa. This shows that there is no relationship between firm leverage and ERM adoption. Surprisingly, the POLS indicate a negative relationship for South Africa and a 10% significance level for Ghana.

Table 3. 7: Panel Logistic Regression Results

		South Africa				**Ghana**		
Variables	VIF	RE	ME	POLS	VIF	RE	ME	POLS
Ind_Div	1.063	18.98***	0.187**	0.473***	1.362	2.589***	0.379***	0.428***
		(5.315)	(0.093)	(0.119)		(0.743)	(0.057)	(0.0940)
Size	1.818	0.864	0.005	0.0306**	1.329	0.0765	0.0112	0.0104
		(0.577)	(0.008)	(0.0148)		(0.263)	(0.038)	(0.0297)
Big4	1.346	10.15***	0.179**	0.255**	1.139	1.898**	0.278***	0.306***
		(3.859)	(0.093)	(0.106)		(0.776)	(0.093)	(0.0918)
Own	1.059	6.389**	0.055**	0.179***	1.135	0.193	0.028	0.0366
		(2.646)	(0.030)	(0.0585)		(0.699)	(0.103)	(0.0915)
ROA	1.385	-8.024***	-0.116*	-0.138*	1.109	-4.742	-0.695	-0.532**
		(2.798)	(0.102)	(0.0806)		(3.590)	(0.500)	(0.234)
Life	1.375	-7.150**	-0.082	-0.168***	1.065	-0.0903	-0.013	-0.0290
		(2.928)	(0.064)	(0.0593)		(0.683)	(0.100)	(0.0793)
Lev	1.220	0.814	0.013	-0.0147	1.052	0.612	0.090	0.0442*
		(0.747)	(0.021)	(0.0405)		(0.392)	(0.058)	(0.0256)
Constant		25.57***		-0.280		-4.421		-0.150
		(8.657)		(0.233)		(4.927)		(0.535)
Obs		250	252	250		132	132	132
R-squared				0.196				0.2614
Prob>F				0.000				0.000
No. of id		63	63			33	33	
LR Test		127.98***				2.33*		
Wald Test		55.82***				17.01**		

Notes: Standard errors in parentheses; where ***, ** and * denote statistical significance at 1%, 5% and 10% level, respectively. RE is Random Effect; ME is Marginal Effect; POLS is Pooled OLS; VIF is Variance Inflation Factor; LR Test is Likelihood-ratio test.

3.12.2 Quantile Regression Results

In Tables 3.8 and 3.9, the study provides the quantile regression results of the determining factors for both countries. This approach provides valuable insight into the determinants at different distribution levels. First, the quadratic terms for the continuous variables (that is, firm size, return on assets and leverage) were obtained to estimate their non-linearities as shown in Models (1)-(3). Four models, that is, Models (4)-(7), were further estimated for both samples. For each sample, the study obtained the report for the quantiles at 20%, 40%, 60% and 80% to show the level at which the factors considered determine ERM adoption. The standard errors for the coefficient estimates are obtained using the bootstrap approach at 100 bootstrap replications. For the South African sample, it is seen that firm size, return on assets, and leverage negatively impacts ERM adoption at its initial stages and a positive impact at the extreme stage, showing a nonlinear relationship direct U-shape. The direct U-shape between firm size and ERM adoption was statistically significant only at the 20^{th} quantile. Return on assets and leverage further show significant results for all quantiles. This suggests that these factors promote ERM adoption at higher levels and vice-versa. The results further reveal that industrial diversification, Big four auditing companies and ownership have a positive relationship with ERM adoption at different levels of the distribution, showing significant coefficients estimates across all levels of the quantile distribution. The results submit that industrially diversified insurers, audited by one of the big4 audit firms and owned by foreigners, are more likely to adopt ERM at all levels of quantiles. Life insurers showed varied results revealing a significant positive impact on ERM adoption at the 80^{th} quantile.

The results from the Ghanaian sample show similar trends for the relationship between firm size and ERM adoption. The direct U-shape shows significant values at the 20^{th} and 60^{th} quantiles, indicating that firms are more likely to adopt ERM as they increase in size. On the contrary, return on assets and leverage revealed an inverted U-shape relationship from the 40^{th} quantile. The results show that insurers are more likely to adopt ERM at lower levels of profitability and leverage. The results for industrial diversification confirm similar patterns like the South African sample, showing a significant positive relationship at all quantiles. This indicates that industrial diversification is a significant predictor of ERM adoption. The Big four auditing company was

also positive and significant only at the 40th quantile, whereas ownership and life insurers reveal a positive relationship at higher levels of quantiles, but this was insignificant.

Table 3. 8: Quantile Regression Results (South Africa)

South Africa:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				Quantile Regression			
VARIABLES	RE	RE	RE	Q.20	Q.40	Q.60	Q.80
Size	-0.473	0.848	1.135*	0.853***	0.00858	0.00984	0.00011***
	(4.212)	(0.630)	(0.635)	(0.232)	(0.00914)	(0.0124)	(0.00021)
$Size^2$	0.0328			-0.0266***	-0.000148	-0.000137	-0.000213
	(0.141)			(0.00756)	(0.000296)	(0.000395)	(0.00345)
ROA	-8.924***	-14.05***	-13.57***	0.244	0.278***	0.228***	0.000034**
	(3.185)	(5.348)	(4.458)	(0.332)	(0.0125)	(0.0176)	(0.00021)
ROA^2		3.822*		-0.0987	-0.349***	-0.334***	-0.000***
		(2.166)		(0.120)	(0.00459)	(0.00604)	(0.00001)
LEV	1.158	0.618	-14.25	-0.476***	-0.0524***	-0.0845***	-0.00010
	(0.943)	(0.758)	(15.08)	(0.125)	(0.00610)	(0.00972)	(0.0012)
LEV^2			4.022	0.0440***	0.0119***	0.0150***	0.00000***
			(11.68)	(0.0119)	(0.000579)	(0.000918)	(0.000123)
Ind_Div	19.05***	18.95***	19.22***	0.639***	2.076***	2.047***	0.00017**
	(4.245)	(5.853)	(5.847)	(0.227)	(0.00877)	(0.0109)	(0.00085)
Big4aud	8.266**	10.26**	15.45***	0.0876	2.158***	1.124***	0.0000023*
	(3.450)	(4.628)	(4.808)	(0.190)	(0.00772)	(0.0112)	(0.00052)
Own	4.834**	6.276**	6.921**	1.638***	0.0173***	0.0274***	0.00001***
	(2.345)	(2.872)	(3.048)	(0.120)	(0.00437)	(0.00565)	(0.0003)
Life	-6.208**	-7.595**	-6.666**	-0.0289	-0.00204	-0.000778	0.00013***
	(2.535)	(3.216)	(2.952)	(0.127)	(0.00520)	(0.00604)	(0.0045)
Constant	-10.10	-23.24**	-24.91**	-7.784***	-3.256***	-2.172***	1.099***
	(31.63)	(9.342)	(10.76)	(1.734)	(0.0710)	(0.0950)	(0.0231)
Observations	252	252	252	252	252	252	252
Number of id	63	63	63				
LR Test	125.55***	129.06***	121.43***				
Wald Test	43.16***	47.10***	47.28***				

Table 3. 9: Quantile Regression Results (Ghana)

Ghana:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				Quantile Regression			
VARIABLES	RE	RE	RE	Q.20	Q.40	Q.60	Q.80
Size	-7.730**	0.0632	0.130	-3.904***	-0.0100	-0.0205**	-0.00871
	(3.863)	(0.272)	(0.270)	(0.426)	(0.00690)	(0.00795)	(0.00865)
$Size^2$	0.231**			0.117***	0.000308	0.000553**	0.000244
	(0.116)			(0.0129)	(0.000209)	(0.000234)	(0.000262)
ROA	-5.315	0.298	-4.727	-0.244	0.148***	0.228***	0.297***
	(3.550)	(8.419)	(3.605)	(1.348)	(0.0165)	(0.0186)	(0.0268)
ROA^2		-13.61		-0.230	-1.391***	-1.457***	-1.505***
		(17.26)		(0.934)	(0.0114)	(0.0128)	(0.0193)
LEV	0.610	0.587	-1.723	-0.000383	0.00753***	0.00159	0.000875
	(0.413)	(0.408)	(1.215)	(0.102)	(0.00147)	(0.00183)	(0.00287)
LEV^2			0.854*	0.0110	-0.000552***	-0.000130	-0.000115
			(0.485)	(0.00767)	(0.000112)	(0.000137)	(0.000214)
Ind_Div	2.474***	2.626***	2.564***	0.325**	2.190***	2.192***	0.00860***
	(0.824)	(0.765)	(0.684)	(0.155)	(0.00213)	(0.00238)	(0.00314)
Big4aud	1.645**	1.930**	2.158***	0.128	0.0115***	0.00342	0.00414
	(0.792)	(0.792)	(0.797)	(0.139)	(0.00207)	(0.00234)	(0.00331)
Own	0.550	0.157	0.133	0.183	-0.00111	0.00143	0.000733
	(0.786)	(0.727)	(0.708)	(0.135)	(0.00194)	(0.00221)	(0.00309)
Life	-0.409	-0.0768	-0.0676	0.00964	-0.000199	0.00200	0.00135
	(0.794)	(0.702)	(0.713)	(0.136)	(0.00172)	(0.00204)	(0.00288)
Constant	61.23*	-4.433	-4.524	30.94***	-1.032***	-0.916***	1.156***
	(32.23)	(5.139)	(5.008)	(3.616)	(0.0573)	(0.0683)	(0.0723)
Observations	132	132	132	132	132	132	132
Number of id	33	33	33				
LR Test	2.94**	2.41**	2.33**				
Wald Test	18.42***	16.71***	20.25***				

3.13 Discussion of Empirical Results

3.13.1 Linear Regression

The empirical results show that the parameter estimates are consistent for both countries, but the statistical significance differs in many respects. It can be noted that five of the seven determinants from the South African sample significantly explain ERM adoption, while only two factors were significant in the Ghanaian sample. The differences in the significant results may be attributed to the sample size and that many insurance companies are without an ERM adoption Ghana than in the South African insurers. This is in line with the findings of Hoyt and Liebenberg (2008), who had many insignificant results in their regression model, explaining this was due to a large number of non-ERM firms within their sample. The study is based on the theoretical discussions and assumptions stated in the literature review.

The positive result for industrial diversification for South Africa and Ghana is consistent with the findings of Hoyt and Liebenberg (2008, 2011) and Lechner and Gatzert (2018); therefore, the study reject the null hypothesis and explain that well-diversified insurers are more likely to adopt ERM. Given the findings of this study, we posit that the implementation of ERM reduces the complexities associated with diversification, thereby enhancing insurance performance. However, Golshan and Rashid (2012) and Farrell and Gallagher (2015) are against this argument, revealing an inverse relationship between industrial diversification and ERM adoption. But their inverse relationship may be due to their sample size, data type, and in the case of Golshan and Rashid (2012), most of their sampled firms did have other business segments. Unlike the previous studies, we find a statistically significant relationship between diversification and ERM adoption. It is suggested that firms with other business segments face higher risks and complexities; therefore, insurers that are industrially diversified tend to implement ERM to reduce the risk that is associated with them (Lechner & Gatzert, 2018).

Next, we find that the positive evidence between firm size and ERM adoption is in line with the literature (Beasley et al., 2005; Pagach & Warr, 2011; Farrell & Gallagher, 2015; Lechner & Gatzert, 2018; Bohnert et al., 2019) who finds that size influence firms' decision to practice ERM. This is a long-held view that an increase in size enhances firm's ability to adopt an ERM system. According to Lechner and Gatzert (2018), a proportionate increase in firm size leads to an increase

in the number of risks which motivates firms' decision to implement ERM. In addition, Beasley et al. (2005) also argue that larger firms have greater ability to channel enough resources for their ERM implementation (Beasley et al., 2005). Unfortunately, this study finds an insignificant result for both samples, suggesting that firm size does not matter in making ERM decisions (Hoyt & Liebenberg, 2009, 2011; Golshan & Rashid, 2012). This is not surprising since ERM is now gaining relevance in these countries, and most insurers are still in the process of engaging ERM.

The positive and significant results for the Big4 further indicates that the presence of the big four auditing firm in an organisation is associated with ERM adoption. This was true for both countries. The positive and significant result confirms the research hypothesis that the big four are more likely to recommend ERM to firms they audit. The result is also consistent with previous findings (Beasley et al., 2005; Golshan & Rashid, 2012; Baxter et al., 2013). The empirical result can be attributed to the fact that these auditing companies are interested in maintaining their reputation. In this endeavour, they ensure that audited firms comply with the generally accepted accounting practices and other regulatory policies on risk management (Lechner & Gatzert, 2018). The findings confirm the theoretical argument that the adoption of ERM is possible within a regulated environment.

The study again finds that ownership has a positive impact on ERM implementation. This was statistically significant from the South African data. This evidence strongly supports the literature (Pagach & Warr, 2011; Hoyt & Liebenberg, 2008, 2011; Liebenberg & Hoyt, 2003). Thus, the South African market suggests that foreign investors are interested in higher returns within a short period, hence encouraging firms to practice a strong risk management system. In addition, most of these foreign investors come from developed economies and have the financial capacity to support ERM implementation. Unfortunately, the Ghanaian data mean that ERM seems not to be relevant regardless of the ownership structure.

Regarding the association between profitability (measured with ROA), life insurers and ERM adoption, the study finds a negative relationship for the samples from both countries. The result for the South African data reveals that ROA and life are statistically significant. This supports Lechner and Gatzert (2018) findings, who also find a significant negative relationship. This is in

accordance with the theoretical and empirical findings (Nocco & Stulz, 2006; Pagach & Warr, 2011; Khan et al., 2016), arguing that implementing an ERM strategy is more likely for firms that have recently experienced poor performance and are more likely to default. Lechner and Gatzert (2018) also argue that less profitable firms are more likely to practice ERM to reduce any costs that affect their profits.

On the other hand, highly profitable firms are not interested in ERM implementation. This can be explained by the fact that insurers in highly developed markets already benefit from their market and may not be interested in risk management. Though profitable firms have the financial capacity to fund ERM, it is also argued that its implementation comes with associated costs. This is in relation to the CRO appointment, establishing risk committee and the required human and financial needed for ERM implementation (Hoyt & Liebenberg, 2011; Lin et al., 2012). It is important to note that though the cost of ERM implementation may occur, its value-enhancing capacity cannot be overemphasised. Lechner and Gatzert (2018) add that the profitability of ERM is expected to be realised over time. Furthermore, the relationship between life and ERM adoption shows that life insurers are less likely to be associated with ERM adoption. The negative relationship can be attributed to the fact that there not many life insurers in the South African sample. The sample reveals insignificant results for Ghanaian insurers, implying that ROA and Life do not play any vital role in ERM adoption.

When the impact of financial leverage on performance is observed, the study find that leverage have a positive relationship with ERM adoption for insurers. This result is consistent for insurers in Ghana and South Africa. It is argued that financial level results in a high level of risk and financial distress, which serves as a motivation for ERM adoption, but this relation is not statistically significant in both cases showing that leverage does not have any impact on a firm's decision to adopt ERM. The positive relationship is the same for Razali and Tahir (2011), Golshan and Rashid (2012) and Khan et al. (2016). However, this is in sharp contrast to results of (Bohnert et al., 2019; Lechner & Gatzert, 2011; Pagach & Warr, 2011; Hoyt & Liebenberg, 2011).

3.13.2 Quantile Regression

Our results show that firm size has a negative and positive effect on ERM adoption, implying a direct U-shape relationship across all quantiles for both countries. The results further revealed a similar relationship for return on assets and leverage for South Africa. This was statistically significant at all levels of quantiles of the distribution. This explains that the impact of these factors on ERM adoption is not monotonous but has a nonlinear relationship. It also implies that these factors are more likely to lead to ERM adoption at higher levels. Bohnert et al. (2019) argue that larger firms face a higher risk of financial distress, resulting in ERM deployments. This is because ERM helps manage the complexities that firms face as they grow in size. Also, the direct U-shape relationship between return on assets and ERM suggests that firms making advanced profits can channel financial resources for their ERM implementation (Farrell & Gallagher, 2015). Again, empirically, it is evident that high leverage firms have a high level of risks and a high propensity to go bankrupt and adopt ERM to reduce the risk of financial distress (Khan et al., 2016).

On the contrary, the results from Ghana suggest an inverted U-shape relation between leverage and ERM adoption, but this was mostly insignificant. Industrial diversification and the Big4 audit companies revealed a significant positive association with ERM adoption across all quantiles for the two samples, suggesting that these factors are significant predictors of ERM adoption. This affirms the argument in the literature that firms with other business segments face many complexities which provides support for ERM adoption. Furthermore, the Bug4 auditors want to ensure transparency and reliability in the firms they serve; hence recommend ERM to their clients (Lechner & Gatzert, 2018). Life insurers produced varied results across the quantiles for both samples, but these were insignificant, whiles ownership was positive and statistically significant for South Africa. It is argued that foreign shareholders gain from integrated risk management, according to proponents, because it allows corporations to make better risk-adjusted decisions and raise company value (Paape & Speckle, 2012).

3.14 Summary and Conclusion

This study contributes to the extant literature by investigating the determinants of ERM adoption from an emerging market perspective in Sub-Saharan Africa, which, to the best of the researcher's knowledge, has not been explored. The paper examines the determinants of ERM adoption among insurers in Ghana and South Africa during a four-year period, 2015-2108. The study further adopts the quantile regression approach as opposed to the linear method employed in the literature to examine the determinants of ERM adoption. This approach provides a broad description of these factors on ERM at different levels. Our findings support the contingency theory and institutional theory, suggesting that several factors influence insurers' decision to implement an ERM system and that the adoption of ERM is possible when firms pay attention to its environmental contexts and regulatory environments. Using a panel logistic regression approach, the empirical findings indicate that Industrial Diversification is significantly and positively related to ERM adoption in Ghana and South Africa. Insurers that operate in other business segments practice ERM to reduce the complexities related to diversification. Regarding the type of auditing firm, the study further proves a statistically significant positive impact on insure'rs ERM adoption. The findings are in sync with previous studies (See Table 3.1), implying that the big four auditing firms encourage their clients to practice ERM to maintain their reputation and ensure that firms comply with the generally accepted accounting practices and other regulatory policies regarding risk management.

It was also found that ownership is positively related to ERM adoption for South African insurers. However, in the Ghanaian case, the study found an insignificant positive relationship. The positive and significant relationship supports the assertion that foreign investors are interested in their returns hence encourage firms to adopt a strong risk management system to recoup their profits within the shortest time. In terms of financial leverage, the results show an insignificant but positive effect on insurers ERM adoption. The positive relationship reflects that firms that depend on loans to finance their business rely on ERM adoption to reduce any financial distress. Concerning firm size as a determinant of ERM adoption, the findings reveal a positive association with ERM implementation. The positive result is in agreement with previous findings (see Table 3.1); however, the insignificant results indicate that firm size does not influence insurers decision to adopt an ERM system in Ghana and South Africa. Profitability shows a negative relationship with ERM adoption. This was statistically significant for the South African data but insignificant

for the Ghanaian data. This is in line with previous studies, which state that ERM implementation is more probable in firms experiencing poor performance. Surprisingly, the results show that insurers belonging to the life industry are less likely to adopt an ERM system in Ghana and South Africa. Unlike the Ghanaian sample, the south African sample supports this claim with a statistically significant result.

Our findings also suggest that the initial levels of size, profitability and leverage reduce ERM adoption, while an extreme increase in these factors promotes ERM adoption, which implies a nonlinear direct U-shape relationship, indicating the enhancing effect of size, profitability, and leverage on ERM adoption. These relationships were significant at all quantile levels. On the contrary, the study presents an inverted U-shape relationship for return on assets and leverage from the Ghanaian sample. The study also finds a significant positive relationship for industrial diversification, Big4 audit companies and ownership across the various quantiles. However, life insurers positively affect ERM adoption only at higher levels.

3.15 Managerial Recommendations

The findings reveal that aside from regulatory requirements, other firm characteristics influence insurers decision to practice ERM. Based on the above findings, the study recommends that insurers consider ERM implementation to ensure that factors contributing to its adoption are properly maintained. It is important to note that these factors do not operate differently; hence, a holistic evaluation of these factors may provide useful information on managing them in relation to ERM. Moreover, insurers that depend on debts to finance their business should consider adopting ERM to reduce the cost of financial distress.

In South Africa, since profitability has a significant negative effect on ERM adoption, the study recommends that the financial services board ensure that poorly performing insurers should consider ERM adoption as this is likely to enhance their profitability. And for Ghana, it was observed that many insurers have not yet adopted ERM, which may have contributed to the many insignificant results. The study, therefore, recommends that the national insurance commission should monitor the activities of insurers and encourage them to adopt ERM. Again, insurers that are large in size and want to increase their profitability and leverage must promote ERM adoption

as it helps manage the complexities associated with these factors. Generally, the empirical evidence shows that insurers performance is likely to increase while the cost of financial distress is likely to reduce if insurers adopt an ERM system.

3.16 Limitations and Future Research

The sample was limited to a few firm characteristics. However, there are other factors influencing ERM adoption. Hence, future studies could consider other factors such as how firm culture, board characteristics, the structure of existing risk management function and economic characteristics might influence a firm's decision to adopt ERM and by increasing the sample size. More so, the proxy for ownership was based on yes or no answers; future studies could use more robust measures such as the percentage of shares owned by foreigners. The approach to measuring industrial diversification can be improved by considering the number of business segments a firm has, as proposed by Golshan and Rashid (2012). Furthermore, our study was limited to the insurance industry in Ghana and South Africa. As the ERM discipline continues to gain recognition, it is expected that other industries in other emerging markets to have adopted ERM; hence, the study encourages future studies to examine these concepts in other contexts in emerging markets. This will provide a holistic assessment of the factors influencing firms to implement ERM. Further analysis is needed to understand the nonlinear relationship, and at what threshold levels these factors influence ERM adoption. A binary approach was used due to the lack of ERM disclosure and an appropriate measurement for ERM adoption in Ghana and South Africa. Future studies could identify a more robust measure for identifying ERM adoption.

Appendix

Table 3. 10: ERM Adoption by years

Year	0	1	Total
South Africa			
2015	17	46	63
2016	16	47	63
2017	14	49	63
2018	14	49	63
Total	61	191	252
Ghana			
2015	23	10	33
2016	19	14	33
2017	7	26	33
2018	4	29	33
Total	53	79	132

Table 3. 11: Summary Statistics

Variables		Mean	Std.Dev.	Min.	Max.	Observation	Mean	Std.Dev.	Min.	Max.	Observation
		South Africa					Ghana				
ERM	Overall	0.758	0.429	0.000	1.000	N=252	0.598	0.492	0.000	1.000	N=132
	Between		0.411	0.000	1.000	n=63		0.336	0.000	1.000	n=33
	Within		0.130	0.008	1.508	T=4		0.363	-0.152	1.348	T=4
Ind_Div	Overall	0.952	0.214	0.000	1.000	N=252	0.765	0.426	0.000	1.000	N=132
	Between		0.215	0.000	1.000	n=63		0.380	0.000	1.000	n=33
	Within		0.000	0.952	0.952	T=4		0.200	0.265	1.515	T=4
Size	Overall	14.565	2.345	10.008	20.298	N=252	17.820	1.409	12.444	20.887	N=132
	Between		2.323	10.367	20.257	n=63		1.193	14.743	20.114	n=33
	Within		0.407	12.599	18.474	T=4		0.771	13.146	21.276	T=4
Big4	Overall	0.921	0.271	0.000	1.000	N=252	0.758	0.431	0.000	1.000	N=132
	Between		0.272	0.000	1.000	n=63		0.435	0.000	1.000	n=33
	Within		0.000	0.921	0.921	T=4		0.000	0.758	0.758	T=4
Own	Overall	0.270	0.445	0.000	1.000	N=252	0.697	0.461	0.000	1.000	N=132
	Between		0.447	0.000	1.000	n=63		0.467	0.000	1.000	n=33
	Within		0.270	0.270		T=4		0.000	0.697	0.697	T=4
ROA	Overall	0.417	0.372	0.000	2.897	N=252	0.091	0.132	0.010	1.310	N=132
	Between		0.315	0.001	1.809	n=63		0.099	0.018	0.593	n=33
	Within		0.201	-0.816	1.662	T=4		0.089	-0.292	0.808	T=4
Life	Overall	0.444	0.498	0.000	1.000	N=252	0.455	0.500	0.000	1.000	N=132
	Between		0.501	0.000	1.000	n=63		0.505	0.000	1.000	n=33
	Within		0.000	4.444	4.444	T=4		0.000	0.455	0.455	T=4
Lev	Overall	0.647	0.675	-2.574	9.948	N=252	0.910	1.264	-0.452	12.512	N=132
	Between		0.436	-0.298	3.350	n=63		0.657	0.287	3.665	n=33
	Within		0.517	-1.708	7.246	T=4		1.084	-2.292	9.745	T=4

CHAPTER FOUR
ENTERPRISE RISK MANAGEMENT AND INSURANCE PERFORMANCE IN GHANA AND SOUTH AFRICA: THE MODERATING ROLE OF CORPORATE GOVERNANCE

4.1 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 management system, businesses are now shifting to a new risk management paradigm, known as Enterprise Risk Management (ERM) (Gordon et al., 2009). ERM encourages the interconnections of several organisational risks and ensures that these risks are managed holistically. 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. According to the Committee of Sponsoring Organisations of the Treadway Commission (COSO) (2017), ERM is the culture, capabilities, and practices integrated with the organisation's strategy and performance to manage risk in creating, preserving, and realising value. One of the key components of the COSO (2017) ERM framework is governance. COSO states that governance sets the tone for an organisation while providing oversight responsibilities for ERM. The new COSO framework highlights that governance involves: board risk oversight, establishing operating structures, commitment to core values, and attracting, developing, and retaining capable individuals. For an effective risk management system and maximising profitability, the organisation must coordinate its governance and risk management activities.

Despite the varied literature on ERM, empirical studies on the ERM-performance relationship remain limited and contradictory (Farrell & Gallagher, 2015). While most of these studies are centred on developed economies (Florio & Leoni, 2017; Gordon et al., 2009; Hoyt & Liebenberg, 2011; Pagach & Warr, 2008, 2010), very few studies (Silva et al., 2019; Horvey & Ankamah, 2020) have been done on emerging markets. Hence the understanding of ERM in emerging economies is not clear 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 and uncertainties that demand a robust risk management system. For instance, there are talent shortages in the areas of technology, actuarial expertise, and non-executive directors with experience in the insurance industry in developing countries (PwC, 2018). Black et al. (2014) also reveal that corporate governance rules are less stringent in developing economies than in developed countries. As a result, the necessity of conducting an empirical study of ERM in developing economies has significant promise. Therefore, this study contributes to knowledge by investigating the impact of ERM within the African context, particularly in the insurance industry in Ghana and South Africa. The insurance market in these countries is still developing compared to the European and American economies. The penetration rate is around 2% and 16%, respectively. More so, new regulatory reforms have taken place to ensure an effective risk management system in Ghana and South Africa. For instance, the introduction of a solvency framework in the insurance industry 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 (Bohnert et al., 2019).

In addition, the literature on the relationship between ERM and performance has yielded mixed results. Some studies argue that ERM improves performance (Hoyt & Liebenberg, 2008, 2011; McShane et al., 2011) and enhances the firm's value (Grace et al., 2015; Eckles et al., 2014). However, Lin et al. (2012) and Li et al. (2014) argue that a negative relationship exists between ERM and performance, while Beasley et al. (2008) and Pagach and Warr (2010) found no evidence on the ERM and performance relationship. The inconclusive results may be a result of certain moderating factors affecting the relationship. 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., 2020), the role of the risk committee (Malik et al., 2020), financial literacy (Yang et al., 2018), and ERM maturity (Farrell & Gallagher, 2019) moderate the ERM-performance relationship, the literature is still not aware of how corporate governance affects this relationship. Literature has shown that ERM is more effective when corporate governance factors are considered (Bromiley et al., 2015; Gordon et al., 2009). Caldwell (2012) affirms that one of the major factors leading to a robust ERM system is good corporate governance initiatives, of which board oversight is an essential attribute. This supports

the contingency theory, which states that the relationship between two factors is mostly influenced by another factor; hence the impact of ERM on performance is subject to a number of influences (Woods, 2009). However, the linkages among these variables have not been empirically tested, as studies have mostly focused on the direct relationship between ERM and performance. Regardless of the growing volume of academic literature on ERM, knowledge about the relationship between ERM and firm performance will not be complete without examining the connection between ERM and corporate governance. In line with this argument, this study contributes to empirical knowledge by addressing how corporate governance characteristics affect the ERM-performance relationship.

The analysis in this chapter is based on 33 and 63 insurance companies from Ghana and South Africa, respectively. A panel regression technique was used to analyse the panel data from 2015 to 2018. The methodological strategy revolves around (i) the impact of ERM and CG on performance. (ii) the moderating role of CG on ERM and performance. The pragmatic results are in line with the literature, showing a positive relationship between ERM and performance (Underwriting performance and Return on Assets) of insurers in Ghana and South Africa. It is further revealed that corporate governance factors (board size, board independence and gender diversity) contribute significantly to the success of ERM implementation. This is supported by the high significance level of the interaction terms. In addition, the positive net effect in most of the models denotes that there is a synergetic and complementarity relationship between ERM and the governance factors on insurance performance. In summary, the findings imply that insurers must leverage corporate governance factors to ensure the success of ERM implementation.

Our study contributes to the literature in several ways. First, the study considers a wide range of ERM features rather than viewing ERM adoption as “yes or no”, as in previous research. The new index for ERM is based on risk governance, operating mechanism, and quality of risk oversight factors. This approach overcomes the one-dimensional approach to ERM measurement. Second, it identifies the role of ERM on performance within the African context which is less investigated. Third, the study contributes to the literature by examining the moderating role of corporate governance on the ERM-performance relationship.

The rest of the chapter is structured as follows. Section Two, the literature review section, provides a review of selected literature detailing the relationship between ERM and CG on insurance performance and how CG moderates the relationship between ERM and performance. Section Three describes the analytical model and estimation techniques used in analysing the data. Section Four reports the empirical results, while Section Five discusses the results. The final section summarises, concludes, and provides policy recommendations.

4.2 Literature Review

The section reviews the theoretical underpinnings of this study. It first addresses three main theories (that is, the agency theory, portfolio theory and contingency theory), which provide a foundation for the study. The section further discusses the empirical literature on ERM and corporate governance and their impact on insurance performance to support the purpose of the study.

4.3 Theoretical Review

4.3.1 Agency theory

This theory expounds on the conflicts of interests and behavioural biases between agents and principals (Eisenhardt, 1989). Shareholders and managers have dissimilar interests in the company, and their risk management objective differs. While owners may demand high risk to high return on investments, managers desire low risk and return on investment. Agency theory offers support for risk management to answer the disparity between incentives by managers and shareholder interests. The agency theory stresses that risk management should line up the interest of shareholders and managers to increase organisational performance. This theory is also based on theory X by McGregor (1960), revealing that both the principal and agent seek to maximise their interest. The agency theory of risk management exists to resolve any disagreement between the principal and agents by incorporating any differences among them. To address this disagreement, Jankensgard (2019) points out that agents should be given attractive benefits to meet managers' expectations. Jensen and Meckling (1976) further explain that internal controls such as risk management can be adopted to manage and monitor the activities of managers.

Agency cost of risk management and information asymmetry are some of the major problems under the agency theory and are believed to be cause failures among organisations. Tufano (1998) define the agency cost of risk management as a process where managers use risk management for their own benefits. For instance, firms hedge to finance investment opportunities instead of going to the capital markets for an external source of funds. According to Mayers and Smith (1987), the conceivable opposing interests between shareholders and managers is a result of information asymmetry, which can prevent the firm from engaging in profitable ventures. Information asymmetry usually occurs between principals and managers and happens due to complex organisational structures, information technological progress resulting in an information overload, and changes in the ownership structure (Zalewska, 2014).

Jankansgard (2019) further narrate that the adoption of ERM addresses these two risk management problems. First, it avoids the agency problem of corporate risk management and ensures that managers implement risk management activities in the best interests of the company's investors (Jensen & Meckling, 1976; Tufano, 1998). The second is the information problem of risk management. ERM helps managers gather relevant information on risk exposures in a timely and consistent manner to aid the organisation decision-making process in terms of the firms overall risk-return profile. They conclude by saying that ERM should be more prevalent in firms with high-level information asymmetry and agency cost of risk management. In that regard, the value of ERM will be obvious. Nocco and Stulz (2006) add that ERM brings value to firms because they allow firms to implement their strategic plan while minimising cost. This is because ERM serves as a governance tool for reducing the agency cost of risk management by monitoring managerial decisions.

4.3.2 Portfolio theory

The present-day portfolio theory stated by Markowitz (1952) states that when a group of assets (risks) are combined into a portfolio, the risk associated with that portfolio is reduced as long as some of these assets do not have any positive correlation or are less perfectly positively correlated. In that regard, the total risk situation of the portfolio is less than the specific risks in the portfolio. Meulbroek (2002) noted that it is not advisable for a firm to focus on an individual risk as this may create other types of risks that may affect the firm. Also, managing risks in silo's prevent firms to

be cognizant of the interdependencies and correlations among its risks. However, when ERM is adopted, it enables the firm to manage all kinds of risks in an integrated manner. Given that, the firm can identify the full potential of risks and eliminate unfavourable risks and hedging contracts that affect the natural hedging of risks within the portfolio (Eckles et al., 2014).

Markowitz (1952) further argue that risk management does not create value for stockholders. The reason is that shareholders can, without much stress, spread their risk, and hence only the systematic risk is relevant. In view of that, all risk management practices have a negative net present value and must therefore not be implemented. This assertion is supported by Aebi et al. (2012), who claim that risk management can bring down the firm's risk, yet this reduces shareholders returns. Beasley et al. (2015) explain that the negative NPV project resulting from a firm's reduction of idiosyncratic risk is based on the notion that capital markets work devoid of resistances and deficiencies. When such resistances and deficiencies are introduced, the value creation of ERM emerges. This supports the assertion made by Hoyt and Liebenberg (2011), stating that the application of the portfolio theory enhances firm value as long as its benefits outweigh the cost of ERM implementation.

More so, the seminal works of the Capital Asset Pricing Model (CAPM) by Modigliani and Miller (1958), using the neo-classical financial and portfolio theories, took a stance that ERM adoption on firm performance is neutral. The CAPM model states that it is a waste of resources to manage risks since the idiosyncratic risk is eliminated by diversification within an asset class; therefore, the capital structure is irrelevant to firm value (Belmont, 2004; Lai et al., 2011). This implies that the concept of ERM does not appeal to the proponents of the CAPM (Lai et al., 2011) because, in a capital market, risk management does not create any value (Modigliani & Miller, 1958). However, the CAPM is often criticised for its inherent limitations (Chatterjee et al., 1999; Fama & French, 2004). This is because the CAPM is built on the assumption that firms operate in a perfect market void of information asymmetries and moral hazards, but this does not hold in practice because information asymmetries and moral hazards are real and have created agency problems, therefore, need management (Lai et al., 2011; Stein, 1989). Researchers have concluded that firms operate in an imperfect market; therefore, the value creation of risk management can be enhanced as firms exploit the advantages in an imperfect market (Modigliani & Miller, 1958;

Graham & Smith, 1999). Based on these limitations, the favourable outcomes of ERM adoption undoubtedly must reflect in a risk pricing formula that certainly affects the variable in the CAPM. This is, of course, based on the assumption that managing unsystematic risk can yield positive effects (Hoyt & Liebenberg, 2008; Gordon et al., 2009).

Nocco and Stulz (2006) assert that companies have to practice ERM to safeguard the asset of the business from a lower-tail returns outcome risk where the result of these effects would lead to the reduction of shareholder value. He further argues that the elements that will indicate the benefit of ERM to firms will depend on the likelihood of the earnings outcome of a lower tail and the cost of firm worth lost in the possible financial distress.

4.3.3 Contingency Theory

The contingency theory explains that there is "no one best way" to integrate a system into an organisation. This is because the relationship between two parameters is often influenced or determined by other factors (Chenhall, 2003). In addition, Mikes and Kaplan (2014) explain the ERM theory by arguing in favour of the contingency theory, which seeks to identify various parameters that explain large observed differences in how ERM is implemented. Their theory stress that there is no one universal form of ERM that will maximise firm value. Instead, each firm chooses from the available design parameters to obtain an "ERM-mix" that is suitable given its particular circumstances. Saeidi et al. (2019) highlight that the relationship between ERM and performance will be felt when firms recognise the factors which influence this relationship. According to the COSO (2004) ERM framework, the best ERM system may differ from one organisation to another; hence, they propose a contingency approach in selecting an appropriate ERM system for organisations. This explains the inconsistent findings on the impact of ERM on performance. Furthermore, the contingency perspective of ERM is consistent with the literature on management control systems. The contingency theory outlines several factors that influence the control system, classified under the areas of organisational structure, environments, technology, size, board characteristics and strategy (Woods, 2009).

Knight (2006) explains that corporate governance and ERM have some interrelations and interdependencies, and for a company to survive, it must ensure the effectiveness of these two

components. While ERM concentrates on risk management, corporate governance provides oversight responsibilities, decisions and provision of resources. Thus, the board of directors adopts ERM to address the agency problem's challenges and information asymmetries (Jankansgard, 2019; Gordon et al., 2009). Knight further explained that corporate governance holds the organisation together while ERM provides resilience to the organisation. According to Baxter et al. (2013), organisations with a better ERM system have a robust corporate governance structure and risk management committees. The new ISO framework emphasises the importance of the board in successfully implementing ERM (ISO, 2018). The COSO (2017) ERM framework also spells out the essence of risk oversight for good governance, stating that, "The board of directors has the primary responsibility for risk oversight in the entity, and in many countries, it has a fiduciary responsibility to its stakeholders, including conducting reviews of enterprise risk management practices" (p. 11). Based on these frameworks, ERM can be described as a component of corporate governance, whereas corporate governance encompasses the risk management function (Florio et al., 2021). The reason is that ERM is a top-down approach directed by the executive board (Gatzert & Martin, 2015). Senior managers set the objectives and strategies of an organisation, hence ensuring that ERM is incorporated into the organisation's corporate objectives. The board's role is to set the strategic goals, values, culture, and strategies for the organisation, which ensures effective internal controls in risk management and assessment.

4.4 Traditional Risk Management System versus Enterprise Risk Management System

4.4.1 Traditional Risk Management (TRM) system

In the traditional system, risks were managed in silo's; thus, firm managers placed responsibilities on business units or departmental heads to manage risks within their areas of responsibility (Beasley, 2016). This is because different departments and/or functions manage risks within their discipline. Each function adopted and developed tools that were independent of each other. Bromiley et al. (2015) further explain that stakeholders in finance were only interested in systematic risks while giving less attention to unsystematic risks. However, in later years, the idea that unsystematic risks can impose a cost on an organisation was accepted. TRM system is viewed as a disintegrated approach to managing risks. Different kinds of risk are managed separately in different departments within the firm, such as liquidity, market, credit and operational risks were separately managed in different silos (Hoyt & Liebenberg, 2011).

In the silo system, each silo leader is responsible for managing or elevating risks within their silo. Therefore, in the Silo system, the human resource head is only concerned about risks that affect its business unit while the IT department head also concentrates on risk within his business unit, and it goes on for other business units. However, this method of risk management does not help.

Beasley (2016) explained some limitations to the traditional/silo risk management system. Some of these limitations are that some risks can "fall between the silo's" that none of the silo leaders can see. Also, there may be risks that can have multiple effects on silos in different ways, individual silo leaders who put up measures to manage risks do not know how those measures are likely to impact other silo managers, and mostly, silo leaders are tempted to focus only on internal aspects of risk management while ignoring external factors. Managing the same risk in different silo's can lead to duplication and waste of resources and is more defensive than offensive since most business units do not have risk expertise and are not proactive in managing risk (Hoyt & Liebenberg, 2011, 2003). More so, TRM creates a lot of inefficiencies and inconsistencies because there is a lack of coordination. Due to these shortcomings, a lot of managers have begun to embrace ERM as a way of managing their risk oversight (Beasley et al., 2015). A broader perspective in risk management will help overcome the challenges of the traditional risk management system. Chapman (2011) noted that ERM responds to the inadequacies of the silo-based risk management approach.

4.4.2 Enterprise Risk Management (ERM) system

Risk management has evolved from a narrow view to a holistic approach to managing them. ERM is a response to the inadequacies of the TRM approach. The ERM approach to managing risk helps manage each risk as a feature of the firm's overall risk portfolio managed in an integrated manner (Muelbroek, 2002). Enterprise risk management is also known as Enterprise-Wide Risk Management, Strategic Risk Management, Holistic Risk Management, Corporate Risk Management, Integrated Risk Management, Portfolio Risk Management and Business Risk Management and Scientific risk management because it involves a body of knowledge and processes. However, this study adopts the term "Enterprise risk management."

ERM has been explained from diverse perspectives by individuals and organisations. ERM is believed to reduce firm risks and, in turn increase performance and shareholders value. The

importance of ERM implementation and its impact on performance is revealed in the following definitions. Kleffner et al. (2003) define ERM as the systematic approach of identifying, assessing, and managing risks in an entire organisation. Sobel and Reding (2004) highlight that ERM is a well-disciplined and structured approach that helps management know and manage uncertainties encompassing all business risks using a holistic approach. In a similar vein, Deloach (2000, pp.5) defines ERM: *"A structured and disciplined approach: it aligns strategy, processes, people, technology and knowledge with the purpose of evaluating and managing the uncertainties the enterprises face as it creates value."* According to Meulbroek (2002), ERM is defined as a process that requires that managers collectively identify and assess organisational risks that affect performance and adopt a strategic risk management approach to manage those risks to achieve an effective risk management strategy. ERM must have two main characteristics. First, it must be comprehensive (a detailed inclusion of all kinds and different ranges of risks). Second, it must be integrated, that is, should cut across all business lines, functions and departments (Arena et al., 2010).

International organisations such as the Casualty Actuarial Society (CAS) (2003) also define ERM as integrated management of operational, hazard, strategic and financial risks. In addition, the International Organisation for Standardisations (ISO) explains ERM as a set of activities brought together to direct and control the affairs of risk in an organisation. The Risk and Insurance Management Society in 2011 also reveals ERM as a strategic approach that supports an organisation to achieve its goals by identifying all risks and managing them to reduce their impact. COSO (2017) further explain ERM as an art and science because it involves a body of knowledge and expertise to manage an organisation. ERM makes companies resilient and responds to change. This is due to their proactive nature in identifying risks and deviations that may occur and how to respond to these deviations. ERM reveals the strength and weakness of a firms strategy while evaluating alternative strategies within a changing environment and how strategy can help with the attainment of a firms mission and vision. A good risk management system instils trust and confidence in stakeholders.

Based on the above-noted definitions, it can be viewed that these authors provide a gist on the value of ERM implementation. While some authors view ERM as a system that helps to achieve

organisational goals and objectives, others see it as a way of mitigating the large problems facing an organisation, whereas other scholars view it as a way of creating value for an organisation. Generally, these definitions reveal that ERM is a system that combines all risk activities of a firm, manages them in an integrated manner, and facilitates the identification of such interdependencies to achieve the firms' strategic objectives. These definitions further explain that ERM as a new paradigm offers better opportunities and a competitive edge than the traditional risk management system. Table 4.1 provides a summary of the difference between ERM and TRM.

Table 4. 1: Difference between TRM and ERM

TRM	**ERM**	**SOURCE**
Manage risk separately (Fragmented)	Manage risk Holistically (Integrated)	Hoyt and Liebenberg (2011); Pagach and Warr (2010);
They identify and respond to internal risks	They identify and respond to internal and external risks	Beasley (2016)
Risk is considered an individual hazard	Risk is part of firm strategy	Lundqvist (2014); Beasley et al. (2008);
Takes a bottom-up approach	Takes a top-down approach	Gatzert and Martin (2015); Beasley et al. (2008)
More defensive	Very offensive	Hoyt and Liebenberg (2003); Gatzert and Martin (2015).
Does not consider all risks (Narrowly focused)	Encompasses all risks (Broadly focused)	Beasley (2016); COSO (2004); Lam (2000)
Focus on People	Focus on people and process	McShane et al. (2011); Deloach (2000)
Does not consider its effect on other business units	Considers its effects on all business units	Beasley (2016); Lundqvist (2014)
Very reactive and Cost-Based	Proactive and Value-Based	Deloach (2000)
There is an information asymmetry	Information asymmetry is reduced, thereby improving communication	Hoyt and Liebenberg (2003); Beasey et al. (2008).

Leads to duplication of resources	Avoids duplication of resources	Beasley (2016); Hoyt and Liebenberg (2011)
Managed by functional/ departmental managers	Managed by risk experts such as CRO and has a risk committee	Kleffner et al. (2003); Gatzert and Martin, (2015)
There is no centralised risk committee/board	A centralised risk committee/board is dedicated to managing risk	Sekerci and Pagach (2019); Kassim and Hussin (2010)
No formal report to the board	Submits a formal report to the board at least annually	Sekerci and Pagach (2019)
Does not consider shareholder value and responsibilities to investors	Considers shareholder value and responsibilities to investors	Meier (2000); Kassim and Hussin (2010)
It does not involve all employees at all levels of the organization	Involves all employees at all levels of the organisation	Kassim and Hussin (2010)
Negative and Ad-hoc	Positive and Process-driven	Valsamakis et al. (2004); Deloach (2000)

4.5 Empirical Literature Review on ERM and Performance

Scholars have explored the impact of ERM on performance from different contexts. However, the findings of previous studies remain inconclusive. Following the most developed stream of ERM literature, Florio and Leoni (2017) investigated whether a relationship exists between the extent of Italian companies' ERM implementation and firm performance. They developed a proxy for ERM implementation by considering the following variables: CRO appointment, Risk committee, risk assessment frequency, level and method. Using Ordinary Least Square (OLS) regression method, their results reveal that an advanced level of ERM implementation improves performance, thereby reducing the risk exposure of firms. Farrell and Gallagher (2019) support this assertion, arguing that the level of ERM maturity increases a firm's value and profitability.

Callahan and Soileau (2017) explain that ERM provides firms with a competitive advantage over their industry counterparts. This is justified by their empirical results, which state that firms with

a strong ERM system achieve greater operating performance, enabling them to perform better than their peers. A survey approach was used to measure the ERM maturity level. These levels include: Non-existent ERM process = 0; Initial = 1; Repeatable but intuitive = 2; Defined process = 3; Managed and Measurable = 4; Optimised = 5.

Gordon et al. (2009) assessed firms ERM system using the output components of the COSO (2004) framework, which include strategy, operation, reporting and compliance. Their findings reveal that the relationship between ERM and firm performance is contingent on five main factors. That is industry competition, firm complexity, firm size, environmental uncertainty, and the board. They conclude that firms that want to enhance performance should implement ERM within the context of these variables. Silva et al. (2019) investigated the impact of ERM on Tobin Q on the Brazilian stock exchange. Their study was based on a sample of 80 listed firms from 2004 to 2013. Using an autoregressive GLM, they confirm the findings of previous studies by revealing a positive relationship between ERM and firm value (Tobin's Q).

According to the study by Iswajuni et al. (2018), ERM, ROA and firm size have a significant positive effect on firm value. Their study was on the manufacturing companies listed on the Indonesia stock exchange. The study period was between 2010-2013, and firm value was measured using Tobin's Q. Similarly, Ping and Muthuveloo (2015) used a survey approach and found that ERM enhances firms performance significantly. Saeidi et al. (2020) find a positive relationship between ERM and firm performance among 84 firms in Iran. Their structural equation modelling technique further reveals that intellectual capacity (knowledge and information technology) has a moderating effect on this relationship, while trust, training and organisational culture did not affect this relationship.

In the Ghanaian case, Horvey and Ankamah (2020) examined how ERM affects the performance of listed on the Ghanaian equity market, adopting three performance indicators, thus, ROA, ROE and Tobin Q. They find that ERM propels performance at both firm-level and market level. Furthermore, ERM has a significant and positive impact on a firm ROA and ROE. Their finding further reveals a significant and positive impact on the value of financial firms but an insignificant and negative impact on non-financial firms. The reason is that most non-financial firms do not

have a strong risk management system in place. Again, Horvey and Ankamah (2020) highlight a non-linear relationship between ERM and performance, but this relationship is based on the performance indicator being used.

Contrary to these findings, Hudin and Hamid (2014) reveal that risk management implementation does not guarantee that a company will perform better. They narrate that irrespective of the risk management theory or framework adopted, when risk management is implemented incorrectly, it will have an adverse effect on the company. Similary, Pagach and Warr (2010) find no significant impact of ERM implementation. With a sample of 106 firms selected from 1992-2004, their study failed to support the hypothesis that ERM is a value-creating activity.

Again, Gonzalez et al. (2020) explain that the implementation of ERM does not induce the performance and value of the non-financial firms of Spanish listed companies. Neither does it affect the probability of reducing a firms bankruptcy. They also find that the adoption of the CRO improves financial health. The measurement of ERM was based on several variables such as risk committee, CRO, ISO, COSO, risk map, and hedging the risk of interest rates, exchange rates, credit risk, and sale price. In addition to this, Agustina and Baroroh (2016) explained that ERM has an insignificant influence on firms' value in the Indonesian market since banks adopted ERM due to compliance to regulatory requirements and do not take a keen interest in proper management practices for effectiveness.

4.5.1 ERM in Insurance

Building on research in the insurance sector, Nguyen and Vo (2020) conducted a cross-country analysis for European countries. They adopted the treatment effects to examine the impact of ERM using the solvency margin of insurers. Solvency was measured as the ratio of the book value of equity to solvency margin are exposed to financial vulnerability. They found a significant and inverse relationship between ERM adoption and solvency. This supports the case of Lin et al. (2012), who also found an insignificant and inverse relationship among the US property and casualty insurance industry. According to Nguyen and Vo (2020), insurers with ERM implementation programs may trigger financial crises stating that the inverse relationship could be attributed to increased risk-taking and environmental uncertainties. Moreover, there was evidence

that the solvency of the European insurers depends on the actual business and the liabilities of insurers to their policyholders as it is positively linked to firm-specific characteristics such as financial leverage, ROA, combined ratio, and business type.

Hoyt and Liebenberg (2011) examined the relationship between ERM and firm value for insurance companies in the US. They used the Chief Risk Officer as an indicator for ERM implementation and Tobin's Q (market and book value of equity over its liabilities) as a proxy for insurance firms' value. Their findings demonstrate that ERM significantly improves firm performance. They, however, found some differences in Tobin's Q for firms that practice ERM and firms that are yet to implement it, and this relationship was determined to be statistically significant. A previous study conducted by Hoyt and Liebenberg (2008) confirmed this result in the same context.

Altuntas et al. (2011) focused on the property and liability insurers in Germany. The study adopted a quantitative approach, and a total of 95 insurance companies were examined. They reveal ERM influences firm performance; however, this depends on the extent of the firms' level of ERM implementation. While Altuntas et al. (2011) examined insurers in Germany, Lechner and Gatzert (2018) broadened the scope by considering banks, insurance and the energy sector listed on the German stock exchange. Using the CRO as an ERM proxy and cross-sectional regression analysis, they find a significant positive relationship between ERM and shareholders value. Firm size was negative and significant at a 1% level of significance, while leverage positively affected firm value. In line with this, Bohnert et al. (2019) found a significant and positive relationship between ERM and firm value while investigating this relationship among European insurers. They also measured firm value with Tobin Q and used a maximum likelihood technique. Firm size was also negative effect, while leverage had a positive effect on firm value.

In contradiction to this finding, Lin et al. (2012) and Li et al. (2014) found an inverse relationship to exist between ERM and performance, while Aebi et al. (2012) found mixed results. Lin et al. (2012) examined the impact of ERM among the US property and casualty insurance industry. Their findings state that the market responds negatively to the implementation of ERM. That is, ERM has a significant negative relationship with firm value, profitability, and underwriting performance. They explain that poorly implemented ERM is detrimental to organisational

performance. Another possible reason for the negative relationship is that investors may find it difficult to appreciate the value implication of ERM (Fraser et al., 2008). Again, the implementation of ERM comes with an associated cost, which is not well managed can negatively affect the organisation. In the case of Aebi et al. (2012), ERM characteristics such as risk committee and the CRO reports to executive board/CEO were negative. In addition, Li et al. (2014) finds that the impact of ERM falls below statistical significance recommending that insurers in China should resort to a robust risk management system to appreciate the impact of ERM.

According to the study conducted by Farrell and Gallagher (2015), there exists a positive relationship between ERM and firm performance. This relationship was found to be statistically significant at a 1% significance level. This implies that firms with a higher level of ERM maturity perform better. Their regression results further revealed that leverage and firm size had an inverse relationship with performance. A total of 225 companies that cut across Canada, Europe, the UK, and the USA were examined. A survey approach and the RIMS model was used to measure ERM. On the other hand, Nair et al. (2014) used S&P rating to measure ERM and found 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).

This is consistent with the findings of Grace et al. (2015), who conclude that ERM increases firm value. They surveyed insurance firms and insurance clients. They further argued that the positive relationship between ERM and firm value is contingent on a combination of three main factors: a simplified economic capital model, a cross-functional risk manager, and that risk managers should report to the board of directors and the CEOs, linking them to the strategic direction of the organisation. However, Beasley, Pagach and Warr (2008) argue that this relationship is firm-specific. Beasley et al. (2008) further provide insight on how the implementation of ERM varies across industries. The study on ERM was based on three industries: financial services, insurance and energy. They used a sample size of 120 firms from 1992 – 2003. concluded 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.

McShane et al. (2011), using the S&P risk management rating, highlight a significant positive relationship exists between ERM and shareholder value, but only 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. Their study further revealed that firm size and financial leverage had an inverse relationship with firm value, whereas leverage was 1% significant.

According to the above literature, it can be observed that empirical studies on ERM and performance in advanced countries are becoming more abundant. Still, research within the African context remains limited. While some studies focused on the ERM-performance relationship using a simple proxy for ERM, there is a gap in knowledge in establishing empirical measures for ERM. Though the impact of ERM on performance is diverse, there is enough argument to support the assertion that ERM enhances firm performance. From the above discussion, the study seeks to test the following hypothesis on the ERM and performance relationship:

H0: There exists no relationship between ERM and firm performance.

H1: There exists a positive relationship between ERM and firm performance.

4.6 Empirical Review on the Moderating role of Corporate Governance on the ERM and Performance relationship

Corporate governance matters a lot in the insurance industry. Corporate governance studies are increasingly emphasising the importance of boards of directors in reducing agency problems, particularly in the insurance industry (Huang et al., 2011). This is due to the different set of activities and ownership structures. The concentration of power may aggravate potential conflicts of interest and, as a result, create agency issues. As a result, the agency theory emphasises the critical role of corporate governance in facilitating compliance by limiting executives' self-serving desire to compensate for risk through opportunistic means (Fadun, 2013). According to agency theory, insurers are better able to control conflicts of interest between policyholders and owners and control conflicts of interest between owners and managers better (Boubakri, 2011).

Again, building on the contingency theory, this study argues that the implementation of ERM may not be effective without integrating a strong corporate governance system. Scholars have therefore

proposed a combination of these factors as the way forward to ensure an effective risk management system as they complement each other. Corporate governance addresses ERM as one of its core elements. According to Bromiley et al. (2015), ERM purports to manage all risks, including financial, operational and strategic, faced by an organisation in an integrated manner. This requires an alignment between ERM and corporate governance because corporate governance provides a supporting role towards risk management, whereas ERM provides a premise for accountability and transparency.

The primary responsibility of an organisation's board of directors is to provide oversight responsibilities over decisions made by management to ensure that risk decisions and management activities do not exceed their risk appetite level. To achieve this, the board instituted many corporate governance practices and requirements to enhance their risk oversight responsibility. These requirements include creating a board risk committee, the appointment of the CRO, the integration of risk management into an organisation's corporate governance system, and the introduction of proper risk assessment processes (Florio & Leoni, 2017; Lundqvist, 2014). According to the King III corporate governance code in South Africa, the responsibility of risk management resides with the board of directors. Similarly, the new solvency framework in Ghana also encourages the integration of risk management within its governance framework. By this, firms can harness the mutually symbiotic relationships between the two to increase their competitive leverage in the long term. The study, therefore, argues that the success of ERM cannot be achieved with a strong corporate governance system. As a result, while earlier research has focused solely on the direct link between ERM and firm performance, this study went a step further by identifying how board characteristics interact with ERM in affecting performance.

4.6.1 Board Size

This is one of the most important features of a company's functionality (Jensen, 1993). The size of the board reveals the number of executive and non-executive directors. The size of the board is very significant to ERM implementation due to its ability to influence management decisions. Beasley et al. (2008) argue that ERM cannot succeed with support from the executive board. Klefffner et al. (2004) also discovered that the adoption of ERM is linked with endorsement from the board of directors. In addition, COSO (2004) contend that implementing an effective ERM

system depends on the organisation's executive board. This argument is supported by Sobel and Reding (2004), who state that the board of directors play an active role in the implementation of ERM. They monitor the risk activities and performance of an organisation.

According to Sekerci and Pagach (2019), large boards that are well coordinated can enhance ERM implementation and success because it represents a governance tool that provides a foundation upon which the risk management agency cost is reduced through monitoring managerial actions (mitigation). Previous studies on corporate governance have revealed several issues on having a larger board size or smaller board size. The latter explains that having a smaller board size is associated with a high level of concentrated knowledge while the former bring diversities in decision making. Beasley et al. (2009) add that the board encourages diversity to ensure greater risk transparency, with the goal of minimising the likelihood of fraudulent and opportunistic behaviour.

Eisenberg et al. (1998) point out that firms with small board sizes achieve higher returns on their investments. However, Jensen (1993) argue that smaller board sizes reduce diversity in knowledge. Large board sizes can result in delays in decision making and coordination problems which affect risk management activities (Lipton & Lorsch, 1992). A study conducted by Maruhun et al. (2018) in Malaysia indicates that board size significantly influences ERM implementation. According to Gordon et al. (2009), the successful implementation of ERM is associated with the level of monitoring by the board of directors. They reveal that this relationship is statistically significant at 1%. In addition, Beasley et al. (2019) reveal that one of the factors which encourage managers to focus on risk oversight is the executive board. Based on the above discussions, the study anticipates that board size is an integral component in enhancing the ERM program. Hence, this study hypothesises that:

H0: Board size has no moderating effect on the ERM-Performance relationship

H2: Board size has a moderating effect on the ERM-Performance relationship

4.6.2 Board Independence

The ultimate role of the board is to monitor organisations decisions and actions (Fama, 1980). Board independence represents the ratio of independent directors on the board. The involvement

of independent board members is vital for organisational success (Wu & Li, 2015). According to Sekerci and Pagach (2019), having more independent directors leads to more effective oversight because independent members are more objective in their management decisions, reducing agency costs. Fama (1980) explains that independent board members exercise higher managerial controls because they want to build their reputation and be well-known as experts in the decision control role. As a result, independent directors are more likely to recommend ERM to the executive board to enhance their risk oversight responsibilities. This is in line with Beasley et al. (2005), who find that the ratio of independent board members is positively associated with the level of ERM adoption.

Fama and Jensen (1983) add that independent members are interested in reducing opportunistic costs and shareholders interests; hence, they are more likely to suggest ERM to make them more effective in their operations. On the contrary, Desender (2007) argue that having an independent board is not enough to achieve improved risk management measures unless the position of the CEO is different from the Board Chairman. The preceding discussion reveals that the impact of ERM on performance is contingent on the ratio of independent directors. Hence, the study hypothesises that:

H0: Board Independence has no moderating effect on the ERM-Performance relationship

H3: Board Independence has a moderating effect on the ERM-Performance relationship

4.6.3 Gender Diversity

One distinguishing feature that characterises board composition is board diversity (Erhardt et al., 2003). Board diversity ranges from gender, nationality, and educational background. This study shall focus on the gender diversity of board members. A recent study by Ernst & Young (as cited in Fernando et al., 2020) states that an increase of 0% to 30% of females on the executive board leads to a 15% increase in profits due to their unique skills in risk, strategy setting, and compliance. Females tend to offer a different viewpoint and are risk-averse; hence are more likely to adopt risk management measures to protect the company from unforeseen circumstances (Gonzalez et al., 2020). Laeven and Levine (2006) also argue that risk aversion could sometimes lead to poor performance due to lower risk-taking. Hence, the more risk-averse the board is, the lower the return on their investments. Gender diversity represents the ratio of females on the executive board.

Joecks et al. (2012) provide an empirical justification 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.

Chen et al. (2016) are of the view that gender diversity in the boardroom is advocated as a means of improving corporate governance and risk management. This is because females exhibit a lower adverse effect and ensures risk management effectiveness. They are of the opinion that females are more concerned about ethical and regulatory issues than men. Hence, they commit to risk management as a way of responding to these issues. Studies have shown that firms with more volatilities in their stock returns have fewer females on their executive board (Adams & Ferreira, 2004). Johnson (2017) says that gender diversity has a strong correlation with risk management because of its capacity to improve risk oversight. In summary, the above literature suggests that women have a positive attitude towards ERM than men. In light of the above, it is hypothesised that:

H0: Gender diversity has no moderating effect on the ERM-Performance relationship

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

4.7 Conceptual Framework

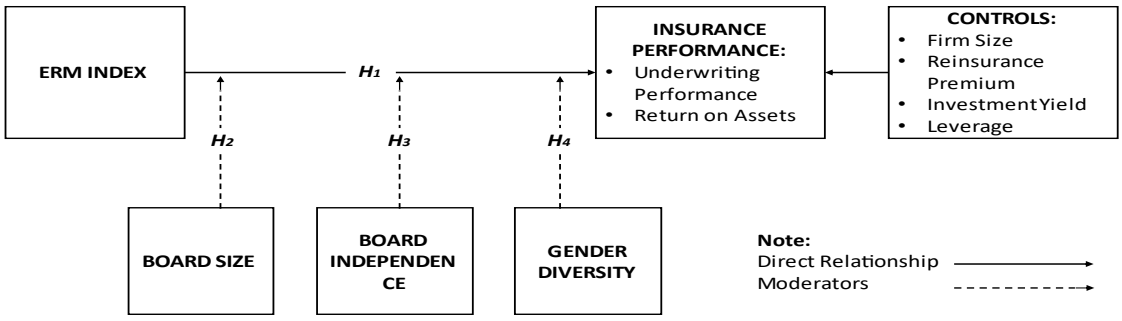


Figure 4. 1: Conceptual Model

4.8 Methodology

4.9 Data and Sample

The main focus of this study is first to examine the impact of ERM on insurance performance and second to investigate how CG characteristics interact with ERM in affecting performance. The sample consists of 96 insurance companies from the population of all insurance companies (life and non-life) in Ghana and South Africa. Out of this sample, 33 insurers were from Ghana and 63 were from South Africa, for which detailed financial information was obtained. Information on CG characteristics was obtained from individual insurers' CG reports, while information on the dependent and control variables was obtained from the databases of the national insurance commission of Ghana and the Financial Service Board of South Africa. The study focuses on the period 2015 to 2018 because, in 2014, new recommendations on ERM were released in Ghana, while South Africa embraced the King III CG code, which emphasises a robust risk management technique. The insurance industry was chosen for this study because it appears to have embraced ERM more than other industries due to the risk-bearing nature of its business operations. Furthermore, by concentrating on the insurance sector, potential biases caused by industry-specific and inter-industry heterogeneity are avoided.

4.10 Description of Variables

4.10.1 Dependent Variables

The study measures performance by considering two variables that capture diverse aspects of insurance performance. The first variable is Return on Assets (ROA) which is measured as the ratio of net profits to its assets. The second variable is underwriting performance (Und_Perf), which is a new variable that has not been empirically investigated. Underwriting performance is measured using the combined ratio, which is the sum of the loss ratio and expense ratio. The reason for choosing these two measures is because insurance companies obtain their profits from two main sources: investments and underwriting activities. ROA captures historical performance and shows how well an insurer manages its assets to create revenue (Hoyt & Liebenberg, 2011; Horvey & Ankamah, 2020), while underwriting is understood as the profit/loss on a portfolio of insurance policies before investment income is taken into account. Underwriting performance also indicates

the total profit/loss after deducting incurred claims and operating expenses from the premiums earned (Pooser & Brown, 2018; Shim, 2017).

4.10.2 Independent Variable: Enterprise Risk Management Index (ERMI)

One major consideration in the literature is how to quantify the Enterprise Risk Management Index (ERM). Previous studies adopt different proxies for ERM measurement. Due to the lack of ERM disclosure on companies' websites and in their annual reports, most studies rely on the CRO appointment, presence of a risk committee, or an ERM keyword search to establish a binary proxy for ERM (Beasley et al., 2008; Hoyt & Liebenberg, 2011; Silva et al., 2019). Other scholars rely on risk governance features (Florio & Leoni, 2017; Horvey & Ankamah, 2020). In some other cases, the ERM score is based on the Standard and Poor's (S&P) risk management rating (McShane et al., 2011), RIMS (Farrell & Gallagher, 2015), and COSO ERM component (Gordon et al., 2009). These procedures have their own limitations. To address these challenges, this study follows Altuntas et al. (2011) and Santomil and Gonzalez (2020) by adopting a survey approach to identify a cluster of 12 ERM features in creating an index. The survey questions indicate whether an insurer has an ERM programme in place and when it was implemented. Furthermore, specific questions about insurers' ERM activities were asked, including the year in which they initiated such programmes. Each feature is treated as binary, given the value of one in the year the firm adopts an ERM activity and cut off in the subsequent years. Anonymous risk experts first helped with a pilot study to ensure the reliability of the instrument.

The study focuses on several features, which are captured into three broad categories: risk governance (RG), operational mechanisms (OM), and the quality of risk oversight (QRO). Risk governance establishes the risk management system's structure, defining roles, responsibilities and accountability while setting the guidelines for making risk management decisions (Lundqvist, 2015; Aebi et al., 2012). This category of indicators includes the appointment of a CRO, presence of the CRO on the executive board, 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. These include: the firm's risk assessment frequency, level, methodology, and risk management framework. The last category, the quality of risk oversight (QRO), reveals the quality

of risk oversight. The ERM features included in this category are: the existence of an active risk committee, the experience of the risk committee, and the expertise of the CRO.

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 (Florio & Leoni, 2017; Aebi et al., 2012; Horvey & Ankamah, 2020) adopt a composite index by summing the dummy ERM features, this study uses Multiple Correspondence Analysis (MCA), which is more appropriate in creating an index for binary variables (Abdi & Valentin, 2007). Using MCA helps examine the pattern of relationships among several categorical variables, thereby creating an index (Greenacre, 1991). The study merges the survey data with the financial data to examine the relationships between ERM and insurance performance in the period 2015-2018. Details about the ERM features have been provided in Appendix D. The study obtained ethical clearance from the Wits Ethics Committee (HREC Non-Medical) to proceed with the survey with the protocol number H20/11/22. Consent was obtained from respondents, and they were assured that the information provided would be kept confidential.

4.10.3 Moderating Variable

The study includes three corporate governance variables that interact with ERM in influencing performance. The first variable is board size (BOARD), representing the total number of executive and non-executive directors on the board (Sekerci & Pagach, 2019). The next is board independence (BODIND), representing the ratio of independent directors on the executive board (Wu & Li, 2015; Beasley et al., 2005). The last corporate governance variable chosen for examination is gender diversity (GENDER), which measures the ratio of females to males on the executive board (Joeks et al., 2013; Sekerci & Pagach, 2019).

4.10.4 Control Variables

The model includes four sets of control variables, namely: firm size, reinsurance premium, investment yield and leverage. Firm size (SIZE) is measured as the natural log of total assets (Beasley et al., 2008; Hoyt & Liebenberg, 2008). The extent of a firm's risks is likely to be influenced by its size, as are the resources available for the ERM system (Florio & 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 & Leoni, 2017). Reinsurance (REINS) is also measured as the ratio of reinsurance premiums to total premiums (Shim, 2015). Reinsurance is a risk management strategy that enhances insurance performance by transferring part of insurers' risk to reinsurance companies. Investment yield (INVYIELD) assess the quality of the investment portfolio. This is also measured as the ratio of investment income to total investment.

4.11 Empirical Model

Given the objectives of this study, four regression models are derived. A panel data technique is used to examine the relationships. The use of panel data is due to the benefits associated with it. It helps to control insurance specific effects and omitted variables. Moreover, it accounts for both long-run and short-run effects, overcoming the limitations of cross-sectional and time-series techniques. The study adopts the model of Horvey and Ankamah (2020) and Gordon et al. (2009). The first two models in equations (1) and (2) examine the direct impact of ERM on insurance performance, whereas equations (3) and (4) examine how board size, board independence and gender diversity interact with ERM in affecting insurance performance. The interaction models in equations (3) and (4) were specified following the suggestions by Brambor et al. (2006) and Baron and Kenny (1986), who state that interaction effects are examined by including all constitutive terms and their interaction terms in the same model. The within fixed effect model of the panel estimation technique is used to examine these relationships. This is based on the Hausman test, which was statistically significant at a 1% significance level. The study conducts a separate analysis for insurers in Ghana and South Africa to control for differences that might arise from regulatory and market differences across industries.

$$\text{UND_PERF}_{it} = \beta_{1t}\text{RG}_{it} + \beta_{1t}\text{OM}_{it} + \beta_{3t}\text{QRO}_{it} + \beta_{4t}\text{ERMI}_{it} + \beta_{5t}\text{SIZE}_{it} + \beta_{6t}\text{REINS}_{it} + \beta_{7t}\text{INVYIELD}_{it} + \beta_{8t}\text{LEV}_{it} + \mu_{it} \quad \text{(Eq. 1)}$$

$$\text{ROA}_{it} = \beta_{1t}\text{RG}_{it} + \beta_{1t}\text{OM}_{it} + \beta_{3t}\text{QRO}_{it} + \beta_{4t}\text{ERMI}_{it} + \beta_{5t}\text{SIZE}_{it} + \beta_{6t}\text{REINS}_{it} + \beta_{7t}\text{INVYIELD}_{it} + \beta_{8t}\text{LEV}_{it} + \mu_{it} \quad \text{(Eq. 2)}$$

$$\text{UND_PERF}_{it} = \beta_{1t}\text{ERMI}_{it} + \beta_{2t}\text{BOARD}_{it} + \beta_{3t}\text{BODIND}_{it} + \beta_{4t}\text{GENDER}_{it} + \beta_{5t}(\text{ERMI} * \text{BOARD})_{it} + \beta_{6t}(\text{ERMI} * \text{BODIND})_{it} + \beta_{7t}(\text{ERMI} * \text{GENDER})_{it} + \beta_{8t}\text{SIZE}_{it} + \beta_{9t}\text{REINS}_{it} + \beta_{10t}\text{INVYIELD}_{it} + \beta_{11t}\text{LEV}_{it} + \mu_{it} \quad \text{(Eq. 3)}$$

$$ROA_{it} = \beta_{1t}ERMI_{it} + \beta_{2t}BOARD_{it} + \beta_{3t}BODIND_{it} + \beta_{4t}GENDER_{it} + \beta_{5t}(ERMI * BOARD)_{it} + \beta_{6t}(ERMI * BODIND)_{it} + \beta_{7t}(ERMI * GENDER)_{it} + \beta_{8t}SIZE_{it} + \beta_{9t}REINS_{it} + \beta_{10t}INVYIELD_{it} + \beta_{11t}LEV_{it} + \mu_{it} \ldots\ldots\ldots\ldots\ldots \quad (Eq. 4)$$

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

Note:
Subscripts *i* denote individual insurance company; whereas *t* denotes the sample period. The beta's (β) are the parameters to be estimated; and μ_{it} denotes the error terms where μ_i represent the individual insurance-specific effect; λ_t represents the symmetric time effect, while ε_{it} represent the idiosyncratic time effect. Year dummies were included in the model to capture the variations in insurance performance over the period.

With respect to the interaction between ERM and the corporate governance factors in equations (3) and (4), the study follows the conditions specified in Brambor et al. (2006) to test for the joint significance of the constitutive and interaction terms to arrive at the net effect of the ERM and corporate governance factors on insurance performance. For instance, in equations (3) and (4), the hypothesis that the impact of ERM on performance is conditioned on board size, board independence and gender diversity is tested by the joint coefficients, respectively. The net effect is derived by taking the first derivative of the constitutive and interactive terms with respect to ERM in equations (3) and (4). This is stated as:

$$\frac{\partial PERF}{\partial ERMI} = \beta_1 + \beta_5 BOARD_{it} = 0 \quad (Eq. 5)$$

$$\frac{\partial PERF}{\partial ERMI} = \beta_1 + \beta_6 BODIND_{it} = 0 \quad (Eq. 6)$$

$$\frac{\partial PERF}{\partial ERMI} = \beta_1 + \beta_7 GENDER_{it} = 0 \quad (Eq. 7)$$

Where PERF represents insurance performance (Underwriting Performance and Return on Assets). The nature of ERM interacted with board size, board independence, and gender diversity are examined by summing the coefficients and the test of significance for the joint coefficients.

4.12 Analysis and Discussion

4.12.1 Descriptive Statistics

Table 4.2 presents an overview of the variables included in the study. Analysis of the descriptive statistics indicates that the mean of underwriting performance, which is proxied as the combined ratio, is 1.056 in South Africa and 0.737 in Ghana. The mean results imply that the Ghanaian insurers make more underwriting profit, whereas the South African insurers experience underwriting loss. The return on asset shows that, on average, 42% of insurers earnings are generated from its assets in South Africa and 9% in Ghana, suggesting that the South African insurance industry rely more on profits from investment income and not necessarily on underwriting profit. This confirms the findings of Vivian (2003) that insurers in South Africa rarely make underwriting profits. The descriptive statistics show that the trend of underwriting losses seems to have continued to the present day. Vivian (2003) further narrate that the underwriting losses are subsidised from investment income.

Excerpts from the corporate governance measures explain that the average board size is about 11 for South Africa and 7 for Ghana. This result is relatively compatible with the NIC regulation in 2015, which states that insurers should have at least seven board members. The maximum and minimum values for board size includes 24 and 5 for South Africa and 13 and 4 for insurers in Ghana, respectively. In terms of board independence, both countries recorded an independent ratio of about 57%. South Africa has the maximum independent ratio of about 88%, while the country with the minimum independent ratio is Ghana which is about 12%. The average values for independent board members indicate that more than half of the board members are independent directors. The average for independent directors is explained by the regulations of the corporate governance code, which states that at least one-third of the board members must be independent directors. The findings also indicate that about 24% of the board members in the South African sample are females, while the Ghanaian sample records an average of 19% female ratio. The country with the highest female ratio was South Africa, with up to 77% of females represented on the board, while Ghana had 60%.

Regarding the control variables, the South African insurance industry has a positive total asset with an average of 35,300 billion South African Rand. Financial leverage averages 65%, showing

that insurers' assets are more than their debts. Reinsurance premium also has a mean of 0.341. Investment yield records a positive mean value of 5.684, ranging between -54.964 and 490.147 with a standard deviation of 35.242 showing large variations on the return on investment among insurers in South Africa. In the Ghanaian context, the total asset of the sampled insurers is valued at an average of 117,000 million Ghana cedis. The mean value (91%) for financial leverage in Ghana is higher than in South Africa, indicating that insurers in Ghana depend a lot on debts to finance their business. The average reinsurance premium is 0.204, whereas the average investment yield for Ghana is -0.637.

Table 4.5 provides the correlations matrix for all model variables for both countries. The correlation table serves as a check and control for multicollinearity. Following the 0.7 multicollinearity criterion as Kennedy (2008) recommended, the data in Table 4.5 reveal no indication of multicollinearity.

Table 4. 2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
South Africa					
Dependent Variables					
Underwriting Performance	252	1.056	2.011	0.012	13.29
Return on Assets	252	0.417	0.372	0.000	2.897
Enterprise Risk Management					
Risk Governance	252	0.051	0.987	-3.138	1.723
Risk Oversight	252	-0.009	0.945	-2.603	2.335
Operating Mechanism	252	0.060	1.016	-.886	5.450
ERM Index	252	0.069	0.979	-2.785	3.261
Corporate Governance					
Board Size	252	11.675	3.877	5.000	24.000
Independent Directors	252	0.568	0.134	0.143	0.875
Gender Diversity	252	0.242	0.123	0.000	0.769
Control Variables					
Size	252	35,346	11,135	2,220.00	653,435
Reinsurance Premium	252	0.341	0.343	-2.574	0.988
Investment Yield	252	5.684	35.242	-54.964	490.147
Leverage	252	0.647	0.675	-2.574	9.948
Variable	**Obs**	**Mean**	**Std.Dev.**	**Min**	**Max**
Ghana					
Dependent Variables					
Underwriting Performance	132	0.737	0.669	-0.213	2.120
Return on Assets	132	0.091	0.132	0.010	1.310

Enterprise Risk Management					
Risk Governance	132	0.015	1.027	-1.181	3.220
Risk Oversight	132	-0.024	1.010	-1.419	2.405
Operating Mechanism	132	-0.050	0.974	-1.759	2.731
ERM Index	132	-0.017	0.994	-1.004	1.744
Corporate Governance					
Board Size	132	7.212	2.004	4.000	13.000
Independent Directors	132	0.573	0.124	0.300	0.857
Gender Diversity	132	0.196	0.119	0.000	0.600
Control Variables					
Size	132	117,231	17,120	2,537.5	1,180,032
Reinsurance Premium	132	0.204	0.390	-3.583	0.987
Investment Yield	132	-0.637	6.154	-13.043	6.947
Leverage	132	0.910	1.264	-0.452	12.512

4.12.2 ERM Features

Table 4.3 records the distribution of the ERM features across the four years. The mean distribution of the ERM index is also provided in Table 4.3. Looking at Table 4.3, one can note that the number of insurers practising the ERM features has been steadily increasing; however, some insurers still lack most of these features. The study finds that CRO appointment is present in 76% of the sample in South Africa. Again, only 13% are executive board members, and about 70% have prior risk management experience. In Ghana, 62% of the sample have appointed CRO's, 6.8% are executive board members, and 60% have experience in risk management. Only CRO executive has an engagement rate of less than 50% in both contexts, explaining that most insurers do not include CROs on the executive board. The absence of the CRO on the board can be detrimental to organisational risk decisions. Having the CRO as a member of the executive board is an important feature because it gives the risk manager great influence and power to influence risk decisions (Aebi et al., 2012). About 92% and 90% of insurers in South Africa and Ghana have risk management committees, indicating that a majority of the insurers have a separate committee in charge of risk management. Having a risk committee promotes risk management activities and enhances monitoring and implementation of a robust management system. The total mean value for the other features indicates an engagement rate of at least 50% of both samples.

Table 4. 3: Distribution of ERM Features

Distribution of ERM Features over the Years (2015-2018)												
South Africa												
	2015		**2016**		**2017**		**2018**		**Total**		**Total Mean**	
ERM features	0	1	0	1	0	1	0	1	0	1	0	1
CRO Appointment	17	46	16	47	14	49	14	49	61	191	0.2421	0.7579
CRO Executive	56	7	55	8	53	10	53	10	217	35	0.8611	0.1389
Risk Committee	6	57	6	57	5	58	5	58	22	230	0.0873	0.9127
Risk Appetite	7	56	7	56	7	56	5	57	26	225	0.1032	0.8929
Risk Committee Report to Board	10	53	9	54	8	55	8	55	35	217	0.1389	0.8611
Risk Assessment Frequency	7	56	6	57	5	58	4	59	22	230	0.0873	0.9127
Risk Assessment Level	12	51	11	52	9	54	8	55	40	212	0.1587	0.841
Risk Assessment method	23	40	21	42	21	42	18	45	83	169	0.3294	0.6706
Risk Framework	8	55	8	55	7	56	5	58	28	224	0.1111	0.8889
Active Risk Committee	29	34	29	34	29	34	29	34	116	136	0.4603	0.5397
Directors with Insurance Exp	8	55	7	56	7	56	6	57	28	224	0.1111	0.8889
CRO Expertise	20	43	19	44	18	45	18	45	75	177	0.2976	0.7024
Ghana												
	2015		**2016**		**2017**		**2018**		**Total**		**Total Mean**	
ERM features	0	1	0	1	0	1	0	1	0	1	0	1
CRO Appointment	16	17	14	19	12	21	8	25	50	82	0.3788	0.6212
CRO Executive	31	2	31	2	31	2	30	3	123	9	0.9318	0.0682
Risk Committee	5	28	3	30	2	31	2	31	12	120	0.0909	0.9091
Risk Appetite	9	24	8	25	5	28	4	29	26	106	0.1970	0.8030
Risk Committee Report to Board	16	17	13	20	11	22	10	23	50	82	0.3788	0.6212
Risk Assessment Frequency	8	25	7	26	4	29	4	29	23	109	0.1742	0.8258
Risk Assessment Level	8	25	8	25	7	26	6	27	29	103	0.21970	0.7803
Risk Assessment method	14	19	12	21	8	25	8	25	42	90	0.3182	0.6818
Risk Framework	8	25	7	26	5	28	5	28	25	107	0.18934	0.8106
Active Risk Committee	9	24	9	24	8	25	7	26	33	99	0.2500	0.7500
Directors with Insurance Exp	17	16	16	17	9	24	9	24	51	81	0.3863	0.6136
CRO Expertise	19	14	15	18	11	22	7	26	52	80	0.3939	0.6061

Table 4. 4: Mean Distribution of ERM Index

Mean Distribution of ERM INDEX						
South Africa						
Variables	2015	2016	2017	2018	Total	Obs
Risk Governance Index	-0.0153	0.0651	0.0886	0.0662	0.0511	252
Risk Oversight Index	0.0087	0.0049	-0.0449	-0.0051	-0.0091	252
Operating Mechanism Index	0.1895	0.0832	0.0594	-0.0927	0.0599	252
ERM Index	-0.0438	0.0563	0.1429	0.1219	0.0693	252
Ghana						
Variables	2015	2016	2017	2018	Total	Obs
Risk Governance Index	-0.0265	-0.065	0.1108	0.1616	-0.0145	132
Risk Oversight Index	0.266	0.1063	-0.1962	-0.2736	-0.0244	132
Operating Mechanism Index	0.1091	0.0521	-0.1775	-0.185	-0.0503	132
ERM Index	0.3215	0.1626	-2024	-0.3484	-0.0167	132

Table 4. 5: Correlation Table

Variables	Und_Perf	ROA	ERMI	Board	BODIND	Gender	Size	REINS	INVYIELD	LEV
Und_Perf	1.000									
ROA	0.093	1.000								
ERMI	0.046	-0.041	1.000							
Board	-0.143	-0.231	-0.022	1.000						
BODIND	-0.018	-0.098	0.132	0.070	1.000					
Gender	-0.038	-0.227	0.005	-0.042	0.292	1.000				
Size	-0.325	-0.327	0.133	0.461	0.051	-0.101	1.000			
REINS	0.502	0.163	0.252	-0.201	0.068	0.105	-0.173	1.000		
INVYIELD	-0.249	0.052	-0.123	-0.071	0.034	-0.008	-0.009	-0.116	1.000	
LEV	-0.103	-0.028	-0.028	0.088	-0.011	-0.117	0.376	-0.068	0.044	1.000
Variables	Und_Perf	ROA	ERMI	Board	BODIND	Gender	Size	REINS	INVYIELD	LEV
Und_Perf	1.000									
ROA	-0.082	1.000								
ERMI	0.067	0.098	1.000							
Board	0.196	0.122	-0.163	1.000						
BODIND	-0.195	0.086	-0.149	0.033	1.000					
Gender	-0.105	-0.154	0.171	-0.029	-0.111	1.000				
Size	0.037	-0.137	-0.261	0.151	0.131	0.192	1.000			
REINS	0.236	-0.075	0.074	0.027	-0.049	0.153	-0.080	1.000		
INVYIELD	-0.231	0.064	-0.176	-0.094	0.165	-0.041	0.054	-0.007	1.000	
LEV	0.165	-0.131	0.033	-0.081	0.111	0.074	0.202	0.455	-0.198	1.000

4.13 Empirical Results

4.13.1 ERM and Insurance Performance

The first part of this study seeks to utilise the baseline model to examine the overall impact of ERM on insurance performance. Tables 4.6 and 4.7 presents the empirical findings for the South African and Ghanaian samples, respectively. Models 1, 2 and 3 reveals the breakdown of the impact of the ERM categories; thus, risk governance index (RG), quality of risk oversight index (QRO) and Operational mechanism index (OM) on underwriting performance. Similarly, models 5, 6 and 7 present empirical information of these categories on ROA. The essence of this is to understand the value of each category in affecting performance. Model 4 and 8 presents the overall impact of the ERM index on underwriting performance and ROA for both countries, respectively, while controlling for exogenous factors such as firm size, leverage, reinsurance premium and investment yield.

Among the individual ERM categories in South Africa, the coefficient for the RG index on underwriting performance is positive and statistically significant at a 5% significance level. The coefficient result reveals that the presence of risk governance is important in driving underwriting performance. Aebi et al. (2012) confirm this result, explaining that risk governance has a significant impact on performance. On the contrary, none of the other categories, such as QRO and OM indexes, significantly impacted underwriting performance. Regarding Return on Assets (ROA), RG and QRO were positive but statistically insignificant while OM was significant at 10%; however, negatively related. These results present the partial impact of the overall ERM index on performance. The insignificant results illustrate the minimal power of each category in affecting both underwriting performance and ROA. This result is in line with Florio and Leoni (2017) and Grace et al. (2015), which suggest a lower impact of individual characteristics on performance. Hence, recommending an integrated risk management technique.

The result from Ghana is not entirely different. This sample also reveals insignificant and diverse relationships of each risk management category on ROA and underwriting performance. The idea behind the insignificant results may be that some insurers adopt these indicators to respond to regulatory requirements without properly integrating them into their risk management system. Hence, the outcome does not appear to have any harmonious impact on insurance performance.

The result is in line with Agustina and Baroroh (2014), who found an insignificant relationship between ERM and firm value among in Indonesia. They explained that most firms implement ERM to meet regulatory requirements and hence do not place a high value on its procedures for effectiveness. More so, most insurers in Ghana begun their ERM implementation after recommendations from the NIC in 2015, hence may take some time to realise its full potential. The study, therefore, suggests that insurers must move beyond the regulatory requirements to ensure the robust implementation of ERM systems.

Regarding the overall impact of the ERM index (ERMI), the results of the panel analysis are consistent in both contexts. ERM shows a positive relationship with both insurers' Return on Assets and Underwriting Performance in the South African context. The study further reveals a statistically significant impact on underwriting performance at a 1% significance level. The significant result explains that ERM not only enhances performance and shareholders value but also improves insurers' underwriting efficiency. This indicates that the more integrated ERM features are, the higher the underwriting performance. Therefore, the South African insurance industry must ensure a robust risk management technique to reduce underwriting losses. The positive result aligns with most empirics who find a significant positive relationship between ERM and performance (Saiedi et al., 2020; Horvey & Ankamah, 2020; Silva et al., 2019; Florio & Leoni, 2017).

In the case of Ghana, the coefficient of the overall ERM index has a positive impact on the two performance measures. However, these relationships were statistically insignificant. The positive coefficient confirms the research hypothesis and also indicate that an integrated risk management system enhances performance. This is also consistent with the ERM theory, which states that ERM positively impacts performance. The positive result also agrees with empirical findings that also find a positive relationship (Nair et al., 2014; McShane et al., 2011; Gordon et al., 2009; Beasley et al., 2008). To some extent, 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. This is justified by the fact that insurers lack most of the features used in measuring ERM. Silva et al. (2019) claim that ERM implementation in emerging economies is still in its embryonic stage and may take time to realise its potential

benefits. Another possible reason for the insignificant relationship could be because of some contingency factors affecting this relationship. Beasley et al. (2008) argue that the cost and benefits of ERM are based on individual firm-specific characteristics. Therefore, the ERM-performance relationship becomes substantial when moderated with firm-specific factors (Farrell & Gallagher, 2019).

In terms of the control variables, the study reveals a negative relationship between firm size and the two performance measures for South Africa. The relationship is statistically significant with return on Assets. The negative relationship supports Hoyt and Liebenberg (2011) and Horvey and Ankamah (2020), who include this variable in their model. The Ghanaian sample also shows a significant positive relationship between firm size and underwriting performance. The positive relationship confirms the results of Santomil and Gonzalez (2020) and Eckles et al. (2014), who indicate that firm size is significant in affecting insurance performance. Financial leverage also reveals a significant positive impact on performance in most cases. This relationship is in line with previous studies that argue leverage increases firm value by reducing the generation of cash flows (Bohnert et al., 2019; Jensen, 1986). High levels of leverage, according to Hoyt and Liebenberg (2011), may raise the likelihood of bankruptcy and force a company to manage additional costs due to higher financial distress. Investment yield positively impacts return on Assets, showing a statistical significance in the Ghanaian sample. Reinsurance premiums also reveal diverse relationships with both underwriting performance and return on assets. This variable was mostly statistically insignificant.

Table 4. 6: Enterprise Risk Management and Insurance Performance in South Africa

	Underwriting Performance				Return on Assets			
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Size	-0.157	-0.180	-0.174	-0.167	-0.146***	-0.145***	-0.147***	-0.145***
	(0.119)	(0.123)	(0.123)	(0.122)	(0.0510)	(0.0506)	(0.0517)	(0.0508)
Reins	0.278	0.316	0.308	0.291	-0.0633	-0.0650	-0.0624	-0.0661
	(0.193)	(0.209)	(0.206)	(0.202)	(0.0493)	(0.0484)	(0.0479)	(0.0495)
Inv_Yield	-0.00510	-0.00570	-0.00589	-0.00241	0.00105	0.00102	0.00111	0.00131
	(0.00451)	(0.00492)	(0.00481)	(0.00427)	(0.00111)	(0.00110)	(0.00108)	(0.00126)
Lev	0.0604*	0.0489	0.0509	0.0560	0.138***	0.139***	0.138***	0.139***
	(0.0354)	(0.0373)	(0.0369)	(0.0365)	(0.0188)	(0.0187)	(0.0188)	(0.0183)
RGI	0.746**				0.0208			
	(0.364)				(0.0589)			
ROI		-0.0307				0.0399		
		(0.250)				(0.0584)		
OMI			0.0632				-0.0185*	
			(0.0682)				(0.00940)	
ERM Index				0.609***				0.0449
				(0.217)				(0.0525)
Constant	-240.4**	-275.6**	-286.2**	-226.0***	0.925	1.491	4.915	5.600
	(92.70)	(104.4)	(108.8)	(83.65)	(20.23)	(21.06)	(21.46)	(18.52)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	252	252	252	252	252	252	252	252
Prob>F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R-squared	0.186	0.157	0.158	0.210	0.325	0.326	0.327	0.329
Number of id	63	63	63	63	63	63	63	63

Note: Standard errors in parentheses; ***, **, * denotes significance level at 1%, 5% and 10% respectively

Table 4. 7: Enterprise Risk Management and Insurance Performance in Ghana

	Underwriting Performance				Return on Assets			
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Size	0.321**	0.0515***	0.0509***	0.0486**	-0.0819	-0.0923	-0.0831	-0.0918
	(0.144)	(0.0182)	(0.0181)	(0.0186)	(0.157)	(0.155)	(0.158)	(0.153)
Reins	-0.00362	0.0368*	0.0407*	0.0323	-0.166	-0.202	-0.167	-0.186
	(0.128)	(0.0209)	(0.0211)	(0.0233)	(0.177)	(0.190)	(0.181)	(0.170)
Inv_Yield	-0.00965	-0.00108	-0.000530	-0.000566	0.222***	0.223***	0.225***	0.231**
	(0.0101)	(0.000645)	(0.000488)	(0.000610)	(0.0735)	(0.0776)	(0.0787)	(0.0845)
Lev	0.179**	-0.0169	-0.0158	-0.0149	0.0536	0.0624	0.0561	0.0667
	(0.0757)	(0.0129)	(0.0131)	(0.0138)	(0.159)	(0.156)	(0.160)	(0.154)
RGI	0.00532				-0.0333			
	(0.177)				(0.0983)			
ROI		-0.0191				0.109		
		(0.0283)				(0.177)		
OMI			-0.0230				-0.00804	
			(0.0336)				(0.179)	
ERM Index				0.0125				0.0670
				(0.0185)				(0.125)
Constant	-89.08	23.29	21.11	9.157	-16.57	-47.47	-21.54	-68.32
	(89.79)	(20.15)	(18.73)	(18.25)	(169.6)	(168.7)	(182.2)	(173.6)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	132	132	132	132	132	132	132	132
Prob>F	0.000	0.000	0.000	0.000	0.003	0.004	0.004	0.005
R-squared	0.421	0.114	0.114	0.113	0.103	0.106	0.103	0.107
Number of id	33	33	33	33	33	33	33	33

Note: Standard errors in parentheses; ***, **, * denotes significance level at 1%, 5% and 10% respectively

4.13.2 The Moderating role of CG on the ERM-Performance Relationship

Following the discussion in subsection 4.4.1, the study examined how corporate governance factors moderate the relationship between ERM and insurance performance. The study follows the moderation-interaction effect principles specified by Baron and Kenny (1986) to determine the interaction effects. They explain that four conditions must be met to explain interaction effects. First, the constitutive terms and interaction terms must be included in the same model. Second, the constitutive terms and interaction terms must be treated as independent variables. The first two conditions have been specified in models (3) and (4). The third condition is that the moderator, predictor and criterion variables must be uncorrelated, which is met in Table 4.3 and Appendix B. The fourth condition specifies that the moderator hypothesis is supported if the interaction term is significant.

The empirical evidence of how Board Size (BOARD), Board Independence (BODIND) and Gender diversity (GENDER) interact with ERM in influencing the two performance measures are indicated in Tables 4.8 and 4.9 for South Africa and Ghana, respectively. Model (I) shows the independent effects of the constitutive terms, while model (II) reveals the interaction effects. According to the South African sample, the findings from the regression analysis indicate that ERM had a positive impact on return on assets, while showing a significant positive relationship with underwriting performance. In addition, a positive relationship exists between the corporate governance factors and return on assets, suggesting that corporate governance promotes performance. On the other hand, board independence and gender diversity negatively affect underwriting performance, implying that these factors erode underwriting performance. In terms of the interaction terms, the empirical findings show that board size, board independence and gender diversity reinforce the nexus between ERM and underwriting performance. These were positive and statistically significant at 5%, 1% and 5%, respectively. Further, the study observes that board independence is positive and significantly interact with ERM in affecting return on assets at a 10% significance level. However, the interactions of board size and gender diversity with ERM were insignificant, leaving the impact of ERM in a similar range as the baseline model.

In the Ghanaian sample, a positive relationship between ERM and performance is reported in all the models. In most cases, board size and board independence reveal a positive relationship, signifying that board size and board independence promote insurance performance. Furthermore, gender diversity shows an inverse relationship on both underwriting performance and return on assets. Again, the study discloses that board size has a significant moderating effect on the relationship between ERM and underwriting performance at a 1% significance level, while gender diversity reveals a positive and a significant interaction effect on ERM related to return on assets. The results suggest that in the presence of these factors, the potential impact of ERM can be achieved. In addition, the interaction term between board independence and ERMI is significant and inversely related to the two performance indicators. The relationship was at a 1% significance level, implying that board independence weakens the impact of ERM on insurance performance.

One interesting thing from this study is that the constructive terms were insignificant for Ghana when only the independent effects were examined. This is the same for the South African sample when return on assets is used as the outcome variable. However, the interaction terms show significant relationships in both samples. As hypothesised, it requires the interaction of these factors to realise the impact of ERM on performance. In consonance with the fourth condition as suggested by Baron and Kenny (1986), it is evident that interaction effects are indeed present in both samples. These findings support the research hypotheses 2, 3 and 4, signifying that board size, board independence and gender diversity moderate the relationship between ERM and insurance performance, respectively. This suggests that a linkage exists between ERM and performance; hence insurers can appreciate the benefits of ERM by ensuring proper corporate governance structures. This is because the impact of ERM on performance becomes substantial when moderated by corporate governance factors. The empirical findings are consistent with the contingency theory, which stress that the impact of ERM on performance is based on certain parameters; therefore, firms must choose from these parameters to obtain an “ERM-mix” that is suitable for insurers (Mikes & Kaplan, 2014).

The positive and significant interactive term between ERM and board size affecting insurance performance is consistent with the literature. Beasley et al. (2008) and COSO (2004) argue that ERM cannot succeed with support from the board. This is due to their ability to influence

management decisions on risk management. Sekerci and Pagach (2019) emphasise that large boards that are well coordinated can enhance ERM implementation because it represents a governance tool that provides a foundation upon which the risk management agency cost is reduced through monitoring managerial actions.

The argument that board independence interaction increases the effect of ERM on performance confirms Fama (1980) assertion. They assert that independent directors are more likely to recommend ERM to the executive board to enhance their risk 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, reducing agency costs. Beasley et al. (2005) indicate that the ratio of independent board members is positively associated with the level of ERM adoption. Also, the significant negative result among insurers in Ghana might be due to insufficient independent board members. In addition, Desender (2007) argue that having an independent board is not enough to achieve improved risk management measures unless the position of the CEO is different from the Board Chairman.

The positive interaction of gender diversity with ERM support the assertion made by Gonzalez et al. (2020), who narrates that females tend to offer a different viewpoint and are risk-averse; hence are more likely to adopt risk management measures to protect the company from unforeseen circumstances. This is because females are more concerned about ethical and regulatory issues than men. Therefore, they commit to effective risk management to respond to these issues Chen et al. (2016). On the contrary, Levine et al. (1998) argue that risk aversion could sometimes lead to poor performance due to lower risk-taking.

Following the specifications outlined by Brambor et al. (2006), the study obtains the effect and significance of the interaction term by estimating the net effects as shown in equations (5), (6) and (7). The results are reported in Tables 8 and 9 for South Africa and Ghana, respectively. For South Africa, the net effect of ERM through board size, board independence and gender diversity was positive, implying that the positive effect of ERM on both underwriting performance and return on assets are further propelled by these corporate governance factors in South Africa. Following

the computed net effect for Ghana, it is observed that in the presence of board size, board independence and gender diversity, ERM improves both underwriting performance and return on assets among insurers. Despite the negative interactive term of ERM and board independence related to both performance measures in Ghana, the net effect is positive, showing that board independence can complement ERM to enhance insurance performance. In the context of both samples, the study argues that corporate governance promotes the pragmatic impact of ERM on performance. Thus, it reinforces the nexus between ERM and insurance performance. This supports the argument in the literature that the impact of ERM becomes more substantial when modulated with firm-specific factors (Farrell & Gallagher, 2019). 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.

Figure 4.2 shows the plots of the marginal effect at different levels at the 95% confidence intervals. The marginal plots emphasise that the impact of ERM on performance is enhanced as board size increases at different levels. This argument also holds for board independence related to return on assets in both contexts. This confirms the causal relationship illustrating that board size and independence have an additive effect on ERM implementation as the number of board size and independence increases. Concerning gender diversity, the impact of ERM on performance reduces as female ratios increases. This points out that gender diversity has a reductive effect on the impact of ERM as the ratio of females on the board increases. This may be due to the strong risk-aversion levels by females, which may somehow be detrimental to the organisation as females dominate the board.

Table 4. 8: Interaction Effects for South Africa

	Underwriting Performance		Return on Assets	
	Independent Effects Only (I)	*Interaction Effects* (II)	*Independent Effects Only* (I)	*Interaction Effects* (II)
ERMI	0.551***	0.474***	0.0460	0.0742
	(0.170)	(0.168)	(0.0428)	(0.0478)
Board	0.0828**	0.0768**	0.00799	0.00625
	(0.0343)	(0.0343)	(0.00783)	(0.00868)
BODIND	-1.226	-1.595**	0.154	0.210
	(0.749)	(0.744)	(0.157)	(0.175)
Gender	-1.476*	-0.879	0.601	0.546
	(0.828)	(0.829)	(0.425)	(0.469)
ERMI*Board		0.0396**		-3.87e-05
		(0.0164)		(0.00139)
ERMI*BODIND		1.847***		0.216*
		(0.570)		(0.125)
ERMI*Gender		1.893**		-0.0959
		(0.788)		(0.235)
Size	-0.216	-0.200	-0.120***	-0.122***
	(0.132)	(0.129)	(0.0415)	(0.0428)
Reins	0.271**	0.207**	-0.379***	-0.374***
	(0.105)	(0.105)	(0.0605)	(0.0616)
Inv_Yield	-0.00161	-0.00106	0.00144	0.00147
	(0.00189)	(0.00187)	(0.00119)	(0.00115)
Lev	0.0542	0.0662	0.142***	0.142***
	(0.103)	(0.100)	(0.0167)	(0.0174)
Constant	-232.3**	-282.9***	11.59	9.161
	(91.01)	(90.96)	(17.18)	(19.96)
Year Dummies	Yes	Yes	Yes	Yes
Prob>F	0.000	0.000	0.000	0.000
Observations	252	252	252	252
R-squared	0.264	0.312	0.410	0.420
Number of id	63	63	63	63
Net Effects				
Eq. (5)		0.643*		0.200
Eq. (6)		1.141***		0.173*
Eq. (7)		0.698*		-0.076

Note: Standard errors in parentheses; ***, **, * denotes significance level at 1%, 5% and 10% respectively

Table 4. 9: Interaction Effects for Ghana

	Underwriting Performance		Return on Assets	
	Independent Effects Only (I)	*Interaction Effects* (II)	*Independent Effects Only* (I)	*Interaction Effects* (II)
ERMI	0.112	0.162	0.0962	0.298**
	(0.109)	(0.119)	(0.137)	(0.145)
Board	-0.000228	0.0341	0.0820	0.162
	(0.0878)	(0.0966)	(0.122)	(0.118)
BODIND	0.0681	-0.833	0.710	0.876
	(0.897)	(0.686)	(0.947)	(0.947)
Gender	-1.244	-1.655	-0.703	-0.742
	(1.078)	(1.146)	(0.859)	(1.033)
ERMI*Board		0.225***		0.0191
		(0.0607)		(0.0239)
ERMI*BODIND		-0.457***		-1.362***
		(0.0911)		(0.447)
ERMI*Gender		0.313		1.416**
		(0.594)		(0.664)
Size	0.0753	0.0270	-0.116	-0.116
	(0.101)	(0.114)	(0.143)	(0.148)
Reins	-0.0214	0.0876	-0.194	-0.134
	(0.100)	(0.213)	(0.163)	(0.163)
Inv_Yield	0.245**	0.184**	0.234***	0.174***
	(0.0934)	(0.0706)	(0.0787)	(0.0496)
Lev	0.533***	0.531***	0.104	0.107
	(0.122)	(0.152)	(0.152)	(0.153)
Constant	-3.552**	-2.174	-47.48	44.49
	(1.717)	(1.581)	(224.6)	(219.6)
Year Dummies	Yes	Yes	Yes	Yes
Prob>F	132	132	132	132
Observations	0.000	0.000	0.034	0.000
R-squared	0.267	0.351	0.126	0.204
Number of id	33	33	33	33
Net Effects:				
Eq. (5)		1.636***		2.033***
Eq. (6)		0.320*		0.638
Eq. (7)		-0.036		0.169*

Note: Standard errors in parentheses; ***, **, * denotes significance level at 1%, 5% and 10% respectively

4.13.3 Diagnostic Checks

The study conducts several tests to ensure the reliability, consistency and efficiency of the regression models. The descriptive statistics were first examined to identify outliers in the dataset. There were no outliers found. Multicollinearity was checked using the Pearson correlation (see Table 4.5) and the Variance Inflation Factor (VIF) (see Table 4.11). Results from the correlation analysis indicate that multicollinearity does not pose a problem to the regression analysis. The VIF further validates this. The largest for each country is 1.46 for South Africa and 1.56 for Ghana, which are much lower than 10, the threshold of having multicollinearity (Ayyangar, 2007). In order to identify the best estimation technique for the regression analysis, the study used the Breuch and Pagan Lagrange multiplier test for random effects. Given the significance level (P-value=0.000) for each model, the study rejects the null hypothesis concluding that OLS is not suitable for the study. In addition, the Hausman test was used to choose between the fixed effect and random effect. The results from the Hausman test (as presented in Appendix A) indicate the rejection of the null hypothesis (Ho: difference in coefficients not systematic). This indicates that the fixed effect is preferred over the random effect. Further tests also found evidence of heteroscedasticity. The robust standard error was used to ensure a consistent and unbiased result. In addition, there was no evidence of autocorrelation as the Wooldridge test for autocorrelation failed to reject the null hypothesis of no first-order autocorrelation. Year dummies were added to control for year effects. The outcomes of these models show that the findings are consistent and reliable. As a result, our models are suitable for generalisation.

4.14 Conclusion and Recommendations

4.14.1 Conclusion

The practice of ERM is gaining recognition in emerging economies such as South Africa and Ghana. Most scholars and practitioners are now advocating for the adoption of this new paradigm to improve firms' risk management activities. While there has been an increase in ERM literature in recent years, there have been inconclusive results on the ERM-performance relationship. In addition, there are still many key areas that need further investigation, particularly within emerging markets. Based on these arguments, this study sought to examine the impact of ERM on insurance performance and how board size, board independence, and gender diversity moderate the relationship between ERM and insurance performance. Following previous studies, the study measured performance by return on assets. Furthermore, the study took a novel approach to investigate ERM's impact on underwriting performance which has not been empirically investigated. The study chose these two measures because insurers generate profits from the return on investment and underwriting activities. An ERM index was constructed based on twelve features categorised into risk governance, operating mechanisms, and the quality of risk oversight. A panel regression technique between 2015-2018 was used to provide evidence of these relationships.

Based on the sample, the baseline result identifies a positive nexus between ERM and the two performance measures for insurers in both countries, but this relationship was mostly insignificant. The relationship between ERM and underwriting performance shows a significant positive relationship. The positive and significant relationship means that ERM can help reduce underwriting losses in South Africa. The ERM categories also reveal diverse impacts on insurance performance. To some extent, the insignificant result could be attributed to the fact that the concept of ERM is still a recent phenomenon among insurers in both contexts and may take time to gain momentum and relevance. This is justified by the fact that some insurers lack most of the features used in measuring ERM. Silva et al. (2019) claim that ERM implementation in emerging economies is still incipient and that it may take time to realise its potential benefits. 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.

To delve deeper into the impact of ERM on performance, the second objective investigates the interaction between ERM and corporate governance factors on performance outcomes. Specifically, this objective examines the moderating role of board size, board independence and gender diversity on the ERM-performance relationship. The motivation for this study is that corporate governance sets the tone and provides support for effective risk management. However, studies showing the interrelationship between ERM and corporate governance are non-existent. Empirically, the interaction between ERM and the corporate governance factors reveals a significant positive impact on underwriting performance and asset return. This result indicates that these factors propel the impact of ERM on performance. In addition, the interactive term between board independence and ERM denotes a significant negative relationship related to both performance measures in Ghana, showing that board independence reduces the enhancing effect of ERM on performance. The positive net effect of all these factors evinces that corporate governance complements the efforts of ERM in promoting insurance performance. In a nutshell, these findings confirm the hypothesis that the impact of ERM on performance is based on the presence of corporate governance factors. This argument supports the contingency theory of risk management, which suggests that firms must consider contextual factors to ensure the successful implementation of ERM. Given the findings of this study, it is suggested that insurers must ensure the proper integration of corporate governance factors and ERM to improve their efficiency in enhancing performance.

4.14.2 Managerial Implications

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 enterprise risk management due to its positive impact on performance. Insurers who want to boost their performance should not see ERM simply as a regulatory policy but as a tool that provides a competitive advantage and achieves corporate objectives. Moreover, South African insurers who want to avoid underwriting losses must implement ERM due to the significant positive relationship. Further, insurers must pay attention to the ERM categories: risk governance, risk oversight, and operating mechanism, as these factors reveal the potential impact of ERM when combined. Again, the study highlights that insurers can rely on corporate governance factors - the board size, board independence and gender diversity - to enhance the impact of ERM. Hence,

insurers should improve their corporate governance structures to advance the positive impact of ERM implementation.

4.14.3 Study limitations

A survey method was used because ERM information is not readily available from secondary sources. While the survey method ensured a comprehensive ERM index development, surveys are subject to response bias. In addition, the survey response limited the sample for the study as firms self-decide whether to participate in the survey or not. Furthermore, the ERM survey was contingent on the fact that respondents may have sufficient knowledge about the risk practices of the insurance firm. This may not be valid for all insurers, especially when an insurer does not have a designated office for risk management. One technique for addressing this flaw is to allow for a large number of respondents to verify the survey response. This fact notwithstanding, I believe that the results of the study reported in this paper provide important insights into the ERM literature and provide a basis for further empirical investigation in other emerging markets.

4.14.4 Recommendations for Future Studies

Given the aforementioned constraints, this study suggests the development of an ERM index that does not depend solely on primary data but on secondary data to avoid any bias in the results associated with survey data. While this study relied on a comprehensive approach to measure ERM, these features are not exhaustive; therefore, future studies should include more ERM features based on the recommendation of the new COSO (2017) and ISO (2018) frameworks. It will also be worthwhile to consider other interactions by considering the Environmental, Social and Governance (ESG) guidelines, as ERM is closely linked to these standards. It will also be fascinating to concentrate on other corporate governance factors such as CEO duality, ownership, board meetings and board diversity factors. This will provide further insights into how other corporate governance factors moderate the ERM-performance relationship. In terms of estimation techniques, scholars should focus on more robust estimations such as dynamic models, which have the potential to control for endogeneity while increasing the sample size.

Appendix

Table 4. 10: Diagnostic Tests

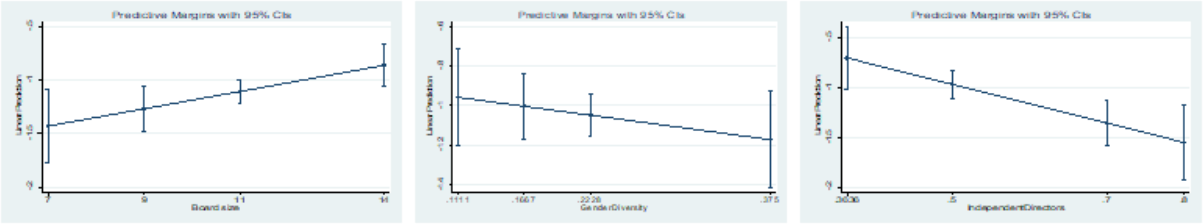
Diagnostics		South Africa		Ghana	
		UND_PERF	ROA	UND_PERF	ROA
Hausman Test	P-Value	0.000	0.000	0.000	0.001
	Chi-Square	42.900	23.690	124.720	19.100
LM Test	Prob > chibar2	0.000	0.000	0.000	0.000
	Chibar2	136.290	135.350	129.640	13.120
Heteroscedasticity test	P-Value	0.000	0.000	0.000	0.000
Serial Correlation	Prob>F	0.391	0.395	0.715	0.115

Table 4. 11: Variance Inflation Factor

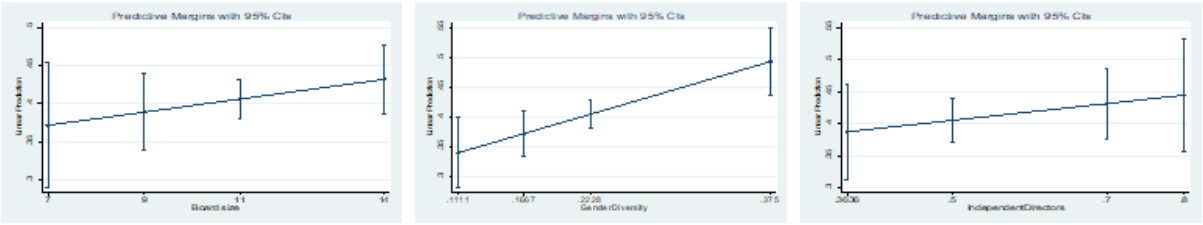
	South Africa		Ghana	
Variables	**VIF**	**Tolerance**	**VIF**	**Tolerance**
ERMI	1.14	0.88	1.22	0.82
Board Size	1.46	0.74	1.13	0.88
Ind. Directors	1.13	0.88	1.11	0.90
Gender Diversity	1.12	0.90	1.17	0.86
Size	1.46	0.69	1.32	0.75
Reinsurance Premium	1.17	0.86	1.42	0.70
Investment Yield	1.01	0.96	1.17	0.85
Leverage	1.12	0.90	1.56	0.64
Mean VIF	1.19		1.25	

Figure 4. 2: Marginal Plots

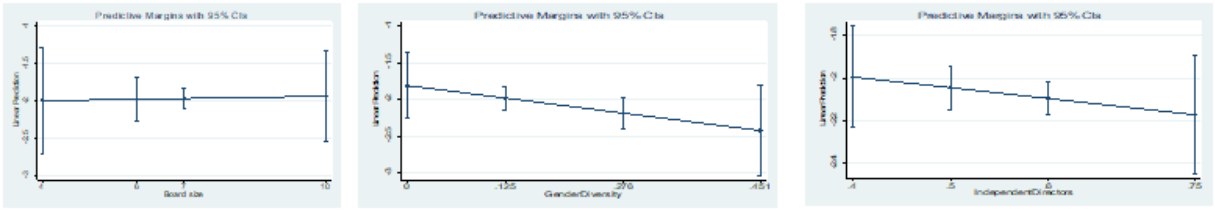
Differentiating underwriting performance w.r.t. ERM: South Africa



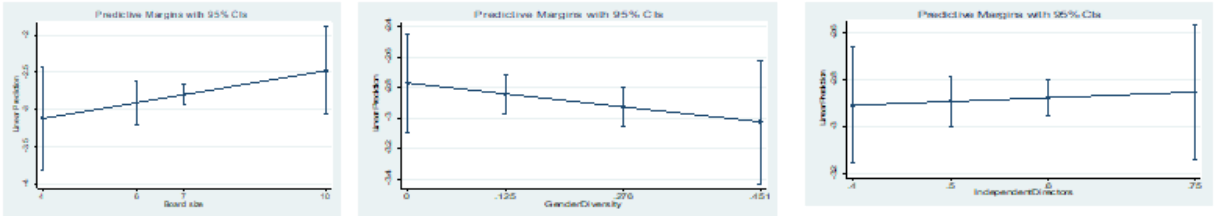
Differentiating return on assets w.r.t. ERM: South Africa



Differentiating underwriting performance w.r.t. ERM: Ghana



Differentiating return on assets w.r.t. ERM: Ghana



CHAPTER FIVE
ENTERPRISE RISK MANAGEMENT, CORPORATE GOVERNANCE AND INSURANCE RISK-TAKING IN GHANA AND SOUTH AFRICA: EVIDENCE FROM A DYNAMIC PANEL THRESHOLD

5.1 Introduction

Risk-taking is very critical to the success of every organisation. Several regulatory developments on corporate governance (CG) and enterprise risk management (ERM) have provoked different schools of thought on how these factors promote firm risk-taking decisions. Although organisations seek to minimise their risks, insurers cannot succeed if they do not take ex-ante profitable risks (Stulz, 2016). The essence of implementing ERM is to ensure that firms are proactive and have adequate resources to manage and control their risk. However, it remains in doubt whether the implementation of ERM influences firms to take more, less or no change in their risk. Even though ERM supports firms in managing their risk activities within an acceptable risk appetite level, there are certain situations where risk management fails to ensure that insurers take the right amount of risk (Stulz, 2008). The Risk management agency theory has proved to significantly impact managers' attitudes toward risk-taking behaviour (Smith & Stulz, 1985), but Eisenhardt (1989) asserts that overconfidence sometimes makes managers go for higher risks. Smith and Stulz (1985) further argue that firms with a strong risk management system may go for higher risks while firms with a weak risk management system may go for lower risks. On the contrary, Ellul and Yeramilli (2013) posit that firms with a strong risk management system take lower risks because their risk culture dictates their risk-raking preferences regardless of the strength of the risk management system. More so, the detailed rules and principles involved can limit firms from taking up certain risky projects that may enhance firm value (Stulz, 2014). One of such rules is the risk-based supervision framework which determines the amount of risk an insurer is able to accept based on their risk portfolio.

On the other hand, the board of directors of every institution is regarded as the cornerstone of an effective internal governance system (Fama & Jensen, 1983). The board's responsibility is to monitor, evaluate, regulate policies, and set the tone for insurers risk-taking culture. This ensures that insurers risk-taking decisions are consistent with the firm's risk appetite levels. Despite the

board's role in promoting sound corporate governance practices, there is also a significant effect on how corporate governance failures/success affect their risk-taking decisions (Srivastav & Hagendorff, 2016). Laeven and Levine (2009) posit that the power of the board and the potential conflicts between the board and managers affects their risk-taking decisions. In addition, the board of directors may lack the time, experience and necessary information required for effective risk-taking. Aebi et al. (2012) report that management decisions could be costly for shareholders, especially when taking lower risks means avoiding valuable investment, affecting shareholders' value. Therefore, shareholders view of risk management does not mean lower risk-taking, which reduces firm value because firms, in some cases, undertake higher risks in other to increase shareholders value.

While assertions on the impact of corporate governance on bank risk-taking have been well documented in the literature (Elamer et al., 2018; Matthew et al., 2016; Su & Lee, 2013; Laeven & Levine, 2009; John et al., 2008), empirical investigation designed to validate the conceptual development of the relationship between CG and insurers-risk taking is scarce, thus requiring further studies to validate this relationship. Furthermore, the extant ERM literature over the past two decades has focused on the value of ERM (Pagach & Warr, 2010; Hoyt & Liebenberg, 2009; Callahan & Soileau, 2017; Silva et al., 2019), the driving force for ERM (Bohnert et al., 2019; Lechner & Gatzert, 2018; Farrell & Gallagher, 2015; Liebenberg & Hoyt, 2003) and its implementation practices (Paape & Spekle, 2012; Soltanizadah et al., 2014) within an organisation; however, empirical evidence on how ERM affect insurers risk-taking, especially in the Ghanaian and South African context has less been explored. Given the significance of corporate governance and ERM, many assume that this may reduce firm risk-taking. Nevertheless, the complexity of insurance firms, attitudes of risk managers and interest of shareholders might influence the risk-taking behaviour of firms (Mikes & Kaplan, 2014). Stulz (2014) argues that ERM does not avoid risk but identifies the threats and opportunities that risk brings and how it affects the strategic objectives.

Again, recent literature has documented the linear relationship between CG, ERM and risk-taking decisions (Elamer et al., 2018; Florio & Leoni, 2017; Huang & Wang, 2015; Ellul & Yerramilli, 2013). However, there is a paucity of research on the threshold dynamics of these relationships.

Scholars argue that there can be a certain level where these factors become excessive in affecting firm decisions (Horvey & Ankamah, 2020). Thus, a threshold is required to influence risk-taking decisions significantly. This study contributes to the literature by deepening our understanding of the non-linearities between CG, ERM and insurers risk-taking. This study applies a dynamic panel threshold regression, an estimation technique recently advanced by Seo et al. (2019), to account for potential endogeneity issues in the regression model.

The study is further motivated by the fact that the insurance industry has seen several regulatory developments in risk management and corporate governance due to their complex business activities. In South Africa, the introduction of the King III corporate governance code in 2009 was written to ensure compliance with corporate governance practices and effective risk management and risk-taking decisions. Similarly, the NIC of Ghana in 2015 developed the governance and risk management framework to ensure proper operational activities. These regulatory reforms were set to ensure appropriate risk management practices and to control their risk-taking behaviour. However, little is known about how ERM and corporate governance affect insurers risk-taking within these contexts. It is also important to highlight that the empirical findings within this subject area differ from study to study. These differences can be attributed to the non-linearity of these relationships. Considering the above premise, our methodological strategy will revolve around these two concerns. First, the study investigates how ERM and corporate governance characteristics alter the risk-taking preferences of insurance firms. Second, the study examines the non-linearity of these relationships using the dynamic panel threshold regression analysis developed by (Seo & Shin, 2016; Seo et al., 2019).

Our study contributes to the literature in three distinct avenues. First, it considers the direct relationship between ERM, CG and insurers risk-taking, which has been less explored. Second, it uses GMM to examine the relationships. The importance of this technique is that it overcomes endogeneity problems. Third, it addresses the issue of the non-linear relationship between ERM, CG and risk-taking decisions. The dataset consists of insurance companies in Ghana and South Africa between 2015-2019. Presaging the key findings, the study reveals a significant positive relationship between ERM and risk-taking for insurers in both countries. Board size is significantly positively related to risk-taking for both samples, whereas gender diversity has an inverse

relationship with risk-taking. Board independence shows a positive impact on risk-taking, with the Ghanaian sample being statistically significant. Results from the dynamic panel regression confirm non-linearities between ERM, CG and risk-taking. Regarding the South African sample, the study finds that ERM significantly increases insurers risk-taking beyond the threshold level. Regarding the corporate governance factors, the South African sample had significant threshold levels for board size, gender diversity, and board independence at 10.03, 0.274 and 0.547, respectively, whiles the Ghanaian sample documents threshold levels of 7, 0.286 and 0.692 for board size, gender diversity and board independence, respectively.

The rest of the session is structured as follows. Section 2 discusses the theories and empirical literature on ERM, CG and risk-taking decisions. Section 3 explains the data, methodology and empirical strategies. Section 4 provides an analysis and discussion of the empirical result, and Section 5 provides a conclusion and policy implications.

5.2 Literature Review

This section first discusses the theory supporting the study. It dwells on the agency theory, which describes the risk preferences of the board and managers in decision-making, which is the foundation of the study. In this section, the study also reviews the literature on the relation between ERM and risk-taking and also between corporate governance and risk-taking decisions.

5.3 Agency Theory

The risk management agency theory has proved to greatly impact the attitudes of managers in risk-taking behaviour (Smith & Stulz, 1985). The Agency theory spreads the investigation of the firm to incorporate the disagreement of managers and shareholders. This theory expounds that a conceivable opposing interest between shareholders and managers is because of information asymmetries, which can lead the firm into losses or not engaging in profitable ventures (Mayers & Smith, 1987). Thus, shareholders and managers have unlike interests in the company and their risk management objective differs. While owners may demand high risk to high return on investments, managers desire low risk and return on investment. This theory is also based on theory X by McGregor (1960), which reveal that both the principal and agent seeks to maximise their interest. The agency theory offers support for risk management as an answer to the disparity

between incentives by managers and shareholder interests (Eisenhardt, 1989). The agency theory stresses that risk management should line up the interest of shareholders and managers to increase organisational performance, as risk management helps manage and monitor managers' activities (Jensen & Meckling, 1976). Iqbal and Mirakhor (2011) add that strong risk management techniques can help firms reduce risk exposure, improve their risk-taking decisions, and enhance financial performance.

Despite the importance of risk management in answering the disparities between managers and shareholders, the emergence of ERM has brought a lot of doubt to the risk-taking behaviours of managers. This is because ERM might encourage the board to take a lower risk, no risk or can be an incentive to go for higher risk (Stulz, 2014). There is growing evidence that organisations do not adopt ERM solely to adhere to regulatory policies and business survival but also manage their risk decisions within their risk appetite level. Farrell and Gallagher (2015) state that the implementation of ERM helps an organization monitor and control their risk within the organisation to optimise their risk-taking decisions. Sobel, Reding and Kurt (2004) say that risk-taking plays a major role in the success of every business as there is no reward without risk decisions. Hence, they suggest that some risks can be exploited for the opportunities they present, while others must be minimised because of the threats they present to us. Notwithstanding, it is yet to be known whether the implementation of ERM increases performance through more, less or no change in their risk-taking decisions.

Furthermore, the agency theory narrates that the board of directors plays an important role in determining organisations' strategic decisions and risk-taking choices. The agency theory posits that managers are naturally risk-averse due to their reputational and employment risks (Eisenhardt, 1989). This theory further reveals that managers who are more secure in their positions take lower risks (Fama, 1980). In contrast, Mishra (2011) states that board-level monitoring with large shareholders leads to higher risk-taking. This argument reveals that agency conflicts influence the risk preferences of firms. The agency theory also narrates that the number of directors influences the decision outcomes of organisations. Thus, the decision-making process of a larger board is time-consuming and has several difficulties; hence they settle for lower risk (Jensen, 1993). In

addition, smaller boards are more efficient and have less coordination problems and may choose higher risks.

5.4 Enterprise Risk Management and Risk-Taking

In the past two decades, ERM has received much recognition among corporate institutions, investors, and regulators because it provides a competitive advantage over firms that manage risk individually (Nocco & Stulz, 2006). ERM adopts a portfolio approach to managing risks as compared to the silo system. The theory of corporate risk management examines firms' risk decisions based on contracting cost and the impact of risk management on corporate policies and explains that ERM helps in the risk management activities of a firm and reduces the cost of financial distress.

Despite the importance of ERM in reducing the cost of financial distress, there are still concerns about the optimal amount of risk a firm should take. That is, whether ERM increases or reduces firms risk-taking decisions. Nocco and Stulz (2006) assert that management must not limit their risks but rather should limit the probability of financial distress to the level that maximises firm value to achieve the purpose of ERM. Thus, managers should optimise their risk portfolio regarding the associated cost and benefits to reflect their risk-taking decisions. Stulz (2016) supports this assertion explaining that ERM is not meant to eliminate risk per se, which can be costly to shareholders. Thus, ERM does mean low risk-taking, which may prevent the firm from undertaking worthwhile projects. Hence, risk-taking decisions should not be made in isolation but must be assessed with their impact on the optimal risk.

In addition, Mikes and Kaplan (2012) elucidate that risk management does not necessarily mean lower risk-taking as this prevents the company from taking valuable projects which may enhance firm value. Pooser and McCollough (2012) further argue that firms sometimes change their risk-taking preferences depending on their performance. Nocco and Stulz (2006) further reveal that the benefits of ERM can be examined from the macro level and micro level. The benefit of ERM at the macro level is that it helps senior managers to quantify and measure the risk-return tradeoff which the firm faces. At the micro-level, ERM becomes the way of life for both managers and employees.

In the empirical literature, Ellul and Yeramilli (2013) argue that the implementation of ERM leads to lower risk-taking. This happens when the risk culture is embedded in the business model of a firm. This determines the amount of risk and the strength of the risk management system. "That is, some firms may have a conservative risk culture and choose to take lower risks and put in place stronger risk management systems, whereas others may have an aggressive risk culture and may choose to take higher risks and also have weaker risk management functions" (Ellul & Yeramilli, 2013, pp. 1763). They further argue that a strong risk management function reduces tail risk by effectively reining executives and traders in the US bank-holding company's excessive risk-taking behaviour. Evidence from Eckles et al. (2014) shows that ERM reduces firms stock returns volatility. That is, ERM reduces the impact of risk events on a firm. Their results revealed that ERM implementation support firms to maximise their profit incentives. Beasley et al. (2005) argue that assessing the risk portfolio of a firm should be beneficial since it improves the board's ability to manage its ERM. Chapman (2006) adds that having an adequate understanding of the level of risk supports the alignment of a firm's strategic decision with the risk-taking. Despite the various assertions in the literature, empirical investigation on this relationship is still nascent. This study contributes to the literature by providing new evidence on the ERM-risk-taking nexus within the context of Ghana and South Africa. To achieve this, the study hypothesis that:

H1: There is a negative relationship between ERM and risk-taking.

5.5 Corporate Governance and Risk-Taking

It is argued that corporate governance plays a significant role in the risk decisions of an organisation (Ballester et al., 2020). Sobel and Reding (2004) explain that though the role of the executive board is not directly to manage risk, its corporate governance activities directly affect their risk-taking decisions. They suggest that the board must be actively involved in the risk-taking decision-making process for its effectiveness. This is done by providing risk directions, authority, and oversight responsibilities. Elamer, Alhares, Ntim and Benyazid (2018) states that enhancing corporate governance among insurers will affect their risk decisions as a good corporate governance system is connected to good risk-taking of insurance companies. Stulz (2016) adds that good corporate governance aids management to adopt mechanisms so that the level of risk chosen maximises shareholders value subject to the constraints imposed by regulation. In addition, Rachdi and Ameur (2011) state the board structure as a key driver of performance and firm risk-

taking. The board provides oversight roles to manage the risk-taking by management. Thus, they play important roles in strategic decision-making and risk-taking choices. Boards of directors are central to corporate governance (Terjesen et al., 2015) and decide or influence most critical decisions affecting listed companies (Luo et al., 2013). Thus, they play important roles in strategic decision-making and risk-taking choices

According to the Committee of Sponsoring Organisations of the Treadway Commission (COSO) (2004), it is the responsibility of the board to provide information on risk management philosophy, risk tolerance level of the organisation and hold risk managers accountable for risk decisions, actions and reporting risk management results. They must monitor and ensure that their activities are aligned with the company's risk appetite level. Akbar et al. (2017) support this argument saying that most corporate governance codes highlight the importance of the board in risk management.

The literature on corporate governance and risk-taking is diverse. Gupta and Leech (2014) say an improved risk oversight by the board will improve risk management activities and processes and make well-informed risk-taking decisions. The agency theory also suggests a positive relationship between the boards' risk oversight and risk-taking (Beasley et al., 2021). However, it is often argued that board members do not have the luxury of time, information, and skills to be able to perform effective risk oversight. The responsibility of the board in providing risk oversight provides a control mechanism for reducing information asymmetry. Business incentives help to align the interest of managers to the shareholders. Minton et al. (2014) opined that high incentives lead to extreme risk-taking by managers. John et al. (2008) suggests there can be an inverse relationship between corporate governance and risk-taking, explaining that the reduction in shareholders power is likely to result in greater managerial power to implement policies that can lead to a negative relationship between corporate governance and risk-taking. King and Wen (2011) also argue that a strong corporate governance system leads to investment in lower risks while a weak corporate governance system encourages research and development.

The linkage between corporate governance and risk-taking is one of those important relationships that explain the impact of corporate governance on firm value. The nexus between corporate governance and risk is based on the fundamental proposition that governance deters opportunistic

managerial behaviour and excessive risk-taking (Balachandrand & Faff, 2015). Despite the importance of this concept, there is a paucity of research on how corporate governance affects insurance decisions. To examine these relationships, the study examines how the following factors (that is, board size, board independence, board gender diversity) affect risk-taking and at what are they significant.

5.5.1 Board Size and Risk-Taking

One of the corporate governance characteristics that influence their activities is the board size. Lipton and Lorsch (1992) posit that larger board sizes slow the decision-making process, making the board ineffective. Hence, firms must embrace small board sizes as they are viewed to be more efficient due to less communication and coordination issues (Jensen, 1993). Pathan and Faff (2013) support this argument that large board sizes lead to poor communication and coordination, which negatively affects managerial ability to monitor business activities. Uchida (2011) assert that board size influences firm value and risk-taking decisions. The agency theory points out that managers are interested in welfare hence are less likely to undertake risky projects (Fama, 1980). This is because large board sizes face the challenge of reaching a consensus on important issues, which may influence them in going for lower risk-taking (Cheng, 2008). Contrary, Mishra (2011) argue that board-level monitoring with large shareholders leads to higher risk-taking. This theory suggests that the size of the board is relevant to the decisions made by the board. In addition, Fama and Jensen (1983) adds that smaller board sizes are efficient and coordinated in their activities as compared to larger board sizes.

This is not without empirical evidence. Huang and Wang (2014) examined the association between board size and risk-taking among Chinese firms. Using an unbalanced panel data from 2003-2011, they find that smaller board sizes are sensitive to higher pay to performance and go for riskier investments than bigger board sizes who are seen to be conservative in using debt financing. The findings support their hypothesis that a negative relationship exists between board size and risk-taking. Their findings are in line with McNulty et al. (2013), who report an inverse relationship between board size and financial risk of UK firms. Wang (2012) also support the hypothesis that smaller boards undertake more risky investment than larger boards. This is in consonance with Elamer et al. (2018), who examined the impact of corporate governance on risk-taking among US

insurance firms. Using panel data of listed insurance companies on FTSE 350, they find that board size has an inverse relationship with firms risk-taking decisions. This relationship was found to be significant. This assertion is supported by Akbar et al. (2017), who also found a negative association between board size and risk-taking decisions.

Conversely, Adams and Jiang (2016) reveal a positive relationship between board size and firm risk-taking decisions. They explain that large boards that are knowledgeable and effective have an enhanced moderating role in managerial behaviour. Dalton et al. (1999) states that larger board sizes are needed in large companies to manage the complexities, increase expertise and resources for their business operations. This is because board size brings diversities which improves their risk-taking decisions. This is important for firms that have several complexities (Coles et al., 2008). However, Chena and Najjar (2012) found this relationship to be statistically insignificant. Against this backdrop, an inverse relationship between board size and risk-taking is expected. The study, therefore, state our hypothesis as:

H2. There is a negative relationship between board size and risk-taking.

5.5.2 Gender and Risk-Taking

There have been growing interest in the gender difference in board decision making. Literature posits that women are more risk-averse in the area of finance, health and safety, and insurance (Harris & Jenkins, 2006). This concurs with the agency theory, which explains the risk-averse nature of females. Croson and Gneezy (2009) explain that women have strong emotions such as fear and nervousness, hence risky situations negatively affect satisfaction, which makes them more risk-averse. This is because they are more sensitive to risks in the context of losses than gains. Since the probability of gains to losses is estimated differently by women than men (Fehr-Duda et al., 2006).

Pradhan et al. (2019) argue that board characteristics such as gender have a higher propensity to influence financial decisions and outcomes. He further explains that women are interested in safer policies in their managerial and risk-taking decisions. Adams and Funk (2012) reveal that female directors have higher benevolence than male directors. As a result, the presence of women on the board reduces risk-taking by the firms. This argument is supported by Chen et al. (2016), who said

that the riskiness of a firm investment is likely to reduce when there are females on the executive board. In addition, the level of risk-taking by firms is reduced due to the presence of females on the board (Charles & Redor, 2014). In the case of Graham et al. (2013), male CEOs have higher debt ratios than their female counterparts, particularly in the short term. Lenney (1977) attributes this to overconfidence. While men tend to overestimate the precision of their risk knowledge, women have less overconfidence and are hence less inclined to take extreme stances on risk-taking (Ray, 2005). As a result, even if they have the same level of risk aversion, women's decisions may be less risky than men.

On the contrary, Berger et al. (2014) report that the presence of females on the executive board of banks leads to higher risk-taking. However, Silva et al. (2016) did not find evidence that board gender diversity affects risk-taking. Similarly, Loukil and Yousfi (2016) said the relationship between gender board diversity and risk-taking is not statistically significant. Again, Midavaine et al. (2016) find no increase in firms risk-taking due to the inclusion of women on the board. Dong et al. (2017) find an inverse relationship between the proportion of female directors and traditional banking risk. This argument is supported by Hurley and Choudhary (2020). Based on the above argument, the hypothesis of this study is stated as:

> *H3: There is a negative relationship between board gender diversity and insurance risk-taking.*

5.5.3 Board Independence and Risk-Taking

The ultimate role of the board is to monitor organisations decisions and actions (Fama, 1980). The involvement of board members, whether independent or dependent, is very vital for organisational success (Wu & Li, 2015). Board independence is the presence of non-executive members on the executive board (Guest, 2010). Board independence with high competence and improved qualifications suggest to shareholders that firms risk-taking reflects management choices (Clarke, 2007). Independent directors protect shareholders' interests using corporate governance principles and are more likely to have higher risk tolerance levels to increase shareholders' value. It is further argued that the presence of independent directors ensures that firms risk-taking decisions reflect management choices due to their qualifications and competencies; hence are believed to make trustworthy judgements (Akbar et al., 2017).

Adams and Jiang (2016) state that the agency theory reveals the importance of independent directors to mitigate inconsistent interests. Therefore, Jensen and Meckling (1976) explain that the agency conflicts between managers and shareholders can be reduced by increasing the number of independent directors. This is because independent directors provide effective monitoring as they are independent and are less likely to be influenced by management. Pathan (2009) explains that independent directors want to protect their reputation hence are more likely to support less risky projects (Akbar et al., 2017; Fama, 1980). Pathan (2009) adds that independent directors would like to protect their reputation and invest in less risky projects to avoid losses and protect the firm image. This argument is consistent with the monitoring hypothesis, which assumes that independent board members help to reduce corporate risk-taking. Empirical findings support the inverse relationship between board independence and risk-taking (Akbar et al., 2017; Tanda, 2015; Brick & Chidambaran, 2008)

Akbar et al. (2017) support the above argument that independent members on the board reduce the risk-taking activity of the firm. Rachdi and Ameur (2011) reveal that independent board members among the executive board affect performance negatively. Using the random effect model and Generalise Methods of Moments GMM, they further argue that independent directors on the board have no significant effect on firm risk-taking. Elamar et al. (2018) also found that board independence has an insignificant negative relationship with risk-taking. Bradley and Chen (2015) are of the view that independent directors reduce the cost of debt due to strong credit conditions or lower leverage and vice-versa. They suggest that independent directors set policies that increase corporate risk-taking. This is confirmed by Beltratti and Stulz (2012), who reveals that the board is riskier when there are more independent directors explaining that firms take higher risks ex-ante in the interests of their shareholders. The study, therefore, expect a negative relationship between board independence and risk-taking. Hence, our hypothesis is stated as:

> *H4: There is a negative relationship between board independence and insurance risk-taking.*

5.6 Method

5.7 Sample and Data Considerations

This study adopts a panel data strategy to examine the relationship between ERM, corporate governance and risk-taking behaviour of 96 insurance companies. The sample consists of 33 insurers from Ghana and 63 from South Africa. The panel data is between 2015 to 2019 because, in Ghana, the new recommendations on ERM were released in 2014 and became effective in 2015. The use of panel data provides a further understanding of ERM and corporate governance practices and their implications on insurers' risk-taking over time. This is essential because the benefits of ERM and CG are not always apparent right away. It is predicted that there will be a temporal lag between the implementation of ERM and the realisation of its benefits. In addition, panel data is seen to provide more reliable results because it incorporates and corrects the constraints associated with time-series data and cross-section data (Brooks, 2019). Data for insurers risk-taking and control variables were extracted from the regulators' database, the National Insurance Commission (NIC) of Ghana and the Financial Sector Conduct Authority (FSCA) of South Africa. Data on the corporate governance variables were obtained from individual insurers' corporate governance reports. A survey was used to collect information on the ERM components. The insurance industry was chosen for this study because it appears to have embraced ERM more than other industries due to the risk-bearing nature of their business operations. Also, the diversity of their business operations and the risks they face demands adequate risk management procedures. Insures undertakes two businesses simultaneously (insurance production business and the investment business). All of these involves risk. As a result, insurers undertake activities that are likely to affect their risk-taking decisions. This study conducts a separate analysis for insurers in Ghana and South Africa to control for differences that might arise from regulatory and market differences across industries. The variables used for analysis are explained below.

5.8 Dependent Variable

To measure insurers risk-taking, the study follows the approach in the literature (Alhassan & Biekpe, 2018; Adams & Buckle, 2003) by adopting the solvency ratio in the z-score. The z-score indicates the insurers' equity and profits and the standard deviations of profits. The z-score measures the distance from insolvency (Laeven & Levine, 2009; Roy, 1952). It also measures the distance to default by displaying the number of standard deviations in revenue that must fall for

equity capital to be eroded (Alhassan & Biekpe, 2019). As a result, a larger value signifies a greater distance to default and, as a result, a greater level of solvency and stability, and vice versa. The estimation for the z-score is provided below in equation (1).

$$Z - SCORE_{it} = \frac{ROA_{it} + EQR_{it}}{\sigma ROA_{it}} \quad (1)$$

Where subscript i and t represent individual insurers and time, respectively; ROA represent insurers return on asset which is measured as net profit divided by total asset; EQR represents equity ratio which is proxied as the ratio of total equity to total assets; while σROA_{it} represents the standard deviation of return on assets.

5.9 Independent Variable

5.9.1 Enterprise Risk Management Index (ERMI)

The study relied on a survey to collect data on insurers' ERM practices. The use of a survey was necessary because of inadequate information for ERM from a secondary source. In the literature, most scholars relied on keyword searches such as the Chief Risk Officer, risk committee, or Enterprise Risk Management to establish a binary proxy for ERM (Beasley et al., 2008; Hoyt & Liebenberg, 2011; Silva et al., 2019). Other scholars rely on risk governance features (Florio & Leoni, 2017; Horvey & Ankamah, 2020) and COSO ERM components (Gordon et al., 2009). Other studies created an ERM index based on the Standard and Poor's (S&P) risk management rating (McShane et al., 2011) and RIMS ERM maturity level (Farrell & Gallagher, 2015) to measure ERM sophistication. To overcome the challenges associated with simple proxies, and insufficient information on the ERM ratings within our context, a survey approach was adopted to collect ERM information from the insurance companies. A survey was necessary because it provides a comprehensive assessment of an insurers' ERM system, which addresses the measurement issues that have plagued earlier studies. The survey questions indicate whether an insurer has an ERM programme in place 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 an ERM activity and cut off in the subsequent years (Lundqvist & Vilhelmsson, 2018).

Anonymous risk experts first helped with a pilot study to ensure the reliability and accuracy of the instrument.

The study focuses on several features, which are captured into three broad categories. The first category of features relates to risk governance (RG) which specifies the direction and control of an insurers risk management system as well as the guidelines for making risk management decisions (Lundqvist, 2015; Aebi et al., 2012). This category is very important as organisations requires a well-governed system to manage their risk holistically. The risk governance features include the appointment of a CRO, 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 second category of features relates to the operating mechanism, which establishes the procedures and tools needed to implement an ERM system (Florio & Leoni, 2017). The feature for this category includes the firm's risk assessment frequency, level, and methodology, and risk management framework. The last category relates to risk oversight (RO) which reveals the quality of risk oversight provided by the committee. It also examines the characteristics of the committee designated in overseeing and managing risk (Ellul & Yerramilli, 2013). 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 aggregating the twelve individual features under each category. While previous studies (Florio & Leoni, 2017; Aebi et al., 2012; Horvey & Ankamah, 2020) adopt a composite index by summing the dummy ERM features, this study uses the Multiple Correspondence Analysis (MCA), which is more appropriate in creating an index for binary variables (Abdi & Valentin, 2007). Using MCA helps to examine the pattern of relationships among several categorical variables, thereby creating an index (Greenacre, 1991). The study merges the survey data with the financial data to examine the relationships between ERM and risk-taking between 2015-2019. Details about the ERM features have been provided in the Appendix. The study obtained ethical clearance from the Wits Ethics Committee (HREC Non-Medical) to proceed with the survey with the protocol number H20/11/22. Consent was obtained from respondents, and they were assured that the information provided would be kept confidential.

5.9.2 Corporate Governance

The study also examines corporate governance mechanisms on insurers risk-taking behaviour. These include the board size, board independence and gender diversity. Board size represents the total number of executive and non-executive directors (Sekerci & Pagach, 2019). Board independence represents the ratio of independent directors on the executive board (Wu & Li, 2015; Beasley et al., 2005), whereas Gender diversity measures the ratio of females to males on the executive board (Joeks et al., 2013; Sekerci & Pagach, 2019).

5.9.3 Control Variables

To avoid the problem of missing variables, the panel regressions include a list of control variables that manage the effect of exogenous factors. The control variables include financial leverage, firm size, investment yield and financial slack. 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 & Leoni, 2017). Firm size (SIZE) is measured as the natural log of total assets (Beasley et al., 2008; Hoyt & Liebenberg, 2011). The extent of a firm's risks is likely to be influenced by its size, as are the resources available for the ERM system (Florio & Leoni, 2017). Investment yield (INVYIELD) assess the quality of the investment portfolio. This is also measured as the ratio of investment income to total investment. Financial slack is also measured as the ratio of cash and short-term investment to total asset. While insurers with ERM may increase financial slack to lower the risk of financial distress, it is also possible that insurers may decrease their financial slack level because of improved risk management decisions (Bohnert et al., 2019; Hoyt & Liebenberg, 2011).

5.10 Empirical Strategies

The empirical analysis for this study is in two parts. First, the study examines the linear relationship between ERM, CG and insurers risk-taking behaviour. Second, the study estimates the non-linear relationship between ERM, CG and risk-taking behaviour. For this reason, the study employs two estimation techniques: a linear system GMM and a dynamic panel threshold.

5.10.1 Linear relationship

To assess the linear relationship, this study adopts the dynamic generalised method of moments (GMM) estimator proposed by (Arellano & Bond, 1991). From the econometric literature, the GMM provides more advantages than the static model. It is used in controlling endogeneity problems by exploiting the data's time series variations and controlling for unobserved group-specific effects. 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 country-specific fixed effects. Again, possible endogeneity problem is suspected between ERM and risk-taking. While ERM may influence risk-taking behaviour, insurers risk-taking decisions may influence the implementation of ERM, 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. Further, a two-step GMM is employed instead of the one-step GMM because of its ability to control heteroscedasticity and autocorrelation while capturing omitted variable problems and measurement errors (Blundell & Bond, 1998). Hence, following the models by (Alhassan & Biekpe, 2018) and modifying it, our specific model is stated as:

$$RT_{it} = \beta_1 RT_{it-1} + \beta_2 RGI_{it} + \beta_3 OMI_{it} + \beta_4 ROI_{it} + \beta_5 ERMI_{it} + \beta_6 LEV_{it} + \beta_7 INVYIELD_{it} + \beta_8 SIZE_{it} + \beta_9 SLACK_{it} + \mu_i + \partial_t + \varepsilon_{it} \quad (2)$$

$$RT_{it} = \beta_1 RT_{it-1} + \beta_2 BODSIZE_{it} + \beta_3 BODIND_{it} + \beta_4 GENDER_{it} + \beta_5 LEV_{it} + \beta_6 INVYIELD_{it} + \beta_7 SIZE_{it} + \beta_8 SLACK_{it} + \mu_i + \partial_t + \varepsilon_{it} \quad (3)$$

where RT denotes insurers risk-taking behaviour, which is measured by the z-score; RT_{it-1} represents the one-period lag of the dependent variable; RGI is the risk governance index; OMI is the operating mechanism index; ROI is the risk oversight index; ERMI is the enterprise risk management index; BODSIZE represents the board size, BODIND represents board independence; GENDER represent gender diversity; LEV represents financial leverage; INVYIELD represents investment yield; SIZE represents firm size; SLACK represents financial slack; β represents the parameters to be estimated; μ_i represents the unobserved country-specific fixed effects; ∂_t represent the time fixe-effect and ε_{it} is the idiosyncratic error term.

5.10.2 Non-linear relationship

To examine the non-linear relationship, the study adopts the dynamic panel threshold model developed by Seo and Shin (2016) and Seo et al. (2019). The general model is specified in equation (4) as:

$$y_{it} = x'_{it}\beta + (1, x'_{it})\delta 1\{q_{it} > \gamma\} + \mu_i + \varepsilon_{it} \qquad \text{i=1,…,n; t=1,…,T} \qquad (4)$$

Where q_{it} is the threshold variable and x_{it} includes the lagged dependent variable. It is assumed that T is fixed, whereas the sample size n grows to infinity. There, the fixed effect μ_i is removed through the first difference process, and then the unknown parameters are estimated using GMM. Thus $\theta = (\beta`, \delta`, \gamma)`$.

Based on the specified general model by Seo et al. (2019), the specific model for the study is stated as:

$$\text{ZSCORE}_{it} = \begin{cases} \alpha_1 \text{ZSCORE}_{it-1} + \theta_{11}\text{LEV}_{it} + \theta_{12}\text{SIZE}_{it} + \theta_{13}\text{INVYIELD}_{it} + \theta_{14}\text{SLACK}_{it} + \mu_i + \varepsilon_{it} \text{ if } q_{it} \leq \gamma \\ \alpha_1 \text{ZSCORE}_{it-1} + \theta_{21}\text{LEV}_{it} + \theta_{22}\text{SIZE}_{it} + \theta_{23}\text{INVYIELD}_{it} + \theta_{24}\text{SLACK}_{it} + \mu_i + \varepsilon_{it} \text{ if } q_{it} > \gamma \end{cases} \qquad (5)$$

For i=1,…,n; t=1,…,T

Where q_{it} is the threshold variable which includes ERM and CG features, and γ is the threshold parameter in the model.

5.11 Findings and Discussions

5.12 Descriptive Statistics

This session provides a summary of the variables used for the regression analysis. A summary of the mean, standard deviations and the range of the variables are reported in Table 5.1. Z-score, which measures insurance risk-taking behaviour, has a mean value of 9.208 and 20.558 for South Africa and Ghana samples, respectively. The table reports the mean values of the ERM index for both countries. The multiple correspondence analysis was used to construct this index. The average board size for the sample of South African insurers is about 12 members (mean=11.914). Out of this sample, 57% of the board members are independent directors, whiles only 24% are females. In the case of Ghana, board size has a mean value of 7.509 and ranges from 3.000 to 13.000. Board

independence averaged 57% of the members, whereas gender diversity has a mean ratio of 21% and ranged between 0.000 and 0.6000. The reports from both samples indicate a large gender disparity on the board of insurance companies. The average values for both cases indicate that more than half of the board members are independent directors.

In terms of the control variables, it can be seen that the South African insurance industry has a positive total asset with an average of 14.571 million South African Rand. The average value for leverage is 0.654. This explains that the South African insurers rely more on their assets to generate value than debts. The yield on investment, representing the total income on investment, has an average value of 2.446, while financial slack averaged 0.399. This shows that South African insurers are making higher yields on their investment. In the context of Ghana, it can be seen that the mean for total asset is 17.854 million Ghana cedis and range between 12.444 and 20.887. Leverage also has a mean of about 92%, indicating that insurers in Ghana depend a lot on debts to finance their business than South African insurers. The average value for financial slack is 0.277, whereas the average investment yield for Ghana is -0.544. The average explains that most insurers in Ghana are not making any profit from their investments.

Table 5 provides a report on the correlation analysis for both cases. The report indicates low correlations among the independent variables showing no presence of multicollinearity. This is further validated by the variance inflation factor (VIF) in Table 5.1. The highest VIFs for South Africa and Ghana are 1.63 and 1.50, respectively. These results are far below the VIF threshold of 10 (Ayyangar, 2007). Therefore, the variables are considered fit to be used in the regression analysis.

Table 5.2 further highlights the distribution of the ERM features over the five years. This provides some understanding of the features considered in measuring the comprehensive ERM index. Table 5.3 also provides the summary statistics of the ERM categories. Table 5.2 shows that the ERM features have been steadily increasing among insurers in both countries. It also reveals that some insurers still lack most of these features. The table indicates that risk committee is more present in both countries, with about 91% having a risk committee. The study finds that CRO appointment is present in about 76% of the sample in South Africa and 62% of the sample in Ghana. The feature

with the lowest score was the presence of the CRO on the executive board. The table records about 14% for South Africa and 7% for Ghana, indicating that most insurers do not have their CROs represented on the board. This is likely to affect the level of power and influence the CRO can have in their risk decisions.

Table 5. 1: Descriptive statistics

Variable	Obs	Mean	Std.Dev.	Min	Max	VIF
South Africa						
Dependent Variable						
Z-Score	315	9.208	20.708	-7.807	161.208	
Enterprise Risk management Index						
ERMI	315	0.000	1.002	-1.209	3.438	1.09
Corporate Governance Variables						
Board Size	315	11.914	3.870	5.000	24.000	1.35
Independent Directors	315	0.569	0.134	0.000	0.923	1.13
Gender	315	0.239	0.132	0.000	0.769	1.10
Control Variables						
Leverage	315	0.654	0.643	-2.574	9.948	1.13
Investment Yield	315	2.446	6.414	-6.694	64.101	1.03
Size	315	14.571	2.336	10.008	20.298	1.63
Slack	315	0.399	.449	0.000	6.385	1.29
Variable	**Obs**	**Mean**	**Std.Dev.**	**Min**	**Max**	
Ghana						
Dependent Variable						
Z-Score	165	20.558	24.824	-3.003	178.500	
Enterprise Risk management Index						
ERMI	165	-0.006	0.999	-1.192	3.119	1.27
Corporate Governance Variables						
Board Size	165	7.509	2.169	3.000	13.000	1.22
Independent Directors	165	0.581	0.360	0.000	4.714	1.05
Gender	165	0.214	0.121	0.000	0.600	1.12
Control Variables						
Leverage	165	0.917	1.184	-0.452	12.500	1.42
Investment Yield	165	-0.544	5.625	-63.043	6.947	1.08
Size	165	17.854	1.360	12.444	20.887	1.21
Slack	165	0.277	0.906	-3.625	8.000	1.50

Table 5. 2: Distribution of ERM Features

DISTRIBUTION OF ERM FEATURES OVER THE YEARS (2015-2019)														
South Africa														
	2015		**2016**		**2017**		**2018**		**2019**		**Freq(2015-2019)**		**%(2015-2019)**	
ERM features	0	1	0	1	0	1	0	1	0	1	0	1	0	1
CRO Appointment	17	46	16	47	14	49	14	49	14	19	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%
Ghana														
	2015		**2016**		**2017**		**2018**		**2019**		**Freq(2015-2019)**		**%(2015-2019)**	
ERM Features	0	1	0	1	0	1	0	1	0	1	0	1	0	1
CRO Appointment	18	15	16	17	12	21	8	25	8	25	62	103	37.57%	62.42%
CRO Executive	31	2	31	2	31	2	30	3	29	4	153	11	92.27%	06.67%
Risk Committee	5	28	3	30	2	31	2	31	2	31	14	151	08.48%	91.52%
Risk Appetite	10	23	8	25	5	28	4	29	4	29	31	134	18.79%	81.21%
Risk Com'te Report to Board	16	17	13	20	11	22	10	23	8	25	58	107	35.15%	64.85%
Risk Assessment Frequency	8	25	7	26	5	28	4	29	4	29	28	137	16.96%	83.03%
Risk Assessment Level	8	25	8	25	7	26	6	27	6	27	35	130	21.21%	78.79%
Risk Assessment method	14	19	12	21	8	25	7	26	7	26	48	117	36.36%	88.64%
Risk Framework	9	24	9	24	6	27	4	29	4	29	32	133	19.39%	80.61%
Active Risk Committee	9	24	9	24	8	25	7	26	6	27	39	126	23.64%	73.36%
Directors with Insurance Exp	18	15	17	16	11	22	7	26	6	27	59	106	35.76%	64.24%
CRO Expertise	19	14	15	18	11	22	7	26	7	26	59	106	35.76%	64.24%

Table 5. 3: Descriptive Statistics for ERM Categories

Variable	Obs	Mean	Std.Dev.	Min	Max
South Africa					
Enterprise Risk management Index					
RGI	315	0.000	1.001	-1.89	2.688
OMI	315	0.000	1.015	-0.740	3.703
ROI	315	0.000	1.001	-0.850	2.920
ERMI	315	0.000	1.002	-1.209	3.438
Ghana					
Enterprise Risk management Index					
RGI	165	-0.011	1.002	-1.585	2.802
OMI	165	0.000	1.003	-.911	2.72
ROI	165	0.000	1.003	-.884	1.754
ERMI	165	-0.006	0.999	-1.192	3.119

Table 5. 4: Correlation Matrix

Variables	Z-SCORE	ERMI	RGI	OMI	ROI	BODSIZE	BODIND	GENDER	LEV	INVYIELD	SIZE	LEV
South Africa												
Z-SCORE	1.000											
ERMI	0.093	1.000										
RGI	0.050	0.828	1.000									
OMI	0.132	0.608	0.240	1.000								
ROI	0.062	0.848	0.635	0.294	1.000							
BODSIZE	0.179	-0.057	-0.019	0.092	-0.138	1.000						
BODIND	0.009	-0.210	-0.177	-0.131	-0.144	0.092	1.000					
GENDER	-0.062	0.080	0.094	0.090	-0.019	0.054	0.232	1.000				
LEV	0.027	-0.001	-0.044	0.109	-0.043	-0.029	-0.066	-0.040	1.000			
INVYIELD	0.032	0.081	0.072	0.125	0.059	-0.045	-0.038	-0.102	0.014	1.000		
SIZE	0.322	-0.138	-0.168	0.062	-0.189	0.455	0.065	-0.034	0.282	-0.081	1.000	
LEV	-0.081	0.023	0.094	-0.190	0.102	-0.320	-0.059	0.020	-0.137	0.075	-0.449	1.000
Variables	**Z-SCORE**	**ERMI**	**RGI**	**OMI**	**ROI**	**BODSIZE**	**BODIND**	**GENDER**	**LEV**	**INVYIELD**	**SIZE**	**LEV**
Ghana												
Z-SCORE	1.000											
ERMI	-0.069	1.000										
RGI	-0.029	0.820	1.000									
OMI	0.034	0.770	0.471	1.000								
ROI	-0.151	0.746	0.462	0.360	1.000							
BODSIZE	0.159	-0.247	-0.174	-0.266	-0.137	1.000						
BODIND	-0.033	0.027	0.033	0.036	-0.020	0.076	1.000					
GENDER	0.072	0.125	0.076	0.152	0.157	0.163	0.112	1.000				
LEV	0.119	-0.167	-0.135	-0.087	-0.160	0.059	-0.134	-0.056	1.000			
INVYIELD	0.127	-0.184	-0.130	-0.112	-0.179	0.041	-0.066	-0.010	0.018	1.000		
SIZE	0.183	-0.306	-0.226	-0.178	-0.307	0.155	0.064	0.159	0.057	0.218	1.000	
LEV	0.154	-0.057	-0.004	-0.095	-0.014	0.291	0.028	0.127	0.489	0.033	0.133	1.000

5.13 Dynamic Panel Regression Analysis

5.13.1 The relationship between ERM and risk-taking behaviour

The system GMM estimation technique was adopted to examine the linearity between ERM, CG and risk-taking behaviour. The estimated results for both countries are reported in Table 5.5. Models 1 and 4 presents the breakdown on the impact of the ERM categories; thus, risk governance index (RG), quality of risk oversight index (QRO) and Operational mechanism index (OM) on insurance risk-taking behaviour, whereas Models 2 and 5 presents the empirical information for the overall ERM index and risk-taking. Models 3 and 6 reveals the results of the corporate governance factors on risk-taking. The assumptions regarding the use of GMM are satisfied. This is indicated by the insignificance of the AR(2) test indicating the absence of second-order autocorrelation. The Hansen test of overidentifying restrictions is statistically insignificant, showing p-values greater than 0.10, confirming the overall validity of the instruments and reliability of the regression results (Roodman, 2009). As shown in the table, the coefficients of the lagged dependent variable (Z-Score) is positive and statistically significant across all the models. This holds for the samples in South Africa and Ghana. The significance of the lagged dependent variable justifies the appropriateness of the dynamic GMM. It shows that there is strong inertia of insurance risk-taking behaviour over time, implying that the previous values of insurance risk-taking affect its current risk-taking decisions.

Regarding the individual categories for the South African sample, the index for risk oversight (RO) reveals a positive relationship with risk-taking. This relationship is statistically significant at 5%. The significant positive result indicates that the presence of a quality risk oversight level in an insurance company leads to high risk-taking decisions. Also, the index for risk governance (RG) and operating mechanism (OM) shows an inverse relationship, with OM being statistically significant at 5%. The inverse relationship shows that strong risk governance and operating mechanism systems reduces insurers risk-taking. To improve their risk-taking decisions, insurers must strengthen their risk governance and operating mechanism structures. In the case of Ghana, the operating mechanism index (OMI) show a positive relationship. In contrast, the risk governance and risk oversight indexes have a negative relationship with insurance risk-taking decisions. Each category is statistically significant at 1%, showing some consistency with the South African sample.

The overall ERM index (ERMI), which combines the features within the individual categories, are reported in Model 2 and 4 for South Africa and Ghana, respectively. The results from both countries reveal a significant positive relationship with insurers' risk-taking. The results indicate that a robust ERM system improves insurers' risk-taking decisions, which leads to high risk-taking. In other words, insurers involved in higher-risk activities must advance their ERM system to manage any adverse effects associated with higher risk-taking. This finding is in consonance with the idea that ERM does not necessarily mean lower risk-taking but reduces the cost of financial distress. Stulz (2014) argue that better risk management leads to better risk-taking; hence there is no need for management to lower their risk. Stulz (2016) further suggests that risk-taking decisions should not be made in isolation but must be assessed in relation to their impact on a firm's optimal risk. This will help create value for shareholders. Nocco and Stulz (2006) add that to achieve the purpose of ERM, management must not limit their risks but rather should limit the probability of financial distress to the level that maximises firm value. According to Iqbal and Mirakhor (2011), strong risk management techniques can help firms reduce risk exposure and improve their risk-taking decisions, which enhances financial performance. However, Ellul and Yeramilli (2013) contradict this result explaining that the implementation of ERM leads to lower risk-taking.

5.13.2 The relationship between Corporate Governance and risk-taking behaviour

In terms of the relationship between corporate governance and risk-taking behaviour, Models 3 and 6 provides empirical results for the three factors. That is board size (BODSIZE), board independence (BODIND) and gender diversity (GENDER). The finding indicates that some corporate governance factors react more rigorously to risk-taking than others in both samples. The results from the estimated models show that the relationship between board size and risk-taking behaviour is positive and statistically significant at a 5% significance level for insurers in South Africa and Ghana. The positive results show that board size leads to high risk-taking. This study concurs with other studies that find a positive relationship between board size and firm risk-taking (Adams & Jiang, 2016; Najjar, 2012). Similarly, Unchida (2011) show that board size influences firm value and risk-taking. However, the study negates the findings of Elamer et al. (2018) and McNulty et al. (2013), who report an inverse relationship between board size and risk-taking choices of firms.

Gender diversity, measured as the percentage of females on the board, reveals a negative relationship with insurers' risk-taking for both samples, with the South African sample showing statistical significance. The negative relationship implies that having females influence the board to take lower risks. The result is also consistent with the agency theory, which explains that females are risk-averse and are more likely to reduce their losses than gains, making them go for lower risk (Croson & Gneezy, 2009). This argument is supported by Chen et al. (2016), who said that the riskiness of a firm investment is likely to reduce when there are females on the executive board. Adhikari (2019) adds that women are interested in safer policies in their managerial and risk-taking decisions; as a result, the presence of women on the board may lead to lower risk-taking.

Board independence is also considered a corporate governance feature. This was proxied as the ratio of independent directors on the board. The results from both samples indicate that board independence has a negative relationship with risk-taking behaviour. While the South African sample shows an insignificant result, the Ghanaian sample is statistically significant at a 10% significance level. The positive result explains that an increased number of independent directors on the executive board leads to higher risk-taking. This contradicts the argument by Pathan (2009), who explains that independent directors want to protect their reputation hence are more likely to support less risky projects. However, this study argues that independent directors protect shareholders' interests using corporate governance principles and are more likely to have higher risk tolerance levels to increase shareholder value.

The study controlled for firm level variables that could influence insurers risk-taking behaviour. These variables include financial leverage, investment yield, firm size and financial slack. Financial leverage was negative and significant for the South African sample. Firm size is mostly significant and positive for both samples, suggesting that large firms are more likely to go for higher risk as they have enough resources to manage the cost associated with it. This supports the argument that the extent of a firm's risks is likely to be influenced by its size, as are the resources available for the ERM system (Florio & Leoni, 2017). The results for investment yield was also positive, with the Ghanaian sample showing a high level of significance. This indicates that insurers who are earning higher returns on their investment have more appetite for risky investment. Financial slack, measured as the ratio of cash and short-term investment to total assets,

shows a significant positive relationship with risk-taking. Bohnert et al. (2019) explain that financial slack helps to reduce the cost of financial distress, which in turn affects their risk-taking behaviour.

Table 5. 5: ERM, CG and Risk-Taking

	South Africa			Ghana		
VARIABLES	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Z-Score(-1)	0.329***	0.361***	0.061**	0.160***	0.115***	0.108***
	(0.030)	(0.018)	(0.031)	(0.013)	(0.012)	(0.032)
RGI	-2.241			-6.990***		
	(1.348)			(1.849)		
ROI	2.048**			-16.268***		
	(0.970)			(3.115)		
OMI	-2.854**			12.522***		
	(1.300)			(2.074)		
ERMI		3.345**			8.244***	
		(1.312)			(0.960)	
BODSIZE			0.767**			1.373**
			(0.342)			(0.554)
GENDER			-12.432*			-7.948
			(6.602)			(15.262)
BODIND			2.330			16.805*
			(5.993)			(9.244)
Lev	-10.954*	-0.960*	-0.710*	2.762	1.630	-0.698
	(6.148)	(0.540)	(0.358)	(2.790)	(1.593)	(2.103)
InvYield	0.164	-0.050	0.122*	4.081***	1.633***	0.337
	(0.103)	(0.096)	(0.072)	(0.814)	(0.150)	(0.212)
Size	4.199***	4.933***	1.846**	-2.702	2.051*	1.810
	(0.555)	(0.548)	(0.813)	(2.047)	(1.101)	(1.527)
Slack	-6.756	43.915***	2.448	23.117**	16.325***	1.274
	(4.923)	(3.960)	(4.504)	(10.673)	(5.276)	(2.099)
Constant	-43.043***	-142.961	-30.200**	0.000	-33.738*	-26.289
	(9.207)	(449.623)	(13.100)	(0.000)	(19.037)	(22.804)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	252	252	252	132	132	132
Prob>F	0.000	0.000	0.000	0.000	0.000	0.000
Number of id	63	63	63	33	33	33
AR(2)	0.709	0.814	0.789	0.169	0.147	0.311
Hansen	0.328	0.247	0.275	0.204	0.836	0.307

Note: Standard errors in parentheses; ***, **, * denotes significance level at 1%, 5% and 10% respectively. Estimations are done using xtabond2 in Stata.

5.14 Dynamic Panel Threshold Regression Analysis

5.14.1 ERM and risk-taking behaviour

This section discusses the non-linear relationship between ERM, CG and insurers risk-taking behaviour among insurers in South Africa and Ghana. The dynamic threshold was estimated using the approach by Seo et al. (2019) and Seo and Shin (2016). Tables 4.6 and 4.7 shows the estimated results based on the dynamic threshold model for the two threshold variables. Thus, ERM and corporate governance. Both tables show that the bootstrap p-value test for linearity was evaluated at 100 bootstrap replications and trimmed by the default 0.4 rates. The Tables show that the bootstrap p-value (0.000) rejects the null hypothesis of no threshold effect in all the models, confirming non-linearity in the ERM and risk-taking nexus. Hence, the samples can be split into two. The various factors are divided into upper regime/lower regime when the threshold value is greater than/less than or equal to the threshold indicator. The non-linear relationship affirms Horvey and Ankamah (2020) arguments, who asserts that there is a certain level where ERM becomes excessive in affecting firm decisions.

Table 6 presents the threshold result of the ERM index (ERMI) and the individual categories: risk governance index (RG), operating mechanism index (OMI) and risk oversight index (ROI) for insurers in South Africa and Ghana. The indexes were measured using the multiple correspondence analysis (MCA) due to the binary nature of the ERM features. Insurers with values below the threshold indicator are classified as having a weak risk management system, and those above the threshold indicator are classified as having a strong risk management system. The results from Table 6 shows the existence of a threshold model for ERMI and the individual categories. This is based on the significance of the p-values of the linearity test and the threshold indicators. The significance of the lagged dependent variable confirms the dynamism of risk-taking.

According to the South African sample results, the coefficient estimates for the threshold variables in the lower regime are negative and significant. This indicates their reduction effect on risk-taking at lower levels. In the upper regime, the coefficient estimate for ERM is positive and statistically significant. This indicates that insurers with a strong ERM system take higher risks when ERM is above the threshold level. The argument also holds for the individual risk categories based on their positive and significant results, showing that each category is vital for implementing an ERM

system, and their robustness plays a crucial role in enhancing insurers risk-taking decisions. The findings suggest that there exists a certain threshold level at which ERM must attain before it could enhance risk-taking. The result also implies that firms with a strong risk management system have a great appetite for risk because a robust risk management system helps firms manage any sophistication and adverse effects associated with risk-taking. The findings are consistent with both theoretical and empirical arguments. Mikes and Kaplan (2012) elucidate that risk management does not necessarily mean lower risk-taking as this prevents the company from taking valuable projects which may enhance firm value. This supports the theory of corporate risk management, which explains that ERM helps in the risk management activities of a firm and reduces the cost of financial distress (Mangram, 2013; Markowitz, 1952). Sobel et al. (2004) state that risk-taking plays a major role in the success of every business as there is no reward without risk decisions. Hence, some risks can be exploited for the opportunities they present us. Stulz (2014) adds that a strong risk management system makes it less likely for businesses to miss their target which is associated with high risk-taking.

In contrast to the South African sample, the ERMI results for Ghana show a negative relationship with risk-taking in the upper regime, indicating that an improved ERM system (ERMI) leads to lower risk-taking, but this was statistically insignificant. The differences in this finding may be attributed to the diverse strength of the ERM system for both countries. Furthermore, the result for Ghana shows that when ERM increases but stays below the threshold level, it exerts a significant positive impact on risk-taking. It also implies that insurers with a weak risk management system, thus below the threshold level, are more likely to accept higher risks. This phenomenon is possible when insurers risk-taking decisions are influenced by their risk culture but not the risk management system. This concurs with Ellul and Yerramilli (2013), who posits that firms with a weak risk management system sometimes go for higher risks because they may have an aggressive risk culture that is embedded in their business model. In that case, their risk culture determines the choice of their risk. The findings further reveal that a strong risk governance and operating mechanism system increases insurers risk-taking. The significant positive result confirms this in the upper regime. Stulz (2014) affirms this result that good risk governance does not mean taking less risk. Rather, it helps the firm to take the right amount of risk for its shareholders. While these categories confirm similarities with the South African result, risk oversight shows an inverse

relationship above the threshold, negating the findings in South Africa. This shows that an improved risk oversight level leads to lower risk-taking decisions in Ghana. This relates with Ellul and Yerramilli (2013) results, who find that the quality of risk oversight lowers aggregate risk among US bank-holding companies. The study suggests that the ERM categories must not be implemented in isolation as they are not independent of each other.

Table 5. 6: Threshold Model on the Effect of Enterprise Risk Management on Risk-Taking

	South Africa				Ghana			
VARIABLES	RGI	OMI	ROI	ERMI	RGI	OMI	ROI	ERMI
Lower Regime								
Z-Score(-1)	-0.196***	-0.254***	-0.169***	-0.327***	0.314*	-0.334***	-0.302***	-0.308***
	(0.0232)	(0.0305)	(0.00746)	(0.0176)	(0.171)	(0.0997)	(0.0623)	(0.0461)
Size	-12.03***	0.974	0.0125	-2.103***	5.686**	11.79**	2.721	4.182
	(3.405)	(0.670)	(0.296)	(0.608)	(2.575)	(4.714)	(2.397)	(2.877)
Lev	-4.223***	-0.894	-1.300***	-0.710***	-6.232	-3.775	-1.643	-4.103**
	(1.182)	(2.137)	(0.298)	(0.169)	(7.741)	(2.323)	(1.534)	(1.736)
Inv_Yield	2.540***	0.662***	-0.201***	0.740*	0.437	-0.649	-2.079***	-0.124
	(0.666)	(0.195)	(0.0703)	(0.399)	(0.271)	(0.756)	(0.595)	(0.346)
Slack	14.54**	0.897	2.952**	-21.21***	4.175	5.408	3.814**	4.565*
	(6.179)	(1.553)	(1.385)	(5.991)	(4.372)	(5.597)	(1.909)	(2.695)
Threshold Variables	-19.33**	-8.073	-7.944***	-17.10***	26.90	5.324	17.54***	9.558**
	(9.702)	(9.045)	(1.252)	(2.605)	(16.49)	(12.88)	(6.791)	(4.454)
Constant	-264.5***	48.65**	-43.79	-98.99**	-288.8*	-131.7	214.3**	732.8***
	(45.91)	(20.68)	(49.70)	(38.69)	(159.8)	(254.5)	(89.25)	(178.5)
Upper Regime								
Z-Score(-1)	0.359***	0.345***	0.373***	0.513***	-0.623***	1.405***	0.667***	2.499***
	(0.0239)	(0.0145)	(0.0125)	(0.0173)	(0.175)	(0.288)	(0.191)	(0.603)
Size	17.96***	-3.587***	3.775	7.737***	7.357	-0.0130	-12.64**	-41.27***
	(3.076)	(1.076)	(3.454)	(2.788)	(8.481)	(12.72)	(5.490)	(8.944)
Lev	-3.666	-0.311	23.62***	-3.083	72.26***	-7.813	20.39**	35.97***
	(4.026)	(2.263)	(8.458)	(9.038)	(14.50)	(12.10)	(8.542)	(13.61)
Inv_Yield	-2.572***	-0.556*	0.225**	-0.777*	-0.513	8.781***	0.573	14.04***
	(0.670)	(0.285)	(0.0875)	(0.419)	(3.592)	(2.002)	(0.636)	(2.548)
Slack	-13.04**	-21.78***	-2.778*	18.78***	-14.61	-142.7***	-12.17	5.775
	(6.145)	(8.014)	(1.479)	(6.513)	(43.68)	(34.96)	(11.30)	(11.23)
Threshold Variables	20.59**	15.75*	7.619***	15.37***	72.63*	97.62***	-39.80***	-26.37
	(9.486)	(9.545)	(2.277)	(2.673)	(42.07)	(18.99)	(7.205)	(28.28)
Threshold Indicator	-0.421***	0.0409	0.358***	0.453***	0.298	0.654***	0.201	0.822***
	(0.0921)	(0.245)	(0.103)	(0.127)	(0.467)	(0.199)	(0.308)	(0.0606)
Linearity (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
No. of Obs	63	63	63	33	33	33	33	33

Note: Standard errors in parentheses; ***, **, * denotes significance level at 1%, 5% and 10% respectively.

5.14.2 Corporate Governance and risk-taking behaviour

The threshold dynamics for the corporate governance variables for insurers from South Africa and Ghana are presented in Table 5.7. The threshold variables are board size (BODSIZE), gender diversity (FEMRATIO), and board independence (BODIND), whereas Z-Score is the dependent variable. The linearity test (p-values) indicates an overall significant non-linear relationship for the two countries, employing a bootstrap procedure with 100 replications. Therefore, the study rejects the null hypothesis of no threshold effects because the threshold indicator and linearity test are significant at 1%.

The threshold values for insurers in South Africa are 10.03, 0.274 and 0.547 for board size, gender diversity and board independence, respectively. This indicates how low these factors should be in order to improve insurers corporate governance structures. The lower regime's estimated corporate governance threshold variables contain observations for weak corporate governance structures and vice-versa. The empirical results for the threshold variables in the upper regime show an insignificant effect on risk-taking for the South African insurers, suggesting that they do not affect risk-taking, while in the lower regime, the coefficient estimates for the threshold variables are statistically significant. More specifically, board size and board independence reveal a significant positive relationship with risk-taking in the lower regime. This suggests that insurers with smaller board sizes and board independence promotes higher risk-taking. This is because small board sizes are sensitive to higher pay to performance and are more likely to go for riskier investments (Huang & Wang, 2014). The study lends support to the argument that smaller boards have less communication and coordination issues which makes them more efficient in their risk-taking decisions (Pathan & Faff, 2013; Jensen,1993). The significant negative result for independent directors' supports the view that independent directors set policies that increases firm risk-taking (Bradley & Chen, 2015). The significant negative coefficient for gender diversity in the lower regime confirms that females are naturally risk-averse and are more likely to go for lower risks (Adhikari, 2019).

Also, in Ghana, the threshold values for board size, gender diversity and board independence are 7, 0.286 and 0.692, respectively. The threshold level is relatively compatible with the NIC regulation in 2015, which states that insurers should have at least seven board members, and at

least one-third must be independent directors (NIC, 2015). This study, therefore, justifies the threshold level given by the NIC. The results indicate that insurers in Ghana must achieve these threshold levels to enhance their corporate governance system. Gender diversity and board independence indicate significant results in the upper regime. This means that board independence and gender diversity exerts a statistically significant effect on risk-taking when they fall above the threshold level. More so, above the threshold level, gender diversity and board size reveal a negative relationship, which is similar to findings from the South African sample. The negative relationship means that at higher levels, large board size and female ratios lead to lower risk-taking. This supports the notion that large board sizes face the challenge of reaching a consensus on important issues, which may encourage them in going for lower risk-taking (Cheng, 2008). The agency theory also explains that large board sizes lead to poor coordination and communication problems, hence resort to lower risk (Jensen & Meckling, 1976). This diverges from the argument that large board size brings diversities which improves their risk-taking decisions (Dalton et al., 1999). The negative result for gender diversity supports the persistency of the risk-aversion nature of females (Croson & Gneezy, 2009). It also supports the empirical results by Dong et al. (2017), who found an inverse relationship between the proportion of female directors and traditional banking risk. In addition, the threshold result for board independence is positive in the upper regime and negative in the lower regime. The evidence suggests that the board is riskier when there are more independent directors on the executive board. This finding supports the argument that independent directors with high competence and improved qualifications suggest to shareholders that firms risk-taking reflects management choices (Clarke, 2007).

Table 5. 7: Threshold Model on the Effect of Corporate Governance on Risk-Taking

	South Africa			Ghana		
VARIABLES	BODSIZE	FEMRATIO	BODIND	BODSIZE	GENDER	BODIND
Lower Regime						
Z-Score(-1)	0.236***	-0.123***	-0.239***	-0.0842**	-0.162***	-0.321***
	(0.0769)	(0.0469)	(0.0608)	(0.0327)	(0.0225)	(0.119)
Size	-0.612	-8.466***	-3.259***	8.224*	4.651*	2.215
	(1.065)	(1.692)	(1.076)	(4.327)	(2.708)	(3.494)
Lev	-1.314***	27.00***	-1.539	-1.348	22.89***	2.538
	(0.470)	(10.02)	(0.955)	(1.840)	(4.145)	(1.967)
Inv_Yield	0.154	-0.0107	-0.00979	-3.232	-0.631***	-1.305

	(0.0986)	(0.0191)	(0.0597)	(2.224)	(0.184)	(1.537)
Slack	-7.523***	4.020	-3.192**	0.322	36.57***	8.892**
	(2.661)	(5.443)	(1.396)	(2.831)	(6.474)	(4.253)
Threshold Variable	0.843***	-40.43**	7.164**	-0.143	13.58	-141.6***
	(0.289)	(16.44)	(3.138)	(1.342)	(21.05)	(40.23)
Constant	20.55**	7.733	-54.18***	189.6***	178.3	-351.5***
	(10.09)	(34.44)	(13.98)	(72.52)	(116.7)	(125.1)
Upper Regime						
Z-Score(-1)	-0.604***	0.0257	0.454***	-0.186**	0.146	-0.693**
	(0.0625)	(0.0472)	(0.0376)	(0.0739)	(0.117)	(0.342)
Size	-2.159**	2.985	4.814***	-10.44***	-6.088	13.55*
	(0.976)	(2.165)	(1.010)	(3.945)	(5.294)	(7.028)
Lev	13.14***	-27.98***	-6.046	9.116**	-28.43***	13.67
	(2.635)	(9.196)	(8.335)	(3.687)	(6.293)	(26.92)
Inv_Yield	-0.0641	-0.0438	0.261**	3.345	0.796	8.880***
	(0.160)	(0.136)	(0.116)	(2.471)	(0.924)	(2.766)
Slack	6.907**	-51.77***	-0.778	-12.39***	-39.20***	54.79***
	(2.862)	(15.11)	(5.610)	(4.494)	(10.77)	(13.83)
Threshold Variable	-0.616	15.95	-14.00	-0.778	-182.8*	153.6***
	(0.449)	(37.85)	(11.18)	(1.865)	(105.0)	(36.75)
Threshold Indicator	10.03***	0.274***	0.547***	7***	0.286***	0.692***
	(0.416)	(0.0272)	(0.0423)	(0.433)	(0.0182)	(0.118)
Linearity Test(p-value)	0.000	0.000	0.000	0.000	0.000	0.000
No. of Obs	63	63	63	33	33	33

Note: Standard errors in parentheses; ***, **, * denotes significance level at 1%, 5% and 10% respectively.

5.15 Robustness Check

A set of conventional econometric methods and procedures were followed to ensure the dataset's consistency, reliability, robustness, and efficiency. First, the study sought for outliers by examining the descriptive statistics. No potential outlier was found. Second, multicollinearity was checked by observing the correlation table. The table reveals no presence of multicollinearity. This is further validated by the variance inflation factor, as shown in Table 5.1, which is far below the threshold of 10 (Ayyangar, 2007). The Generalised Method of Moments estimation technique was adopted to deal with endogeneity problems (Arellano & Bond, 1991). This is due to the inclusion of the lagged dependent variable, which is considered to be endogenous. Given the choice of one lag length, the AR(2) specification test result was statistically insignificant, revealing that the model does not suffer from second-order serial correlation. The Hansen Test of overidentifying conditions also had insignificant p-values, providing evidence of the validity and reliability of the

regression outputs. Again, the empirical results from both samples reveal some level of consistency. As a result, well-informed inferences can be made from our findings.

5.16 Conclusion

While ERM has gained considerable attention in the literature, the nexus between ERM, CG and risk-taking is still apparent. This chapter sought to examine the linearity and non-linearity between ERM, CG and risk-taking behaviour on a panel of 63 and 33 insurers from South Africa and Ghana, respectively. This is based on the notion that there is a threshold level where these factors either exacerbate or reduce insurers' risk-taking choices. Z-score was used as a proxy for risk-taking, and a comprehensive ERM index was developed based on risk governance, operating mechanism and risk oversight categories. The sample period is between 2015-2019. The empirical relationships were analysed using the Generalised Method of Moments (GMM) estimation technique to control for endogeneity that might arise from the inclusion of the lagged dependent variable. Year dummies were included to control the year effects to arrive at a robust result. The significance of the lagged dependent variable across all the models justifies the choice of the dynamic model. It also shows that there is a strong inertia of insurance risk-taking behaviour over time, implying that the previous values of insurance risk-taking affect its current risk-taking decisions.

The empirical results from the linear system GMM suggest diverse impacts between the ERM categories (that is, risk governance, operating mechanism and risk oversight) and risk-taking. The study reveals a negative relationship between risk governance and insurers risk-taking, with the Ghanaian sample being statistically significant. It is also observed that risk oversight and operating mechanism significantly impact risk-taking, with both samples showing different directions. In terms of the relationship between ERM and risk-taking, the study finds consistency in the ERM results for both countries. The results indicate that a significant positive relationship exists between ERM and insurers risk-taking decisions. The study, therefore, concludes that insurers with a strong risk management system undertake higher risks.

The results elicit another interesting finding from the corporate governance variables. The estimated result shows a significant positive relationship between board size and risk-taking at 5%

for the South African and Ghanaian insurers. This suggests that insurers with a strong board system have a strong predisposition for risks due to their knowledge and competence. Further, the study reveals an inverse relationship between gender diversity and risk-taking for both countries, with the South Africa sample being statistically significant. The results imply that having females on the board leads to lower riskier policy choices. This concurs with the agency theory predicting that females are more risk-averse in their risk-taking decisions. The study finds that board independence positively impacts risk-taking, with a 10% significance level for the Ghanaian sample.

Regarding the non-linear relationships, the study adopts the dynamic panel threshold developed by Seo and Shin (2016) and Seo et al. (2019). The empirical evidence suggests a non-linear relationship between ERM and risk-taking. This is supported by the bootstrap p-value (0.000), which rejects the null hypothesis of no threshold effect in all the models, implying a significant threshold effect for both countries. This is further supported by the threshold indicator, which is statistically significant in all the models. In the case of South Africa, the study finds that beyond the threshold level, ERM significantly increases insurers risk-taking. The Ghanaian sample reveals an insignificant impact above the threshold level. The ERM categories for insurers in South Africa have a significant negative effect below the threshold level. This shows their reduction effect on risk-taking at lower levels. At higher levels, risk governance and operating mechanism reveal a positive impact on risk-taking in both cases.

The threshold effects for board size, board independence and gender diversity are also examined in this study. The study again confirms a non-linear relationship between ERM and insurers risk-taking. This is also consistent for both samples. For South Africa, the findings suggest a threshold level for board size, gender diversity and board independence at 10.03, 0.274 and 0.547, respectively. The threshold levels are statistically significant at 1%. Below the threshold level, board size and board independence showed a positive impact, while gender diversity showed a negative impact. All of these variables were statistically significant. For the Ghanaian insurance industry, the threshold levels for board size, gender diversity and board independence are 7, 0.286 and 0.692, respectively, justifying the threshold level by the NIC. Board independence showed a significant result for values below and above the threshold. The threshold levels vary between

these countries. The study argues that differences in regulatory policies and corporate governance structures might have accounted for this difference.

5.17 Recommendations

Following the findings from this chapter, the following recommendations are made. First, the significant positive relationship between ERM and risk-taking suggests that an improved risk management system leads to better risk-taking. Hence insurers must not lower their risk but ensure the robustness of their ERM system to increase shareholders value. Second, insurers should not treat the ERM categories in isolation as they are not independent of each other. Their combined effect helps to reduce the cost associated with risk-taking. Evidence provided in this study shows that there are several opportunities for ERM implementation. Therefore, insurance companies that want to maximise profits must strictly adhere to the ERM principles to safeguard their risk-taking decisions. This can be achieved by employing the necessary resources needed for ERM implementation. Third, insurers need a strong corporate governance system to enable a proper understanding of their risk-taking choices. To achieve this, regulators and investors are advised to consider the significant threshold levels to determine the optimum level of risk that must be pursued.

5.18 Limitations and Future Studies

This study contributes to the extant literature by investigating the linearity and non-linearity between ERM, CG, and insurers' risk-taking behaviours. Despite its contributions, the study provides avenues for further research in several ways. First, while this study was limited to the insurance industry in Ghana and South Africa, future research may extend it to other countries within sub-Saharan Africa (SSA). Another avenue is to consider other proxies for insurance risk-taking, such as underwriting risk, which was not considered in this study. In addition, future studies could improve on this study by considering other corporate governance factors such as CEO duality and the number of board meetings. More so, researchers are advised to explore how reinsurance, regulation and competition affect insurers risk-taking. As ERM continue to evolve, further research is needed to check the robustness of the ERM index in other contexts. This will enhance our understanding of the ERM procedures and tools needed to achieve the overall benefits.

CHAPTER SIX
SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

6.1 Introduction

This final chapter provides a summary and concludes the study. Policy recommendations are proffered, and key areas for further research are provided.

6.2 Summary and Conclusions

This study investigates the linkages between enterprise risk management, corporate governance, performance and risk-taking among insurers in Ghana and South Africa. This is necessitated by the fact that the insurance industry operates within a complex and uncertain environment, which requires them to cope with new risks, innovate and make substantial commitments. Against this backdrop, many interventions have been put in place to make insurers resilient against unforeseen mishappenings. One of these is the implementation of a robust risk management system and improving corporate governance structures. Despite the growing literature on ERM, empirical investigation within the African context remains egregiously limited. The study, therefore, focused on different strands, which have not seen much attention in the literature.

Therefore, this study seeks to answer the following research questions:

i. What are the determinants of ERM adoption among insurers in Ghana and South Africa?
ii. What is the impact of ERM on insurers' performance in Ghana and South Africa? Does corporate governance moderate the ERM-performance relationship in Ghana and South Africa?
iii. Does a linear and non-linear relationship exist between ERM, corporate governance, and insurers' risk-taking behaviour in Ghana and South Africa?

6.2.1 The measurement and performance of ERM

The first objective sought to provide a systematic literature review of ERM. It discusses the various measurements and the impact of ERM on performance. The systematic literature review spanned between 2001-2020. Results from the literature review revealed no uniform approach to ERM measurement as scholars rely on different proxies. Due to the difficulty in assessing ERM

information, most scholars rely on a simple proxy, thus the appointment of the Chief Risk Officer to measure ERM. Regarding the impact of ERM on performance, the literature revealed mixed findings. While some found an inverse relationship, others assert that ERM has no influence on firm performance. Generally, there is enough evidence to support the assertion that ERM enhances firm profitability and value. The study further found that an advanced level of ERM implementation significantly improves firm performance.

6.2.2 Determinants of ERM adoption

The study employed the logistic panel regression technique to examine the various factors that determine ERM adoption among insurers in Ghana and South Africa. The findings first reveal that about 76% of the insurers in South Africa are engaged in ERM adoption. In comparison, 59% have adopted ERM in Ghana. This is true as the South African insurance industry is highly developed and is more likely to face higher complexities that require the implementation of ERM amid the uncertainties than in Ghana. The empirical findings suggest that firm size and leverage are positively associated with ERM adoption in both countries. The findings are also consistent for industrial diversification and the type of audit firm. The study reveals that both sets of factors are positive and significant determinants of ERM adoption among insurers in Ghana and South Africa. In addition, ownership structure shows a positive relationship, but this was only significant in the South African case. Further findings disclose that profitability and life insurers have a significant and inverse relationship for insurers in South Africa. Again, our findings suggest that the initial levels of size, profitability and leverage reduce ERM adoption. At the same time, an extreme increase in these factors promotes ERM adoption, which implies a nonlinear direct U-shape relationship, indicating the enhancing effect of size, profitability, and leverage on ERM adoption. These relationships were significant at all quantile levels. On the contrary, the study sees a significant inverted U-shape relationship for return on assets and leverage from the Ghanaian sample. The results further show that industrial diversification, Big4 audit companies and ownership show consistent patterns of a significant positive effect on ERM adoption at different quantiles for both samples, whiles life insurers showed diverse relationships for both samples.

6.2.3 The moderating role of corporate governance on the ERM-Performance nexus

This objective assessed the impact of ERM on insurance performance. Further, it investigated whether the impact of ERM on performance is conditioned on corporate governance (that is, the board size, board independence and gender diversity). Two measures of performance were considered in this case, thus underwriting performance and return on assets. The empirical results showed consistency in the ERM-performance relationship for insurers in Ghana and South Africa. The study revealed that ERM has a positive impact on both underwriting performance and return on assets. The positive result affirms the agency theory, which stresses that risk management lines up the interest of shareholders and managers to increase organisational performance. Therefore, insurers who want to avoid agency problems must implement ERM since it avoids the agency problem of corporate risk management and ensures that managers implement risk management activities in the best interests of the company's investors. For South Africa, the findings also revealed that board size, board independence and gender diversity moderate the relationship between ERM and underwriting performance. These relationships were positive and statistically significant. In addition, board independence showed a significant positive interaction effect on ERM in affecting insurers return on assets. The results show that corporate governance enhances the impact of ERM on performance. In the case of Ghana, the study reveals that board independence showed a significant adverse effect on the ERM-performance relationship. Board size and gender diversity showed a significant positive interaction effect on insurance performance. The positive net effect further evinces that board size, board independence and gender diversity enhance the impact of ERM on insurance performance. The result from the interaction terms supports the contingency theory of risk management, which suggests that firms must consider contextual factors to ensure the successful implementation of ERM. Given the findings of this study, it is suggested that insurers must ensure the proper integration of corporate governance factors and ERM to improve its efficiency in enhancing performance.

6.2.4 The threshold dynamics between ERM, corporate governance and risk-taking

The study examined whether a linear or non-linear relationship exists between ERM, corporate governance and risk-taking behaviour. Using the two-step system generalised method of moments, the linear regression elicits a significant positive relationship between ERM and risk-taking for both countries, implying that insurers with a strong ERM system are more likely to pursue higher

risks. The empirical evidence also suggests that board size significantly impacts risk-taking for both samples, while gender diversity shows an inverse relationship with risk-taking. Board independence is also positively related to risk-taking, with the Ghanaian sample showing statistical significance. The results from the dynamic threshold estimation for South Africa indicate that, in almost all the threshold variables, below the estimated threshold level, ERM and its categories (that is, risk governance, operating mechanism and risk oversight) exhibit a significant negative impact on insurers risk-taking. Above the threshold level, ERM exhibit a significant positive effect on risk-taking. This explains that ERM has a reduction effect on insurers risk-taking behaviour at lower levels, but as ERM implementation advances, its impact on risk-taking increases. Conversely, the results from Ghana suggest a significant positive relationship between ERM and risk-taking below the threshold level. Beyond the threshold, ERM revealed an inverse relationship, but this was statistically insignificant. The risk governance and operating mechanism result recorded a positive and significant relationship, showing consistency with the South African data. The conclusion is that the implementation of ERM at higher levels enhances the risk-taking behaviour of insurance companies.

Regarding the corporate governance factors, the empirical findings from South Africa showed that board size, board independence and gender diversity have a significant impact on insurers risk-taking below the threshold level. Again, the South African sample shows significant threshold levels for board size, gender diversity and board independence at 10.03, 0.274 and 0.547, respectively, while the Ghanaian sample also documents significant threshold levels at 7, 0.286, and 0.692 for board size, gender diversity, and board independence, respectively. This suggests that insurers must consider the significant threshold levels to determine the optimum level of risk that must be pursued.

6.3 Policy Implications and Recommendations

In an attempt to improve risk management activities, insurers in Ghana and South Africa are resorting to a robust risk management technique. The insurance sector operates in a complicated and uncertain environment that demands it deal with new risks and make significant investments. ERM provides a proactive and holistic approach to managing risk within an entire organisation. The findings from this study have useful managerial and policy implications. First, the results from

the literature review reveal consistency in the ERM results, suggesting that ERM enhances firm performance. This paper recommends that financial and non-financial firms consider adopting ERM as it is likely to improve performance and value. More so, firms should consider advancing their ERM system as a higher level of ERM implementation was seen to significantly influence performance.

Second, the findings in chapter three also have some implications. The empirical results reveal that several factors determine ERM adoption among insurers in Ghana and South Africa. The findings suggest that the risk management activities of insurers can be improved by considering the factors that significantly affect them. Insurers that depend on debts to finance their business should consider adopting ERM to reduce the cost of financial distress. The study further found that profitability has a significant negative impact on ERM adoption; therefore, less profitable insurers are encouraged to adopt ERM to enhance their performance. This is because the adoption of ERM helps to manage the complexities and the cost of financial distress associated with these factors. Policymakers should note that larger firm size, profitability, and leverage levels promote ERM adoption. Insurers must note that the factors that influence ERM adoption do not operate differently; hence, a comprehensive assessment of these factors could provide useful information on how to manage them. The findings of this study align with the institutional and contingency theory of ERM, which explains that a variety of factors influence insurers' decision to implement an ERM. Hence, insurers who want to achieve the best from ERM adoption must consider the environmental parameters due to their significant influence on how ERM is implemented.

The fourth chapter provides information that will help policymakers develop suitable ERM guidelines for insurers in Ghana and South Africa. The insurance industry regulators must highlight the practice of enterprise risk management because of its positive impact on performance. Insurers who want to enhance their performance should consider ERM a tool that gives them a competitive edge and helps them fulfil their business goals and not only as a statutory requirement. To ensure the effectiveness of ERM implementation, insurers must take into account its categories such as risk governance, risk oversight and their operating mechanisms. Another crucial finding was that corporate governance (board size, board independence, gender diversity) enhances the impact of ERM on performance. Therefore, the study suggests that insurers must improve their

corporate governance system due to their moderating influence on the ERM-performance relationship. The finding also serves as a guide to the board of directors. This is rightly so because the characteristics of the board influence their risk decisions. The board sets the pace for risk management and must provide oversight responsibilities and resources for implementing ERM.

The fifth chapter shows that ERM and risk-taking have a significant positive relationship, indicating that a better risk management system leads to better risk-taking. As a result, to maximise shareholder value, insurers must not reduce their risk-taking activities but maintain the resilience of their ERM system to improve their risk-taking decisions. Another important finding that was documented was the impact of corporate governance on risk-taking. For South Africa, the study revealed that board size, board independence and gender diversity significantly influence risk-taking. It is therefore recommended that the board of directors must strengthen their supervision and oversight roles for effective risk-taking decisions. In line with the agency theory, insurance companies should ensure that females are well represented on the board. This is due to their risk-averse nature, which ensures the implementation of safer policies and improved risk-taking decisions. Insurers are recommended to increase the number of independent directors to provide effective monitoring. This will reduce the agency conflicts between managers and shareholders. Insurers require a strong corporate governance system to comprehend their risk-taking decisions fully. To do this, regulators and investors should think about major threshold levels when determining the best level of risk to pursue. There is also the need for continuous assessment to understand the optimal number of risks that need to be taken. Regarding the threshold effect of ERM on risk-taking, insurers need to improve their ERM system as advanced ERM enhances their risk-taking decisions.

6.4 Recommendations for further research

The findings and conclusions from this study call for further research effort. First, further studies on the empirical measurement of ERM should rely on both primary and secondary data as they complement each other. This will provide a detailed understanding of the various factors considered for ERM implementation. The study suggests that scholars consider examining the ERM-performance relationship in emerging economies as most of these studies centred on the US and European economies.

Third future research should look into other determinant factors such as firm culture, board characteristics, the structure of the existing risk management function, and economics. Furthermore, the proxy for ownership was based on yes or no responses; future research may employ more robust indicators such as the percentage of shares owned by foreigners. According to Golshan and Rashid (2012), the approach to gauging industrial diversification can be enhanced by taking into account the number of business categories a company has. Further analysis is needed to understand the nonlinear relationship, and at what threshold levels these factors influence ERM adoption.

Fourth, other moderating factors should be considered by looking at the Environmental, Social, and Governance (ESG) rules, as ERM is strongly tied to these standards. Other aspects of corporate governance, such as CEO duality, ownership, board meetings, and board diversity, will be fascinating to study. This will give us a better idea of how other corporate governance elements influence the ERM-performance link. Scholars should concentrate on more robust estimating techniques, such as dynamic models, which have the ability to compensate for endogeneity while expanding the sample size.

Fifth, another avenue is to look at other risk-taking proxies, such as underwriting risk, which was not considered in this study. Future research could also improve this study by taking into account additional corporate governance factors such as CEO duality and the number of board meetings. Researchers should investigate how reinsurance, regulation, and competition influence insurance risk-taking. Further study is needed to assess the robustness of the ERM index in additional scenarios as ERM evolves. This will help us better understand the ERM procedures and tools required to attain the desired results. Finally, while the scope of this research was limited to the insurance industries in Ghana and South Africa, future research could expand it to other countries in sub-Saharan Africa (SSA). In addition, these relationships could further be explored for the COVID-19 period in order to determine the differences in the behaviour before and during the COVID-19 pandemic.

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Appendix: QUESTIONNAIRE

Background Information:

Please take a few minutes to complete this questionnaire. The data collected is solely used for academic purposes and industry-wide analysis. Your specific answer will be completely confidential and anonymous, but your views, in combination with those of others, are extremely important to measure enterprise risk management (ERM) implementation of insurance firms.

Directions: Tick, Mark, or write the most appropriate response

SECTION ONE: ORGANISATIONS PROFILE

1. Firm's name: ……
2. Line of business: [ ] Life/long term [ ] Non-Life/Short term
3. Ownership: [ ] Foreign [ ] Local

SECTION TWO: ENTERPRISE RISK MANAGEMENT PRACTICES

1. Does your organisation have an Enterprise Risk Management (ERM) process in place?
   [ ] Yes
   [ ] No, but considering adoption in the short term (one to three years)
   [ ] No, and not considering

2. If Yes to q1, in which year did your organisation adopt Enterprise Risk Management? ……..

3. If Yes to q1, what is your primary motivation for adopting Enterprise Risk Management? **(Tick as many as apply)**
   [ ] Corporate governance pressures
   [ ] Good business practice
   [ ] Competitive advantage
   [ ] Regulatory pressure
   [ ] Reputational cost
   [ ] Investment community pressure
   [ ] Recent Global financial crises
   [ ] Strong risk management system
   [ ] Others (please specify).....

4. If No to q1, why has the organisation not adopted Enterprise Risk Management?
   [ ] It is not necessary [ ] High cost of adoption
   [ ] Low staff capacity [ ] Industry regulation
   [ ] Low risk profile of industry

5. Does your organisation have an independent risk management department/committee?
   [ ] Yes [ ] No

6. If Yes, when was this department/committee created?
   [ ] between 1 – 3 years [ ] between 4 – 6 years [ ] 7 years and above

7. Does the risk committee report to the executive board?
   Yes [ ] No [ ]
   If No, please specify: …….

8. What is the reporting frequency of the risk committee to the executive board?
   [ ] Monthly [ ] Quarterly [ ] Semi-annually [ ] Bi-annually

9. Does the institution have policies that define its risk appetite?
   Yes [ ] No [ ]

10. The responsibility for risk management is documented?
    Yes [ ] No [ ]
11. Does the institution have a Risk Management Plan?
    Yes [ ] No [ ]

12. Does your institution have Risk Management Framework (RMF**)?**
    Yes [ ] No [ ]
    If Yes, please specify the framework: ……

13. The Risk Committee is made up of at least 3 non-executive directors (one of whom is the chairman of the audit committee).
    [ ] Yes [ ] No

14. Does any of the independent directors on the risk committee have a prior experience in the insurance industry?
    [ ] Yes [ ] No

15. The risk management governance structure of your institution includes the following:
    (Tick as many as apply)
    [ ] Board of Directors;
    [ ] Board Risk Committee;
    [ ] Board Audit Committee;
    [ ] Senior/Executive Management;
    [ ] Chief Risk Officer;
    [ ] Chief Internal Auditor;
    [ ] Compliance Officer;
    [ ] Operational Management

16. How many times does the risk committee meet in a year?
    [ ] Monthly [ ] Quarterly [ ] Semi-annually [ ] Bi-annually

17. How often are the risk assessment procedures in the manuals and programmes reviewed by your institution? [ ] Monthly [ ] Quarterly [ ] Semi-annually [ ] Bi-annually

18. At what level does the institution conducts its risk assessment procedures?
    [ ] Lower level [ ] Functional level
    [ ] Top level [ ] Across all levels

19. What method/approach to risk assessment is adopted by the institution?
    [ ] Qualitative
    [ ] Quantitative
    [ ] Both

SECTION THREE: RISK MANAGERS PROFILE

20. Has your institution appointed a Chief Risk Officer (CRO) as the head of risk management?
    Yes [ ] No [ ]
21. If Yes to q19, when was the first CRO appointed?
    [ ] between 1 – 3 years
    [ ] between 4 – 6 years
    [ ] 7 years and above

22. If No to q19, what is the official title of the head of Risk Management? ……

23. Is the CRO a member of the executive board?

    Yes [ ] No [ ]

24. Is the CRO among the top 5 paid employees in the organisation?
    Yes [ ] No [ ]

25. Who does the head of risk management report to?
    [ ] CEO
    [ ] Executive board
    [ ] if others, please specify:…….

26. What is the highest qualification of the risk manager?
    [ ] First degree
    [ ] Master's degree/Doctorate
    [ ] Professional Risk Manager
    [ ] Others (please specify)…….

27. Did the risk manager have a prior experience before being appointed by your institution?
    Yes [ ]
    No [ ]

28. What is the gender of the risk manager?
    [ ] Male
    [ ] Female

ETHICS CERTIFICATE

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Horvey

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: H20/11/22**
PROJECT TITLE	Enterprise risk management, corporate governance, compliance and performance of the insurance industry: Empirical evidence from Ghana and South Africa
INVESTIGATOR(S)	Mr S Horvey
SCHOOL/DEPARTMENT	Wits Business School/
DATE CONSIDERED	20 November 2020
DECISION OF THE COMMITTEE	Approved Risk Level: Minimal
EXPIRY DATE	17 December 2023

DATE 18 December 2020 **CHAIRPERSON** _____
(Professor J Knight)

cc: Supervisor : Professor J Mensah

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University. Unreported changes to the application may invalidate the clearance given by the HREC (Non-Medical)

I/We fully understand the conditions under which I am/are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to completion of a yearly progress report.**

_____ 18 / 12 / 2020
Signature **Date**

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES