ACTUARIAL RISK MANAGEMENT PRACTICES, UNDERWRITING RISK, FIRM CHARACTERISTICS AND PERFORMANCE OF PROPERTY AND CASUALTY INSURANCE FIRMS IN EAST AFRICA

BY

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DECLARATION

This PhD Research thesis is my original work and has not been submitted to any other University for any award. All the sources used herein are duly acknowledged.

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DEDICATION

I dedicate this Doctoral thesis to my dear parents, for laying a strong academic foundation for me and the encouragement to accomplish whatever I wanted and, for mentoring many others to achieve their dreams.

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ABBREVIATIONS AND ACROYNMS

AFP	-	Actuarially Fair Premium
ANOVA	-	Analysis of Variance
ARM	-	Actuarial Risk Management
ARMP	-	Actuarial Risk Management Practices
CEO	-	Chief Executive Officer
ERM	-	Enterprise Risk Management
EUT	-	Expected Utility Theory
GDP	-	Gross Domestic Product
GM	-	General Manager
FC	-	Firm Characteristics
FP	-	Financial Performance
IBNR	-	Incurred But Not Reported
IRA	-	Insurance Regulatory Authority
IRA-U	-	Insurance Regulatory Authority, Uganda
MD	-	Managing Director
NAIC	-	National Association of Insurance Commissioners
NCD	-	No Claim Discount
P & C	-	Property and Casualty
P & L	-	Property and Liability
RBS	-	Risk Based Supervision
ROA	-	Return on Assets
ROE	-	Return on Equity
RM	-	Risk Management

TIRA	-	Tanzania Insurance Regulatory Authority
UK	-	United Kingdom
UR	-	Underwriting Risk
USA	-	United States of America
VaR	-	Value at Risk

ABSTRACT

The purpose of this study was to establish the relationship among actuarial risk management practices (ARMP), underwriting risk, firm characteristics and performance of property and casualty (P & C) firms in East Africa. The study first explored the relationship between ARMP and firm performance then explored the effect of intervening and moderating variables on this relationship. The joint effect of all the variables on firm performance was also tested. ARMP variables included underwriting practices, pricing practices, claims management practices and reinsurance and retentions practices. Firm characteristics comprised of size, age, managerial competence, ownership structure and country of domicile of the firms. Firm performance was measured using financial indicators of return on assets and average premium growth rate percent while non-financial performance measures comprised of composite score for quality of service, reputation and innovation. The population consisted of all 82 P & C firms in Kenya, Uganda and Tanzania, of which a census survey was carried out. Primary data was collected using a structured questionnaire while secondary data was collected from annual financial statements of the firms for the period 2010 to 2014. Data was analyzed using descriptive statistics and multiple regression analysis for testing the hypotheses. The findings revealed an insignificant relationship between ARMP and financial performance. However, the relationship with non-financial performance was significant, with pricing, reinsurance and retentions and claims management practices being the predictors of performance. Underwriting was not a significant predictor, probably explained by the market practices of price undercutting rather than basing price on risk evaluation. Loss ratio was found to significantly mediate the relationship between ARMP and non-financial firm performance. Loss ratio predicted non-financial firm performance and in turn pricing, reinsurance and retentions and claims management practices predicted non-financial performance. The study established that firm characteristics have a significant moderating effect on the relationship between ARMP and firm performance. Specifically, size (for financial performance), size, age, managerial competence and the home country of the firm (for non-financial performance) where found to influence the direction of this relationship. The implication is that bigger firms in terms of asset base, have ability to engage in optimal risk management practices leading to better performance. The home country of the firms was important in that there was a difference when the countries were segregated. The finding on the relationship between ARMP and non-financial performance was significant for Kenya but insignificant for Uganda and Tanzania, which may be reflective of differences in various aspects of insurance risk management practices in each country. Ownership structure had no significant effect on the relationship between ARMP and both financial and non-financial performance. The results show that ARMP, underwriting risk and firm characteristics jointly significantly influence non-financial firm performance, implying that all the variables need to be taken into account in order to improve performance of these firms. The results of this study add to theory and existing knowledge and makes contribution to policy and practice in the area of insurance risk management, especially in formulation of the risk management framework for industry on what is expected to be done. The results may trigger practitioners, while strategizing for better performance, to reflect on their decision making with respect to the various challenges that the industries faces in insurance risk management practices and high loss ratios among others.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Risk and uncertainty are basic terms of risk management which characterize situations where the actual outcome for a particular event or activity is likely to deviate from the estimate or forecast value (Raftery,1994). Insurers bear risks and undertake risk management (RM) through analysis and evaluation of risks inherent in most sectors of the economy and provide reassurance to most economic entities (Duompos et al., 2012; Williams et al., 2013). Among these is actuarial (insurance) risk which stems from the very nature of the insurance business services. Insurers thus play an important function in the financial services sector of most countries by lowering total risk, contributing to stability, economic growth and efficient resource allocation. They create liquidity, reduce transaction costs, spread financial losses and facilitate economies of scale. The performance of insurance firms is therefore of major importance to various stakeholders such as shareholders, policyholders, agents and policymakers (Charumathi, 2012).

Insurance risk liabilities are usually estimated by using actuarial or statistical techniques, which are based on probability theory using past experience and making assumptions about the future (Trowbridge, 1989). If these calculations are incorrect, the consequences for the insurer may be adverse, distorting the insurer's true financial situation which could result in both solvency and liquidity problems (Actuarial Education Company, 2014). Actuarial risk results when the assumptions that actuaries incorporate into a model to price or make a decision on a specific insurance policy turns out wrong or somewhat inaccurate. Consequences of this would be under pricing risk, underwriting losses and

reinsurance risk which occurs when there is insufficient or inappropriate reinsurance coverage (Santomero & Babbel, 1997).

Risk management is a systematic management function that ensures conservation, protection and maximization of both human and physical capital for owners of business and dependants. It is a continuously monitored integrated formal process for defining objectives, identifying sources of uncertainties, analyzing or evaluating these uncertainties and formulating managerial responses to arrive at an acceptable balance between risk and opportunities (Vaughan & Vaughan, 2008).

According to Babbel and Santomero (1996), risk management enables the organization to save on costs and often leads to enhanced performance. A structured actuarial risk management (ARM) approach is essential for achievement of better organizational results. This includes selective underwriting, good claims management that is related to the underwriting strategy, reserving arrangements, and optimal retention levels. The extent or direction of this relationship would be influenced by internal firm specific characteristics like size, age, ownership structure and company management amongst others (Yegon et al., 2014).

This study is guided by theories whose models are based on practical problems that are associated with premium determination and credibility. These theories include; the ruin theory also known as the collective risk theory that deals with the stability and vulnerability to insolvency of an insurer (Buhlmann, 1970; Kaas et al., 2008); the expected utility theory (EUT) that deals with choices that individuals make when faced

with uncertain outcomes and enables people and enterprises reduce uncertainty thereby reducing risk (David, 2010); credibility theory that is based on past information's credence to enable development of premium rates for the future (Kaas et al., 2008); and the asymmetric information theory that posit that imperfect information between parties to a contract may prevent the likelihood of attaining a mutually useful agreement by the parties, thus helps explain underwriting factors, premiums charged and aspects of claims management by insurers (Baranoff et al., 2009).

Property and Casualty (P & C) Insurers form part of the larger insurance industry in East Africa. They offer a broad category of coverage against loss of property, damage or other liabilities. The Insurance sectors of the East African nations comprising Kenya, Uganda and Tanzania, face many challenges including lack of sufficient capacity in risk management skills (IRA, 2015; IRA-U, 2014; TIRA, 2014). Several general insurance companies especially in Kenya have become insolvent in the period (1993-2013) and perhaps effective management of the insurance risk can improve performance of these firms (Mose & Kuloba, 2013).

A number of insurance companies with Kenyan interests have been set up in Uganda and Tanzania due to the insurance growth opportunities in various sectors like industry, tourism, road and rail networks, technological communications, infrastructure, construction and real estate across the East and Central African region (AKI, 2014). With an increase in the number of mergers, acquisitions and other restructuring activities of insurance companies in East Africa there is an opportunity to create synergies and leverage on innovation to improve their risk management practices. These activities, if

managed properly, could enhance continuing revenue growth and profitability for the P & C sub-sector in these economies (IRA, 2014; TIRA, 2014, IRA-U, 2014).

1.1.1 Actuarial Risk Management Practices

Actuarial risk management practices (ARMP) involve systematic handling of the risks contained in the products offered to customers through various techniques to protect against insurance risk. These risks are not all borne directly by the insurer itself (Actuarial Education Company, 2014). Proper management of these exposures helps insurers to be prepared for such risks by defining, measuring and reducing exposure to acceptable levels (Ashby et al., 2013). These measures include a combination of a robust underwriting process, pricing that is sufficient for profitability, correctly evaluated and fair claims management that is in line with pricing and a reinsurance process that is appropriate for the portfolio (Santomero & Babble, 1997).

Underwriting involves a detailed and systematic analysis of identifying and measuring a potential insured's risk exposures in order to price the insurance in accordance with its associated risk. Actuaries use stochastic models and sophisticated regression analysis and data mining tools to take into account, severity and frequency of claims uncertainty and inflation as they all impact on premiums (Baranoff et al., 2009). An insurance claim is a demand by the insured for recovery or benefit from an insurer for a loss that an insurance policy might cover (IRA-U, 2014). According to Barth and Eckles (2009), claims erode earnings and, its costs highly influence the profitability of P & C insurers. There is therefore need to service only genuine claims in order to reduce these costs. Yusuf and Dansu (2012) assert that good claims management involves dealing with claimants

courteously and should result in payment of legitimate claims, accurate reserving, avoidance or reduction of protracted litigation and reduction in the insurer's expense.

Reinsurance is the transfer of a risk, wholly or partially from an insurer to a reinsurer hence is insurance for insurance companies. It is therefore one of the most important tools used by insurers to cater for insurance claims as it shifts part of the burden of payment to the reinsurer. The retention ratio (net premiums/gross premiums) is that portion of risk not passed on to the reinsurers and reflects the overall underwriting strategy of the insurer (Charumathi, 2012). Reinsurance caters for large losses by protecting against catastrophic exposures, risk concentration and the volatility of underwriting results of the cedant (Udaibir et al., 2003). According to Cummins and Trainar (2009), reinsurers also provide both expertise and underwriting capacity and are often systemically important to the primary insurance market. Berger and Udel (1993) note that disciplined observance of underwriting guidelines and execution of a comprehensive program of reinsurance are both critically essential in management of catastrophe risks.

1.1.2 Underwriting Risk

Underwriting risk refers to the chance of loss on a risk evaluation activity whereby the policy premium income does not adequately cover the claims. It is the ratio of net benefits paid or incurred to net earned premiums (Adams & Buckle, 2000). Net earned premium is that portion of the net written premium relating to the period of insurance that has already run. Net incurred claims consist of claims paid in the financial period plus changes in outstanding claims. Claims paid represent all costs related to payment to

claimants during the period, irrespective of when the loss occurred. Outstanding claims represent liability for all claims related to events that happened prior to end of the financial year, but not yet settled as at then. The best information available is used in calculating outstanding claims and includes allowances for claims incurred but not reported (IBNR). Baranoff et al. (2000) note that this estimate is hard to accurately project and may result in errors, but once established and set aside, enable the insurer to meet its obligation to policyholders.

Underwriting risk can take the form of underestimated liabilities from unpaid (expired) past policies or underpriced current business. It could arise from incorrect or inaccurate underwriting, wrong or inaccurate assumptions on the frequency and severity of losses or from factors wholly beyond the underwriter's control. In addition, it could be due to much of the total written premiums remaining outstanding for long periods and turns out to be uncollectible (Shiu, 2004). For P & C insurers, the loss ratio denotes the quality of business underwritten and is an important indicator of whether the pricing policy of the firm is correct. While it is not realistic to eliminate it completely, underwriting risk is at the centre of key risk management efforts of an insurer and mitigation of this risk is therefore very vital for the long term profitability of the firm (Yusuf & Dansu, 2012).

1.1.3 Firm Characteristics

Firm characteristics are the internal organizational factors that are likely to play a significant role in shaping its behavior with respect to risk management hence influence the direction of its performance (Duompos et al., 2012; Charumati, 2012). These include: size, age, ownership structure, managerial competence and country of domicile of the

firm among others. The size of a firm is measured by, among others, total assets, gross premiums written and capital employed (Almajali, et al., 2012; Chen & Wong, 2004). With more assets, bigger firms compared to smaller ones would find it easier to achieve economies of scale, write higher volumes of business, give adequate security in form of optimal reinsurance covers, operate with less constraints and be more flexible as they have more capital. As established by Yegon et al. (2014), the extent to which big and small firms would engage in risk management practices would not be the same hence would accordingly be reflected in their performance.

A firm's age is measured by the number of years the organization has been in operation. The age of a firm may contribute to enhancement or diminishment of firm performance. Shiu (2004) notes that as firms age, they acquire capabilities and skills over time, may not be prone to the liabilities of being new and can operate more efficiently compared to newer firms. Such operational capability may include involvement in optimal risk management activities thus contributing to achievement of superior performance. However, as noted by Demirgüç-Kunt and Maksimovic (1998), older firms may also be inhibited by inertia, bureaucracy and laxity in risk management thus affecting performance negatively.

Managerial competence consists of skills, knowledge and qualification of the key staff of the firm. According to the resource based view of organizations, managerial competence forms part of the firm's core resources (Carmeli, 2001). Udaibir et al. (2003) asserts that organizations which have greater resources of competent personnel are likely to have higher operational efficiency. This is likely to be correlated with general management soundness, and this would be reflective of the ARM systems in place. Managerial

resources would therefore influence the relationship between risk management practices and performance. Agiobenebo and Ezirim (2002) affirm that ownership structure of the firm influences various managerial aspects of the company. This is especially with respect to concentration of ownership by majority shareholders, and identity of owners in terms of local, foreign or institutional investors (Lee, 2008). The structure will have an effect on decisions such as payment of dividends or interest, operational aspects such as reinsurance and retention ratios thus impacting on performance. Hoyt et al. (2011) also established that ownership structure was positively related to enterprise risk management, and hence performance.

Differences in various aspects of insurance risk management specific to a market or country may have an influence on performance (Fuss, 2002). Such aspects include competitive factors, regulatory, supervisory and compliance requirements, and operational interventions with respect to underwriting, appraisal of pricing objectives, and claims management (IRA, 2015). Countries may thus be at different levels of economic development with inflation and volatility, affecting rates of returns which in turn will have an impact on the level and extent of risk management practices in those particular countries hence, affecting performance accordingly (KPMG, 2015).

1.1.4 Firm Performance

Performance is a general measure of a firm's actual output or results as assessed against its intended outputs and is thus related to its overall health over a given period of time. Kaplan and Norton (1996)'s Balanced Scorecard model focuses on multiple indicators of organizational performance and translates a company's vision and strategy into a coherent set of performance measures. The four perspectives of the scorecard: financial measures,

customer knowledge, internal business processes, and learning and growth enable companies track financial results while simultaneously monitoring progress in building capabilities and acquiring intangible assets they need for future growth (Kaplan and Norton (1996).

The financial perspective includes overall profitability, indicated by various ratios. It can be measured from three perspectives namely, solvency, profitability, and liquidity. Solvency measures the amount of borrowed capital used by the business relative to the amount of owner' equity capital invested in the business. Profitability (for insurers) is the excess of revenues from underwriting activities over the costs incurred in generating them. It can be derived from some of the most accepted financial ratios, namely: Return on Assets (ROA) i.e. net income divided by total assets; Return on Equity (ROE) i.e. net income divided by total equity; and Profit Margin, calculated by dividing net income by sales (Ross et al., 2009; Zender, 2004). Liquidity measures the ability of the business to meet its financial obligations as and when they fall due without disrupting normal operations (Almajali, *et al.*, 2012). These financial measures are inadequate, however, for guiding and evaluating the journey that companies must make to create future value through investment in customers, suppliers, employees, processes, technology, and innovation (Dorf & Raitanen, 1997).

According to Lewin and Minton (1986), non-financial indicator parameters, some of which may be difficult to quantify, include operational performance (market share, new product introduction and innovation, and product or service quality) and overall effectiveness including reputation, survival, achievement of goals, and perceived overall

performance relative to competitors among others. Poor performance from this perspective is thus a leading indicator of future decline, even though the current financial picture may look good (Kaplan & Norton, 1996). An assessment of overall soundness thus needs to take into account both quantitative and qualitative indicators to achieve an acceptable degree of reliability of firm performance (Udaibir *et al*., 2003). However, the application of these measures would depend on the type of firm and strategies being pursued (Kokakulah & Austil, 2007).

1.1.5 Property and Casualty Firms in East Africa

Property and Casualty Insurers, otherwise known as Property and Liability (P-L) Companies, Non-Life or General Insurance Companies are firms that deal with covers that protect against property damage or losses to individuals or business, and / or against legal liability that may result from injury or damage to the property of others. The insurance industries in the three East African countries (Kenya, Uganda and Tanzania), are governed by their relevant Insurance Acts and regulated by the Insurance Regulatory Authorities in each country i.e. the Insurance Regulatory Authority (IRA) respectively for Kenya and Uganda and Tanzania Insurance Regulatory Authority (TIRA) for Tanzania. As summarized in Table 1.1, there were a total of 108 insurance firms operating in the region as at 31st December, 2015 and out of these, 82 (76%) were P & C firms.

Non life business dominates the markets in terms of gross written premiums averaging about 77% and insurance penetration i.e. the ratio of premium underwritten to the Gross Domestic Product (GDP) in the three economies being low at less than 3%. The GDP income performance over the five years period commencing 2009 for P & C firms in the

region averages about 1.5%, which is quite low in comparison to other sectors (IRA, 2015; IRA-U, 2015; TIRA, 2015). There is need therefore to establish factors that can influence and improve the actuarial risk management practices and thus performance of these companies.

Table 1.1: Summary of Insurers' Statistics in East Africa

Country	**Total Number of Insures**	**No. of P & C Insurers**	**% P & C Premiums to Total Premiums**	**Insurance Penetration rate (2014)**
Kenya	50	35	64%	2.80
Uganda	28	21	76%	0.86
Tanzania	30	26	90%	0.70
Total	**108**	**82**		

Source: Insurance Regulatory Authorities Reports, 2015- (Kenya, Uganda, Tanzania)

According to the IRA reports (2014), the underwriting results for the industries' general insurance business have been on an upward trend since 2009 but dropped in 2014 for Kenya, largely attributable to the motor private class of business which has experienced high cases of fraud. In Tanzania it is reported that general insurers' operations were unprofitable during 2013/2014 with the health/medical class of business being the most affected (TIRA, 2014). The gross direct premiums of these companies have been on an upward but decreasing trend (IRA, 2015; IRA-U, 2014; TIRA, 2014) which calls for improved underwriting, pricing and sound claims management practices by the firms

Over the years, the P & C firms in East Africa have faced many challenges irrespective of their size, age, ownership or management team. These include low insurance penetration, the threat of terrorism and sabotage, skills incapacity, inadequate technical and financial capability to take part in the effective underwriting and insurance of complex risks

associated with infrastructure projects as well as the new emerging risks in the gas and oil sectors in the region. This means that major insurance risks are placed in offshore markets, leading to reduction in financial resources that are retained domestically for economic advancement and growth (IRA, 2014; TIRA, 2014). Industry personnel also lack skills and competencies in risk awareness and management skills (Mose & Kuloba, 2013). There are also low levels of public awareness on insurance products and services and lack of a requisite financial education program (including insurance education) in the formal education system (IRA-U, 2014). All these challenges affect the continued sustainability of these companies, pointing to the need for them to embrace risk management best practices.

Despite the fact that risk management is a relatively new phenomenon in East Africa, Kenya and Tanzania have recently introduced the Risk Based Supervision (RBS) approach which emphasizes on comprehending the sufficiency of insurer's risk management structures. Uganda is in the process of formulating a framework towards the same. According to Randle (2009), regulators have had to turn to RBS due to the realization that applying the same set of rules to all companies regardless of the risk profile is not only costly but has an inherent risk of loss of the required effectiveness. The risk based model captures quantifiable risk measures such as insurance risk, market risk, counterparty default risk and operational risk. The models are used to compute the risk based capital requirements for insurers and reinsurers. This is a step towards timely preventive and corrective interventions of the many challenges faced not only by P & C companies but the whole insurance industry.

1.2 Research Problem

Risk management often leads to improved performance and makes it possible for an organization to reduce costs and achieve better results. An optimal underwriting approach combined with adequate premium rates, retention levels and sound claims management lead insurance firms to better profits while individual internal characteristics of the firm also influence the strength and / or direction of overall performance. According to Ashby et al. *(*2013), proper and efficient actuarial risk management practices by insurance firms are essential for their survival. The insurance industry lowers the total risk that economies face, hence has the motivation to measure and deal with the risks that they are exposed to and simultaneously encourage and support risk mitigation activities for others, by adopting a structured risk management approach (Duompos et al., 2012; Udaibir *et al.,* 2003).

Santomero and Babble (1997) note that the period since 1987, has seen a dramatic rise in the number of insolvent insurers the world over. The ostensible causes of these insolvencies were myriad, including mispricing of insurance products, natural catastrophes and "churning" of policies by unscrupulous sales agents and; malfeasance on the part of officers and directors of the insurance companies among others, pointing to inadequate actuarial risk management practices. A structured risk management program can thus be utilized to address the convergence of major risks as experienced in the current economic climate.

The industry reports of 2014 for the three East African countries highlight the various challenges faced by the insurance sector in East Africa. These include low penetration of insurance services, lack of understanding and poor perception of insurance by majority of

the population, claims and fraud issues due to lack of clear policy guidelines, liquidity issues and industry competition leading to poor underwriting practices, premium undercutting and mis-selling and, a mismatch between product prices and underwriting costs. Very little effort is geared towards product innovation, service delivery methods and distribution channels (IRA, 2014). These among other factors may have contributed more than ten general insurers in Kenya becoming insolvent between 1993 and 2013. P & C firms should therefore not merely engage in price reduction but adopt best practices in managing their actuarial risk. This may lead to potential payoff in terms of: better customer relationships, improved ability to provide products and services that meet quality standards; added receptiveness and reliability in complying with reporting requirements; better enterprise risk management (ERM) and decision-making, and improved business growth (KPMG, 2015).

Conceptually, most studies carried out in various countries on the insurance industry have not delved into risk management or dealt specifically with actuarial risk management practices. The studies have concentrated on determinants of property and casualty insurers' financial performance. These include: Mwangi and Iraya (2014), Shiu (2004), Chen and Wong (2004) and, Adams and Buckle (2003). Similar studies cover life insurance companies, including: Akotey et al. *(*2012) and Charumathi (2012). These studies considered various variables such as firm size, premium growth, age, cost of capital, leverage, investment performance, liquidity, loss ratio, retention ratio and management competence among others as determinants of financial performance. The studies by Chen and Wong, (2004) and Charumathi, (2012) found that size, liquidity, leverage, earnings asset, investment yield were important determinants, but the finding on

size was contradicted by Mwangi and Iraya (2014), Adams and Buckle (2003), and Akotey et al. (2012). There is also no consensus on which factors are significantly related to financial performance and which ones are not. The studies did not delve into, or provide a causal link between actuarial risk management practices and firm performance.

Contextual gaps are noted in that studies have been done in various other sectors on the wider area of risk management and the relationship to specific aspects of firm characteristics but not in the insurance sector. These include; Yegon et al. (2014) on the effect of size on Enterprise Risk Management, measured in terms of financial performance of listed firms in Kenya, and found that an increase in firm size leads to improvement in efficiency of ERM; Waweru and Kisaka (2012) on the effect of enterprise risk management implementation on value of listed firms in Kenya, and found that the level of ERM implementation has a positive effect to the value of these companies; Tahir and Razali (2011) on the relationship between enterprise risk management on the value of publicly listed firms in Malaysia and found a positive but insignificant relationship to firm value; and, Mugenda et al. (2012) on the effect of risk management on financial performance for sugar manufacturing firms in Kenya and found a more than average positive relationship between risk management practices and performance.

In addition, a study in Tanzania by Richard et al. (2008) on credit risk management, using theoretical literature review, was done on a commercial bank and established that the operational environment was important, while Mwelu et al. (2014) studied risk

management and profitability in manufacturing firms in Uganda and found that the risk management process influences changes in profitability levels.

Methodological gaps exist in that most of the above studies have used secondary data from financial statements to determine financial performance thus neglecting the non-financial performance aspect. Other studies have only looked at an analysis of the process using surveys (Santomero & Babbel, 1997), while some have documented the wider risk management process in the financial services sector (Grondin et al., 2001). These studies also did not deal with insurance risk management specifically.

Research findings from the various studies on property and casualty insurer performance are conflicting and inconclusive, probably due to the fact that the relationship between actuarial risk management practices and performance has not been examined or modeled to differentiate between the factors that may intervene and / or moderate this relationship. These inconsistent findings may also be attributable to the market of operation as insurance industries of emerging nations generally lack skills in risk management compared to their counterparts in the developed world, and some aspects of the practices might be specific to each market.

It is therefore necessary for further empirical work to be carried out in order fill these gaps and clarify the findings in this area. This study thus undertook to answer the following research question: how do firm characteristics and underwriting risk affect the relationship between actuarial risk management practices and performance of property and casualty firms in East Africa?

1.3 Research Objectives

The overall objective of this study was to establish whether firm characteristics and underwriting risk have an effect on the relationship between actuarial risk management practices and performance of property and casualty firms in East Africa. Arising from this broad objective, the specific objectives were: -

(i) To establish the relationship between actuarial risk management practices and performance of property and casualty firms in East Africa.

(ii) To determine the influence of underwriting risk on the relationship between actuarial risk management practices and performance of property and casualty firms in East Africa.

(iii) To establish the effect of firm characteristics on the relationship between actuarial risk management practices and performance of property and casualty firms in East Africa.

(iv) To establish the joint effect of actuarial risk management practices, underwriting risk and firm characteristics on performance of property and casualty firms in East Africa.

1.4 Value of the Study

This study contributes to finance theory by examining the relationship among actuarial risk management practices, underwriting risk, firm characteristic and firm performance. This contributes to broadening of the available knowledge on the effect of underwriting risk and firm characteristics on the relationship between actuarial risk management practices and performance of P & C firms. This may also help explain the conflicting

results in this area. Given that the area has largely been understudied in East Africa, academicians may use the study as a basis for further research.

Given the current concern with risk management globally, pinpointing the major success indicators of P & C firms' profitability helps in facilitating the design of actuarial risk management programs that may improve the performance of the P & C sector. The effects of ARMP on firm performance as documented in the study will help insurance managers when setting underwriting and pricing objectives, claims management and reinsurance and retentions strategies, especially considering the many insurers who are performing dismally and / or become insolvent in the recent past in the market.

The study also contributes to various policy making decisions by stakeholders including the insurance regulators, especially in formulation of the risk management framework for the insurance industry. The findings of the study may assist the various governments, policy makers of insurance companies and corporate executives to have a basis of laying out the important factors to concentrate on while strategizing on policies for better performance for their firms. The systematic analysis of ARMP and performance causation is a positive move towards formulation of policy directions for sustained development in the property and casualty insurance sector.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

The chapter discusses theoretical foundations and covers key theories including expected utility theory, credibility theory, the information asymmetry theory and the ruin theory. It also examines theoretical and empirical literature on the relationships amongst the variables and provides a summary of gaps in knowledge. The last section shows the conceptual framework and research hypotheses.

2.2 Theoretical Foundations

The theoretical underpinning of this research can best be explained using insurance risk theories that deal with models involving premium calculation and credibility. Four theories namely, the ruin theory, the expected utility theory, credibility theory and the information asymmetry theory are reviewed here below.

2.2.1 Ruin Theory

Ruin theory, also known as collective risk theory is an area of actuarial science that uses models in mathematics to illustrate an insurer's susceptibility to insolvency. The theory was introduced by Lundberg (1932) but although still young and developing, it has become one of the building blocks of the theory of stochastic processes. The ruin model describes the stability of an insurer. It deals with questions like premium rates to charge so that there are enough reserves to cover the future claims, the expected amount of claims, their severity and frequency, and how much of the company's reserves should be invested (Kaas et al., 2008).

Ruin occurs if a company's income given its initial wealth, fails to cover expenses Wüthrich (2015). According to Buhlmann, (1970) most insurance companies aim to make profit and would like their ruin probabilities to be near zero. They will therefore adjust their models and, consider competition accordingly to achieve this. To model the risk in non-life insurance, claim severity and frequency are taken into account by making certain assumptions and employing various techniques in probability theory. The total amount of claims is calculated together with its mean and variance (denoting uncertainty) and this value is decomposed in terms of frequency and severity. The insurer then decides on what premiums to charge, then focus shifts to the insurer's long-term vulnerability to insolvency based on the mathematical models. Stochastic processes enable monitoring of the insurer's monetary surplus through time, and then ruin theory is introduced to assess the chances that the insurer would reach bankruptcy given the model (McGregor, 2007; Promislow, 2011).

The probability that this ever happens, under the assumptions that annual premiums as well as claim generating process remains unchanged, is a good indication of whether the insurer's assets match his liabilities sufficiently. This may perhaps be done by increasing the premiums they charge, increasing initial capital, or by adjusting their portfolio in some other way through use of models, that use approximations of probability in order to avoid ruin (Kaas et al., 2004; Gerber and Shiu, 1998; Buhlmann, 1970; Promislow, 2011)

The ruin theory is of great significance as a RM tool to P & C companies looking to prosper in the long run by estimating the number of claims hence address an insurer's vulnerability to insolvency. Consequently, companies will only offer non-life insurance if they can make a profit, or at least sustain themselves. However, they may also face a

lot competition from other businesses and may be willing to take some risk, for example by reducing premiums thus increasing the probability of ruin in order to become more marketable (Powers, 1995). However, ruin theory will not cater for poor models which can lead to disaster in the real world. The same model should probably not be used year after year or continuously when conditions change and for such models, it is desirable that the users have the ability to modify them order to deal with a wider range of insurance problems on hand (Promislow, 2011).

This theory applies in this study as it is the basis used in assessing the premiums to charge, expected claims considering frequency and severity, reserves to cover claims, amount of reserves to invest, underwriting risk which manifests itself in random occurrences of losses leading to fluctuations in the underwriting result of P & C insurers. These activities in turn lead to risk mitigation efforts which should focus on reducing underwriting risk as it is directly related to the long-term profitability of an insurer.

2.2.2 Expected Utility Theory

Expected utility theory (EUT) deals with choices that individuals make when faced with uncertain outcomes. It assumes that individuals try to maximize their utility in different outcomes if certain axioms (i.e. transitivity, measurability, independence, and completeness) of rational choice are satisfied (Neumann & Morgenstern, 1953). Although the theory has well-recognized roots that extend into the eighteenth and nineteenth centuries, much of its development has occurred in the last two or three decades. The utilitarian viewpoint was introduced by Bentham (1824) but was eventually abandoned as it was deemed impossible to measure. This gave way to structural accounts of rationality and rational choice theory as evidenced in the works of various authors, for example

Neumann and Morgenstern (1953), who posit that decisions that are undertaken under uncertainty are not directly based on expected payoffs, but rather on expected utilities associated with these payoffs. Tversky and Kahneman (1974) however note that the mathematical correctness of EUT does not guarantee the expected utility in practice.

As Friedman and Savage (1948) note, the expected utility model explains the very existence of insurers, where the choice among different degrees of risk is very prominent. In this model, an insured is a rational decision maker, who is risk averse and while trying to take full advantage of his utility so as to be in a secure financial position, is willing to pay more than the expected value of his claims (Kaas et al., 2008).

According to David (2010), an individual's risk aversion is a key component in insurance pricing, in that he is willing to pay the actuarially fair premium (AFP) i.e. the expected loss, or more than the AFP (known as risk premium) for an insurance policy to increases his welfare. Under the concept diminishing marginal utility, this choice will be up to a point that is not beyond the maximum premium the person is willing to pay; otherwise the individual will not buy full insurance. This theory is applicable in this study in that, insurance companies are aware of this behavior of risk-averse individuals hence in determining their rates, charge this risk premium in addition to basic premiums so as to make profits and this contributes to their earnings, hence performance. It is therefore expected that pricing practices, of the firms, based on this theory, will contribute to better profits and thus enhanced performance

2.2.3 Credibility Theory

Credibility theory is a branch of actuarial science used to quantify how unique a particular outcome will be, compared to an outcome deemed as typical. The advent of

credibility dates back to Whitney (1918) who in assessing the individual risk premium from a portfolio of similar risks, suggested that individual and class risk experience be combined. He also proposed that the rate of premium charged be an adjusted average of the two. It was formulated mainly using a Bayesian statistical setting, often preferred because of the ease of recognizing more than one source of randomness through both "sampling" and "prior" information (Promislow, 2011). A typical group of purchasers of insurance is not homogeneous with each insured being different from all others in terms of habits and eccentricities. There will be both bad and good risks within the group which cannot be identified at the outset of the contract. However, subsequent experience and information will give an indication as to the degree of risk for each, leading to adjustment of their premiums (Longley-Cook, 1962).

On the other hand, Bühlmann credibility looks at the variance across the population, specifically, the total variance attributable to each class's expected values (Variance of the Hypothetical Mean), including the expected value of the process variance across all classes (Buhlmann, 1970). He posits that measuring credibility especially in fire insurance is done by considering the average annual variance of the ratio of incurred losses to earned premiums from say a five year average. The loss ratio is first adjusted for trend, and also for rate revisions but even without these adjustments, a good idea of credibility can be obtained by noting the amount of stability in loss ratios from year to year.

Thus credibility theory deals with evaluation of past information's credence so as to develop future premium rates (Kaas et al., 2008). An example of this merit rating is the NO Claim Discount (NCD) for automobile insurance. To avoid many variations, the

resultant individual rates are usually adjusted using some rules, guidelines or judgment (Promislow, 2011). However, the rate classification system has never been perfect hence underwriters are normally careful and try to avoid frequent rate fluctuations as such rate variability may lead to a number of side effects such as cancellation of some policies and subsequent underwriting of others before expiry date, leading to adverse selection (i.e. there will be an increase in the number of "bad" risks, remaining in the insurers' books (David, 2010; Longley-Cook, 1962).

In the current study this theory is considered to be one of the most applicable in actuarial risk management practices, especially in underwriting as it is the basis that underlies selection of the type of business to underwrite and, for calculation of premiums for a group of insurance contracts as well as stability of loss ratios.

2.2.4 Information Asymmetry Theory

The concept of information asymmetry also referred to as the theory of imperfect information is used to explain a wide array of circumstances. People possess different information, depending on the circumstances, which affects their behavior in many situations. The significance of this theory was established by Akerlof (1970) and Rothschild and Stiglitz (1976) who used the insurance market in which the characteristics of the commodities exchanged are not fully known to at least one of the parties to the transaction. Akerlof (1970) argued that in many markets the buyer uses some market statistic to measure the value of a class of goods based on the average of the whole market, while the seller has more factual knowledge on the specific good that he is selling. He concludes that this information asymmetry prevents the chance of arriving at an agreement that is beneficial to both parties.

In an insurance setting, the model suggests that, as a result of information asymmetries there arises two market problems, both of which affect insurance prices: adverse selection (one party having more advantageous or hidden information) and moral hazard (a person with a higher risk chooses to hedge the risk, preferably without paying more to do so) (Pauly, 1974). The impact of adverse selection is to increase premiums for all people who hedge. To mitigate the extent of adverse selection and its effects and, moral hazard, insurers underwrite the risk by asking a lot of questions through completion of proposal forms and provision of additional information to determine the risk types of individuals in order to charge the correct premiums (David, 2010). If a claim occurs, the customer may also absorb or share part of the loss through deductibles, excesses and/or co-insurance payments (Auronen, 2003). However, as discussed by Jovanovic (1982) imperfect information, may also lead to favourable selection under specific circumstances and not necessarily to adverse selection. This study used this theory as it helps explain underwriting factors, premiums charged and aspects of claims management by property and casualty insurers.

2.3. Actuarial Risk Management Practices and Firm Performance

A structured RM approach is essential for survival and achievement of better organizational results at a reduced cost. The performance of insurance firms is therefore influenced by good ARMP and if a P & C Insurer fails, this may likely be due to a weak actuarial risk management program. Some relevant studies on risk management practices by insurers include Fernandez (2009) who carried out a survey in Europe and Latin America on insurers' global risk management practices and established that the practices

are improving in terms of viability but implementation is rather slow. However, the survey was general, touching on the RM process and practices and not management of insurance risks. No attempt was made to link them to firm performance. Hoyt et al. (2011) in a survey on the value of enterprise risk management in the USA insurance industry found that ERM practices are positively related to firm performance. This study however did not also concentrate on management of the insurance risk

Leverty and Grace (2012) used data from the National Association of Insurance Commissioners' (NAIC) in the U.S. over a 10 year period (1987-1997) to investigate the reason for claim reserve management and establish the determinants of reserve error. They found that under-reserving and the environment in which the business is underwritten affects the claim liability. However, the evidence found casts doubt on whether insurers manipulate reserves to avoid solvency monitoring. This study only considered claim reserving and not other actuarial risk management tools.

Berger et al. (1992) in an empirical study that explored the reason for the crisis in the United States insurance industry liability account in the mid 1980's found evidence that reinsurance can lead to lower prices in the primary product market and reduce uncertainty. Reduction in reinsurance can lead to increased insurance premiums and intense competition in the primary market. The resulting deterioration (reduction) in price and quality of insurance may lead to adverse selection and in turn lead to a decline in profitability since the insurers cannot fully adjust policy offers. This study however only covered reinsurance and not other variables like underwriting and claims. However, Shiu (2004) argues that great dependence on reinsurance will lead to a reduction of the

company's retention level, leading to higher reinsurance premiums, which may result in a reduction in profitability for the insurer. Notably, these findings conflict with those of Leverty and Grace (2012) which showed that no significant relationship exists between retention ratio and financial performance.

2.4 Actuarial Risk Management Practices, Underwriting Risk and Firm Performance

A robust ARM program often leads to an optimal retention ratio, low loss ratio and better underwriting profits or low underwriting losses which in turn influence performance. Higher loss ratios may point to the need for better claims risk management policies by the insurer to safeguard it against potential future payouts. Lower expense ratios are better as this translates to more profits for the company (Chen & Wong, 2004).

Cummins (1991) in his empirical analysis on statistical and financial models of insurance pricing and the insurance firm, established that if insurers perform their underwriting and reinsurance programs well and price the underlying risks correctly this will lower the loss ratio and increase underwriting performance, which in turn leads to higher performance. The study however relied on secondary data and concentrated on use of established models to arrive at the conclusions. However Udaibir, et al. (2003) contradict the finding on reinsurance and notes that an increase in underwriting capacity through reinsurance may increase competition, drive down premium rates and relax underwriting standards, thereby causing underwriting losses and impacting negatively on firm performance.

Chidambaran et al. (1997) investigated the economic performance of U.S. P & C insurance industry using 18 lines of insurance for the period 1984–1993. The study

adopted an industrial organization approach and focused on loss ratios and combined ratios in order to measure pricing performance. They found that the line of concentration of the insurer and their share in the line as direct writers were significant determinants of the firms' performance A survey by Chen and Wong (2004) on the determinants of financial health of Asian insurance companies listed in the stock exchange used panel cross sectional data and established that loss ratio, among other factors, is positively related and a significant determinant of profitability of insurance firms. These studies however did not delve into the actuarial risk management aspect and concentrated on factors that determine performance of these firms.

2.5 Actuarial Risk Management Practices, Firm characteristics and Firm Performance

While optimal ARMP is expected to lead to positive insurer firm performance, the extent or direction of this relationship in turn is expected to be influenced by internal firm specific characteristics. Several relevant empirical studies have been carried out to determine how firm specific factors influence P & C insurer's performance.

Adams and Buckle's (2003) study in Bermuda insurance market examined the determinants of corporate financial performance. They used panel data for 1993–1997, and found that lowly liquid, highly leveraged companies performed better operationally than highly liquid, lowly leveraged companies. Underwriting risk was also found to be positively related to performance, suggesting that actuarial and operational risks are well managed. However, the scope of the firms' activities as well as the size of companies were not found to be important explanatory variables. These results confirm those of Adams (1996) for the New Zealand market and Akotey et al. (2012) for the Ghanaian

market. These studies however did not examine actuarial risk management practices or examine the effect these firm characteristics would have on the relationships between the ARMP and firm performance.

Mwangi and Iraya (2014) carried out a study to determine the relationship between selected firm specific factors and financial performance of general insurance underwriters in Kenya. The study employed multiple linear regression analysis with data for years 2010- 2012 and found that financial performance was positively related to earning assets and investment yield. Growth of premiums and size of underwriter were not significantly related to financial performance. This confirms Adams and Buckle's (2003) study on size and scope of activities. The main limitation of these studies is that ARMP was not tested.

Ahmed et al. (2011) examined the impact of firm level characteristics on the performance life insurance companies in Pakistan, using regression analysis. They established that insurers' profitability is not significantly determined by age or liquidity, that leverage is negatively related and not statistically significant. They also found that the loss ratio as well as firm size are significant and positively influence profitability of the firms. This study however covered life insurance firms and did not incorporate the effect of risk management in the analysis.

Choi (2010) in his study, of the United States P-L firms, tested the relationship between, growth, size of the firm and age, and also analyzed the influence of firm characteristics on growth of the firm. He used Heckman's two-stage methodology for different sub periods and found that during the relevant sample periods, older firms do not grow as fast

as younger firms and also found that economies of scale have a positive relationship to growth of the firm. However, this study did not consider the risk management aspect and only related some variables to growth and not overall firm performance. Claudio and Waelchli (2010), using database of financial, statistical and market information on global companies, found that as firms grow older, their profitability seems to decline. This study was however only limited to age and profitability. Accordingly most of these findings on age and firm performance suggest that there is a relationship but no exact direction of the relationship.

2.6 Actuarial Risk Management Practices, Underwriting Risk, Firm Characteristic and Firm Performance

According to Ostroff and Schmidt (1993), a multi-dimensional view of, and an analysis of the effect of various variables on their relationships with firm performance would give more conclusive results. In order to expand profits, insurers may lower underwriting standards, raising the probability of higher claim costs which in turn lead to shrinking underwriting results and reduced profits and vice versa (D'Arcy and Gorvett, 2004). Optimal management of the reinsurance portfolio is likely to result in a higher retention ratio (thus lower reinsurance premiums), leading to a lower loss ratio, which in turn would lead to higher profitability, thus impacting on firm performance (Booth et al., 1999).

Akotey et al. (2012) in a study on the FP of life insurance companies in Ghana used panel regression data of ten (10) life insurance companies covering the period 2000 to 2010. They found that gross premiums written and insurers' sales profitability are positively related, and that large underwriting losses are as a result of rapid expansion of operations

as well as price undercutting. A cross-sectional study by Yusuf and Dansu (2014) on the effect of claim cost on Nigeria's non-life insurers' profitability found that strategic claims management will aid the profitability of the firm through reasonable cost control, suitable key staff and developing an analytical framework to detect and reduce excesses in order to enhance performance. These studies however did not consider underwriting and pricing aspects and their effects.

Kim et al. (1995) used a dynamic statistical model to predict failures of insurers, based on U.S. data for life insurers (1987-1990) and non-life insurers (1984-1990) and established that the important variables for prediction of a failure for non-life insurers include: premium growth rate, loss reserves, investment performance, age of the company, expenses, underwriting results, reinsurance recoveries, realized capital gains and unrealized capital gains. Pervan *et al.* (2012) through a dynamic panel model investigated factors that influence the profitability of Bosnia and Herzegovina insurance industry and found that claims ratio was strongly and negatively related to performance but found significant positive impacts for age and market share. Both studies however did not consider the effect of ARMP.

Barth and Eckles (2009) investigated the impact of growth on reported underwriting profitability in the short term using P & C insurer groups and stand-alone insurance in the United States for the years 1998–2005 and found that changes in loss ratios were negatively related to premium growth. The relationship was however found to be positive for growth in claim count and loss ratio changes. However, the short term methodology employed was only useful for changes in the loss ratio and did consider the long-term

term effects or the outcomes that growth can have on reserving. Other actuarial risk management variables were also not considered.

2.7 Summary of Literature and Knowledge Gaps

Theoretical and empirical evidence from these past studies reveals many and differing factors that determine performance of P & C insurers. Most of the studies deal with financial performance. While some of the studies were inconclusive most of them did not arrive at a common conclusion, and did not deal with the relationship(s) between the various factors that influence performance. The main limitation of these studies is that they offer only a partial assessment of firm performance, depending on the selected measure.

Several knowledge gaps can be identified from some of the empirical studies reviewed. A contextual gap arises from the fact that empirical research on ARMP of P & C insurers' impact on firm performance is scarce in East Africa as many of the studies have been done mostly in other parts of the world and, cover the general area of factors that impact the financial performance of P & C insurers. This study has provided more evidence especially in the perspective of developing countries and with the introduction of moderating and intervening variables, explained convincingly the relationship between ARMP and performance of P & C insurance firms in East Africa.

Secondly a conceptual gap is that most studies have not modeled actuarial risk management practices against determinants of performance and there has been no endeavour to improve the predictive power of the findings by introducing suitable

moderating and intervening variables. This study introduces firm characteristics as a moderating variable and underwriting risk (loss ratio) as an intervening variable in an attempt to further explain the relationship between ARMP and firm performance. The study tested the joint effect of all three variables i.e. ARMP, underwriting risk, firm characteristics and their effect on firm performance of P & C insurance firms in East Africa.

A methodological gap arises in that in that most past studies have used secondary data from financial statements and financial analysis methods to measure performance and ignored the other perspective of non financial measures such as quality of service, innovation and reputation. This study used secondary as well as primary data and considered both financial and non financial measures of performance. Table 2.1 is a summary of literature and knowledge gaps. For each study, results, research gaps and how the current study addresses these gaps are indicated.

Table 2.1: Summary of Literature and Knowledge Gaps

Study	Country	Focus of Study	Methodology	Main Findings	Knowledge Gaps	Focus of Current Study
Mwangi and Murigu (2015)	Kenya	The determinants of performance of general insurance companies in Kenya.	Descriptive statistics and simple linear regression analysis.	Positive relationship for size, leverage, management ownership structure; No relationship with underwriting risk, liquidity, age and retention ratio.	Covered firm characteristics; Did not consider ARMP; used secondary data.	Focused on role of ARMP, FC and on overall firm performance; used primary and secondary data.
Yususf and Danzu (2014)	Nigeria	The effect of claim cost on insurers' profitability in Nigeria.	Descriptive statistics and linear regression analysis.	Claims, expenses and human capital development affects profitability.	Covered claims, did not consider other variables like pricing, underwriting and retentions.	Focused on all ARM variables in relation to performance.
Yegon et al. (2014)	Kenya	Effects of firm size on enterprise risk management of listed firms in Kenya.	Descriptive research design and regression analysis models.	Increase in firm size leads to improvement in efficiency on enterprise risk management.	Only covered size in relationship to risk management. Focused on listed firms in Kenya.	Focused on P & C firms in E Africa; considered other variables and performance.
Mwelu et al. (2014)	Uganda	Risk management and profitability of manufacturing firms in Uganda.	Descriptive research design, regression analysis and factor analyses.	Risk management process influences up to 35% changes in levels of profitability.	Covered risk management process. Targeted manufacturing firms in Uganda.	Focused on insurance firms in E Africa. Covered insurance risk, and performance.
Akotey et al. (2012**)**	Ghana	Determinants of profitability in the life insurance industry of Ghana.	Regression model for panel longitudinal cross-sectional data.	Positive relationship with gross written premiums; Negative relationship with investment income.	Did not consider effect of RM; covered life Insurance companies and used only secondary data.	Focused on P & C firms, ARMP, FC and on overall performance; Used primary data also
Mugenda et al. (2012)	Kenya	Implications of risk management practices on financial performance of sugar manufacturing firms in Kenya.	Exploratory design using survey and regression analysis.	Positive relationship between risk management practices and performance; Effective RM can proactively help in overcoming the possibilities of business failures.	Covered risk management practices; concentrated on the sugar sector.	Focused on insurance sector, ARMP and other variables and their effect on performance.

Study	Country	Focus of Study	Methodology	Main Findings	Knowledge Gaps	Current Study
Waweru and Kisaka (2012)	Kenya	The effect of enterprise risk management implementation on the value of companies listed in the NSE.	Regression analysis model using TOBIN'S Q.	An increase in the level of ERM implementation in companies had a positive effect on the value of firms.	Focused on firms listed in the Nairobi stock exchange; covered ERM.	Focused on insurance sector, focus on ARMP and performance.
Ahmed et al. (2011)	Pakistan	Determinants of Financial Health of Pakistan Insurance Companies.	Descriptive statistics and regression analysis on panel data.	Size and loss ratio are significant and positively related to the profitability; Leverage is negatively related and liquidity is not a significant determinant.	Used secondary data only; Focused on determinants of FP; Did not consider role of risk management.	Focused on ARMP FC and UR on performance; used both primary and secondary data for analysis.
Hoyt et al. (2011)	USA	The Value of Enterprise Risk Management: Evidence from the U.S. Insurance Industry.	Regression analysis model using TOBIN'S Q.	ERM is positively related to firm size, institutional ownership, but negative with reinsurance use and leverage.	Covered ERM, which used survey methodology where measure of ERM may not be so robust.	Concentrated on East Africa. Focused on ARMP; used both primary and secondary data.
Barth and Eckles (2009)	USA	The impact of growth on reported underwriting profitability in the short term using P & C insurers.	Univariate statistics and regression analysis models on panel data.	Negative relationship between premium growth and changes in loss ratios, but positive with claim count growth and loss ratios.	Did not consider ARMP or any statistical relationships between variables under study.	Focused on combined effect of three variables on performance of P & C firms.
Richard et al. (2008)	Tanzania	Credit risk management of a commercial bank in Tanzania.	Theoretical literature review using evidence from developed countries.	The environment within which a bank operates is an important consideration for a credit risk management system to be successful.	Dealt with credit risk in a banking environment; No field study was carried out.	Focused on insurance risk management using primary and secondary data.
Chen and Wong (2004)	Different Asian Countries	Determinants of Financial Health of Asian Insurance Companies.	Survey using Multivariate, discriminant and regression analyses.	Size, investment and liquidity are significant determinants of the profitability of insurers.	Targeted only firms listed in the stock exchange, looked at implementation of RM and value of firm.	Focused on P & C firms and on all ARM variables in relation to firm performance.

Study	Country	Focus of Study	Methodology	Main Findings	Knowledge Gaps	Current Study
Shiu (2004)	United Kingdom	The economic performance of U.K. general insurance industry,	Static and dynamic panel data models using regression analysis.	Liquidity, unexpected inflation, interest rate level and underwriting profits were statistically significant.	Did not consider ARMP or any statistical interrelationships between various variables under study.	Focused on combined effect of ARMP , FC and UR on overall performance.
Adams and Buckle (2003)	Bermuda	Determinants of corporate financial performance in the Bermuda insurance market,	Descriptive univariate statistics and regression analysis.	Leverage, liquidity, and underwriting risk positively related to performance but no relationship with size.	Did not consider effect of RM nor analyze various interrelationships.	Focused on all ARM variables in relation to performance.
Adams (1996)	New Zealand	Investment earnings and the characteristics of life Insurance Firms: New Zealand Evidence	Panel cross sectional data; using pooled weighted least squares regression model.	Leverage, liquidity positively related to financial performance.	Covered life insurance companies, did not consider ARMP or any statistical relationships between variables.	Focused on P & C firms; Considered moderating and intervening factors in firm performance.

2.8 Conceptual Framework and Research Hypotheses

This section discusses the independent, intervening, moderating and dependent variables, followed by the conceptual model and research hypotheses. The conceptual model is shown in Figure 2.1 and depicts the inter-relationships between the variables as envisaged.

2.8.1 Conceptual Framework

As asserted by various authors, risk management enables the organization to save on costs and often leads to enhanced firm performance. It is expected that ARMP which is the independent variable comprising of underwriting, pricing, reinsurance practices and retention levels and claims management practices has an effect on the performance of the P & C insurance firms. Specifically, it is expected that optimal ARMP are associated with better firm performance in terms of return on assets and premium growth rates as well as efficiency in service, innovative practices and better reputation. This is shown as H1, and links the independent and dependent variables.

The relationship between the independent variable and the dependent variable is not direct, but mediated by the intervening variable. Underwriting risk (loss ratio) is considered as the intervening variable. Lax underwriting standards and poor claims management practices would lead to higher loss ratios. This in turn would lead to poorer performance and may point to a need for better underwriting and claims risk management policies to guard against future possible payouts leading to improved performance. The opposite effect would hold if underwriting standards were stricter. The effect of

intervening variable on the relationship between the independent and dependent variable is depicted by H2.

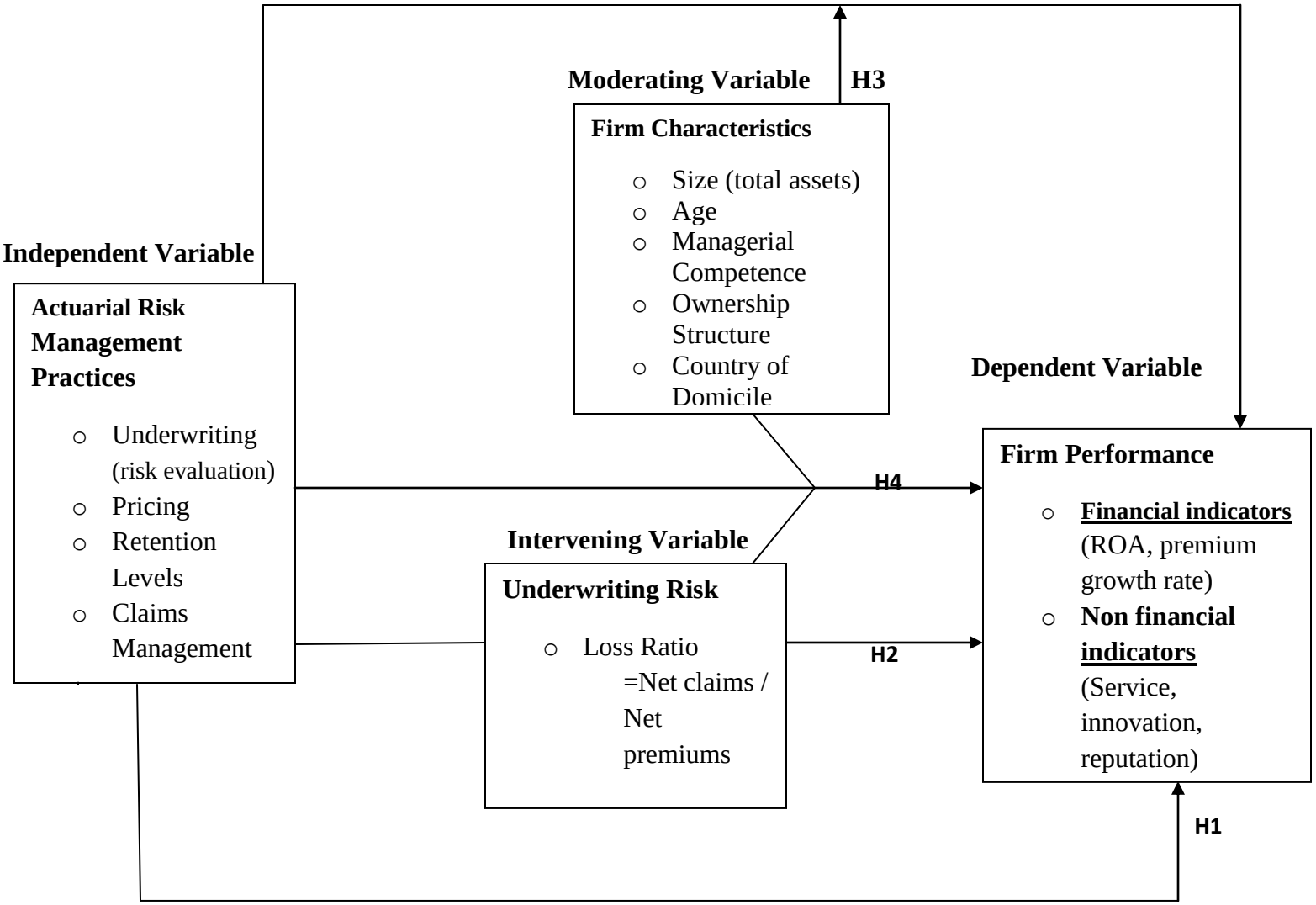
While optimal actuarial risk management practices lead to positive insurer firm performance, the extent to which an insurance firm engages in ARM activities is contingent on a number of internal firm specific characteristics and in turn would impact on the direction and strength of this relationship. These include firm size, age, managerial competence, ownership structure and country where firm is domiciled. The expected relationship is such that the bigger the firm size in terms of assets, the better would be the relationship between ARMP and firm performance than for smaller firms. The age of the firm is measured by the length of time since establishment. Older firms are expected to have acquired capabilities and skills over time and develop better reputation to enable them operate more efficiently hence it is expected that the older the firm is the better would be the relationship between ARMP and firm performance.

The benefit of management competence (education, professional and work experience) is that it would enhance the extent and quality of ARMP in place and is therefore expected to contribute to better firm performance. Ownership structure, defined in terms of majority percentage of local or foreign interests tends to influence the management and operational aspects of the company including ARMP. As ownership concentration increases the positive monitoring effect of concentrated ownership dominates thus impacting on performance.

The home country of a particular firm is expected to impact on the relationship between ARMP and firm performance as there may be differences in aspects of risk management specific to that country such as regulatory and operational interventions. Firms in a country with optimal ARMP are therefore expected to perform better. The effect of moderating variable on the relationship between the independent and dependent variable is depicted by H3, while H4 depicts the combined effect of all the variables on the dependent variable.

The dependent variable in this study is firm performance, represented by both financial and non financial measures. Financial performance is represented by the financial measures of return on assets (ROA), which determines a firm's ability to make use of its assets, therefore is a direct success indicator of the firm's business activity; and premium growth rate, measured by the annual gross written premium growth rate average percentage over a 5 year period. The non financial performance measures are derived from indicators of service quality, innovation and reputation of the firms.

Figure 2.1 - Conceptual Model



Source: Researcher, (2017)

2.8.2 Research Hypotheses

Arising from the study objectives, the study tested the following null hypotheses:

H1a: There is no significant relationship between actuarial risk management practices and financial performance of property and casualty firms in East Africa.

H1b: There is no significant relationship between actuarial risk management practices and non-financial performance of property and casualty firms in East Africa.

H2a: Underwriting risk does not have a significant intervening effect on the relationship between actuarial risk management practices and financial performance of property and casualty firms in East Africa.

H2b: Underwriting risk does not have a significant intervening effect on the relationship between actuarial risk management practices and non-financial performance of property and casualty firms in East Africa.

H3a: The strength of the relationship between actuarial risk management practices and financial performance of property and casualty firms in East Africa is not significantly moderated by firm characteristics.

H3b: The strength of the relationship between actuarial risk management practices and non-financial performance of property and casualty firms in East Africa is not significantly moderated by firm characteristics.

H4a: Actuarial risk management practices, underwriting risk and firm characteristics have no significant joint effect on financial performance of property and casualty firms in East Africa.

H4b: Actuarial risk management practices, underwriting risk and firm characteristics have no significant joint effect on non-financial performance of property and casualty firms in East Africa.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methods and approaches that were adopted in conducting this study. This includes the philosophical direction, the research design, the study population, data collection methods, operationalization of the study variables, validity and reliability of the measurement instruments, and data analysis and presentation.

3.2 Philosophical Orientation

Research philosophy is the underlying fundamental belief that underpins the choices that require to be made in guiding a research position. Various philosophical paradigms exist but the two main research philosophies that guide research in social sciences are the positivist and phenomenological paradigms (Cooper and Schindler, 2008).

Phenomenological paradigm is also known as the qualitative, subjectivist, humanistic or interpretive research paradigm, focusing on the immediate experience, and researchers drawing meaning by interpreting experiences that are observed during their involvement in the research phenomenon. In this approach, opinions of experts are sought rather than drawing samples from a population (Collis & Hussey, 2003). In contrast, its opponents argue that it is subjective, lacks sound theoretical foundation and does not adhere to the strict scientific code required in social science research

The positivistic paradigm is alternatively known as the quantitative, objective, scientific, experimentalist or traditionalist research paradigm (Blumberg *et al.*, 2005). The approach is methodologically quantitative, value free (Easterby-Smith et al. 2002) and separates the researcher from the phenomenon being investigated. It assumes that the researcher

maintains a clear distinction between facts and value judgments and consistently uses a rational approach to the research. Positivists place a strong emphasis on the quantification of constructs and believe that the best, or the only, way of measuring the properties of phenomena is through quantitative measurement using statistical techniques to ensure precision, logic and evidence attesting (Cooper & Schindler, 2008). The overriding features of a positivistic philosophy are therefore operationalizing concepts so that they are measurable, the production of quantitative data based on large samples as well as on theory and hypothesis testing (Saunders et al., 2007).

As this research attempted to test a number of quantitative constructs a positivistic research philosophy was adopted. The approach was also considered appropriate because it was in line with the proposed study methodology where a conceptual and theoretical structure was developed and then tested empirically with particular instances being deduced from general influences (Bryman & Bell, 2003; Easterby-Smith et al., 2002).

3.3 Research Design

Research design provides a framework that guides a research study. It is the blueprint that ensures that the research problem is addressed. It guides the determination of the type of data, its collection and its analysis. The three main basic types of research design are exploratory, causal and descriptive. Exploratory research is directed at discovering ideas and insights, causal research deals with cause-and-effect relationships while descriptive research is usually aimed at describing a population with respect to important variables (Cooper & Schindler, 2008; Williams, 2007).

Descriptive designs involve three main methods namely survey studies which describe the status quo, correlation studies which investigate the relationship between variables

and developmental studies which seek to determine changes over time. Descriptive designs can also be either as cross-sectional which involves drawing a sample of elements from the population of interest and measuring characteristics of the elements only once or over a relatively short period of time or longitudinal, where sample members are measured repeatedly over time (Sekaran, 2003).

This study employed a descriptive, cross-sectional research design and sought to determine the relationship between ARMP, underwriting risk, firm characteristics, and the performance of P & C insurance firms as at a point in time in order to assess strength of relationships among variables. However, this design does not posses the ability to establish which factors, between two variables are related or causes which (Cooper & Schindler, 2008).

3.4 Population of the Study

The unit of analysis in this study is the firm and the target population was all property and casualty insurance companies licensed by the respective insurance regulatory authorities in Kenya, Uganda and Tanzania as at 31st December, 2015 as reflected in appendix III. A census survey was carried out on all the 82 firms as the number is relatively small.

3.5 Data Collection

The study used both primary and secondary data. Secondary data was extracted from audited financial statements of the insurers and, IRA audited annual reports to cross check and confirm the statistics. The data consisted of five year results for years 2010-2014 (or a lesser duration for firms not in existence for five years). Year 2015 was not included as the 2015 annual reports had not yet been compiled by most of the firms or the

Insurance Regulatory Authorities of the various countries by the time this study was carried out. This data was used to compute an average for the return on assets (ROA) as indicator of financial performance. The statistics for loss ratio, premium growth rate and retention levels were also obtained from these financial statements for the same period. A data collection form (see Appendix II) was used to source this data.

Primary data was collected on firm profiles, actuarial risks and risk management practices adopted by the individual companies, firm characteristics and the non-financial performance indicators for these firms through use of a questionnaire (see Appendix I). The questionnaire contained likert type questions, developed from pertinent literature in line with the objectives of the study and was divided into four sections (for ARMP of underwriting, pricing, reinsurance and retentions and claims management) relating to the research variables. The fifth section covered non-financial firm performance aspects. Data collection was done through both email and drop and pick methods. The respondents were first contacted and given an explanation of the purpose of the research. For Uganda and Tanzania, follow-ups were done by two trained research assistants who had been engaged for this purpose. The respondents were general managers, risk managers, underwriting, claims and/or reinsurance managers to take into account representation of all functional areas that handle actuarial risk in the firms.

3.6 Operationalization of Key Study Variables

The variables in this study, namely actuarial risk management practices, underwriting risk, firm characteristics and firm performance were operationalized as shown in Table 3.1. The independent variable in this study is ARMP while firm performance is the dependent variable. The moderating variable is firm characteristics while underwriting

risk takes the intervening role between actuarial risk management practices and firm performance.

Table 3.1 Operationalization of Study Variables

Variable	Indicator	Operational Definitions	Measurement / Scale	Questionnaire Reference
Actuarial Risk Management Practices (Independent)	Underwriting	Assessment of risk to ensure that the cost of the cover is proportionate to the risk being evaluated	5 point likert type scale (Interval)	Section B (B1-B12)
	Pricing	The determination of rates or premiums to charge for insurance to cover losses and expenses from underwritten risks	5 point likert type scale (Interval)	Section B (B13-B24)
	Reinsurance Retention ratio: (net written premium divided by gross written premiums)	The transfer of whole or part of a risk from an insurer to a reinsurer Gross written premiums is total premiums income written before deducting outgoing reinsurance premium Net written premiums is gross premium income less reinsurance premiums.	5 point likert type scale (Interval) Ratio Scale	Section B (D1-D5) Section F (F4-F5), (F7-F8)
	Claims Management	Analyzing, advising and giving optimal customer services and effective communication in respect of claims under an insurance policy for: • compensation, • repayment • restitution • any remedy for loss or damage, or some other obligation	5 point likert type scale (Interval)	Section C (C1-C14)

Variable	Indicator	Operational Definitions	Measurement / Scale	Questionnaire Reference
Underwriting Risk (Intervening)	Loss ratio (Net claims incurred/Net premiums earned)	Net claims is the total of paid and outstanding claims arising in a given period. Net premium earned is the portion of the gross premium relating to the period of insurance that has already run.	Ratio Scale	Secondary data Section F (F6, F10,F11)
Firm Characteristics (Moderating)	Size	Log of total assets of the company.	Ratio Scale	Section F (No. F1)
	Age	Number of years since firm was established.	Ratio Scale	Section A (Q 1)
	Managerial Competence	Education and work experience of Chief Executive Officer	Ratio Scale	Section A (Q 2 -4)
	Ownership Structure	Percentage of local ownership in firm	Ratio Scale	Section A (Q 5)
	Country of Domicile	Country where firm is incorporated namely, Kenya, Uganda or Tanzania	Ratio Scale (using partial regressions)	Section A (Q 1)
Firm Performance (Financial and non-financial) (Dependent)	Financial <u>Performance</u> Return on Assets (ROA) • = Net Income before tax / Total assets	Measure of a firm's ability to make use of its assets,	Ratio Scale	Secondary data Section F (F1-F2)
	• Annual premiums growth rate	Annual gross written premium growth rate average percentage over a stated period	Ratio Scale	Section F (F4)
	Non-financial Performance	Service quality, innovation and reputation of the firms	5 point likert type scale (Interval)	Section E (Q E1-E28)

Source: Author, 2017

3.7 Data Validity and Reliability

In order to establish the goodness of fit of the data collected on the study variables, reliability and validity tests were conducted. A research instrument is said to be valid if it measures what it is supposed to measure. Validity can also be defined in terms of the absence of self contradiction and is closely linked to the research instrument used (Lancaster, 2005). The research tested face, content and construct validity. To ensure face validity the draft questionnaire was given to two selected persons knowledgeable in the area and in research to ascertain the items suitability in obtaining information according to research objectives of the study. The main purpose was to check questionnaire structure, sequence, meaning and ambiguity of questions. Content validity was determined by pretesting and construct validity done by designing a set of items that match the theoretical literature in the area and in line with the conceptual framework developed.

Cooper and Schindler (2008) point out that a study is reliable only to the degree to which it generates consistent results (assuming that there are no real changes in what is measured or the circumstances surrounding the measurement). Prior theoretical and empirical research in the area informed the selection of study variables and how they were measured. In order to ensure reliability of the questionnaire, a pilot study involving two insurance companies was carried out and the results were used to improve the questionnaire and data collection instruments. To increase reliability, the secondary data was personally collected by the researcher. For internal consistency for all likert-type questions, a reliability test using the Cronbach Alpha model was computed. The Alpha can take any value from zero (no internal consistency) to one (complete internal

consistency) where 0.7 is the acceptable limit (Sekaran, 2003). George and Mallery (2003) provide the following rules of thumb: > 0.9 = Excellent, > 0.8 = Good, >0.7 = Acceptable, > 0.6 = Questionable, > 0.5 = Poor and < 0.5 = Unacceptable.

3.8 Data Analysis

In getting the data ready for analysis, data editing, standardization, coding and categorization was undertaken. Data was then analyzed in stages.

3.8.1 Descriptive Statistics

Descriptive statistics were computed and interpreted and covered organizational data of the respondent firms and all response variables. These included measures of central tendency and standard deviation (for exploring deviation/dispersion in the underlying data) as well as coefficient of variation, kurtosis and skewness which were also computed and interpreted. Tests of normalcy and linearity were also conducted because use of parametric statistics such as multiple regression and correlation requires that the sample data is normally distributed and has homogeneity of variance (Mugenda & Mugenda, 2003). In this study, since the scale of most of the data collected was interval or ratio, Pearson Moment Product Correlation (r) was used to explore relationships between the variables

Correlation analysis was used to measure the strength of the relationship between all the variables (ARMP, underwriting risk, firm characteristics and firm performance). This helped in establishing the suitability of the data for regression analysis by ensuring that the independent and dependent variables have a statistically significant relationship while

at the same time controlling for multicollinearity problem which occurs if any two independent variables are highly correlated (Cooper & Schindler, 2008).

3.8.2. Study Models

Multiple regression analysis (for hypotheses testing) was used to determine the expected relationships of the various variables as hypothesized in the study at 95% confidence level. The 5% level of significance has been used in prior studies such as Mwangi (2014) and Muindi, 2014). The regression analyses provided estimate equations to predict the magnitude of the dependent variable and provide values for the predictor variables. The justification for the use of multiple regressions in this study was based on the fact that in the hypothesized relationships, multiple determinants (independent variables) were considered to have predictive ability on a single dependent measure. Each independent, moderating and intervening variable for each of the models was entered in sequence where necessary and its value assessed as provided for by Sekaran (2003).

Coefficient of multiple correlation (r), coefficient of determination (R^2), adjusted coefficient of determination (adjusted R^2) were used to assess the strength of fit. F tests and t tests were also done to test the significance of the regression model. For each hypothesis, the adjusted coefficient of determination (R^2) was used to measure the amount of variation explained the study variables. The overall significance was then determined to establish whether the independent variable significantly predicted the dependent variable. Additionally, the significance of each subscale of the independent variable was established to determine the level of significance in as far as being a predictor of the dependent variable is concerned using unstandardized regression

coefficients. Various statistics were extracted and interpreted with respect to the regressions. The degrees of freedom were k and n-k-1, where: k = number of predictor variables and n = number of predictor observations. The models in line with the research objectives are as hereunder: -

The first research objective was to determine the relationship between actuarial risk management practices and both financial and non-financial firm performance of P & C firms in East Africa. Composite scores were calculated for variables which had more than one measure and used for regression purposes. Financial performance measures used ROA and premium growth rate composite score while all the non financial performance measures (quality of service, innovation and reputation) were collapsed into one composite score. Multiple regressions were used to determine these relationships. The models tested hypothesis one and was as follows: -

$$FP = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR + \beta_4 CM + \varepsilon_1 \quad (3.1)$$

$$NFP = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR + \beta_4 CM + \varepsilon_1 \quad (3.2)$$

Where:

FP = Financial Firm Performance (composite score computed as an arithmetic mean of ROA and premium growth rate mean scores)

NFP = Non-Financial Firm Performance (composite score computed as an arithmetic mean for service quality, innovation and reputation mean scores)

β_0 = Regression constant or intercept

$\beta_{1..}$ B_{-4}= Regression coefficients

UW = Underwriting (measured by mean score for underwriting practices)

PR= Pricing (measured by mean score for pricing practices)

RR= Reinsurance and retentions (composite score computed as the arithmetic mean of the mean scores for reinsurance practices and retention ratios).

CM = Claims management (measured by mean score for claims management practices)

ε= Error term (accounts for variability in firm performance that cannot be explained by the predictor variables).

Research objective two was to establish the intervening influence of underwriting risk on the relationship between actuarial risk management practices and firm performance (financial and non-financial). Stepwise multiple regression models were used as follows as in MacKinnon, et al. (2002):

Step 1

Relationship between ARMP and Firm performance (as in equations 3.1 and 3.2 above);

$FP = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR + \beta_4 CM + \varepsilon_1$

$NFP = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR + \beta_4 CM + \varepsilon_1$

Where: -

$\beta_{0,}\ \beta_{1\text{-}4}$ = as defined in 3.1

FP, NFP, UW, PR, RR, CM, = as defined in equation 3.1 and 3.2 above

ε= Error term

Step 2

$LR = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR + \beta_4 CM + \varepsilon_1$ ……*3.3*

Where: -

LR = Underwriting risk (Loss Ratio) score (computed as the mean of total loss ratio scores over the period by all firms).

UW, PR, RR, CM, = as defined in equation 3.1 above

$\beta_{0,}$ $\beta_{1\text{-}4}$ = regression coefficients as defined in 3.1 above

Step 3

$FP = \beta_0 + \beta_1 LR$ ……..…… …… .(3.4)

$NFP = \beta_0 + \beta_1 LR$ ……..…… ……. ..(3.5)

Step 4

$FP = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR + \beta_4 CM \ \beta_5 LR + \varepsilon_1$…… …… ..(3.6)

$NFP = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR + \beta_4 CM \ \beta_5 LR + \varepsilon_1$…… (3.7)

Where: -

β_0= regression constant or intercept

$\beta_{1\text{-}5\ =}$ regression coefficients for the respective determinants

FP, NFP, UW, PR, RR, CM, LR = as defined in equations 3.1-3.3 above

ε= Error term

Mediation (intervention) occurs if ARMP (equation 3.1 and 3.2 above) predicts firm performance and still predicts firm performance when underwriting risk is in the model (equation 3.6 and 3.7) i.e. The influence of the independent variable (ARMP) on the dependent variable (firm performance should be insignificant (or significantly less) in the presence of the intervening variable (underwriting risk).

The third research objective was to establish the moderating effect of firm characteristics on the relationship between actuarial risk management practices and performance (financial and non-financial) of P & C firms in East Africa. The stepwise multiple regression models that were used were in line with the methodology suggested by Baron & Kenny (1986). The models were as follows: -

Step 1 (a) and 1(b) – Same as equations 3.1 and 3.2

Step 2(a)

$FP = \beta_0+\beta_1 UW +\beta_2 PR+\beta_3 RR + \beta_4 CM +\beta_5 SZ +\beta_6 (UW*SZ) + \beta_7 (PR*SZ) +\beta_8 (RR*SZ) +\beta_9 (CM*SZ) + \varepsilon$ 3.8

$FP = \beta_0+\beta_1 UW +\beta_2 PR+\beta_3 RR + \beta_4 CM +\beta_5 A +\beta_6 (UW*A) + \beta_7 (PR*A) +\beta_8 (RR*A) +\beta_9 (CM*A) + \varepsilon$ 3.9

$FP = \beta_0+\beta_1 UW +\beta_2 PR+\beta_3 RR + \beta_4 CM +\beta_5 MC +\beta_6 (UW*MC) + \beta_7 (PR*MC) +\beta_8 (RR*MC) +\beta_9 (CM*MC) + \varepsilon$ 3.10

$FP = \beta_0+\beta_1 UW +\beta_2 PR+\beta_3 RR + \beta_4 CM +\beta_5 OS +\beta_6 (UW*OS) + \beta_7 (PR*OS) +\beta_8 (RR*OS) +\beta_9 (CM*OS) + \varepsilon$ 3.11

$FP = \beta_0+\beta_1 UW +\beta_2 PR+\beta_3 RR + \beta_4 CM + \varepsilon$ 3.12*

$FP = \beta_0+\beta_1 UW +\beta_2 PR+\beta_3 RR + \beta_4 CM + \varepsilon$ 3.13**

$FP = \beta_0+\beta_1 UW +\beta_2 PR+\beta_3 RR + \beta_4 CM + \varepsilon$ 3.14***

Step 2(b)

$NFP = \beta_0+\beta_1 UW +\beta_2 PR+\beta_3 RR + \beta_4 CM +\beta_5 SZ +\beta_6 (UW*SZ) + \beta_7 (PR*SZ) +\beta_8 (RR*SZ) +\beta_9 (CM*SZ) + \varepsilon$ 3.15

$NFP = \beta_0+\beta_1 UW +\beta_2 PR+\beta_3 RR + \beta_4 CM +\beta_5 A +\beta_6 (UW*A) + \beta_7 (PR*A) +\beta_8 (RR*A) +\beta_9 (CM*A) + \varepsilon$ 3.16

$NFP = \beta_0+\beta_1 UW +\beta_2 PR+\beta_3 RR + \beta_4 CM +\beta_5 MC +\beta_6 (UW*MC) + \beta_7 (PR*MC) +\beta_8 (RR*MC) +\beta_9 (CM*MC) + \varepsilon$ 3.17

$NFP = \beta_0+\beta_1 UW +\beta_2 PR+\beta_3 RR + \beta_4 CM +\beta_5 OS +\beta_6 (UW*OS) + \beta_7 (PR*OS) +\beta_8 (RR*OS) +\beta_9 (CM*OS) + \varepsilon$……..……..……....3.18

$NFP = \beta_0+\beta_1 UW +\beta_2 PR+\beta_3 RR + \beta_4 CM + \varepsilon$ ……..…….....3.19*

$NFP = \beta_0+\beta_1 UW +\beta_2 PR+\beta_3 RR + \beta_4 CM) + \varepsilon$ ……..…….…….....3.20**

$NFP = \beta_0+\beta_1 UW +\beta_2 PR+\beta_3 RR + \beta_4 CM + \varepsilon$ ……..…….....3.21***

Where: -

FP, NFP, UW, PR, RR, CM, ε = as defined in equation 3.1 and 3.2 above

SZ = Size of the firm (measured by log of total assets)

A = Age of the firm (measured by length of time since established)

MC = Managerial Competence (measured by academic, professional qualifications and work experience of the CEO)

OS = Ownership Structure (represented by percentage of local ownership in the firm)

ε= Error term

* = (K), ** = (T) and *** = (U). i.e.Country of Domicile (CD)- Separate regressions to test for moderating effect of CD for each of the countries namely, Kenya, Tanzania and Uganda respectively with respect to ARMP and firm performance.

In equation 3.8-3.21 the overall models should be significant with the addition of the firm characteristics of size, age, managerial competence, ownership structure and country of domicile and at least one of the predictor variables.

The fourth research objective was to establish the joint effect of actuarial risk management practices, underwriting risk, firm characteristics on performance (financial and non financial) of P & C firms in East Africa.

Multiple Regression Models:

Part a

Part (1a)

$FP = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR_+ \beta_4 CM + \beta_5 SZ_+ \beta_6 A_+ \beta_7 MC + \beta_8 OS + \beta_9 LR + \varepsilon_1$ **…(3.22)**

Part (1b)

$FP = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR_+ \beta_4 CM + \beta_5 SZ_+ \beta_6 A_+ \beta_7 MC + \beta_8 OS + \beta_9 LR + \varepsilon_1$…….…….....….. (**3.23**)*

$FP = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR_+ \beta_4 CM + \beta_5 SZ_+ \beta_6 A_+ \beta_7 MC + \beta_8 OS + \beta_9 LR + \varepsilon_1$…….…..….. (**3.24**)**

$FP = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR_+ \beta_4 CM + \beta_5 SZ_+ \beta_6 A_+ \beta_7 MC + \beta_8 OS + \beta_9 LR + \varepsilon_1$……...…...….. (**3.25**)***

Part 2(a)

$NFP = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR_+ \beta_4 CM + \beta_5 SZ_+ \beta_6 A_+ \beta_7 MC + \beta_8 OS + \beta_9 LR + \varepsilon_1$**...(3.26)**

Part 2(b)

$NFP = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR_+ \beta_4 CM + \beta_5 SZ_+ \beta_6 A_+ \beta_7 MC + \beta_8 OS + \beta_9 LR + \varepsilon_1$……..….. (**3.28)***

$NFP = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR_+ \beta_4 CM + \beta_5 SZ_+ \beta_6 A_+ \beta_7 MC + \beta_8 OS + \beta_9 LR + \varepsilon_1$……..……..….. (**3.29)****

$NFP = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR_+ \beta_4 CM + \beta_5 SZ_+ \beta_6 A_+ \beta_7 MC + \beta_8 OS + \beta_9 LR + \varepsilon_1$……..….. (**3.28)*****

Where the variables are as defined in the above sections (3.1 to 3.21) and = Partial regressions for *Kenya, **= Tanzania and *** = Uganda.

Table 3.2: Summary of Objectives, Hypothesis and Analytical Models

Objective	Hypothesis (Null)	Analytical Model	Interpretation
To determine the relationship between ARMP and performance of P & C firms in East Africa	**H1(a)**: There is no significant relationship between ARMP and financial performance of P & C firms in East Africa **H1(b):** There is no significant relationship between ARMP and non financial performance of P & C firms in East Africa	Regression Model: Pearson correlation coefficient Goodness of fit tests (e.g. t – test) R and R^2 and F tests	Relationship exists if at least any of $\beta_{1...}\beta_4$ is significant. Pearson correlation coefficient is significant.
To establish the effect of underwriting risk on the relationship between the ARMP and performance of property and casualty firms in East Africa	**H2(a)**: Underwriting risk has no significant intervening effect on the relationship between ARMP and financial performance of P & C firms in East Africa **H2(b)**: Underwriting risk has no significant intervening effect on the relationship between ARMP and non financial performance of P & C firms in East Africa.	Stepwise Regression Model: Pearson correlation coefficient Goodness of fit tests (e.g. t – test) R and R^2 and F tests	An intervening relationship exists if at least one of $\beta_{1...}\beta_5$ is significant and Pearson correlation coefficient is significant.
To establish the effect of firm characteristics on the relationship between the ARMP and performance of property and casualty firms in East Africa	**H3(a)**:Firm characteristics have no significant moderating effect on the relationship between the ARMP and financial performance of P & C firms in East Africa **H3(b)**:Firm characteristics have no significant moderating effect on the relationship between the ARMP and non financial performance of P & C firms in East Africa	Stepwise Regression and partial regression Models Stepwise multiple regression analysis Pearson correlation coefficient. Goodness of fit tests (e.g. t – test) R and R^2 and F test	A relationship exists if at least one of $\beta_{5...}\beta_9$ is significant and Pearson correlation coefficient is significant.

Objective	Hypothesis (Null)	Analytical Model	Interpretation
To establish the joint effect of ARMP, underwriting results and firm characteristics, on FP of P & C firms in East Africa	**H4(a)**: ARMP, underwriting risk and firm characteristics have no significant joint effect on the financial performance of P & C firms in East Africa **H4(b)**: ARMP, underwriting risk and firm characteristics have no significant joint effect on the non financial performance of P & C firms in East Africa	Multiple regression and partial regression Models. regression analysis Pearson correlation coefficient Goodness of fit tests (e.g. t – test) R and R^2 and F test	Relationship exists if at least one of $\beta_{1...}$ β_9 is significant. Pearson correlation coefficient is significant

CHAPTER FOUR
DESCRIPTIVE DATA ANALYSIS

4.1. Introduction

This chapter describes the findings as per the feedback from the respondents and links them to the objectives of the study. Questionnaires and data collection forms were used to seek the respondents' perceptions of the various attributes defining actuarial risk management practices, firm characteristics, underwriting risk and performance of property and casualty firms in East Africa. The chapter covers pilot test reliability analysis, tests of normality and linearity, the study response rate, and then provides the descriptive statistics of the study by way of frequency tables.

4.2 Validity and Reliability Tests

Validity indicates the degree to which an instrument measures what it is supposed to measure (Kothari, 2004). The preliminary version of the questionnaire was refined after discussion with the supervisors then a pilot study was conducted on two firms to ensure that it would collect the relevant information. The respondents helped evaluate clarity of the questions and enhance content. Based on their input, the questionnaire that was used for data collection was restructured to improve comprehension and relevance.

Reliability refers to the consistency, stability or dependability of the data. A measuring instrument is reliable if it provides consistent and dependable results (Kothari, 2004). The questionnaire that was pilot tested on two insurance companies in Kenya and responses received were tested for reliability using Cronbach's alpha. According to Kothari, The rule of thumb for Cronbach's alpha is that the closer the alpha is to 1, the higher the reliability Table 4.1 indicates the reliability statistics of the various variables for actuarial

risk management practices (underwriting, pricing, reinsurance, and claims management) and non-financial performance indicators of service quality, innovation and reputation.

Table 4.1: Pilot Test Reliability Analysis

Scale	Number of Items	Cronbach's Alpha (α)
Underwriting Practices	15	0.767
Pricing Practices	12	0.799.
Reinsurance Practices	9	0.731
Claims Management Practices	14	0.762
Non Financial Performance Indicators	35	0.904

Source: Research Data

All the variables were quite reliable with a Cronbach's alpha reliability coefficient greater than 0.7. Underwriting practices scale had a cronbach alpha of 0.767, pricing criteria scale reported a Cronbach alpha coefficient of 0.799, reinsurance and retentions scale had a Cronbach alpha of 0.731, and claims management scale had a Cronbach alpha coefficient of 0.762 while the non financial performance scale reported a Cronbach alpha coefficient of 0.904. The results signify an acceptable level of internal consistency of the data collection instrument.

4.3 Response Rate

This study took the form of a census survey of all general insurance companies licensed by the respective insurance regulatory authorities in Kenya, Uganda and Tanzania as at 31st December, 2015. The total number of questionnaires distributed was 82 and out of these, 57 questionnaires were returned duly completed indicating a response rate of approximately 69.5%, which according to Fowler (1984) is representative. Similar

studies conducted have achieved almost similar responses, for example Mwangi (2014) at 67%, Muindi (2014) at 72.1% and Iraya (2014) at 60.5%.

4.4 Tests of Normality and Linearity

The use of parametric statistics such as multiple regression and correlation requires that the sample data is normally distributed and has homogeneity of variance. Since multiple regressions was used to test the hypotheses formulated in this study, preliminary normality and linearity tests were performed to ensure there was no violation of these attributes and that data was normally distributed and had homogeneity of variance. Table 4.2 reflects the normality tests.

Table 4.2: Results for Tests of Normality

Scale	Skewness	Kurtosis
Financial Firm Performance	-3.413	14.611
Non Financial Firm Performance	-0.037	-0.406
Underwriting Practices	-0.351	-0.936
Pricing Practices	-1.111	3.193
Reinsurance & Retention Practices	-.045	-.532
Claims Practices	-.753	.666

Source: Research Data

Skewness (symmetry) and kurtosis (peakedness) values of the data were analyzed to check the overall shape of the probability distribution of the variables. A value of zero indicates a perfectly normal distribution (Cooper & Schindler, 2008). The negative kurtosis for non-financial firm performance, underwriting practices and reinsurance & retention practices implies that their distribution is flatter than normal but since they did not indicate extreme departures, their normality was assumed. Negative skewness implies

that the distribution is asymmetrical with a long tail to the left for all of them. Positive values imply that the distribution is skewed to the right. However these results do not indicate extreme departures from normality assumptions.

Linearity tests were conducted by use of a scatter plot to confirm if the relationship between the variables were fairly linear and that the forecasts and confidence intervals yielded by the regression models were not inefficient, biased or misleading. The test showed a significant moderate and positive relationship between underwriting risk and financial performance, ARMP and age and underwriting risk and non financial performance. A weak positive relationship ($r \leq 0.4$) was found between all other variables. This analysis showed that linearity existed between the variables of the study. The scatter plot of the relationships between variables is as shown in Appendix IV.

4.5 Actuarial Risk Management Practices

Actuarial risk management practices (ARMP) was the independent variable of this study. It was important to establish the respondents' perception of the insurance risk management practices in their firms. The ARMP were measured on a 5-point Likert scale whereby respondents were expected to either: "strongly agree", "agree", "be neutral", "disagree" or "strongly disagree". For each question, the response that represented the most favorable response for the practices was accorded 5 points, followed by 4, 3, 2, and 1 for the least favorable respectively.

A mean score of ≥ 4.5 was interpreted to mean strongly agree; $3.5 \leq 4.5$ was interpreted to mean that respondents agreed; 2.5 to $\leq$ 3.5 was interpreted to mean that the respondents were neutral; 1.5 to $\leq$ 2.5 implied that the respondents disagreed, and a score of $\leq$ 1.5 was interpreted to mean strongly disagree. A standard deviation of $\leq$ 1 was

interpreted to mean that respondents had the same perception in the rating of the statement while a standard deviation greater than 1 was interpreted to mean that the respondents did not have consensus about the statement. A total of 43 statements were used to measure the ARMP in the insurance firms.

To determine the optimal number of classes to use in a frequency distribution Scott (2009) recommends the use of Sturge's rule. The number is given by k = 1 + 3.322 (Log10 *n*), where k is the number of classes and n is the number of observations. In this study, the number of classes arrived at using primarily Sturge's rule was: k = 1 + 3.322 (log 57) = 7 where n =57. However, the researcher considered the data being summarized under each variable and varied the classes accordingly. Descriptive statistics for these variables are as hereunder

4.5.1. Underwriting Practices

A robust underwriting process is expected to lead to positive insurer firm performance. The respondents were asked to indicate the extent to which they agreed with aspects of underwriting in their organizations through a set of twelve statements and the results are shown in Table 4.3. The findings reveal that five practices that are the most widely used by P & C insurers in East Africa all with a mean of ≥ 4.0 include: determination of premiums through measurements of risk exposures; consideration of severity of a claim in gauging risk; use of various approaches to counter adverse selection and moral hazard; consideration of competitor actions; and, use of coinsurance and reinsurance for management of risky business.

Table 4.3: Underwriting Practices

Underwriting Practices	Mean	SD	Max	Min	SK	KU	CV
Measure risk exposures in order to determine premiums	4.40	.728	5	2	-1.375	2.395	0.17
Concentrates on risks for which firm has competitive advantage	3.68	1.167	5	1	-.674	-.357	0.32
Select good business and turn down poor ones	3.70	1.117	5	1	-.887	.113	0.30
Avoids business that increases risks	3.98	1.087	5	1	-1.109	.657	0.27
Claim severity and frequency used in the risk assessment and pricing	4.35	.612	5	3	-.367	-.616	0.14
Transfer very risky business through coinsurance and reinsurance	4.09	1.243	5	1	-1.212	.486	0.30
Only underwrite risks which make profits	3.21	1.048	5	1	-.247	-.587	0.33
Use standardized underwriting processes	3.56	.945	5	1	-.578	-.107	0.27
Underwriting process considers competition	4.04	.934	5	1	-1.185	1.501	0.23
Discourage marketing of substandard business	3.37	1.175	5	1	-.357	-.462	0.35
Use risk management models to asses catastrophic events	3.65	1.077	5	1	-.402	-.731	0.30
Use various approaches to counter adverse selection	4.21	.655	5	2	-1.068	1.977	0.16
N=57: Mean Score	**3.86**	**.982**	**5**	**1.3**	**-.788**	**.356**	**0.26**

SD is standard deviation, SK is skewness, KU is kurtosis CV is coefficient of variation, *Source: Research Data*

However, the results show that some practices are used to a slightly lesser extent (mean of $3.5 \leq 4.0$) including: avoidance of businesses that increase risks; the use of standardized underwriting processes, (an indication that some of the firms may be using adhoc underwriting methods for risk evaluation). Firms also use underwriting risk management models that allow measurement of catastrophic events; and, select good

business and turn down poor ones. The mean score of 3.86 implies that the respondents agreed that the underwriting practices are in place. No major differences in responses were noted across the three countries as reflected in Table 4.27.

4.5.2. Pricing Practices

The study sought to establish the pricing practices that were used by the insurance firms and results are shown in Table 4.4. It is observed that four pricing practices had a mean of 4 and above, meaning that they are much used. These include: use of group loss experience to determine premiums; rating according to classifications for each class of insurance; the use of experience rating system and/or merit rating for some classes of insurance to determine premiums; and, consideration of the stability of loss ratio. To a slightly lesser extent (mean of $3.5 \leq 4.0$), firms use the following practices: making allowances for future reserves to cover future claims; loading base premiums by a certain margin in order to make profits; firm's premium rates correctly following overall trends in the company; and, using experience rating systems to determine the next year's premiums.

It was however evident that the firms were neutral in the use of three pricing practices (mean of 2.5 to ≤ 3.5), namely: - performance of frequent revision of rates; the use of stochastic models to calculate insurance premiums; and, adjusting calculated revised rates by some rule or judgment. The mean score of 3.75 implies that most firms had these practices in place.

Table 4.4: Pricing Practices

Pricing Practices	Mean	SD	Max	Min	SK	KU	CV
Use of stochastic models/regression/data mining tools as guide in determining premiums	3.31	1.034	5	1	-.559	-.402	0.31
Determines / modify future premiums by relying on individual and/or group loss experience	4.16	.774	5	1	-1.480	4.428	0.19
Use rate classifications for each class of insurance	4.47	.734	5	2	-1.587	2.833	0.16
Load base premiums by a certain margin in order to make profits	3.54	1.196	5	1	-.594	-.282	0.34
make allowance for reserves to cover future claims	3.67	1.075	5	1	-.809	.274	0.29
Perform rate revisions frequently (every year)	3.47	1.136	5	1	-.426	-.577	0.33
Adjust resultant revised rates by rule or judgment	3.19	1.060	5	1	-.681	-.130	0.33
Experience policy cancellations and/or rewrite some policies if rates regularly fluctuate	3.44	1.195	5	1	-.662	-.523	0.35
Consider stability of loss ratio yearly in premium determination	4.00	.926	5	1	-.979	1.053	0.23
Premium rates correctly follow overall trends in the company	3.89	.947	5	1	-1.244	1.930	0.24
Develop and uses an experience rating system to determine the next year's premiums	3.81	.990	5	1	-1.084	1.071	0.26
Use merit rating (based on loss history) for some classes.	4.02	.855	5	1	-1.098	2.011	0.21
N=57: Mean Score	**3.75**	**.994**	**5**	**1.1**	**-0.933**	**0.974**	**0.27**

SD is standard deviation, SK is skewness, KU is kurtosis CV is coefficient of variation.

Source: Research Data

4.5.3. Reinsurance and Retentions Practices

Reinsurance is a risk management tool used by insurers to especially stabilize insurance claims. The study sought to establish how the insurance firms manage reinsurance using a

set of 5 statements and the results are reflected in Table 4.5. The results show that the firms arrange for sufficient and appropriate reinsurance coverage (mean of 4.61) and that reinsurance has helped the firms in underwriting expertise, increasing capacity, monitoring exposures, reducing level of risk loss reserves and also assisted in stabilizing volatility in underwriting results. (mean 4.24). The findings also show that most of the respondents firms do not transfer only high risk ratio classes to the reinsurers.

Table 4.5: Reinsurance Practices

Reinsurance Practices	**Mean**	**SD**	**Max**	**Min**	**SK**	**KU**	**CV**
Always arrange sufficient and appropriate reinsurance covers for risks as need be.	4.61	.701	5	1	-2.842	11.703	0.15
Retain a larger percentage of the risks in the lines underwritten	3.42	1.281	5	1	-.267	-1.267	0.37
Reinsure only the risky classes / those with high loss ratios	2.60	1.321	5	1	.554	-.886	0.51
Portfolio has not been affected by catastrophic risks due to appropriate reinsurance arrangements	4.05	.895	5	1	-1.190	1.853	0.22
Reinsurance has helped the firm in : Underwriting expertise, capacity, monitoring exposures, reducing the level of loss reserves, Helped stabilize volatility in underwriting results	4.24	.610	5	3	-.656	-.054	0.14
N=57: Mean Score	**3.78**	**.962**	**5**	**1.4**	**-.788**	**2.269**	**0.28**

SD is standard deviation, SK is skewness, KU is kurtosis CV is coefficient of variation: Source: Research Data

No major differences were noted in the way reinsurance practices are carried out in the three countries, with the mean score of 3.78 implying that majority of the firms use reinsurance as a risk management tool hence this should contribute toward stabilizing their firms' performance.

Retention ratio (the ratio of net written premiums to gross written premiums) is important in that higher retention ratios would lower the reinsurance premiums leading to reduced premium outflows, which may in turn positively impact the financial performance of the company. The average gross written premiums and net written premiums over the 5 year period are summarized in Tables 4.6 and 4.7 respectively.

Table 4.6: Gross Written Premiums

Range / Statistic	**Frequency**	**Percent**
≤ 500 million	14	24.6
Over 500 million up to 1 billion	14	24.6
Over 1 billion up to 1.5 billion	10	17.5
Over 1.5 billion up to 2 billion	2	3.5
Over 2.0 billion up to 2.5 billion	6	10.5
> 2.5 billion	11	19.3
Total	**57**	**100**
Arithmetic mean (Kshs)	1,566,445,726	
Standard deviation (Kshs)	1,645,191,324	
Coefficient of variation (ratio)	1.05	
Minimum- (Kshs)	19,711,773	
Maximum - (Kshs)	7,470,919,200.	

N= 57, *Source: Research Data*

Table 4.6 shows that majority of firms (66.7%) transact gross premiums of up to Kshs. 1.5 billion, with 19.3%. writing gross premiums of more than Kshs. 2.5 billion. The average gross premium written is about Kshs. 1.5 billion with a maximum of 7.5 billion (written by a Kenyan company) and a minimum of Kshs. 19.7 million (written by a Ugandan Company).

Table 4.7 reflects the net premiums written (gross written premiums less reinsurance ceded) by the firms and shows that majority of firms (61.4%) transact net premiums of up to Kshs. 800 million. Only 9% write net premiums of more than Kshs. 2.0 billion. The

mean net premium written is about Kshs. 1 billion with a maximum of 5.6 billion (from Kenya) and a minimum of Kshs. 8 Million (from Uganda).

Table 4.7: Net Written Premiums

Range / Statistic	**Frequency**	**Percent)**
≤ 400 million	21	36.8
Over 400 million up to 800 million	14	24.6
Over 800 million up to 1.2 billion	8	14.0
Over 1.2 billion up to 1.6 billion	3	5.3
Over 1.60 billion to 2.0 billion	6	10.5
> 2.0 billion	5	8.8
Total	57	100.0
Arithmetic mean (Kshs)		1,055,655,891
Standard deviation (Kshs)		1,297,948,031.
Coefficient of variation (ratio)		1.23
Minimum- (Kshs)		8,193,931
Maximum - (Kshs)		5,696,058,800.

Source: Research Data

The retention ratios (net written premiums divided by gross written premiums) calculated from the secondary data collected are reflected in Table 4.8. The results reveal that 63% of the firms retain over 60% of the gross premiums that they underwrite. The average retention ratio was 65% with minimum retention being 27% and maximum being 98%.

Maximum retention ratios were 98% for Kenya, 92% for Uganda and 64% for Tanzania, while minimum retention ratios were 41%, 30% and 27% for the countries respectively. Tanzania was noted to have the lowest maximum and minimum retention ratios. To arrive at a composite score for reinsurance practices and retention ratios, an arithmetic

mean using the individual average scores for each company for reinsurance practices and retention ratio was calculated for use in regression analysis.

Table 4.8: Retentions Ratios

Retention Ratios-(Range)	**Frequency**	**Proportion (%)**
≤ 30 %	3	5.3
31-45 %	8	14.0
46-60 %	10	17.6
61-75 %	19	33.3
>75 %	17	29.8
Total	**57**	**100.0**
Retentions Ratio		
Arithmetic mean (ratio)		65%
Standard deviation (ratio)		18.15%
Coefficient of variation (ratio)		0.28
Minimum- (ratio)		27%
Maximum - (ratio)		98%

Source: Research Data

4.5.4. Claims Management Practices

The study further sought to establish the practices that the firms employ in management of claims. The results are presented in Table 4.9. The findings show that nine claims management practices had a mean of 4 and above. They include: Autonomy of the claims department; regular analysis, reporting and minimization of unnecessary costs; performing loss reserving for each claim under all classes underwritten, which was evidenced by the finding that the firms did not perform loss reserving for long tail lines only; avoidance of protracted legal disputes so as to reduce claim costs; expeditious handling of claims; dealing with claimants courteously; customer care that leads to

Table 4.9: Claims Management Practices

Claims Management Practices	Mean	SD	Max	Min	SK	KU	CV
Claims department is a separate and autonomous	4.04	1.101	5	1	-1.152	.658	0.27
Regularly analyze, report and minimize unnecessary costs	4.37	.555	5	3	-.101	-.812	0.13
Often charge sufficient premiums to cover claims and expenses	3.61	1.056	5	1	-.581	-.583	0.29
Actual losses are often less than those projected due to correct analysis	3.37	1.029	5	1	-.295	-.483	0.31
Perform loss reserving for each claim under all classes underwritten	4.26	1.009	5	1	-1.963	4.107	0.24
Loss reserves done for long tail lines only	2.30	1.180	5	1	.944	.292	0.51
Use several loss control measures (e.g. large excesses to reduce severity of losses	3.72	1.031	5	1	-.822	.298	0.28
Undertake precautionary measures during underwriting and claims involving unfamiliar risks	3.80	1.052	5	1	-.757	.212	0.28
Try to avoid protracted legal disputes to reduce claim costs	4.12	.734	5	2	-.760	.965	0.18
Handle claims expeditiously and pay valid claims efficiently	4.51	.630	5	2	-1.365	2.904	0.14
Deals with claimants courteously	4.42	.565	5	3	-.293	-.834	0.13
Quality and quantity of customer care is good leading to improved claims settlement record.	4.35	.582	5	3	-.229	-.652	0.13
Review claims performance, monitor claims expense, legal costs and settlement costs	4.46	.600	5	2	-1.113	2.988	0.13
Plans for future payment and avoid disputes in claims payment	4.37	.723	5	2	-1.283	2.271	0.17
N=57: Mean Score	**3.98**	**.846**	**5**	**1.7**	**-.698**	**.809**	**0.23**

SD is standard deviation, SK is skewness, KU is kurtosis CV is coefficient of variation. *Source: Research Data*

improved claims settlement record; monitoring of claims statistics and planning for future payments.

The implication of these findings is that majority of the respondent firms have in place optimal claims managements practices which should lead to quality customer service and enable their organizations to reduce claim costs thus improving their performance (mean 3.98). However, the findings also show that some practices are not carried out to the level expected including: not taking into account precautionary measures for claims involving unfamiliar risks (mean 3.80) and the use of several loss control measures (like large excesses and consumer education programs) to reduce severity of losses (mean 3.72), charging of sufficient premiums to cover claims and expenses (mean 3.61), implying that some firms perform incorrect projection of actual losses (mean 3.37), which may negatively affect their claims performance.

4.5.5 Summary of Actuarial Risk Management Practices

Table 4.10 summarizes mean scores for the actuarial risk management practices.

Table 4.10: Summary of Mean Scores for Actuarial Risk Management Practices

Actuarial Risk Management Practice	Mean	SD	**SK**	**KU**	**CV**
Underwriting Practices	3.86	.982	-.788	-356	0.26
Pricing practices	3.75	.994	-.933	0.974	0.27
Reinsurance and retentions Practices	3.83	.775	-.1.232	2.179	0.20
Claims management Practices	3.98	.846	-.698	-.809	0.23

N =57: SD is standard deviation, SK is skewness, KU is kurtosis CV is coefficient of variation.
Source: Research Data

The claims management composite score was the highest (mean score 3.98) followed by Underwriting (mean 3.86), reinsurance and retentions (mean 3.83) and pricing practices (mean 3.75.). These overall mean scores that range between $3.5 \leq 4.5$ for all the actuarial risk management practices imply that on average, the respondent firms agreed that there is optimal application of the practices. It is noted that the mean standard deviations for these results is less than 1.00, implying that the respondent firms did not largely differ in their rating on the use of these practices.

4.6 Firm Performance

Firm performance was the dependent variable of this study. Both financial and non-financial performance indicators were calculated. Financial performance measures consisted of ROA and average of premium growth percentage over the period 2010-2014. Non-financial performance measures were computed using respondents' perceptions in terms of quality of service and market share, innovation and reputation.

This section presents the analysis of firm performance and just like the independent variables, non-financial performance (Appendix 1 Section E) was measured on a 5-point Likert scale whereby respondents were expected to either have: "excellent performance", "good performance", "average performance", "poor performance" or "very poor performance" in respect of the various aspects. For each parameter, the response that represented the most favorable response for the firm performance was accorded 5 points, followed by 4, 3, 2, and 1 for the least favorable. A score of <1.5 was interpreted to mean very poor performance; 1.5 to < 2.5 implied poor performance; 2.5 to < 3.5 was interpreted to mean average performance; 3.5 < 4.5 was interpreted to mean good performance while a score of ≥ 4.5 was interpreted to mean excellent performance. A

standard deviation of ≤1 was interpreted to mean that respondents had a consensus in the rating of the statement while a standard deviation greater than 1 was interpreted to mean that the respondents differed in their perception about the statement. The 28 statements that were used to gauge the level of performance were uniquely tailored to be specific to insurance firms.

4.6.1: Non Financial Firm Performance – Quality of Service and Market Share

The results for performance in respect of service quality leading to improved market share are reflected in Table 4.11. The results show that performance in the following areas was good (mean of ≥ 4.00): emphasis on customer centered services (mean 4.53) and high quality customer services (mean 4.14); having mechanisms in place for solving customer complaints (mean 4.21); getting referrals from existing customers (mean 4.19); shaping new product development using customer feedback (mean 4.23), and actions of competitors (mean 4.00) as well as changes in regulatory framework (mean 4.02).

However, the firms performed a little lower in the following areas (mean 3.5 < 4.0): new product development; current risks (like terrorism and flooding) shaping or influencing direction in the development of new products; and, ability to determine revenues from new customers. The firms performed poorly in terms of general increase in customer base and growth potential attributable to quality service (mean 2.26), implying that quality of service given does not necessarily lead to increased customer base, perhaps explained by the low penetration rates in these markets. The mean score (4.03) implies that on average performance was good and there were no major differences reflected across the three countries.

Table 4.11: Non Financial Firm Performance: Quality of Service and Market Share

Firm Performance-Quality of Service / Market Share	**Mean**	**SD**	**Max**	**Min**	**SK**	**KU**	**CV**
Emphasis on customer-centre services and processes	4.53	.538	5	3	-.464	-1.055	0.12
Provides high quality services that match customer expectations.	4.14	.789	5	2	-.935	1.024	0.19
Maintained market share in the last 3 years.	3.96	.981	5	2	-.633	-.573	0.25
Customer claims processed within a reasonable period of time (within 14 days).	3.72	.959	5	1	-.658	.123	0.26
Mechanisms to ensure that customer complaints are resolved satisfactorily	4.21	.590	5	2	-.616	2.497	0.14
Get referrals from existing customers due to quality service	4.19	.611	5	3	-.122	-.392	0.15
Experienced general customer growth due to quality service	4.26	.791	5	2	-.961	.649	0.19
Improved market share growth due to competitive advantage	3.91	.851	5	1	-.909	1.549	0.22
Ability to determine percentage of revenues from new customers/market segments	3.82	.897	5	1	-1.046	1.251	0.23
Regular development of new and creative products ahead of competitors	3.61	1.003	5	1	-.586	.154	0.28
New product development is shaped by recent events like:							
- Terrorism/Flooding	3.82	1.011	5	1	-.831	.607	0.26
- Feedback from customers	4.23	.627	5	2	-.656	1.705	0.15
- Actions of competitors	4.00	.779	5	2	-.704	.607	0.19
- Changes in regulatory framework	4.02	.813	5	1	-1.067	2.443	0.20
N =57: Mean Score	**4.03**	**.803**	**5**	**1.7**	**-.728**	**0.756**	**0.20**

SD is standard deviation, SK is skewness, KU is kurtosis CV is coefficient of variation. Source: Research Data

4.6.2: Non Financial Firm Performance: Innovation

On innovation, the performance of the firms was good (mean of ≥ 4.00) in the following as shown in Table 4.12: availability of high performance work systems like personal computers and internet services to all staff; and necessary infrastructure and technology, knowledge and skills, required to create, plan, design, and deliver products and services to customers and stakeholders.

Table 4.12: Non Financial Firm Performance: Innovation

Firm Performance-Innovation	Mean	SD	Max	Min	SK	KU	CV
Automated critical processes for better service delivery to customers and other stakeholders.	3.89	.900	5	2	-.701	-.038	0.23
Firm operations are almost entirely paperless	2.81	1.093	5	1	.144	-.801	0.39
Incorporated relevant processes and programs into their business models to help outperform competitors.	3.54	.825	5	1	-.935	.779	0.23
Automated claims function from notification to settlement	3.00	1.239	5	1	.000	-1.027	0.41
Have automated service provider functions (claims adjustors, surveyors, engineers, motor assessors)	2.81	1.060	5	1	-.065	-1.092	0.38
have analysis based programs to help improve efficiency in:- Assessment of fraudulent claims, new product development, cloud computing and social marketing	3.29	.890	5	1	-.514	.186	0.27
Have technological tools (personal computers and internet) for all staff/ employees	4.21	.977	5	1	-1.394	1.647	0.23
Have necessary physical infrastructure, information systems, knowledge and skills, for service delivery to all stakeholders.	4.19	.934	5	1	-1.764	3.825	0.22
N =57: Mean Score	**3.47**	**.989**	**5**	**1.1**	**-.653**	**.434**	**0.29**

SD is standard deviation, SK is skewness, KU is kurtosis, CV is coefficient of variation. Source: Research Data

All other performance indicators had low to medium scores as evidenced by the mean scores (2.5 ≤ 4.0). The mean score of 3.47 implies that the technological tools although in place or available may not be well utilized for the intended purposes due to lack or insufficient training, unfamiliarity of application and / or other factors within the firms.

4.6.3: Non Financial Firm Performance: Reputation

The study results as reflected in Table 4.13 reveals that all the reputation practices contribute to performance among the P and C firms that were surveyed (mean 4.29).

Table 4.13: Non Financial Firm Performance: Reputation

Firm Performance-Reputation	Mean	SD	Max	Min	SK	KU	CV
Firm involved in transparent business practices to improve public trust	4.44	0.598	5	2	-1.053	2.907	0.13
Firm's reputation has not been damaged by scandals or. unethical behaviours leading to better performance	4.28	0.921	5	2	-1.309	1.009	0.22
Firm involved in other activities to cater for interests of other / all stakeholders	4.26	0.669	5	2	-0.731	1.079	0.16
Firm engages in Corporate Social responsibility (CSR) activities	3.96	0.609	5	2	-1.026	3.872	0.15
Claim issues are crucial to firm's reputation	4.49	0.658	5	2	-1.331	2.329	0.15
N =57: Mean Score	**4.29**	**0.691**	**5**	**2**	**-1.090**	**2.239**	**0.16**

SD is standard deviation, SK is skewness, KU is kurtosis CV is coefficient of variation.

Source: Research Data

These include: firm involvement in transparent business practices which improve public trust (mean 4.44), firm not being involved in scandals which damage reputation (e.g. unethical behaviours like under pricing, reckless management, incompetence, fraud etc)

leading to better performance relative to competitors (mean 4.28), involvement in activities (social, environmental economic) to cater for all stakeholder (mean 4.26); claims issues being crucial by enhancing the firm's reputation and thus performance (mean 4.49) and engagement in corporate social responsibility (CSR) to enhance reputation and contribute to performance (mean 3.96).

4.6.4 Summary of Non-Financial Performance

Table 4.14 shows the summary of results for the non financial performance scores. The results indicate that the firms have performed well in reputation and service quality but average on innovation. The overall result for non-financial performance was good as reflected by a mean of 3.93. Across the countries, and it is noted that individual country performance was not very different (Kenya (mean,4.0), Tanzania (mean,3.8) and Uganda (mean, 3.7).

Table 4.14: Summary: Non-Financial Performance

Non Financial Performance	Mean	SD	SK	KU	CV
Service quality	4.03	.471	-.418	1.028	0.12
Innovation	3.47	.707	-.685	.887	0.20
Reputation	4.29	.444	-.239	-.914	0.10
N =57: Mean Score	**3.93**	**.838**	**-.773**	**.936**	**0.22**

SD is standard deviation, SK is skewness, KU is kurtosis CV is coefficient of variation. *Source: Research Data*

4.6.5: Financial Performance

Financial performance was measured using return on assets (ROA) i.e. the ratio of net income earned before taxation to total assets and, average gross premium growth rate of the firms over the period 2010-2014. The premiums were converted to a common base

(Kenyan) for comparative and analysis purposes. The findings as reflected in Table 4.15 reveal that majority of the firms (86%) had a net income before tax of up to Kshs. 500 million, while 14 % of the firms had a net income of above Kshs. 500 million. Average net income was Kshs. 231 million and ranged from a minimum (loss) of 82 million to a maximum of Kshs. 1.2 billion. It is noted that the highest and lowest net incomes reported above are from Kenya and Tanzania respectively.

Table 4.15: Net Income before Tax

Net Income Before Tax (Kshs)	**Frequency**	**Percent**
Up to 100 million	22	38.6
Over 100 Million up to -200 million	14	24.6
Over 200 Million up to 300 million	7	12.3
Over 300 million up to 400 million	2	3.5
Over 400 million up to 500 million	4	7.0
Above 500million	8	14.0
Total (N=57)	57	100.0
Arithmetic mean		230,949,786
Standard deviation (Kshs)		293,599,051
Coefficient of variation (ratio)		1.27
Minimum- (Kshs)		(81,967,568)
Maximum - (Kshs)		1,233,333,200

Source: Research Data

Results for total assets held by the firms are reflected in Table 4.16 showing that up to 67% of the firms had total assets of up to Kshs. 3 billion while the rest (33%) had assets of above Kshs. 3 billion. Minimum assets held were Kshs. 73 million (by a Ugandan Firm) and maximum Kshs. 11 billion (by a Kenyan firm); while the mean was about Kshs. 3 billion. As reflected in Table 4.27, the average assets held by Kenyan, Ugandan and Tanzanian firms were about 3.7 billion, 2 billion and 1.6 billion respectively

Table 4.16: Total Assets held by the Firms

Range (Kshs)	Frequency (No. of Firms)	Percent (%)
Up to1 billion	13	22.8
Over 1.0 up to 2 billion	14	24.6
Over 2.0 billion up to 3billion	11	19.3
Over 3.0 up to 4 billion	7	12.3
Over 4.0 up to 5 billion	4	7.0
Over 5 billion	8	14.0
Total	57	100
Arithmetic mean (Kshs)		2,909,227,548
Standard deviation (Kshs)		2,575,565,020
Coefficient of variation (ratio)		0.89
Minimum- (Kshs)		73,166,961
Maximum - (Kshs)		11,263,202,400

Source: Research data

Table 4.17 shows the ratio of net income earned before taxation to total assets (ROA) for the firms which ranges from a minimum of -24.9% to a maximum of 30.3% with the mean return being about 6 %.

Table 4.17: Return on Assets

Range (Kshs)	Frequency (No. of Firms)	Percent (%)
Negative up to 0%	8	14.0
Over 0% up to 5%	15	26.3
Over 5% up to 10%	21	36.8
Over 10% up to 15%	9	15.9
Over 15%	4	7.0
Total	**57**	**100**
Arithmetic mean (Kshs)		5.99
Standard deviation (Kshs)		9.06
Coefficient of variation (ratio)		1.5
Minimum- (Kshs)		(24.9)
Maximum - (Kshs)		30.3

Source: Research data

As reflected in Table 4.27, the most profitable firms are noted to be in Kenya with an average ROA of about 9% , followed by Ugandan Firms (ROA 5.4%) with the lowest in Tanzania at -0.5%.

Table 4.18 shows the gross premium growth rates percent for the period 2010-2014. The growth rate ranged from a minimum of -26% to a maximum of 242% (both recorded by Ugandan companies as per Table 4.27) with an overall mean growth rate being 26.3%. The mean growth rates for Uganda, Tanzania and Kenya were 44.5%, 21.6 % and 20.7% respectively.

Table 4.18: Gross Premium Growth Rates (2010-2014)

Growth Rate (Range)	**Frequency (No. of Firms)**	**Percent (%)**
Negative up to 0%	3	5.3
Over 0% up to 15%	23	40.4
Over 15% up to 30%	19	33.3
Over 30% up to 45%	6	10.5
Over 45%	6	10.5
Total	**57**	**100**
Arithmetic mean (Kshs)		26.3
Standard deviation (Kshs)		40. 2
Coefficient of variation (ratio)		1.53
Minimum- (Kshs)		(26%)
Maximum - (Kshs)		242%

Source: Research data

4.6.6 Summary of Financial Performance

Table 4.19 shows the summary of results for financial performance combining return on assets and premium growth rates. The combined return's mean was 16% with a minimum of -11.5% and a maximum of 113.8% . Standard deviations of 9.7%, 34.3% and 10.4% for Kenya, Uganda and Tanzania respectively (See Table 4.27) imply that the greatest

degree of heterogeneity of profitability considering ROA and premium growth rate is among Ugandan insurers.

Table 4.19: Combined Financial Performance

Combined Return (Range)	Frequency	Percent (%)
Negative up to 0%	4	7.0
Over 0% up to 5%	3	5.3
Over 5% up to 10%	12	21.0
Over 10% up to 15%	17	29.8
Over 15% up to 20%	9	15.8
Over 20 up to 25%	7	12.3
Over 25%	5	8.8
Total	**57**	**100**
Arithmetic mean (Kshs)		16.1
Standard deviation (Kshs)		18.7
Coefficient of variation (ratio)		1.16
Minimum- (Kshs)		(11.5%)
Maximum - (Kshs)		113.8%

Source: Research data

4.7 Underwriting Risk

The study sought to establish the loss ratios (percentage of net claimed incurred to net premiums earned) of the firms over a five year period. The loss ratio for each of the years for each firm was computed and summed up then an overall mean calculated for each company. The resultant summary statistics reflected in Table 4.20 show that 65% of the insurance firms had between 46 to 75 percent loss ratio. The maximum loss ratio was 96% (Kenyan firm) and the minimum 8% (Ugandan firm) with the average loss ratio for the firms being 52% (mean loss ratios were: 60% for Tanzania, 57% for Kenya, and 32% for Uganda as reflected in Table 4.27).

Table 4.20: Loss Ratios

Loss Ratios- (Range)	Frequency (Firms)	Percent
0-15%	2	3.5
16-30%	5	8.8
31-45%	10	17.5
46-60%	22	38.6
61-75%	15	26.3
Above 75 %	3	5.3
Total	**57**	**100.0**
Arithmetic mean (%)		51.7
Standard deviation (%)		17.0
Coefficient of variation (ratio)		0.33
Minimum- (%)		8%
Maximum - (%)		96%

Source: Research data

4.8 Firm Characteristics

Firm characteristics in this study included size (using log of total assets), age, measured by the number of years the firm had been in operation, managerial competence in terms of academic, professional qualifications as well as work experience of the senior staff, ownership structure of the firm (using percentage of local interests) and country where the firm is domiciled (Kenya, Uganda or Tanzania).

4.8.1. Size of the Firm

The size of the firm was measured using the log of total assets. Goddard and Wilson (2005) used the same measure. The asset values were converted to a common currency for uniformity of values (Kenya Shillings) for purposes of analysis since financial reports that were used in this study were done in the relevant country's currency. The results for total assets held are reflected in Table 4.16 (section 4.6.5 above) and log of total assets is reflected in Table 4.21

Table 4.21: Size of the Firms

Range (log of total assets)	Frequency	Percent
Up to 20.1	7	12.3
20.2 to 20.8	6	10.5
20.9 to 21.5	17	29.8
21.6 to 22.2	19	33.4
22.3 and above	8	14.0
Total	**57**	100.0
Arithmetic mean (log)		21.4
Standard deviation (log)		0.983
Coefficient of variation (ratio)		0.05
Minimum- (log)		18.1
Maximum - (log)		23.1

Source: Research Data:

The mean was 21.4 with the lowest being 18.1 and highest being 23.1. Majority of the firms (63.2%) had a log of total assets of between 20.9 and 22.2. Only 14% of the firms had a log of total assets of 22.3 and above. On average, as reflected in Table 4.27, the biggest insurance companies in terms of assets are in Kenya (mean 21.8), followed by Uganda (mean 21.6) with the smallest being in Tanzania (mean 20.9).

4.8.2. Number of Years in Operation

Age was measured by the number of years since incorporation as was also done by Iraya (2014). Table 4.22 captures the distribution. The results reveal a wide age range from a minimum of 3 (for a Tanzanian firm) years to a maximum of 104 years (for a Kenyan firm). The majority of the companies (88%) have been in operation for up to 45 years. The mean ages of the firms was 37 for Kenya, 13 for Tanzania and 17 for Uganda with the overall mean age for all the firms being 27 years as reflected in Table 4.27.

Table 4.22 Number of Years in Operation (Age)

Years (Range)	Frequency	Percent
1-15 years	21	36.8
16-30 years	11	19.3
31-45 years	18	31.6
46-60 years	4	7.0
Over 60 years	3	5.3
Total	57	100.0
Arithmetic mean (years)		27.05
Standard deviation (years)		19.744
Coefficient of variation (ratio)		0.73
Minimum- (years)		3
Maximum - (years)		104

Source: Research Data:

4.8.3 Managerial Competence

The qualifications of the senior management employees are very important since these are the people tasked with major management decision making that affect operations of an organization. The study thus sought to measure and draw inferences on managerial competence of the senior staff / heads of departments of the firms using knowledge (level of education and professional qualifications) and skills (years of work experience). The respondents were required to indicate the years of experience of the senior management staff as well as their academic and professional qualifications (Veres et al., 1990). The options ranged from ordinary and advanced level to university education. In order to measure managerial competence scores were assigned using the credentials of the top manager i.e. the Chief Executive Officer (CEO) [or Managing Director (MD) / General Manager (GM) where these were indicated as top managers]. This was because the senior staff designations given by the firms were not uniform hence difficulty in assigning similar scores to the various designated staff. The scores assigned were as follows:

Masters degree and above (4); First degree (3); Diploma/Professional qualification: (2); Ordinary/Advanced levels (1); Similarly for work experience scores were: Over 30 years (4); 21-30 years (3); 11-20 years (2); and 0-10 years (1); the mean for each CEO for skills and experience was determined and taken as representing the firm's managerial competence.

The study revealed that firms' senior staff comprise mostly of the Chief Executive Officers, General Managers, Underwriting, Marketing and Claims Managers, Legal Officers, Finance Managers and Operations Managers. On educational qualifications all firms' CEOs were found to have at least a first degree and a professional qualification. Table 4.23 shows a cross tabulation of the years of experience and educational qualifications of the top manager. The findings are an indication that the top managers of the insurance companies have relevant qualifications and experience commensurate with the type of work they are assigned to do.

Table 4.23: Years of Work Experience and Education for CEOs

Years of experience	**First Degree**	**Second Degree**	**Total**	**Percent**
Up to 10 years	4	4	8	14.0
Over 10 up to 20 years	15	3	18	31.6
Over 20 up to 30 years	10	11	21	36.8
0ver 30 years	6	4	10	17.5
Total			**57**	**100**

Source: Research Data

The results for managerial competence are shown in Table 4.24.

Table 4.24: Managerial Competence Scores

Range /statistic	**Frequency**	**Percent**
Up to 2.4	21	36.8
Over 2.4 up to 2.8	1	1.8
Over 2.8 up to 3.2	29	50.9
Over 3.2	6	10.5
Total	**57**	**100.0**
Arithmetic mean (score from 1-4)		3.0
Standard deviation (score from 1-4)		1.542
Coefficient of variation (ratio)		0.51
Minimum- (score from 1-4))		2.0
Maximum - (score from 1-4)		4.0

Source: Research Data:

Only 10.5% of the firms had a competency level of 3.2 and above, meaning that for these firms, the average CEO had at least a first degree and at least 21 years of work experience in the insurance sector. No major differences were observed across the three countries with the overall mean scores for Kenya, Tanzania and Uganda were 2.7, 2.8 and 2.6 respectively as reflected in Table 4.27.

4.8.4. Ownership Structure

To determine the ownership structure of the firms, the respondents were required to indicate whether their firms were locally or foreign owned and the percentage of ownership of the firms where there was combined ownership. The analysis based on majority (51% and above) local or foreign ownership shows that that 61 % of the respondent firms had majority local ownership while 39% had majority foreign

ownership. It was also noted that of these, about 30% had a combination of local and foreign ownership. Table 4.25 shows the local percent ownership structure of the firms with an overall mean percentage of 69% for all companies. The values ranged from a minimum of 0% to a maximum of 100%. The mean was 78% for Kenya, 38% for Tanzania and 62% for Uganda and Uganda was the only country with some firms with no local ownership as shown in Table 4.27.

Table 4.25: Local Ownership Structure of the Firms

Local Ownership (%)	**Frequency**	**Percent**
0 - 30%	7	12.3
31-60%	18	31.6
61-90%	4	7.0
Over 90%	28	49.1
Total	**57**	**100**
Arithmetic mean (%)		69
Standard deviation (%)		34
Coefficient of variation (ratio)		0.49
Minimum- (%)		0
Maximum- (%)		100

Source: Research Data

4.8.5 Country of Domicile of Firms

Firm performance may be influenced by the prevailing situations in the country of incorporation and operation due to differences in levels of economic development especially for the insurance industry which may have an impact on the level and extent of risk management practices. Table 4.26 shows the breakdown of the number of firms and the response rate from each of the three countries. Using regression analysis, the

moderating effect of home country of the firm on the relationship between ARMP and performance is tested in the next chapter.

Table 4.26: Distribution of firms in Kenya, Uganda and Tanzania

Country	Sample Size	Number of firms that responded	Response rate
Kenya	35	32	91.4%
Uganda	21	13	61.9%
Tanzania	26	12	46.2%
Total	**82**	**57**	**69.5%**

Source: Research Data

4.9 Country Based Summary of Descriptive Findings

An overview of the descriptive results of each country (as highligted in the preceding discussion) is presented in Table 4.27 to give an indication of any systematic similarities and /or differences of the various variables that were under study. The Most profitable firms were noted to be in Kenya with an average ROA of about 9% , followed by Ugandan Firms (ROA 5%) with the lowest in Tanzania at -0.5%. Standard deviations imply that the greatest degree of heterogeneity of profitability considering ROA and premium growth rate is among Ugandan insurers. With respect to size, on average the biggest insurance companies are in Kenya (21.9), followed by Uganda (21.6) with the smallest being in Tanzania (20.9). The mean age of the firms was (37-Kenya; 13-Tanzania; 17 Uganda). Apart from the above, all mean and median values were almost similar for all three countries depicting a reasonably normal distribution of the variable values. These results overall provide strong evidence to conclude that there are not many systematic differences across these three countries' insurance industries.

Table 4.27: Summary of Country Descriptive statistics Findings

Variable	Mean			Standard Deviation			Median			Maximum			Minimum		
	Kenya	TZ	UG	Kenya	TZ	UG	Kenya	TZ	UG	Kenya	TZ	UG	Kenya	TZ	UG
Underwriting	3.97	3.83	3.54	.647	.577	.519	4	4	4	5	5	4	3	3	3
Pricing	3.78	4.00	3.69	.659	.603	.630	4	4	4	5	5	5	2	3	3
Reinsurance	4.16	3.91	3.92	.515	.701	.494	4	4	4	5	5	5	3	3	2
Retention Ratio (%)	73	44	63	12.196	12.060	18.607	72	43	67	98	64	92	41	27	30
Claims Management	3.94	4.00	3.85	.354	0.000	.376	4	4	4	5	4	4	3	4	1
Quality of Service	4.2	4.0	3.8	.535	0.000	.385	4	4	4	5	4	4	3	4	3
Innovation	3.5	3.3	3.2	.915	.452	.688	4	3	3	5	4	4	1	3	2
Reputation	4.2	4.3	4.2	.553	.621	.554	4	4	4	5	5	5	3	3	3
Premium Growth (%)	20.7	21.6	44.5	19.3	20.8	75.6	14.5	20.5	19	100	67	242	(5)	(8)	(26)
ROA	8.6	(.5)	5.4	6.02	10.0	11.7	8.4	2.9	3.2	30.3	11.0	27.8	(5.5)	(24.9)	(14.4)
ROA&PGR(%)	14.7	10.6	25	9.7	10.4	34.3	11.7	3.8	3.7	54	32.1	118.8	(1.1)	(6.3)	(11.5)
Loss Ratio (%)	57	60	32	13.41	9.81	15.89	54	61	31	96.4	81.7	62.3	33.6	44.7	7.9
Size (log of total assets)	21.9	20.9	21.6	0.572	0.931	1.222	21.7	21.3	21.2	23.1	22.0	22.2	20.3	19.0	18.1
Total Assets	3.695b	1.065b	1.998b	2.985b	1.129b	1.553b	2.64b	1.49b	1.67b	11.26b	3.52b	4.22b	669m	73m	181m
Age	37	13	17	20	5	14	37	14	10	104	18	52	5	3	5
Managerial Competence	2.7	2.8	2.6	0.60	0.60	0.60	3	3	3	4	4	4	2	2	2
(Local) Ownership (%)	78	38	62	30	19	45	100	40	100	100	100	100	25	30	0

TZ= Tanzania; UG = Uganda; PGR= Premium Growth Rate

Source: Research Data

4.10 Chapter Summary

This chapter has described the descriptive statistics findings for the independent, dependent, intervening and moderating variables of the study. The mean scores, standard deviations, minimum and maximum values were presented and explained. Any major similarities and/or differences noted across the three East African countries were also brought out. The chapter ends with a summary table of all descriptive findings for all variables across the three countries.

CHAPTER FIVE

HYPOTHESES TESTING AND DISCUSSION

5.1 Introduction

This chapter is a presentation of results and interpretation of the research hypotheses. It contains the results of correlation analysis where interrelationships among the study variables are examined. The study had four null hypotheses, each in two parts testing for the relationship with financial and non-financial performance. The first to be tested was the relationship between actuarial risk management practices (ARMP) and firm performance of P & C firms in East Africa; the second tested the intervening influence of underwriting risk on the relationship between ARMP and firm performance; the third hypothesis tested the moderating effect of firm characteristics on the relationship between ARMP and performance of the firms; while the fourth tested the combined effect of ARMP, underwriting risk, and firm characteristics on performance of P & C firms in East Africa. Tests of goodness of fit (analysis of variance- ANOVA) including correlation coefficient (r), coefficient of determination (R^2), adjusted coefficient of determination (R^2), t tests, F tests and standard error of estimates are also presented. The study reports adjusted R^2 to control for increases in R^2 due to chance when an additional independent variable is added into the model.

5.2 Correlation Between Study Variables

The study sought to establish the nature (strength) and direction (positive or negative) of the relationship that exists between the study variables. In order to achieve this correlation analysis was conducted at 0.05 and 0.01 levels two tailed significance in line with other studies such as Iraya (2014), Muindi (2014) and Munjuri (2013). In addition, the correlation matrix helped determine whether multicollinearity existed between the

independent variables which could interfere with analysis. Pearson's correlation coefficient (denoted by r) was used to establish the nature and direction of the relationship and can take a range of values from +1 to -1. A value of 0 indicates that there is no association between the variables; a value greater than 0 indicates a positive association; a value of 1 indicates perfect positive correlation implying that an increase/decrease in one variable is followed by a proportional increase/decrease in the other variable while a value of -1 indicate perfect negative correlation which implies that an increase in one variable is followed by a proportional decrease in the other variable (Cooper & Schindler, 2008). The following criterion used in other studies such as Mwangi (2014) was used to measure the nature and direction of the relationship between the variables: strong (0.7 and above), moderate (0.4 and less than 0.7) and weak (0 to less than 0.4). Multicollinearity exists when independent variables are highly correlated ($r \geq 0.9$) and tends to lead to a poor regression model (Green et al., 1988). The correlation results are presented in Table 5.1.

The results reveal that there are moderate positive correlations (at 0.01 level of significance) between the following variables: pricing and underwriting practices (r = 0.574), age and reinsurance and retentions (r = .403) and, non-financial firm performance and underwriting (r = 0.402); while there are weak positive correlations between the flowing variables: Age and underwriting (r = .382), ownership structure and reinsurance and retentions (r =.372) and claims management and loss ratio (r= .197).

Table 5.1: Pearson Product-Moment Correlations Results for Study Variables

Correlation Matrix

	Scale	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
1	Underwriting	1										
2	Pricing	0.374**	1									
3	Reinsurance & Retentions	0.316*	0.093	1								
4	Claims Management	0.127	0.303*	(0.048)	1							
5	Loss Ratio	0.177	0.099	(0.051)	0.197*	1						
6	Size	0.067	0.022	0.131	0.007	0.183	1					
7	Age	.382**	0.190	0.403**	-0.048	0.113	0.307	1				
8	Managerial Competence	-0.052	-0.033	-0.206	0.076	0.031	0.163	-0.004	1			
9	Ownership Structure	0.157	0.072	0.372**	-0.001	0.058	0.079	0.333*	-0.009	1		
10	Firm performance (Financial)	0.020	-0.119	0.025	0.034	-0.178	0.326*	0.040	-0.071	-0.027	1	
11	Firm Performance (Non-Financial)	0.402*	0.241	0.307*	0.442*	0.283*	0.116	0.033	0.205	0.143	-0.079	1

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

* Correlation is significant at the 0.05 level (2 –tailed)

A moderate positive correlation exists between the following variables at 5% level of significance: non-financial firm performance and claims management practices (r = .442) while weak positive correlations exist between the following variables: reinsurance and retentions and underwriting (r= .316); claims management and pricing (r= .303); non-financial firm performance and reinsurance and retentions (r = .307); non-financial firm performance and loss ratio (r = .283);ownership structure and age (r = .333) and size and financial performance (r = .326)

Other correlations, although weak and positive or negative are not statistically significant for example: underwriting and claims management practices (r =.127); age and size (r = .307) ownership structure and non-financial performance (r = .143) and loss ratio and financial performance (r = -.178). The correlation results therefore reveal that there are significant relationships between the study variables in line with the study hypotheses. Results further show that the correlations are below the threshold ($r \geq 0.9$) as suggested by Green et al. (1988) hence no indication of multicollinearity.

5.3 Hypotheses Testing

Hypotheses testing was necessary in order to establish whether there was any significant relationship between the dependent variable (financial and non-financial performance of the firms) and the independent variables (underwriting, pricing, reinsurance and retentions and claims management practices) and if this relationship is mediated by loss ratio. The study also predicted that firm characteristics (size, age, managerial competence, ownership structure and home country of the firm) would have a moderating effect on the relationship between ARMP and firm performance. Composite scores were

calculated for variables which had several measures and used for regression purposes. Financial measures used ROA and premium growth rate mean scores while all non financial performance measures (quality of service, innovation and reputation) were collapsed into one composite score. The results from regression analysis, conducted at 95% confidence level, are discussed below.

5.3.1 Relationship between Actuarial Risk Management Practices and Firm Performance

The first research objective was to determine the relationship between actuarial risk management practices and firm performance of P & C firms in East Africa. The study predicted a positive relationship between ARMP and firm performance. The following two null hypotheses were tested sequentially as follows: -

Hypothesis 1a: There is no significant relationship between actuarial risk management practices and financial performance of property and casualty firms in East Africa.

With financial performance as the dependent variable and ARMP as predictor variables, the results of the regression are as shown in Table 5.2 (a-c). The results show a statistically insignificant model: $\vec{R^2}$ =.002, F (4, 40) = 1.022, with a p value of .408 (> .05). This shows that ARMP account for only 0.2 % of the variance in financial firm performance of P & C firms in East Africa. Table 5.2c shows that the model coefficients for all variables are not significant predictors of financial firm performance (p > .05). Their beta coefficients are not different from zero. No model is specified and hypothesis 1a is therefore supported.

Table 5.2: Regression Results for the relationship between Actuarial Risk Management Practices and Financial Performance

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.304[a]	.093	.002	14.025

a. Predictors: (Constant), Reinsurance & Retentions, Pricing practices, Claims management practices, Underwriting practices.

b) **ANOVA[a]**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	804.103	4	201.026	1.022	.408[b]
	Residual	7868.349	40	196.709		
	Total	8672.452	44			

a. Dependent Variable: Firm Performance (Financial)
b. Predictors: (Constant), Reinsurance & Retentions, Pricing practices, Claims management, Underwriting practices

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.982	25.865		.038	.970
	Reinsurance & Retentions	.000	.000	.237	1.463	.151
	Underwriting practices	-6.315	5.935	-.201	-1.064	.294
	Pricing practices	3.090	5.074	.113	.609	.546
	Claims management practices	4.210	5.598	.124	.752	.456

a. Dependent Variable: Firm Performance (Financial)

Hypothesis 1b: ***There is no significant relationship between actuarial risk management practices and non-financial performance of property and casualty firms in East Africa***.

This hypothesis was tested by regressing ARMP on non-financial firm performance which was measured by quality of service, innovation and reputation. Results of the

regression are presented in Table 5.3 (a-c). The results indicate that the effect of ARMP on non-financial performance is significant with $\bar{R}^2$ =.298, F (4, 45) = 6.195, $p \leq .05$). 29.8% of variation in non-financial firm performance can be explained by ARMP.

Table 5.3 Regression Results for the relationship between Actuarial Risk Management Practices and Non-Financial Performance

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.596[a]	.355	.298	.363

a. Predictors: (Constant), Reinsurance & Retentions, Claims management practices, Underwriting practices, Pricing practices

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.262	4	.815	6.195	.000[b]
	Residual	5.924	45	.132		
	Total	9.185	49			

a. Dependent Variable: Firm performance (Non-Financial)

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.558	.642		2.1063	.040
	Reinsurance & Retentions	.141	.072	.071	1.960	.050
	Underwriting practices	.147	.133	.160	1.107	.274
	Pricing practices	.242	.125	.277	2.185	.031
	Claims management practices	.355	.143	.321	2.478	.017

a. Dependent Variable: Firm performance (Non-Financial)

The model can therefore be used in explaining the influence of ARMP on non-financial performance of the firms. The model coefficients of reinsurance and retentions (β= .141, $p \leq .05$), pricing practices (β=.242, $p \leq .05$) and claims management practices (β= .355, $p \leq .05$), and are significant predictors of non-financial firm performance. Underwriting practices (β=.147, $p > .05$) is not a significant predictor of non-financial firm performance. The null hypothesis was therefore rejected and the alternate one confirmed, meaning that there is a significant relationship between ARMP and non-financial firm performance

The prediction equation was specified as: $NFP = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR + \beta_4 CM + \varepsilon_1$ Where NFP is non firm performance, β_0 is the intercept, UW is underwriting practices, PR is pricing practices, RR is reinsurance and retentions and CM is claims management practices while ε_1 is the error term. The regression model can be simplified as: **NFP = 1.558+*.242PR* +. *141RR*+*.355CM***

5.3.2 Intervening Effect of Underwriting Risk on Relationship between Actuarial Risk Management Practices and Firm Performance

The second objective of the study was to assess the mediating effect of underwriting risk on the relationship between ARMP and firm performance. ARMP comprised of underwriting, pricing, claims management and reinsurance and retentions practices, while underwriting risk comprised of loss ratio. Both financial and non-financial firm performances were used in testing the hypotheses.

The study adopted four steps to test the intervening effects in line with the process advocated by Baron and Kenny (1986). In step one the relationship between ARMP

(independent variable) and firm performance (dependent Variable), as in equation 3.1 and 3.2 above, was carried out ignoring the mediator. In the second step, regression between the independent variables (ARMP) and intervening variable (underwriting risk) was performed while ignoring the dependent variable (firm performance). In step 3, regression analysis was performed between underwriting risk (intervening variable) and firm performance (dependent variable) ignoring the independent variable (ARMP). In the fourth step, regression was performed with firm performance as the dependent variable and both ARMP and underwriting risk as the independent variables. The following null hypotheses (II a and II b) were sequentially tested through the four steps:

Hypothesis II a: Underwriting risk does not have a significant intervening effect on the relationship between actuarial risk management practices and financial performance of property and casualty firms in East Africa.

To test the intervening effect, step 1 of the process was the same as performing the regressions under hypothesis Ia (section 5.3.1). The analysis for the relationship of ARMP and financial performance results were statistically insignificant as reflected in Table 5.2 (a-c) above with $\bar{R}^2$ =.002, F (4, 40) = 1.022, and p > .05) hence no further analysis was performed with respect to financial performance under hypothesis II a.

Hypothesis II b: Underwriting risk does not have a significant intervening effect on the relationship between actuarial risk management practices and non-financial firm performance of property and casualty firms in East Africa.

Step 1 results were statistically significant for non-financial performance (section 5.3.1 hypothesis I b) as reflected above in Table 5.3 with $\bar{R}^2$ =.298, F (4, 45) = 6.195, p ≤ .05).

The prediction equation : NFP = $\beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR + \beta_4 CM + \varepsilon_1$ was specified as: **NFP = 1.558+*.242PR +. 141RR+.355CM***

The results for step 2 regressions between ARMP predictor variables and underwriting risk (loss ratio) as the dependent variable as reflected in Table 5.4 (a-c) show a statistically significant relationship between loss ratio and ARMP with. $\bar{R}^2$ = .113, F (4, 45) = 2.553, and $p \leq .05$. ARMP account for 11.3% of the variance in loss ratio. However, none of the model coefficients was a significant predictor of loss ratio ($p > .05$); their beta coefficients are not different from zero.

Table 5.4: Regression Results for the relationship between Loss Ratio as Dependent Variable and Actuarial Risk Management Practices as Predictor Variable

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.430[a]	.185	.113	16.167

a. Predictors: (Constant), Underwriting practices, Pricing practices, Claims management practices, Reinsurance & Retentions

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2669.657	4	667.414	2.553	.050[b]
	Residual	11762.129	45	261.381		
	Total	14431.786	49			

a. Dependent Variable: Loss ratio

b. Predictors: (Constant), Underwriting practices, Pricing practices, Claims management practices, Reinsurance & Retentions

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.039	.319		.122	.903
	Reinsurance & Retentions	-.113	.155	-.238	-.728	.470
	Underwriting practices	.028	.226	.001	1.281	.206
	Pricing practices	-.022	.206	.-169	-.708	.361
	Claims management practices	.459	.375	.281	1.222	.227

a. Dependent Variable: Loss ratio

Results of step 3 with loss ratio as the predictor variable and non-financial firm performance as the dependent variable are shown in Table 5.5(a-c). The model is statistically significant (R^2= .092, F (1, 54) = 5.481 and $p \leq .05$) implying that that loss ratio significantly influences non-financial firm performance.

Table 5.5 Regression Results for the relationship between Loss Ratio as Predictor and Non-Financial Firm Performance as Dependent Variable

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.304[a]	.092	.075	.409

a Predictors (constant), Loss ratio.

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.915	1	.915	5.481	.023[b]
	Residual	9.016	54	.167		
	Total	9.931	55			

a. Dependent Variable: Firm performance (Non-Financial)
b. Predictors: (Constant), Loss ratio

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.452	.175		19.739	.000
	Loss ratio	.008	.003	.304	2.341	.023

a. Dependent Variable: Firm performance (Non-Financial)

Regression coefficient (β) value of loss ratio was .008 ($p \leq .05$). This indicates that a statistically significant relationship exist between loss ratio and non-financial firm performance.

In the fourth step regression was performed with non-financial firm performance as the dependent variable and ARMP and underwriting risk as the predictor variables. Table 5.6 (a-c) reflects the results of the standard linear multiple regression. The model reveals a statistically significant relationship between non-financial firm performance and both ARMP and underwriting risk ($p \leq 0.05$), with $\bar{R}^2 = .284$, $F(5, 44) = 4.887$.) ARMP and underwriting risk account for 28.4% of the variance in non-financial firm performance.

Significant predictor of non financial firm performance is and pricing practices as shown by the regression coefficient ($\beta = .235$, $p \leq .05$), claims management practices ($\beta = .344$, $p \leq .05$) and reinsurance and retentions ($\beta = .155$, $p \leq .05$). This therefore indicates that a relationship exist among ARMP, underwriting risk and non-financial firm performance. From the above ARMP was significantly related to non-financial firm performance. The relationship between loss ratio and non-financial firm performance was also significant and further ARMP still predicted financial performance when loss ratio was in the model.

Table 5.6 Regression Results for the relationship between Non-Financial Firm Performance as Dependent Variable and Actuarial Risk Management Practices and Loss Ratio as Predictors

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.598[a]	.357	.284	.366

a. Predictors: (Constant), reinsurance and retentions, Underwriting practices, Loss ratio, Claims management practices, Pricing practices

b) ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.279	5	.656	4.887	.001[b]
	Residual	5.906	44	.134		
	Total	9.185	49			

a. Dependent Variable: Firm performance (Non-Financial)

b. Predictors: (Constant), Reinsurance & Retentions, Underwriting Practices, Loss ratio, Claims management Practices, Pricing Practices

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.904	.650		1.391	.171
	Loss ratio	.001	.003	.049	.364	.717
	Underwriting practices	.147	.135	.160	1.096	.279
	Pricing practices	.235	.128	.270	2.049	.042
	Claims management practices	.344	.148	.311	2.324	.025
	Reinsurance & Retentions	.155	.071	.059	2.185	.034

a. Dependent Variable: Firm performance (Non-Financial)

Since loss ratio significantly predicted non-financial when ARMP is controlled ($p \leq 0.05$) and ARMP still predicted non-financial performance when loss ratio is in the model, it is concluded that loss ratio has an intervening effect on the relationship between ARMP and non-financial firm performance. Hypothesis II b was therefore rejected.

5.3.3 Moderating effect of Firm Characteristics on Relationship between Actuarial Risk Management Practices and Firm Performance

The third research objective was to establish the moderating effect of firm characteristics on the relationship between actuarial risk management practices, and performance of P & C firms in East Africa. Firm characteristics comprised of size, age, managerial competence, ownership structure and country of domicile of the firms. Two null hypotheses were tested in sequence for financial and non financial firm performance:

Hypothesis IIIa: There is no significant moderating effect of firm characteristics on the relationship between actuarial risk management practices, and financial performance of P & C firms in East Africa.

The moderating effect was computed using the Baron and Kenny (1986) approach. It involved testing the effects on the dependent variable (firm performance) from predictor variables (ARMP and firm characteristics together with the respective interaction terms) between each of the ARMP variables and each of the firm characteristics as per section 3.82 (equations 3.8-3.21) above. The interaction terms were created using centred measures to give a single indicator of the two measures. The creation of these new variable risks bringing in a multicollinearity problem which can affect the estimation of regression coefficients. To address this, the two variables were converted to standardized Z scores that have a mean of zero and standard deviation of one.

The firm characteristics and interaction terms were added in the stepwise multiple regression equations to determine the contribution and effect of each on the relationship between ARMP and firm performance. The subsequent models (Tables 5.7 to 5.13) reflect the results of regression of ARMP and each of the firm characteristics and

interaction terms of size, age, managerial competence, ownership structure (and partial regressions for country of domicile) respectively for model summary, goodness of fit and regression coefficients.

First, the moderating firm characteristic of size and interaction terms was introduced into the ARMP and financial firm performance relationship. Table 5.7 (a-c) shows the results for ARMP, size and of each of the ARMP variables and interaction with size which are statistically significant and produced ($\bar{R}^2$ = .389, F (9, 35) = 4.114, p ≤ .05). The nine variables account for 38.9% of the variance in financial firm performance.

Table 5.7: Regression Results for the relationship between Financial Firm Performance as Dependent Variable and Actuarial Risk Management Practices, Size and Interaction Terms as Predictors

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.717[a]	.514	.389	10.973

a. Predictors: (Constant), Pricing practices, Size, Claims management practices, Reinsurance & retentions, Underwriting practices, UW * SZ, PR * SZ, RR * SZ, CM * SZ

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4458.365	9	495.374	4.114	.001[b]
	Residual	4214.087	35	120.402		
	Total	8672.452	44			

a. Dependent Variable: Firm Performance (Financial)

b. Predictors: (Constant), Pricing practices, Size, Claims management practices, Reinsurance & retentions Underwriting practices, (UW * SZ), (PR * SZ), (RR * SZ), (CM * SZ)

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-78.955	49.887		-1.583	.122
	Reinsurance & Retentions	.085	.000	.079	.584	.563
	Underwriting practices	1.145	4.873	.036	.235	.816
	Pricing practices	1.605	4.564	.058	.352	.727
	Size	3.860	2.052	.262	2.029	.048
	UW*SZ	8.502	6.373	.233	1.334	.191
	PR*SZ	16.121	4.676	.514	3.447	.001
	RR*SZ	.000	.000	-.273	-1.704	.097
	CM*SZ	9.383	8.410	.225	1.116	.272

a. Dependent Variable: Firm performance (Financial)

Where: UW = Underwriting practices; PR= Pricing Practices; RR= Reinsurance and retentions; CM= Claims management practices; SZ = Size of the firm;

The inclusion of size and interaction between size and ARMP accounted for a change in variance (Δ Adjusted R^2) of 38.7%. (i.e. 38.9-.02) Size is a significant predictor of financial performance ($p \leq .05$) and the interaction term between pricing practices and size is also a significant predictor ($p \leq .05$). Underwriting practices, reinsurance and retention practices and claims management practices remain insignificant predictors of financial firm performance ($p > .05$). Size has therefore moderated the relationship between pricing practices and financial firm performance, more specifically, the pricing-size relationship. The prediction equation which was: $FP = \beta_0+\beta_1 UW + \beta_2 PR+\beta_3 RR + \beta_4 CM +\beta_5 SZ +\beta_6 (UW*SZ) + \beta_7 (PR*SZ) +\beta_8 (RR*SZ) +\beta_9 (CM*SZ) + \varepsilon$

Can now be written as**: FP = -78.955+3.86SZ +16.121 (PR*SZ)**

This means that for those firms that are bigger in terms of asset base, the effect of pricing practices on financial firm performance is greater than for smaller firms.

Table 5.8 (a-c) shows the results for ARMP, age and of each of the ARMP variables interaction with age. The results are statistically insignificant ($p > .05$) with $\bar{R}^2$ = -.049, F (9, 35) = .772. None of the independent variables, age or interaction terms is a significant predictor of financial performance. Age has therefore not moderated the relationship between ARMP and financial firm performance. A model is not specified

Table 5.8: Regression Results for the relationship between Financial Firm Performance as Dependent Variable and Actuarial Risk Management Practices, Age and Interaction Terms as Predictors

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.407[a]	.166	-.049	14.379

a. Predictors: (Constant), Pricing practices, Age, Claims management practices, Reinsurance & retention, Underwriting practices, (UW * A), (PR * A), (RR * A), (CM * A)

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1435.836	9	159.537	.772	.643[b]
	Residual	7236.616	35	206.760		
	Total	8672.452	44			

a. Dependent variable: Firm Performance (Financial)

b. Predictors: (Constant), Pricing practices, Age, Claims management practices, Reinsurance and retention, Underwriting practices, (UW * A), (PR * A), (RR * A), (CM * A)

C) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.687	27.232		.172	.864
	Reinsurance & Retentions	.127	.243	.173	.522	.604
	Underwriting practices	-8.387	6.347	-.267	-1.321	.195
	Pricing practices	2.998	5.339	.109	.561	.578
	Claims management practices	5.486	5.891	.161	.931	.358
	Age	.050	.159	.070	.313	.756
	UW*A	-.294	.457	-.226	-.644	.524
	PR*A	.617	.422	.552	1.463	.152
	RR*A	-.018	.035	-.258	-.509	..613
	CM*A	-.334	.485	-.164	-.688	.496

a.Dependent variable: Firm Performance (Financial)

Table 5.9 (a-c) shows the results for ARMP, managerial competence and of each of the ARMP variables interaction with managerial competence. The results are statistically insignificant ($p > .05$) with $\bar{R}^2$ = -.074, F (9, 34) = .670. None of the variables or interaction terms is significant predictor of financial performance.

Table 5.9: Regression results for the relationship between Financial Firm Performance as Dependent Variable and Actuarial Risk Management Practices, Managerial Competence and Interaction Terms as Predictors

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.388[a]	.151	-.074	14.685

a. Predictors: (Constant), Pricing practices, Managerial Competence, Claims management practices, Reinsurance & retention, Underwriting practices, (UW * MC), (PR * MC), (RR * MC), (CM * MC)

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1300.193	9	144.466	.670	.730[b]
	Residual	7332.266	34	215.655		
	Total	8632.459	43			

a. Dependent Variable: Firm performance (Financial)

b. Predictors: (Constant), Pricing practices, Managerial competence, Claims management practices, Reinsurance & retention, Underwriting practices, (UW * MC), (PR * MC), (RR * MC), (CM* MC)

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.976	31.132		-.224	.824
	Reinsurance & Retentions	.127	.199	.272	.050	.960
	Underwriting practices	-5.004	6.417	-.160	-.780	.441
	Pricing practices	3.731	5.672	.136	.658	.515
	Claims management practices	1.955	6.557	.057	.298	.767
	Managerial competence	3.727	4.560	.145	.817	.419
	UW*MC	.658	12.782	.013	.051	.959
	PR*MC	-7.555	9.608	-.182	-.786	.437
	RR*MC	.010	.037	-.155	.336	.738
	CM*MC	6.918	9.149	.161	.756	.455

a. Dependent Variable: Firm performance (Financial)

Managerial competence has therefore not moderated the relationship between ARMP and financial firm performance. A model is not specified.

Table 5.10 (a-c) shows the results for ARMP, ownership structure and of each of the ARMP variables interaction with ownership structure of the firms. The results are statistically insignificant ($p > .05$) with $\bar{R}^2$ = -.046, F (9, 47) = .728. The PR*OS interaction term is significant but since the model is not significant then it cannot be interpreted. Ownership structure has therefore not moderated the relationship.

Table 5.10 Regression Results for the relationship between Financial Firm Performance as Dependent variable and Actuarial Risk management Practices, Ownership structure and Interaction Terms as Predictors

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.350[a]	.122	-.046	.192

a. Predictors: (Constant), Pricing practices, Ownership structure, Claims management practices, Reinsurance & retention, Underwriting practices, (UW * OS), (PR * OS), (RR * OS), (CM * OS)

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.241	9	.027	.728	.681[b]
	Residual	1.724	47	.037		
	Total	1.965	56			

a. Dependent Variable: Firm performance (Financial)

b. Predictors: (Constant), Pricing practices, Ownership structure, Claims management practices, Reinsurance & retention, Underwriting practices, (UW * OS), (PR * OS), (RR * OS), (CM * OS)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.146	.410		.356	.723
	Reinsurance & Retention score	.021	.203	.235	.105	.917
	Underwriting score	.216	.263	-.240	.823	.414
	Pricing score	.364	.243	.171	-1.499	.141
	Claims management score	.523	.493	.112	.1.062	.294
	Ownership structure	-.002	-.083	-.049	-.027	.979
	UW*OS	.003	.031	-.147	.099	.921
	PR*OS	.062	.029	.364	2.127	.039
	RR*OS	-.364	.243	-.017	-.099	.922
	CM*OS	-.039	.034	-.071	-1.155	.254

a. Dependent Variable: Firm performance (Financial)

To determine if the country where the firms are domiciled has any moderating effect on the relationship between ARMP and firm performance, partial regressions that included only ARMP variables in respect of the relevant country were done. Tables 5.11 to 5.13 reflect that results for the partial multiple regressions.

Table 5.11 Regression Results for the relationship between Financial Firm Performance as Dependent Variable and Actuarial Risk management Practices as Predictor (For Kenya)

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.452[a]	.204	.037	5.224

a. Predictors: (Constant), Pricing practices, Claims management practices, Reinsurance and retention, Underwriting practices

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	133.021	4	33.255	1.219	.336[b]
	Residual	518.458	19	27.287		
	Total	651.480	23			

a. Dependent Variable: Firm Performance (Financial)
b. Predictors: (Constant), Pricing practices, Claims management practices, Reinsurance & retention, Underwriting practices

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.293	12.478		-.023	.982
	Reinsurance & Retentions	-.037	.232	-.372	-.160	.874
	Underwriting practices	5.940	3.891	.491	1.527	.143
	Pricing practices	-3.536	3.009	-.367	-1.175	.254
	Claims management practices	1.193	2.740	.099	.436	.668

a. Dependent Variable: Firm performance (Financial)

It is however noted as a limitation that the sample sizes involved for the partial regressions were small (Kenya=32, Tanzania=12, Uganda=13) and do not comply with the degrees of freedom (n-k-1 => 30). Table 5.11(a-c) shows the results for regression for Kenya in respect of ARMP and financial firm performance. The results are not statistically significant ($p > .05$) with $\bar{R}^2 = .037$, $F(4, 19) = 1.219$, implying that ARMP have no influence in financial firm performance of Kenyan Companies. A model is therefore not specified.

The results for partial regression in respect of Tanzania on the relationship between ARMP and financial firm performance are not statistically significant as reflected in Table 5.12 ($p > .05$) with $\bar{R}^2 = -.170$, $F(4, 7) = .600$. ARMP have no influence in financial firm performance of Tanzanian firms. A model is therefore not specified

Table 5.12 Regression Results for the relationship between Financial Firm Performance as Dependent Variable and Actuarial Risk management Practices as Predictor (For Tanzania)

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.505[a]	.255	-.170	25.480

a. Predictors: (Constant), Pricing practices, Claims management practices, Reinsurance & retention, Underwriting practices

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1559.278	4	389.819	.600	.675[b]
	Residual	4544.465	7	649.209		
	Total	6103.743	11			

a. Dependent Variable: Firm Performance (Financial)
b. Predictors: (Constant), Pricing practices, Claims management practices, Reinsurance & retention, Underwriting practices

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	34.306	109.361		.314	.763
	Reinsurance & Retention score	-6.275	7.851	-.328	-.799	.450
	Underwriting score	-18.976	16.499	-.382	-1.150	.288
	Pricing score	9.021	17.879	.187	.505	.629
	Claims management score	13.385	21.002	.235	.637	.544

a. Dependent Variable: Firm performance (Financial)

Table 5.13 (a-c) shows results for partial regression in respect of Uganda on the relationship between ARMP and financial firm performance.

Table 5.13: Regression Results for the relationship between Financial Firm Performance as Dependent Variable and Actuarial Risk management Practices as Predictor (For Uganda)

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.661[a]	.437	-.126	4.639

a. Predictors: (Constant), Pricing practices, Claims management practices, Reinsurance & retention, Underwriting practices.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	66.789	4	16.697	.776	.594[b]
	Residual	86.073	4	21.518		
	Total	152.862	8			

a. Dependent variable: Firm Performance (Financial)

b. Predictors: (Constant), Pricing practices, Claims management practices, Reinsurance and retention, Underwriting practices.

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.664	29.082		.092	.931
	Reinsurance & Retentions	-.141	.941	-.021	-.155	.881
	Underwriting practices	-9.081	5.673	-.768	-1.601	.185
	Pricing practices	1.883	5.545	.179	.340	.751
	Claims management practices	8.543	8.511	.468	1.004	.372

a. Dependent variable: Firm Performance (Financial)

The results are not statistically significant, with $\bar{R}^2$ = -.126, F (4, 4) = .776. (p > .05). ARMP have no influence in financial firm performance of Ugandan firms. A model is therefore not specified

Results indicate that the relationship between financial firm performance and ARMP when all countries are considered together is not significant (Table 5.2, p >.05). Models for the partial regressions for each country in respect of ARMP and financial performance are also insignificant (Tables 5.11-5.13). This shows that country of domicile does not make a difference and therefore has not moderated the relationship between ARMP and financial performance.

Hypothesis III (a) predicted that the firm characteristics have a significant moderating effect on the relationship between ARMP and financial firm performance. Results indicate that the relationship between financial firm performance, ARMP, the moderating firm characteristics of size and interaction term between size and pricing practices is statistically significant ($p \leq .05$). This means that for those firms that are bigger in terms

of asset base, the effect on financial firm performance is greater than for smaller firms. The other four firm characteristics (age, managerial competence ownership structure and country of domicile) are insignificant in moderating the relationship. Since size has moderated the relationship between ARMP of pricing and financial firm performance, the null hypothesis (IIIa) is rejected. Consequently, it is concluded that firm characteristics (specifically size) have a significant moderating effect on the relationship between ARMP and financial performance of the firms.

Hypothesis III b: There is no significant moderating effect of firm characteristics on the relationship between actuarial risk management practices, and non-financial performance of P & C firms in East Africa.

The stepwise multiple regression predicting non-financial firm performance from ARMP and firm characteristics and interaction terms were carried out just like under hypothesis IIIa above. Results are reported in the Tables 5.14 to 5.20 (a-c) for model summary goodness of fit, and regression coefficient respectively. Table 5.14 (a-c) shows that the results for ARMP, size and each of the ARMP variables and interaction with size against non-financial performance are statistically significant with ($\bar{R}^2$ = .261, F (9, 39) = 2.880, $p \leq .05$). The nine variables account for 26.1% of the variance in non financial firm performance. The regression coefficients (β) that are significant predictor of non-financial firm performance is claims management ($\beta = .403$, $p \leq .05$) and reinsurance and retentions ($\beta = .161$, $p \leq .05$) while pricing becomes insignificant. The other variables namely, underwriting practices, and interaction terms are also insignificant predictors of non-financial firm performance ($p > .05$).

Table 5.14: Regression Results for the relationship between Non-Financial Firm Performance as Dependent Variable and Actuarial Risk Management Practices, Size and Interaction Terms as Predictors

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.632[a]	.399	.261	.376

a. Predictors: (Constant), Pricing practices, Size, Claims management practices, Reinsurance & retention, Underwriting practices, (UW * SZ), (PR * SZ), (RR * SZ), (CM * SZ).

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.667	9	.407	2.880	.006[b]
	Residual	5.517	39	.141		
	Total	9.184	48			

a. Dependent Variable: Firm Performance (Non-Financial)

b. Predictors: (Constant), Pricing practices, Size, Claims management practices, Reinsurance & retention, Underwriting practices, (UW * SZ), (PR * SZ), (RR * SZ), (CM * SZ)

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.482	1.515		-.318	.752
	Reinsurance & Retentions	.161	.079	.029	2.039	.047
	Underwriting practices	.174	.148	.189	1.176	.247
	Pricing practices	.203	.147	.232	1.377	.176
	Claims management practices	.403	.159	.364	2.533	.015
	Size	.058	.063	.126	.916	.365
	UW*SZ	.186	.171	.171	1.089	.283
	PR*SZ	-.027	.156	-.027	-.175	.862
	RR*SZ	-.001	.013	.-152	.-.074	.341
	CM*SZ	-.225	.236	-.166	-.953	.346

a. Dependent Variable: Firm Performance (Non-Financial)

Where

UW = Underwriting practices; PR= Pricing Practices; RR= Reinsurance & retentions; CM= Claims management practices; SZ = Size of the firm;

The predictive model that was specified as: NFP = $\beta_0+\beta_1$UW $+\beta_2$PR$+\beta_3$RR + β_4CM $+\beta_5$SZ $+\beta_6$ (UW*SZ) + β_7 (PR*SZ) $+\beta_8$ (RR*SZ) $+\beta_9$ (CM*SZ) + ε now becomes :

NFP = -.482+ .161RR+.403CM

Table 5.15 (a-c) shows that the results for ARMP, age and each of the ARMP variables and interaction with age against non-financial performance.

Table 5.15: Regression Results for the relationship between Non-Financial Firm Performance as Dependent Variable and Actuarial Risk Management Practices, Age and Interaction Terms as Predictors

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.631[a]	.398	.263	.372

a. Predictors: (Constant), Pricing practices, Age, Claims management practices, Reinsurance & retention, Underwriting practices, (UW * A), (PR * A), (RR * A), (CM * A)

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.657	9	.406	2.940	.009[b]
	Residual	5.528	40	.138		
	Total	9.185	49			

a. Dependent Variable: Firm performance (Non-Financial)

b. Predictors: (Constant), Pricing practices, Age, Claims management practices, Reinsurance and retention, Underwriting practices, (UW * A), (PR * A), (RR * A), (CM * A)

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.323	.672		1.634	.110
	Reinsurance & Retentions	.238	.098	.087	2.425	.019
	Underwriting practices	.160	.155	.174	1.031	.309
	Pricing practices	.228	.135	.262	1.694	.098
	Claims management practices	.329	.149	.298	2.204	.033
	Age	-.004	.004	-.165	-.991	.328
	UW*A	-.005	.010	-.116	-.476	.636
	PR*A	.009	.010	.262	.946	.350
	RR*A	-.011	.014	-.169	-.772	.444
	CM*A	.010	.012	.153	.839	.406

a. Dependent Variable: Firm Performance (Non-Financial)

Where:

UW = Underwriting practices; PR= Pricing Practices; RR= Reinsurance & retentions; CM= Claims management practices; A = Age of the firm;

The results are statistically significant with ($\bar{R}^2$ = .263, F (9, 40) = 2.940, $p \leq .05$). The nine variables account for 26.3% of the variance in non-financial firm performance. The regression coefficients (β) that are significant predictor of non-financial firm performance are claims management ($\beta = .329$, $p \leq .05$) and reinsurance and retentions ($\beta = .238$, $p \leq .05$). All the other variables and interaction terms are not significant predictors of non financial firm performance ($p > .05$). The prediction model that was specified as:

$NFP = \beta_0+\beta_1 UW +\beta_2 PR+\beta_3 RR + \beta_4 CM +\beta_5 A +\beta_6 (UW*A) + \beta_7 (PR*A) +\beta_8 (RR*A) +\beta_9 (CM*A) + \varepsilon$ can now be written as:

NFP= .323+ .238 RR + .329CM

This means that older firms would have better risk management practices in terms of claims management and reinsurance and retentions contributing to better non-financial performance.

The results for ARMP, managerial competence and each of the ARMP variables and interaction with managerial competence against non-financial performance as reflected in Table 5.16 (a-c) are statistically significant with ($\bar{R}^2$ = .259, F (9, 39) = 2.869, p ≤ .05). The nine variables account for 25.9% of the variance in non financial firm performance. The regression coefficients (β) of claims management (β = .405, p ≤ .05), reinsurance and retentions ((β = .405, p ≤ .05) and managerial competence (β = .144, p ≤ .05) are significant predictors of non financial firm performance (β = .152, p ≤ .05). The rest are insignificant predictors of non-financial firm performance.

Table 5.16: Regression Results for the relationship between Non-Financial Firm Performance as Dependent Variable and Actuarial Risk Management Practices, Managerial Competence and Interaction Terms as Predictors

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.631[a]	.398	.259	.374

a. Predictors: (Constant), Pricing practices, Managerial Competence, Claims management practices, Reinsurance & retention, Underwriting practices, (UW * MC), (PR * MC), (RR * MC), (CM * MC)

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.621	9	.402	2.869	.029[b]
	Residual	5.470	39	.140		
	Total	9.091	48			

a. Dependent Variable: Firm performance (Non-Financial)

b. Predictors: (Constant), Pricing practices, Managerial competence, Claims management practices, Reinsurance and retention, Underwriting practices, (UW * MC), (PR * MC), (RR * MC), (CM* MC)

c) Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.206	.158		1.303	.199
	Reinsurance & Retentions	.152	.076	.114	1.961	.050
	Underwriting practices	.172	.142	.189	1.216	.231
	Pricing practices	.196	.138	.225	1.420	.164
	Claims management practices	.405	.165	.366	2.450	.019
	Managerial competence	.144	.111	.088	2.039	.047
	UW*MC	-.286	.280	-.183	-1.023	.313
	PR*MC	.246	.236	.186	1.044	.303
	RR*MC	-.004	.012	-.114	-.337	.738
	CM*MC	.071	.229	.051	.311	.757

a. Dependent Variable: Firm performance (Non-Financial)

Where

UW = Underwriting practices; PR= Pricing Practices; RR= Reinsurance & retentions; CM= Claims management practices; MC = Managerial competence.

The predictive model that was specified as: $NFP = \beta_0+\beta_1UW+\beta_2PR+\beta_3RR+\beta_4CM +\beta_5MC +\beta_6(UW*MC)+ {}_7(PR*MC)+\beta_8(RR*MC)+\beta_9(CM*MC)+\varepsilon$ is now written as :

NFP= .206+ .152RR+.405CM+.144MC

This means that firms with greater resources of competent key staff will influence risk management practices especially related to reinsurance and claims management thus contributing to better non-financial firm performance.

For ARMP variables, ownership structure and ARMP interaction with ownership structure against non-financial performance, results as shown in Table 5.17 (a-c)

Table 5.17: Regression Results for the relationship between Non-Financial Firm Performance as Dependent Variable and Actuarial Risk Management Practices, Ownership structure and Interaction Terms as Predictors

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.451[a]	.204	.051	.083

a. Predictors: (Constant), Pricing practices, Ownership structure, Claims management practices, Reinsurance and retention, Underwriting practices, (UW * OS), (PR * OS), (RR * OS), (CM * OS)

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.083	9	.009	1.337	.244[b]
	Residual	.323	47	.007		
	Total	.406	56			

a. Dependent Variable: Firm performance (Non-Financial)

b. Predictors: (Constant), Pricing practices, Ownership structure, Claims management practices, Reinsurance & retention, Underwriting practices, (UW * OS), (PR * OS), (RR * OS), (CM * OS)

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.313	.178		1.764	.084
	Reinsurance & Retentions	.152	.088	.096	1.727	.091
	Underwriting practices	.116	.114	.208	1.016	.315
	Pricing practices	.070	.105	.165	.670	.506
	Claims management practices	.252	.213	.350	1.182	.243
	Ownership structure	.004	.036	.132	.121	.904
	UW*OS	.002	.013	-.050	.128	.899
	PR*OS	-.003	.013	-.241	-.227	.821
	RR*OS	.006	.016	-.100	.351	.727
	CM*OS	-.001	.015	.107	-.044	.965

a. Dependent Variable: Firm performance (Non-Financial)

Where:

UW = Underwriting practices; PR= Pricing Practices; RR= Reinsurance & retentions; CM= Claims management practices; OS = Ownership structure.

Results are statistically insignificant with ($\bar{R}^2$ = .051, F (9, 47) = 1.337, p > .05). The nine variables account for 5% of the variance in non-financial firm performance. All the variables and interaction terms are insignificant predictors of non-financial firm performance (p > .05). No model is specified.

Table 5.18 (a-c) shows the results for partial regression for Kenya in respect of ARMP and non-financial firm performance. The results are statistically significant (p ≤ .05) with $\bar{R}^2$ = .383, F (4, 21) = 4.880. ARMP explain 38.3% of variation in non-financial performance of Kenyan companies. The regression coefficient (β) of claims management is a significant predictor of non financial firm performance (β = .414, p ≤ .05). All the other variables (underwriting practices, pricing practices and reinsurance and retentions are insignificant predictors of non-financial firm performance (p > .05). This indicates that ARMP influence non-financial performance of Kenyan firms, despite the limitation involving small samples.

Table 5.18: Regression Results for the relationship between Non-Financial Firm Performance as Dependent Variable and Actuarial Risk Management Practices as Predictor (for Kenya)

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.694[a]	.482	.383	.402

a. Predictors: (Constant), Pricing practices, Claims management practices, Reinsurance and retention, Underwriting practices

b) ANOVAa

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.162	4	.791	4.880	.006[b]
	Residual	3.402	21	.162		
	Total	6.564	25			

a. Dependent Variable: Firm performance (Non-Financial)
b. Predictors: (Constant), Pricing practices, Claims management practices, Reinsurance & retention, Underwriting practices

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.105	.914		.115	.409
	Reinsurance & Retention practices	.230	.208	.130	1.109	.277
	Underwriting practices	.273	.227	.251	1.205	.242
	Pricing practices	.235	.196	.245	1.201	.243
	Claims management practices	.414	.211	.342	2.341	.023

a. Dependent Variable: Firm performance (Non-Financial)

Table 5.19 (a-c) shows the results for linear regression for Tanzanian firms in respect of ARMP and non-financial performance.

Table 5.19: Regression Results for the relationship between Non Financial Firm Performance as dependent Variable and Actuarial Risk Management Practices as Predictors (Tanzania)

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.626[a]	.392	.088	.341

a. Predictors: (Constant), Pricing practices, Claims management practices, Reinsurance & retention, Underwriting practices

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.583	4	.146	2.230	.182[b]
	Residual	.392	6	.065		
	Total	.975	10			

a. Dependent Variable: Firm Performance (Non-Financial)
b. Predictors: (Constant), Pricing practices, Claims management practices, Reinsurance & retention, Underwriting practices

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.163	1.449		.803	.445
	Reinsurance & Retention score	.059	.103	.518	.571	.584
	Underwriting score	.230	.214	.301	1.075	.314
	Pricing score	.319	.231	.421	1.380	.205
	Claims management score	.461	.281	.518	1.644	.139

a. Dependent Variable: Firm Performance (Non-Financial)

The results are statistically insignificant ($p > .05$) with $\bar{R}^2 = .088$, $F(4, 6) = 2.230$. ARMP explain 8.8% of variation in non-financial performance of Tanzanian firms. None of the regression coefficient is a significant predictor of non financial firm performance ($p > .05$). No model is therefore specified.

Table 5.20 (a-c) shows the results for linear regression for Uganda in respect of ARMP and non-financial firm performance. The results are statistically insignificant ($p > .05$) with $\bar{R}^2 = .330$, $F(4, 8) = 1.290$. ARMP explain 33% of variation in non-financial performance of Ugandan firms. None of the regression coefficient is a significant predictor of non-financial firm performance ($p > .05$). A model is not specified.

Table 5.20: Regression Results for the relationship between Non-Financial Firm Performance as Dependent variable and Actuarial Risk Management Practices as Predictors (for Uganda)

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.773[a]	.598	.330	.256

a. Predictors: (Constant), Pricing practices, Claims management practices, Reinsurance & retention, Underwriting practices

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.600	4	.150	1.290	.351[b]
	Residual	.931	8	.116		
	Total	1.531	12			

a. Dependent Variable: Firm Performance (Non-Financial)

b. Predictors: (Constant), Pricing practices, Claims management practices, Reinsurance & retention, Underwriting practices

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.919	1.497		.614	.562
	Reinsurance & Retentions	.241	.157	.053	1.533	.164
	Underwriting practices	-.504	.256	-.733	-1.966	.097
	Pricing practices	.539	.295	.740	1.823	.118
	Claims management practices	.669	.461	.486	1.451	.197

a. Dependent Variable: Firm Performance (Non-Financial)

For country of domicile, when all countries ARMP are considered, the overall model is significant in explaining the variance in non-financial performance (section 5.3.1. table 5.3). However, when individual countries results are considered, only the Kenyan model is significant in respect of ARMP and non-financial performance. This therefore implies

that the country where the companies are domiciled influences ARMP and therefore has a significant moderating effect on the relationship between ARMP and non-financial performance of these firms. It is however noted that the sample sizes involved for the partial regressions were small (Kenya=32, Tanzania=12, Uganda=13) and do not comply with the degrees of freedom (n-k-1 => 30) hence this is a limitation which nevertheless does not invalidate the results.

The summary results of the assessment of whether firm characteristics moderate the relationship between Actuarial risk management practices and firm performance are presented in Table 5.21

Table 5.21: Summary of the Results of Moderation of Firm Characteristics on the relationship between Actuarial Risk management Practices and Firm Performance

	Moderated by							
	Financial Performance				**Non-Financial performance**			
Independent Variable	**Size**	**Age**	**MC**	**OS**	**Size**	**Age**	**MC**	**OS**
Underwriting	x	x	x	x	x	x	x	x
Pricing	✓	x	x	x	x	x	x	x
Reinsurance & Retentions	x	x	x	x	✓	✓	✓	x
Claims Management	x	x	x	x	✓	✓	✓	x
Model Significant	✓	x	x	x	✓	✓	✓	x
Significant Predictors	SZ; PR*SZ	None	None	None	CM,RR	CM,RR	CM,RR, MC	None

	Moderated by Country of domicile							
	Financial performance				Non-Financial performance			
Independent Variable	**All**	**Kenya**	**Tanzania**	**Uganda**	**All**	**Kenya**	**Tanzania**	**Uganda**
Underwriting	x	x	x	x	x	x	x	x
Pricing	x	x	x	x	✓	x	x	x
Reinsurance & Retentions	x	x	x	x	✓	x	x	x
Claims Management	x	x	x	x	✓	✓	x	x
Model Significant	x	x	x	x	✓	✓	x	x
Significant Predictors	None	None	None	None	PR, RR,CM	CM	None	None

Source: Research Data

Where:

PR= Pricing, Sz= Size, MC=Managerial Competence, OS= Ownership Structure, CM = Claims Management, RR= Reinsurance & Retentions, ✓=Yes, X = No

The analysis of the stepwise regression and partial regression results showed that there was a significant moderating effect of firm characteristics in the relationship between ARMP and financial performance (specifically, size on pricing practices) while size, age, managerial competence and the country where the firm is domiciled are important in influencing the ARMP and non-financial performance relationship. Hypothesis IIIa and IIIb were therefore rejected.

5.3.4 Joint Effect of Actuarial Risk Management Practices, Underwriting Risk and Firm Characteristics on Firm Performance

The fourth objective of the study was to determine the joint effect of actuarial risk management practices, underwriting risk and firm characteristics on performance of property and casualty firms. The following null hypotheses were tested in sequence:

Hypothesis IVa: Actuarial risk management practices, underwriting risk and firm characteristics have no significant joint effect on financial performance of property and casualty firms in East Africa

In the first step, regressions were done for all variables across the countries together and in the second step, the variables were tested in respect of each country (to take care of significance of country of domicile variable) to establish if the joint effect of the variables was significant on firm performance. The prediction equation as discussed in chapter three was:

$$FP = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR + \beta_4 CM + \beta_5 SZ + \beta_6 A + \beta_7 MC + \beta_8 OS + \beta_{10} LR + \varepsilon_1$$

Where the variables are as defined in section 3.8.2 equations 3.1 to 3.21

Multiple regression analysis was carried out to assess the association between financial firm performance (dependent variable), underwriting risk (intervening variable), firm characteristics (moderating variable) and ARMP (independent variable). Table 5.22 (a-c) shows that the model was statistically insignificant ($p > .05$). The multiple regression model produced ($\bar{R}^2 = .025$, $F(9, 47) = 1.159$, $p > .05$).

Table 5.22: Regression Results: Financial Firm Performance as Dependent Variable and Actuarial Risk Management Practices, Underwriting Risk and Firm Characteristics as Predictors

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.426[a]	.182	.025	.185

a. Predictors: (Constant), Loss ratio, Managerial competence, Underwriting practices, Ownership structure, Age, Size, Claims management practices, Reinsurance & retentions, Pricing practices.

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.357	9	.040	1.159	.343[b]
	Residual	1.608	47	.034		
	Total	1.965	56			

a. Dependent Variable: Firm Performance (Financial)
b. Predictors: (Constant), Loss ratio, Managerial competence, Underwriting practices, Ownership structure, Age, size, Claims management practices, Reinsurance and retentions, Pricing practices.

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.425	.639		2.229	.031
	Underwriting practices	.087	.257	.257	.338	.737
	Pricing practices	-.289	.225	-.189	-1.286	.205
	Reinsurance & Retentions	.005	.192	.154	.026	.979
	Underwriting practices	.087	.257	.257	.338	.737
	Size	.067	.027	.183	2.473	.017
	Age	.050	.004	.086	1.257	.215
	Managerial competence	.025	.174	.059	.146	..885
	Ownership structure	-.030	.082	-.182	-.368	.715
	Loss ratio	.163	.154	.123	-1.056	.296

a. Dependent Variable: Firm performance (Financial)

ARMP, firm characteristics and underwriting risk explained 2.5% of the variance in financial firm performance. The findings indicate that financial firm performance was significantly predicted by size ($\beta = .067$, $p \leq 0.05$) while all the ARMP, managerial competence, age, ownership structure, and loss ratio were not significant predictors of financial firm performance ($p > 0.05$). Since the overall model was statistically insignificant ($p > 0.05$), ARMP, firm characteristics (size, age, managerial competence, ownership structure), and underwriting risk jointly have no significant relationship with financial performance of P & C insurers in East Africa.

In step 2, the joint effect of the variables was carried out for each of the countries to test whether the country where the firms were domiciled would make a difference. Table 5.23 shows that the joint effect results for Kenya in respect of ARMP (independent variable), loss ratio (intervening variable) and moderating variable (firm characteristics) against financial performance is not statistically significant ($p > .05$). The multiple regression model produced ($\bar{R}^2 = -.046$, $F(9, 22) = .849$, $p > .05$).

Table 5.23: Regression Results: Financial Firm Performance as Dependent Variable and Actuarial Risk Management Practices, Underwriting Risk and Firm Characteristics as Predictors (Kenya)

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.508[a]	. 258	-.046	.099

a. Predictors: (Constant), Loss ratio, Managerial competence, Underwriting practices, Ownership structure, Age, Size, Claims management practices, Reinsurance and retentions, Pricing practices,

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.074	9	0.008	0.849	.582[b]
	Residual	0.215	22	0.010		
	Total	0.289	31			

a. Dependent Variable: Firm performance (Non-Financial)

b. Predictors: (Constant), Loss ratio, Managerial competence, Underwriting practices, Ownership structure, Age, Size, Claims management practices, Reinsurance & retentions, Pricing practices.

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.144	.655		-1.747	.095
	Underwriting practices	-.190	.204	-.869	-.931	.362
	Pricing practices	.041	.158	.036	.257	.800
	Reinsurance & Retentions	.103	.239	.112	.430	.671
	Underwriting practices	.026	.296	.224	.089	.930
	Size	.060	.031	.158	1.940	.065
	Age	.013	.038	.118	.333	.742
	Managerial competence	.148	.126	.121	1.172	.254
	Ownership structure	.032	.069	.113	.464	.647
	Loss ratio	-.286	.157	-.245	-1.823	.082

a. Dependent Variable: Firm performance (Financial)

The results for joint effect for Tanzania in respect of ARMP, firm characteristics and loss ratio against financial performance as shown in Table 5.24. and are statistically insignificant ($p > .05$). The multiple regression model produced ($\bar{R}^2$ = -.114, $F(9, 3) = .397$, $p > .05$).

Table 5.24: Regression Results: Financial Firm Performance as Dependent Variable and Actuarial Risk Management Practices, Underwriting Risk and Firm Characteristics as Predictors (Tanzania)

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.717[a]	. 514	-1.114	.138

a. Predictors: (Constant), Loss ratio, Managerial competence, Underwriting practices, Ownership structure, Age, Size, Claims management practices, Reinsurance and retentions, Pricing practices,

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.061	9	0.007	0.397	.865[b]
	Residual	0.007	3	0.019		
	Total	0.118	12			

a. Dependent Variable: Firm performance (Non-Financial)
b. Predictors: (Constant), Loss ratio, Managerial competence, Underwriting practices, Ownership structure, Age, Size, Claims management practices, Reinsurance & retentions, Pricing practices.

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.144	.655		-1.747	.095
	Underwriting practices	-.190	.204	-.869	-.931	.362
	Pricing practices	.041	.158	.036	.257	.800
	Reinsurance & Retentions	.103	.239	.112	.430	.671
	Claims management practices	.026	.296	.224	.089	.930
	Size	.060	.031	.158	1.940	.065
	Age	.013	.038	.118	.333	.742
	Managerial competence	.148	.126	.121	1.172	.254
	Ownership structure	.032	.069	.113	.464	.647
	Loss ratio	-.286	.157	-.245	-1.823	.082

a. Dependent Variable: Firm Performance (Financial)

The joint effect results for Uganda in respect of all variables are shown in Table 5.25 and are statistically insignificant. The multiple regression model produced ($\bar{R}^2$ = .489, F (9, 3) = 2.279, p > .05).

Table 5.25: Regression Results: Financial Firm Performance as Dependent Variable and Actuarial Risk Management Practices, Underwriting Risk and Firm Characteristics as Predictors (Uganda)

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.934[a]	.872	.489	.245

a. Predictors: (Constant), Loss ratio, Managerial competence, Underwriting practices, Ownership structure, Age, Size, Claims management practices, Reinsurance and retentions, Pricing practices,

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.232	9	0.137	2.227	.270[b]
	Residual	0.180	3	0.060		
	Total	1.412	12			

a. Dependent Variable: Firm performance (Non-Financial)

b. Predictors: (Constant), Loss ratio, Managerial competence, Underwriting practices, Ownership structure, Age, Size, Claims management practices, Reinsurance & retentions, Pricing practices.

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.795	3.120		1.858	0.160
	Underwriting practices	2.268	2.307	.682	0.983	0.398
	Pricing practices	-0.243	0.767	-.306	-0.317	0.772
	Reinsurance & Retentions	-1.384	0.831	-.438	-1.666	0.194
	Claims management practices	-3.861	2.618	-.624	-1.475	0.237
	Size	-0.199	0.117	-.168	-1.702	0.187
	Age	0.501	0.310	.418	1.619	0.204
	Managerial competence	0.719	0.695	.612	1.035	0.377
	Ownership structure	-0.984	0.530	-.113	-1.858	0.160
	Loss ratio	0.071	0.533	.253	0.133	0.903

a. Dependent Variable: Firm Performance (Financial)

Despite the limitation of the small samples involved, all the models were statistically insignificant for joint effect (p> .05) when tested separately for each country. The model was also not significant when tested for all countries together. This shows that country of domicile is not a significant predictor of financial firm performance since all models for joint effect (tested together for all the three countries as well as each country separately) were statistically insignificant, ARMP, firm characteristics and underwriting risk have no significant joint effect on financial performance of P & C insurers in East Africa. The null hypothesis was therefore confirmed and no model is specified.

Hypothesis IVb: ***Actuarial risk management practices, underwriting risk and firm characteristics have no significant joint effect on non-financial performance of property and casualty firms in East Africa*****.**

Multiple regression analysis was carried out to assess the joint effect of all variables (ARMP, underwriting risk and firm characteristics) on non-financial firm performance. for all firms. Table 5.26 (a-c) shows that the model was statistically significant ($p \leq .05$). The multiple regression model produced $\bar{R}^2 = .243$, $F(9, 47) = 2.999$, $p \leq .05$. ARMP, firm characteristics and underwriting risk explained 24.3% of the variance in non-financial firm performance. The findings indicate that firm performance was significantly predicted by the actuarial risk management practices of reinsurance and retentions ($\beta = .223$, $p \leq 0.05$), claims management ($\beta = .154$, $p \leq 0.05$), managerial competence ($\beta = .159$, $p \leq 0.05$), and loss ratio ($\beta = .125$, $p \leq 0.05$).

Table 5.26: Regression Results: Non-Financial Firm Performance as Dependent Variable and Actuarial Risk Management Practices, Underwriting Risk and Firm Characteristics as Predictors

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.604[a]	. 365	.243	.074

a. Predictors: (Constant), Loss ratio, Managerial competence, Underwriting practices, Ownership structure, Age, Size, Claims management practices, Reinsurance and retentions, Pricing practices,

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.148	9	0.016	2.999	.007[b]
	Residual	0.258	47	0.005		
	Total	0.406	56			

a. Dependent Variable: Firm performance (Non-Financial)

b. Predictors: (Constant), Loss ratio, Managerial competence, Underwriting practices, Ownership structure, Age, Size, Claims management practices, Reinsurance & retentions, Pricing practices.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.161	0.256		0.628	0.533
	Underwriting practices	0.128	0.103	.257	1.244	0.220
	Pricing practices	0.093	0.090	.189	1.032	0.307
	Reinsurance & Retentions	0.223	0.077	.154	2.901	0.006
	Claims management practices	0.154	0.167	.297	2.154	0.038
	Size	0.003	0.011	.083	0.278	0.782
	Age	-.029	0.016	-.086	-1.845	0.071
	Managerial competence	0.159	0.070	.059	2.288	0.027
	Ownership structure	0.007	0.033	.182	0.217	0.829
	Loss ratio	0.125	0.062	.123	2.029	0.048

a. Dependent Variable: Firm Performance (Non-Financial)

The other insurance risk practices (underwriting, and pricing) were not significant predictors ($p > .05$). The other firms characteristic (size, age**,** and ownership structure) were also not significant predictors of non-financial firm performance ($p > .05$). Since the overall model was statistically significant ($p \leq 0.05$), ARMP, firm characteristics and underwriting risk jointly have a significant relationship with non-financial performance of P & C insurers in East Africa. The null hypothesis was therefore rejected. The prediction equation was :

$NFP = \beta_0 + \beta_1 UW + \beta_2 PR + \beta_3 RR_+ \beta_4 CM + \beta_5 SZ_+ \beta_6 A_+ \beta_7 MC + \beta_8 OS_+ \beta_{10} LR + \varepsilon_1$ and the **analytical** model is now specified as:

NFP= .161 + .223RR+.154CM + 159MC+.125LR

In step 2, the joint effect of the variables was carried out for each of the countries to test whether the country where the firms were domiciled would make a difference in respect of non-financial performance just like in hypothesis Iva above. Results in Table 5.27 show a statistically insignificant relationship for Kenyan Companies ($p > .05$). The multiple regression model produced ($\vec{R^2} = .250$, $F(9, 22) = 2.148$, $p > .05$).

Table 5.27: Regression Results: Non-Financial Firm Performance as Dependent Variable and Actuarial Risk Management Practices, Underwriting Risk and Firm Characteristics as Predictors (Kenya)

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.684[a]	. 468	.250	.086

a. Predictors: (Constant), Loss ratio, Managerial competence, Underwriting practices, Ownership structure, Age, Size, Claims management practices, Reinsurance and retentions, Pricing practices,

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.144	9	0.016	2.148	.069[b]
	Residual	0.164	22	0.007		
	Total	0.309	31			

a. Dependent Variable: Firm performance (Non-Financial)
b. Predictors: (Constant), Loss ratio, Managerial competence, Underwriting practices, Ownership structure, Age, Size, Claims management practices, Reinsurance & retentions, Pricing practices.

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.028	0.573		-.050	.961
	Underwriting practices	.254	0.178	.215	1.427	.168
	Pricing practices	.127	0.139	.136	.916	.370
	Reinsurance & Retentions	.310	0.210	.212	1.481	.153
	Claims management practices	.029	0.259	.024	.110	.913
	Size	.002	0.027	.108	.065	.949
	Age	-.026	0.034	-.118	-.779	.444
	Managerial competence	.177	0.111	.161	1.597	.124
	Ownership structure	.064	0.060	.103	1.055	.303
	Loss ratio	.218	0.137	.215	1.587	.127

a. Dependent Variable: Firm Performance (Non-Financial)

The results for Tanzania for joint effect in respect of all variables (ARMP, firm characteristics and loss ratio) against non-financial performance as shown in Table 5.28 are statistically insignificant ($p > .05$). The multiple regression model produced ($\bar{R}^2$ = -1.236, $F(9, 3) = .397$, $p > .05$).

Table 5.28: Regression Results: Non-Financial Firm Performance as Dependent Variable and Actuarial Risk Management Practices, Underwriting Risk and Firm Characteristics as Predictors (Tanzania)

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.694[a]	. 481	-1.236	.073

a. Predictors: (Constant), Loss ratio, Managerial competence, Underwriting practices, Ownership structure, Age, Size, Claims management practices, Reinsurance and retentions, Pricing practices,

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.015	9	0.002	0.397	.892[b]
	Residual	0.016	3	0.005		
	Total	0.031	12			

a. Dependent Variable: Firm performance (Non-Financial)

b. Predictors: (Constant), Loss ratio, Managerial competence, Underwriting practices, Ownership structure, Age, Size, Claims management practices, Reinsurance & retentions, Pricing practices.

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.891	1.444		.617	.581
	Underwriting practices	-.250	.479	-.267	-.523	.637
	Pricing practices	.549	.474	.438	1.159	.330
	Reinsurance & Retentions	.292	.420	.314	.695	.537
	Claims management practices	.260	.544	.123	.598	.553
	Size	-.040	.076	-.106	-.530	.582
	Age	-.038	.100	-.014	-.381	.728
	Managerial competence	.400	.482	.299	.830	.467
	Ownership structure	-.245	.359	-.115	-.681	.545
	Loss ratio	.360	.522	.254	.690	.540

a. Dependent Variable: Firm Performance (Non-Financial)

The joint effect results for Uganda in respect of all variables are shown in Table 5.29 and are statistically insignificant. The multiple regression model produced ($\bar{R}^2$ = .550, F (9, 3) = .2.629, p > .05).

Table 5.29: Regression Results: Non-Financial Firm Performance as Dependent Variable and Actuarial Risk Management Practices, Underwriting Risk and Firm Characteristics as Predictors (Uganda)

a) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.942[a]	.887	.550	.004

a. Predictors: (Constant), Loss ratio, Managerial competence, Underwriting practices, Ownership structure, Age, Size, Claims management practices, Reinsurance and retentions, Pricing practices,

b) ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.038	9	0.004	2.629	.230[b]
	Residual	0.005	3	0.002		
	Total	0.043	12			

a. Dependent Variable: Firm performance (Non-Financial)

b. Predictors: (Constant), Loss ratio, Managerial competence, Underwriting practices, Ownership structure, Age, Size, Claims management practices, Reinsurance & retentions, Pricing practices.

c) Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.511	.511		.999	.391
	Underwriting practices	-.112	.378	- .382	-.295	.787
	Pricing practices	.095	.126	.006	.753	.506
	Reinsurance & Retentions	.238	.136	.138	1.744	.180
	Claims management practices	.585	.429	.421	1.364	.266
	Size	-.010	.019	- .108	-.501	.651
	Age	-.104	.051	- .118	-2.039	.134
	Managerial competence	.109	.114	.212	.958	.409
	Ownership structure	.071	.087	.013	.821	.472
	Loss ratio	-.107	.087	-.123	-1.223	.309

a. Dependent Variable: Firm Performance (Non-Financial)

With respect to joint effect of all variables (ARMP, firm characteristics (size, age, managerial competence, ownership structure) and underwriting risk on non-financial performance the overall model was statistically significant ($p \leq 0.05$), However, when partial regressions were done for each country, all the models were statistically insignificant for joint effect ($p > 0.05$), meaning that country where the firms are domiciled is not a significant predictor on of non-financial firm performance. Since the model for all countries tested together was statistically significant for joint effect ($p \leq 0.05$), it is concluded that ARMP, firm characteristics and underwriting risk jointly have a significant relationship with non-financial performance of P & C insurers in East Africa.

The null hypothesis was therefore rejected and the prediction equation as stated above is specified as: NFP**= .161 + .223RR+ .154CM +.159MC+.125LR.** This means that reinsurance and retention practices, claims management practices, managerial competence and loss ratio influence the non-financial performance of P & C firms in East Africa. The summary results of the assessment on the joint effect of all variables on both financial and non-financial performance are presented in Table 5.30

Table 5.30 Summary of Results of Joint effect of all Variables on Firm performance

	Financial Performance		**Non-Financial Performance**	
	Model Significant	**Predictors**	**Model Significant**	**Predictors**
All 3 Countries	No	Size	Yes	RR,CM,MC,LR
Kenya	No	None	No	None
Tanzania	No	None	No	None
Uganda	No	None	No	None

Where:

RR=Reinsurance and Retentions, CM=Claims Management Practices, MC= Managerial Competence, LR= Loss Ratio

5.4 Discussion of Findings

The overall objective of this study was to determine the relationship among actuarial risk management practices, underwriting risk, firm characteristics and performance of property and casualty firms in East Africa. This section discusses the findings with the summary results in Appendix VII in line with the results of tests of each hypothesis.

5.4.1 Actuarial Risk Management Practices and Firm Performance

The first study objective was to determine the relationship between actuarial risk management practices and performance of property and casualty firms in East Africa. The study hypothesized that the relationship between ARMP and firm performance was not significant. The influence of the actuarial risk management practices on financial performance was found to be insignificant thus confirming the null hypothesis (Ia). Theoretically ARMP have an influence on financial performance implying that the insurance practices may not be employed optimally as would be expected. Also there are many other variables that would influence financial performance of general insurance companies alongside ARMP which were not considered in this study

The study established that there is a significant relationship between actuarial risk management practices and non-financial firm performance, thus rejecting the null hypothesis (Ib). It can therefore be inferred that as these practices improve, non-financial firm performance improves too. Results revealed that pricing, reinsurance and retentions and claims management practices were significant predictors of non-financial performance. This therefore implies that with optimal pricing, sufficient and appropriate reinsurance coverage and good claims management practices, there will be enhancement of the quality of service and reputation of the firm, leading to more business and better

performance. Contrary to theory however, underwriting practices were not found to be significant in predicting non-financial performance of the insurers. This may be attributed to the practice in the market where underwriting guidelines are flouted due to unhealthy competition as was revealed in the descriptive statistics. Respondents indicated that firms do not discourage the marketing of substandard businesses, standard underwriting processes were used to a lesser extent and that underwriting risk management models were not much used in risk assessment, all of which may have a negative impact on firm performance.

The above finding on risk management practices influencing performance is consistent with the findings of Mugenda et al. (2012) who even though they did not study insurance risk concluded that effective risk management practices have a positive relationship with firm performance. The findings also support the study by Cummins (1991) on optimal pricing and reinsurance determining performance, as well as Yusuf and Dansu (2014) who found that strategic claims management through reasonable cost control enhances performance. The findings however contradict Cummin's (1991) study on underwriting being a determinant of performance but confirms findings of Leverty and Grace (2012) which showed no significant relationship between reinsurance retentions ratio and financial performance.

5.4.2 Actuarial Risk Management Practices, Underwriting Risk and Firm Performance

The second study objective was to determine the influence of underwriting risk on the relationship between actuarial risk management practices and performance of property and casualty firms in East Africa. Theoretically, loss ratio is inversely related insurer's

performance as the higher the loss ratio, the lower the level of performance. On the first part, the study hypothesized that underwriting risk (loss ratio) does not have a significant intervening effect on the relationship between ARMP and financial performance of property and casualty firms in East Africa. Since there was no significant relationship between ARMP and financial firm performance in hypothesis Ia, it then follows that loss ratio cannot have an intervening effect where no relationship exists. The null hypothesis (IIa) was therefore not rejected. For non-financial performance, the results indicated that there is a significant mediating effect of loss ratio on the relationship with ARMP. The relationship between loss ratio and ARMP was significant as loss ratio predicted non-financial performance even when ARMP was controlled for, with pricing, reinsurance and retentions and claims management practices being significant determinant of non-financial firm performance. Hypothesis (IIb) was therefore rejected.

These findings are in line with those of D'Arcy and Gorvett (2004) who established that lower underwriting standards would lead to higher claims costs, lower underwriting results and poorer performance and vice versa. Comparison of these findings to various other studies may not be done directly as these previous studies did not consider underwriting risk as a mediating variable but rather as an independent variable in relation to firm performance. Indirectly however, the finding are in line with those of Pervan et al. (2012) who found a strong negative influence on claims ratio on performance. The findings also confirm those of Mwangi and Murigu (2015) who found no relationship of underwriting risk to financial firm performance, but in contradiction to those of Adams & Buckle, (2003) who found that underwriting risk is positively related to financial performance.

5.4.3 Actuarial Risk Management Practices, Firm Characteristics and Firm Performance

The third study objective was to determine the effect of firm characteristics on the relationship between actuarial risk management practices and performance of property and casualty firms in East Africa. The study hypothesized that the moderating effect of firm characteristics on the relationship between ARMP and firm performance was not significant. The results of stepwise multiple regression and partial regression models revealed a statistically insignificant relationship between ARMP, and firm characteristics (age, managerial competence, ownership structure and country of domicile), and financial performance. However, the relationship was significant between ARMP, size and financial performance, more specifically size and the pricing-size relationship whose interaction term was significant. This means that those firms that are bigger in terms of asset base, would perform better and the effect of size on pricing practices on financial firm performance is greater than for smaller firms. Hypothesis (IIIa) was therefore rejected

The results of stepwise multiple regression models for the moderating effect of firm characteristics on the relationship between ARMP and non-financial firm performance were statistically significant (for all firm characteristics except ownership structure) Specifically, the study revealed that the significant predictors of non-financial performance were reinsurance and retentions, claims management practices, managerial competence and country of domicile. When partial regressions were performed to establish the effect of country of domicile in moderation of the relationship, significant

predictors of non-financial performance were pricing and claims management practices. Hypothesis (IIIb) was therefore rejected.

This means that indeed optimal reinsurance and retention and claims management practices enhance non-financial firm performance. The size of the firm, its age, managerial competence and the country where the firm is based are also factors that contribute to firm performance. With more assets, a company is able to use economies of scale in producing more income. It would be more difficult for smaller firms to write insurance premiums than for bigger ones as firms with less capital would be less flexible and, therefore, operate with more constraints. They may also not give adequate security to their clients in the cases of aggregate uncertainty or big catastrophic events.

The finding on age implies that older firms have developed optimal insurance risk management skills and capabilities and, developed reputation over time thus contributing to enhanced non-financial performance in terms of improved quality of service, innovation and increased sales. On managerial competence, the findings imply that the firms have good resources of competent senior staff and this is likely correlated with general management soundness, reflective of the actuarial risk management systems in place thus contributing to non-financial performance. The findings also indicate that country of domicile influences the relationship between ARMP and non-financial firm performance. This may be attributed to differences in various aspects of risk management specific to each country, for example; adoption of technology in operations, streamlining of the claims settlement processes, management of regulatory changes, the extent to which rules and regulations are adhered to and adoption of RBS which are all at different

levels of development in each country. This is evidenced by literature available, and the current finding that the Kenyan model was significant, and that Kenya is ahead of the others in various aspects of risk management practices (IRA, 2015). Ownership structure did not moderate performance implying that the concentration of local ownership is not be a factor in influencing the ARMP (underwriting, pricing, reinsurance and retentions, claims management) and other operational decisions of the firms.

Although previous studies have not considered the moderating effect of these firm characteristics on the relationship between ARMP and performance, they have analyzed their effect on firm performance. Indirectly therefore, the above findings support studies by Ahmed et al. (2011) and Choi (2010) on size as influencing financial firm performance but contradict those of Adams and Buckle (2003) and Akotey (2012). On age, the findings confirm those of Mwangi and Murigu (2015) that it has no influence on financial performance but contradict those of Pervan et al. (2012). The results also confirm the findings on managerial competence by Yusuf & Dansu (2012) who found that suitable key staff are able to manage the insurance programme to reduce excesses and enhance performance.

The finding on ownership structure contradict those of Hoyt et al, (2011) who established that ownership structure was positively related to enterprise risk management and performance and, Lee (2008) who established that as ownership concentration increases, the positive monitoring effect and improves performance. On Country of domicile, the findings confirm those of Hrechaniuk et al. (2007) on the Spanish,

Lithuanian and Ukrainian markets who found that systematic differences across the three countries' insurance industries was reflected in their performance.

5.4.4 Actuarial Risk Management Practices, Firm Characteristics, Underwriting Risk and Firm Performance

The final study objective was to determine the joint effect of actuarial risk management practices, underwriting risk and firm characteristics on performance of property and casualty firms in East Africa. The study hypothesized that ARMP, underwriting risk and firm characteristics have no significant joint effect on performance of property and casualty firms in East Africa. The findings show a statistically insignificant relationship between ARMP, underwriting risk and firm characteristics on financial firm performance for all countries tested together, explaining 2.5% of variation in financial performance (with size as main determinant). Findings for joint effect were also insignificant when the countries were tested separately. Hypothesis (Iva) was therefore confirmed.

On the other hand, the results indicated a statistically significant relationship between ARMP, underwriting risk and firm characteristics and non-financial performance, explaining 24.3% of the variation in non-financial performance (with reinsurance and retentions, claims management, managerial competence and loss ratio as the main predictors). The implication is that all the variables need to be taken into account in order to improve non- financial performance of these firms. The null hypothesis (IVb) was therefore rejected.

The influence of all these variables on firm performance has previously not been considered together in one single study like this one. The results for ARMP, firm characteristics and underwriting risk have been discussed under sections 5.3.1 to 5.3.4 respectively. However, a previous study by Kim et al. (1995) covered some of these variables against performance and concluded that age, premium growth, underwriting risk and reinsurance ratios are important determinants of performance of none life insurers.

CHAPTER SIX
SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The purpose of this study was to establish the relationship among actuarial risk management practices, firm characteristics, underwriting risk and performance of property and casualty firms in East Africa. This chapter summarizes the major findings and gives conclusions and recommendation. Also covered are the limitations of the study and an outline of suggested areas of future research.

6.2 Summary of Findings

The first objective of the study was to establish the relationship between ARMP and performance of property and casualty firms in East Africa. Hypothesis (Ia) tested the relationship between these practices and performance of P & C firms in East Africa against financial performance with hypothesis (Ib) testing against non-financial performance. Multiple regression results confirmed the null hypothesis that there is no significant relationship with financial performance. For hypothesis Ib the null hypothesis was rejected and the alternate one confirmed that there is a significant relationship ($p \leq 0.05$). Pricing, reinsurance and retentions and claims management were found to be positively related to non-financial firm performance. It is therefore concluded that there is a significant relationship between ARMP and non-financial firm performance.

The second objective of the study was to determine the influence of underwriting risk on the relationship between ARMP and performance of property and casualty firms in East Africa. Since hypothesis 1a established that there is no significant relationship between ARMP and financial performance, it then follows that underwriting risk cannot intervene

in a relationship that does not exist. The null hypothesis (IIa) was therefore confirmed. With respect to non-financial performance, results show that underwriting risk (loss ratio) has a significant intervening effect on the relationship between ARMP and firm performance. Pricing practices, reinsurance and retentions and claims management practices were found to influence this relationship, while underwriting practices were not significant predictors. The null hypothesis (IIb) was therefore rejected.

Objective three of the study was to establish the effect of firm characteristics on the relationship between ARMP and performance of property and casualty firms in East Africa. Hypothesis test findings were that firm characteristics moderate the relationship between ARMP and financial firm performance with size influencing the direction of performance. For the relationship with non-financial size, age, managerial competence and country of domicile significantly influence the direction of performance of the firms. The null hypothesis was rejected and the alternate one confirmed for both hypotheses III a and III b.

The fourth objective of the study was to establish the joint effect of ARMP, underwriting risk and firm characteristics on performance of property and casualty firms in East Africa. The results show that the overall model was statistically insignificant for financial firm performance thus confirming the null hypothesis (Iva). However, the results show that actuarial risk management practices, underwriting risk and firm characteristics jointly significantly influence non-financial firm performance with reinsurance and retentions, claims management, managerial competence and loss ratio being the main predictors. The null hypothesis (IVb) was therefore rejected and the alternate one confirmed.

6.3 Conclusions

The study examined the relationship among actuarial risk management practices, underwriting risk, firm characteristics, and performance of property and casualty firms in East Africa. Firm performance was evaluated using composite scores for both financial and non-financial indicators. The financial indicators comprised of return on assets and average of premium growth percent while non-financial performance measures were operationalized using quality of service, reputation and innovation. Results of the study revealed that there are both very young (3 years) and very old (104 years) firms in the region, with majority of them being locally owned. The findings also revealed that most of the senior management employees of the insurance companies have relevant qualifications commensurate with the type of work they are expected to do. However, managerial competence (using the knowledge and skills to of the CEO of each firm as a basis), was not found to significantly influence the direction of the firms' financial performance. The implication is that operational decisions of the firms, especially those involving insurance risk, may not be exclusively made by professional managers but may involve other parties or other considerations. That may also explain why underwriting practices were found not to influence both financial and non-financial performance.

With respect to non-financial performance, the descriptive statistics results show that the firms have performed well on service quality and reputation, implying that the sector is customer-focused and keen on ensuring a high level of customer satisfaction. With respect to innovation, the performance was average implying that there is need for the firms to keep on investing in modern technology in their operations and avoid unethical behaviours which may lead to scandals that would ruin their reputation this affecting their

performance. The sector relies heavily on repeat business and referrals through existing clientele and networks, and achievement of good performance in the fiercely competitive environment is not possible without being efficient. In terms of financial performance, which comprised ROA and premium growth rates, results overall showed a wide range of average composite returns from a minimum of -12% to a maximum of 114% with the mean being about 16%. .

In testing the first hypothesis Ia, the finding was that ARMP and financial firm performance have no significant relationship hence confirmation of the null hypothesis. For Hypothesis Ib however, the finding was that ARMP and non-financial firm performance have a significant relationship hence rejection of the null hypothesis. This means that a firm's performance will be enhanced if it has a robust underwriting process, prices its portfolio sufficiently for profitability, correctly evaluates and has a fair claims management process that is in line with pricing and, a reinsurance process that is appropriate for the portfolio. The descriptive statistics findings revealed that on average, the actuarial risk management practices are generally carried out optimally in the firms as would be expected. However, results from regression analysis showed that claims management, pricing and reinsurance and retention practices were the main determinants of performance while underwriting practices were not found to significantly affect performance. This may be due to the market practices where, because of intense competition for the business, there may be non-adherence to underwriting guidelines. The results imply that in practice, underwriting or risk evaluation as a basis for pricing may not be carried out in most cases leading to charging of inappropriate premiums for most risks. The regulatory authorities have also provided minimum and maximum

premiums chargeable for various classes of the risks hence underwriters never really engage in risk analysis for premium determination. This may explain the reason for the common practice of price undercutting that is prevalent in all the three markets.

Hypothesis IIa was confirmed that underwriting risk (loss ratio) was not a significant mediator in the relationship between ARMP and financial firm performance. However, Hypothesis IIb was rejected as underwriting risk significantly mediated the relationship between ARMP and non-financial performance. While loss ratio was important in influencing non-financial firm performance, pricing, reinsurance and retentions and claims management practices were in turn significant determinants of non-financial performance when of loss ratio was included in the model. Descriptive findings showed that the average loss ratio was about 52% meaning that the insurers spend slightly more than half of their net earned premiums on payment of claims. This implies that firms should keenly watch their loss ratios (claims paid vs. premiums earned) in order to improve their non-financial performance. This could be achieved through correctly underwriting and pricing their risks in order to influence their claims ratio and in turn have a strategic claims management programme in place that controls costs and leads to better reputation for the firm. This in turn will have a ripple effect in increasing business volumes and thus performance in the long run.

Hypothesis IIIa and IIIb were rejected as the study established that firm characteristics have a significant moderating effect on the relationship between ARMP and financial and non-financial firm performance. Size (for both financial and non-financial performance) age, managerial competence and home country of the firm (for non-financial

performance) where especially found to influence the direction of this relationship. P & C firms can strive to increase their assets so as to achieve economies of scale and generate more premiums but at the same time ensure that they maintain optimal insurance risk management practices in order to remain profitable, and also take into account the input of its management as this can enhance their performance further, regardless of their age. Differences in various aspects of insurance risk management practices specific to each country had an influence on non-financial performance hence the need for the regulatory authorities to streamline their regulatory and supervisory roles to ensure compliance with the requirements.

The fourth and final study objective was to determine the joint effect of actuarial risk management practices, underwriting risk and firm characteristics on performance of property and casualty firms in East Africa. Hypothesis IVa was confirmed as the results indicated an insignificant relationship between ARMP, underwriting risk, firm characteristics and financial firm performance. On the other hand, hypothesis IVb was rejected as the results indicated a significant relationship between ARMP, underwriting risk, firm characteristics and firm performance. The implication is that all the variables need to be taken into account in order to improve non-financial performance of these firms.

6.4. Implication of the Research Findings

The study contributes to the growing literature on the role that risk management in organizational performance and the influence that firm specific characteristics play in enhancing the risk management practices in order to better the performance

6.4.1 Contribution to Theory and Knowledge

This study has contributed to finance theory and to the broadening of the available knowledge on risk management generally, and in particular, actuarial risk management practices, the effect of underwriting risk and firm characteristics on the relationship with performance of P & C firms. The study contributes and supports the ruin theory that proposes that the stability and performance of an insurer, depends on optimal management of the insurance risk (Kaas et al., 2008). The study established that portfolio mix, premium rates and adjustments, claim amounts and loss mitigation efforts depend on individual firm characteristics all geared to long term profitability of the firms. This study has demonstrated that organizational performance can be enhanced with optimal actuarial risk management practices but diminish if actuarial risk is not managed well

Previous studies have mainly focused on financial measures of performance and various select variables. This study has contributed to knowledge methodologically by attempting to use non-financial measures of performance as well that are specific to the industry. Previous studies have also mainly used one or two variables like firm characteristics and firm performance but the current study has filled a conceptual gap by introducing ARMP in the relationship and findings show that firm characteristics (size, age, managerial competence and home country of the firm) affect the predictive power of ARMP in this relationship. These interrelationships among various variables thus increases understanding in the area.

The study has also shown that the relationship between the insurance risk management practices and firm performance is not direct but intervened by underwriting risk (loss

ratio). The effect of insurance risk management practices can therefore be best understood by looking at how these practices first affect loss ratio and how loss ratio then affects performance of these insurance companies. Overall, the study established that the combined effect of ARMP, firm characteristics and underwriting risk has a positive effect on firm performance.

Most studies on risk management have been done in the developed world and emerging nations of Asia, and largely in the wider area of risk management. Given that this area and specifically, actuarial risk has largely been understudied in East Africa, this study has made a modest contribution contextually to the existing body of knowledge on actuarial risk management practices despite the fact that a lot is still to be exploited. The study covered three countries, Kenya, Uganda and Tanzania hence the knowledge is useful to the insurance sectors in this region and is also relevant to other African countries. The study has contributed to research interest in this area and, academicians may use the study as a basis for further research

6.4.2 Recommendations for Policy and Practice

With the current concern with risk management globally, it is imperative to identify factors that can help insurance companies and investors increase their firms' performance by identifying the key success indicators. The effects of actuarial risk management practices on firm performance as documented in the study will help insurance managers, corporate executives and practitioners to have a basis of laying out the important factors to concentrate on while strategizing on policies for better performance for their firms. It is evident from these empirical findings that companies that are involved in optimal

pricing, reinsurance and claims management practices will perform well hence they should do all to ensure that they adhere to robust insurance risk management practices so as to improve performance of their firms.

The study also contributes to various policy making decisions by stakeholders including the insurance regulators and governments. Performance of these companies is important as they play a major role in the economic growth and overall development of their nations by lowering total risk, contributing to stability through handling of financial losses and efficient resource allocation. It is evident from the study findings that proper management of the actuarial risk is important in addressing the various challenges that the industries face like price undercutting, fraudulent practices, nonpayment of claims and high loss ratios among others, leading to poor performance and insolvency of firms in the sector. The findings of the study will assist the various governments (i.e. the insurance regulatory authorities) and policy makers of insurance companies especially in formulation of the insurance risk management framework for industry on what is expected to be done.

The findings show that size is positively related to and influences overall firm performance hence the regulators can encourage mergers and acquisitions of insurers and set minimum thresholds for capital base so that there are fewer stronger insurers who can compete effectively and deliver on services as opposed to the many firms in the market engaging in unhealthy competition leading to inadequate underwriting, price undercutting and poor service. This is especially in view of the fact that there is under capacity in these markets to underwrite and take on large risks, especially in the emerging oil and gas sectors.

However, this should not restrict the setting up of new companies at the same time provided they maintain appropriate risk management practices to enable them perform well. There is still a lot of unexploited capacity as evidenced by the low insurance penetration rates in all the three countries. Although managerial competence was found to be a significant predictor of the direction of non-financial performance of the firms, it was insignificant in influencing financial performance. There is hence a significant need to have highly qualified top managerial staff influencing most of the operational decisions. This will strike a balance between making adhoc decisions and professional decisions on insurance risk management. The regulators can consider including other standards on managerial competence as well as governance and risk management structures under the risk based supervision models that recognize and hold responsible, professional managers for noncompliance with the standards.

6.5 Limitations of the Study

The study employed a descriptive, cross-sectional research design which involves collecting and analyzing study units data at a point in time in order to assess strength of relationships among variables. However, the design does not possess the ability to establish which factor, between two variables that are related causes which. Since circumstances change over time, there may be need to develop a time series longitudinal study, which requires time and resources, to provide more insight into the relationships among the variables studied here.

There are many other variables that influence performance of general insurance companies that the study did not look at, for instance, investment yield /income, liquidity,

financial leverage, earning assets and several other macroeconomic factors like inflation and market competition, which are external to the companies but may influence financial performance especially. Results of this study may therefore not provide a complete picture of the various interrelationships with respect to firm performance. The limitation of small samples with respect to accuracy in calculating degrees of freedom when carrying out partial regressions for some variables is also noted although it doesn't necessarily invalidate the results. The lack of risk management studies, especially local ones, and in particular, lack of studies in insurance risk meant that comparative analysis was not possible hence the reliance of studies done elsewhere.

The results of the study were mainly obtained through mail questionnaires (one per firm) and captured the facts as given by the respondents with little contact with the respondent managers hence inability to get their feel and grasp of the subject matter. They may also have given responses to portray their firms as professionally managed, thinking that their firms were being assessed / evaluated. However, the introduction letter and questions were carefully worded to counter this. Some respondents considered the information sought as confidential hence the lower response rate especially from Tanzania. Despite these limitations the quality of the study was not compromised

6.6 Suggestions for Further Research

Several future research possibilities may arise from the findings and limitations of this study. A longitudinal study can be carried out to track changes over time as this would provide a better assessment of how risk management practices and other variables affect performance of P & C insurers.

The financial measures that were used for firm performance were Return on Assets and premium growth rates. Results from these measures were statistically insignificant against the various study variables. It is recommended that a study be carried out especially to establish why the relationship between ARMP and financial performance was not as theoretically expected. This could be done using financial performance measures that do not include some components like investment income, which forms a very substantial part of profits of insurers, generated from other sources but doesn't necessarily arise from ARMP per se.

A replica of the study can be carried out to include additional moderating and intervening variables that may influence performance of general insurance firms to enhance the robustness, validity and generalization of the results. The study could also be replicated in other contexts such life insurance companies, other regions of Africa or other financial sectors like banking, using the applicable risk management practices relevant to such sector(s), to assess any similarities or differences and, give insight into the nature of the relationships that exit.

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Appendix I:

Questionnaire

SECTION A: ORGANIZATION DATA

1. When was the company incorporated?- Year ……Country…….

2. How many employees are in the organization?.....

3. Please indicate how many employees hold the following in your organization: -

Undergraduate Degree and above (1)	Professional qualification(s) in relevant area eg ACII, ACCA,CPA etc (2)	Those who have both degree and professional qualification (1and 2)

4. **Qualification of Senior Staff :**

Kindly fill in the details of Senior staff i.e. CEO, Heads of Departments, Management staff

No	Staff	Position Held	Experience (Years)	O-Level/ A - level	1st Degree -Bachelors	2nd Degree -Masters and above	Dip. (FCII, ACII; AIIK, ACCA,CPA or equivalent	Other

5. Your organization :- ( ) is locally owned: ( ) is foreign owned

( ) has a Combination of local and foreign investors (indicate percentage)

(Local……..%) (Foreign…….%)

( ) is a public company ( ) is a private company

SECTION B: UNDERWRITING AND PRICING

Please indicate the extent to which you agree with the following.

1 Strongly disagree	2 Disagree	3 neutral	4 agree	5 Strongly agree

	UNDERWRITING	SD(1)	D(2)	N(3)	A(4)	SA(5)
B1	We measure risk exposures in order to determine premiums to be charged for improved accuracy in underwriting					
B2	We concentrate on risks for which the firm has competitive advantage					
B3	We select good business and turn down poor ones					
B4	We avoid taking on business that increases risks or present a large risk of insolvency					
B5	We consider claim severity and frequency in order to gauge the risk or charge for it					
B6	We transfer very risky business through coinsurance and reinsurance					
B7	We only offer policies (underwrite risks) which make profits or at least sustain themselves					
B8	Our underwriting processes are standardized as a common risk avoidance practice					
B9	We consider competition and competitors actions in our underwriting process					
B10	We discourage marketing of substandard business by not tying compensation to sales growth					
B11	We use risk management models that allow measurement of catastrophic events to enable determine value at risk for pricing and reserving purposes					
B12	To counter adverse selection and/or moral hazard we:					
	- Use proposal forms /ask many question					
	- Make premium adjustments based on claims experience					
	- Continuously monitor proposers/insureds -					
	- Use deductibles/excess/coinsurance					
	- Other- (Please specify)					

	PRICING	SD(1)	D(2)	N(3)	A(4)	SA(5)
B13	We use stochastic models/regression/data mining tools to guide in determining / calculating premiums accurately and fairly					
B14	We determine / modify future premiums by relying on individual and/or group loss experience					
B15	We have rate classifications for each class of insurance					
B16	We always load our base premiums by a certain margin in order to make profits					
B17	When rating policies, we make an allowance for reserves to cover future claims					
B18	We perform rate revisions frequently (every year)					
B19	The resultant revised rates are adjusted by rule or judgment					
B20	We experience policy cancellations and/or rewrite some policies if rates regularly fluctuate					
B21	We consider stability of loss ratio from year to year to determine the premiums					
B22	Our premium rates correctly follow overall trends in the company					
B23	We develop and use an experience rating system to determine the next year's premiums for individuals and groups					
B24	We use merit rating (according to loss history) for some classes.					

SECTION C:

	CLAIMS MANAGEMENT	SD(1)	D(2)	N(3)	A(4)	SA(5)
C1	Our claims department is a separate and autonomous unit within the company					
C2	We regularly analyze, report and minimize unnecessary costs					
C3	Premiums we charge are often sufficient (enough) to cover our claims and expenses					
C4	Actual losses are often less than those projected due to correct analysis					
C5	We perform loss reserving for each claim under all classes underwritten					
C6	Loss reserves are only done for long-tail lines (like product liability)					
C7	We use several loss control measures like large excesses and consumer education programs to lower the probability and severity of losses incurred/expected					

C8	We take precautionary measures during underwriting and claims involving large/inaccessible areas like agricultural farms					
C9	We try to avoid protracted legal disputes in order to reduce claim costs to make insurance affordable					
C10	We handle claims expeditiously and pay valid claims efficiently					
C11	We deal with claimants courteously; -					
C12	Our quality and quantity of customer care is good and this has improved our claims settlement record.					
C13	We review claims performance, monitor claims expense, legal costs and settlement costs					
C14	We plan for future payment and avoid disputes in payment of claims					

SECTION D:

	REINSURANCE AND RETENTIONS	**SD(1)**	**D(2)**	**N(3)**	**A(4)**	**SA(5)**
D1	We always arrange sufficient and appropriate reinsurance coverage for our risks as need be.					
D2	The company retains a larger percentage of the risks in the lines underwritten					
D3	We only transfer to reinsurers only the risky classes and/ or risks that have a high loss ratios					
D4	Catastrophic risks have not affected our portfolio in the recent past					
D5	Reinsurance has helped us in;					
	- Underwriting expertise /claims advise					
	- Increasing capacity					
	- Monitoring of individual / aggregate exposures					
	- Reducing the level of loss reserves					
	- Stabilize volatility in underwriting results					

SECTION E: firm Performance- Non Financial Perspective (1= v. poor..5=excellent)

	Quality of Service	**1)**	**(2)**	**(3)**	**(4)**	**(5)**
E1	We emphasize on customer-centre services and processes					
E2	The organization provides high quality services that match customer expectations.					
E3	We have maintained our market share in the last 3 years.					
E4	Customer claims are processed within a reasonable period of time (normally within 14 days).					

E5	There are mechanisms to ensure that customer complaints are resolved to their satisfaction					
E6	We get a number of referrals by existing customers due to our quality service					
E7	Our customer base and growth potential has been on an upward trend generally					
E8	Our market share growth is from improved competitive offerings (low cost where we have competitive advantage) OR from products and services that are geared towards premium priced items.					
E9	We are able to determine the percentage of income/revenues from new customers/market segments					
E10	We regularly develop new and creative products that enable differentiation, drive shareholder value, promote our brand and help us seize new market opportunities before competitors do					
E11	Our new product development is shaped by recent events like: -					
E12	- Terrorism/Flooding					
E13	- Feedback from customers/agents/brokers					
E14	- Actions of competitors					
E15	- Changes in laws/regulatory framework					
Innovation						
E16	We have automated and keep improving our critical processes using the Web – based technology to deliver mandated services more efficiently and effectively to our customers and other stakeholders					
E17	Our operations are almost entirely paperless as opposed to manual papers based processes					
E18	We actively incorporate relevant processes and programs into our business models to help us outperform our competitors.					
E19	We have automated claims function from notification through to settlement					
E20	We have automated tasks performed by service providers (claims adjustors, surveyors, engineers, motor assessors)					
E21	We have analysis based programs to help improve efficiency in:-					
	- Assessing fraudulent claims					
	- Improving rate at which business changes to meet changing client needs and expectations					

	- Mobile platforms for ease of access to accounts, quotes, claims support, roadside assistance etc					
	- New product development					
	- cloud computing(network of remote internet servers to store, manage and process information)					
	- We have Google and face book accounts, twitter and LinkedIn to reflect our offline success					
E22	We have technological tools (high performance work systems like personal computers and internet) for all staff/ employees					
E23	We have the physical infrastructure, culture, tools and technology, knowledge and skills, and information systems required to create, plan, design, and deliver products and services to customers and stakeholders.					
	Reputation	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
E24	We involve ourselves in transparent business practices to improve public trust					
E25	Our reputation has not been damaged by scandals (e.g. unethical behaviours- under pricing, reserve problems, false reports, reckless management, incompetence, fraud etc) and has enabled us perform better than our competitors					
E26	We are involved in other activities to ensure that broader social, environmental and economic interests of all stakeholders are taken care of.					
E27	We care more than engaging in profit generation through Corporate Social responsibility (CSR) activities e.g. by:-					
	- Reducing risks externally (give discounts for preventive measures and good housekeeping)					
	- Internally through RM procedures and ethics					
	- Encouraging loyalty among staff while reducing turnover rates					
	- CSR makes us more attractive to investors, increases loyalty, sales and resilience					
	- Other- please specify					
E28	Claim issues are crucial to our reputation					

Appendix II:

Data Collection Form

Section F: Financial Indicators

	Item	Yr 2010	Yr 2011	Yr 2012	Yr 2013	Yr 2014
	From Audited Financial Statements					
F1	Total Assets (Shillings*).					
F2	Net Income					
F3	Total Equity					
F4	Gross written premiums					
F5	Net written premiums					
F6	Net claims (losses) incurred					
F7	Retention Ratio					
F8	Reinsurance Ceded					
F9	Company Market Share (%)- **Optional**					
F10	Net earned premiums					
F11	Loss Ratio					

*Kenya, Tanzania or Uganda Shillings (depending on country firm is domiciled)

Appendix III:

General Insurance Firms in East Africa as at 31 December 2015

Registered General Insurance Companies in Kenya

1. AAR Insurance Company Limited-
2. African Merchant Assurance Company Ltd (AMACO)
3. AIG Kenya Insurance Company Ltd
4. APA Insurance Company
5. British American Insurance Company Ltd (Composite)
6. Cannon Assurance Company Ltd (Composite)
7. CIC General Insurance Company Limited
8. Corporate Insurance Company Limited (Composite)
9. Directline Assurance Company Ltd
10. Fidelity Shield Insurance Company Limited
11. First Assurance Company Limited (Composite)
12. GA Insurance Company Limited
13. Gateway Insurance Company Ltd
14. Geminia Insurance Company Ltd (Composite)
15. Heritage Insurance Company Ltd
16. ICEA LION General Insurance Company Ltd
17. Intra Africa Assurance Company Limited
18. Invesco Assurance Company Ltd
19. Kenindia Assurance Company Ltd (Composite)
20. Kenya Orient Insurance Company Ltd
21. Madison Insurance Company Limited (Composite)
22. Mayfair Insurance Company Limited
23. Occidental Insurance Company Ltd
24. Pacis Insurance Company Ltd
25. Phoenix of East Africa Assurance Company Limited
26. Resolution Health Insurance Company Ltd
27. Saham Assurance Company Ltd (Composite)

28. Takaful Insurance of Africa
29. Tausi Assurance Company Ltd
30. The Jubilee Insurance Company (K) Ltd (Composite)
31. The Kenyan Alliance Insurance Company Ltd (Composite)
32. Trident Insurance Company
33. The Monarch Insurance Company Ltd (Composite
34. UAP Insurance Company Ltd
35. Xplico Insurance Company Ltd

Source www.ira.go.ke

Registered Non Life Insurers in Tanzania As At 31 December 2015

1. UAP Insurance Company Ltd
2. AAR Insurance Co. Ltd
3. Alliance Insurance Corp. (T) Ltd
4. Bumaco Insurance Company Limited
5. First Assurance Company Ltd
6. GA Insurance Tanzania Ltd
7. ICEA Lion of (T) General Insurance Co Ltd
8. Insurance Group of Tanzania Ltd
9. Maxinsure (Tanzania) Limited
10. Metropolitan Tanzania Insurance Co Ltd
11. Milembe Insurance Company Limited
12. MO Assurance Co Ltd
13. Mwananchi Insurance Company Ltd
14. National Insurance Corp. (T) Ltd (Composite)
15. Niko Insurance Tanzania Ltd
16. Phoenix of Tanzania Ass. Co. Ltd
17. Real Insurance Tanzania Ltd
18. Reliance Insurance Co. (T) Ltd
19. Resolution Insurance Company Ltd
20. Star General Insurance Tanzania Ltd

21. Strategis Insurance (T) Ltd
22. Tanzindia Assurance Company Ltd
23. The Heritage Insurance Co. (T)
24. The Jubilee Insurance Co. of Tanzania Ltd
25. UAP Insurance Tanzania Ltd
26. Zanzibar Insurance Corporation

Source: Source www.tira.go.tz

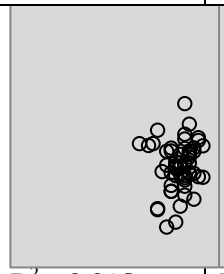
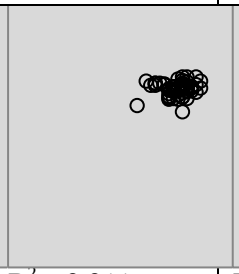
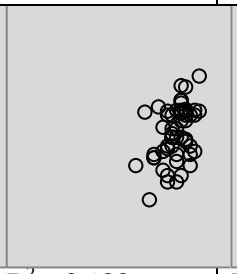
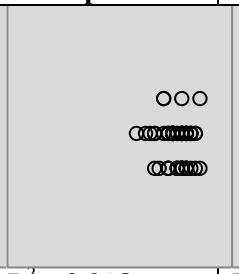
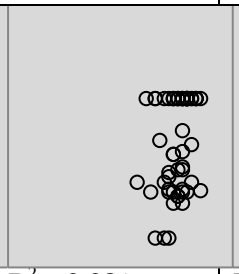
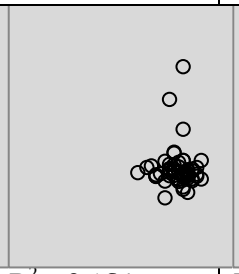
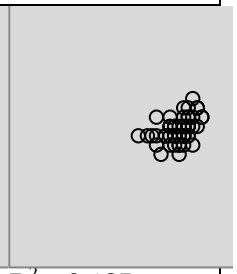
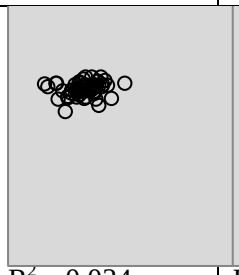
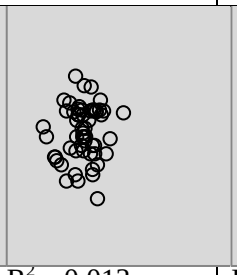
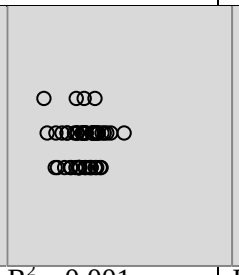
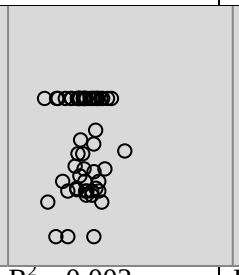
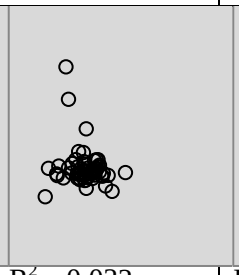
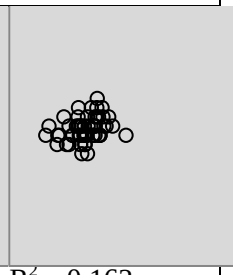
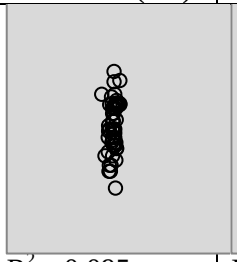
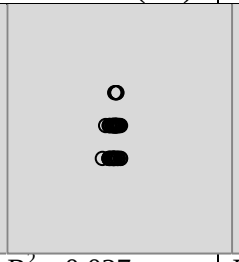
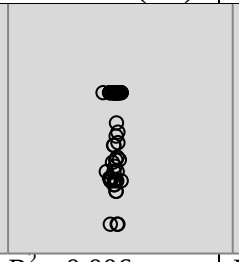
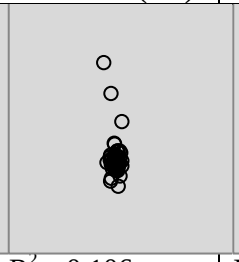
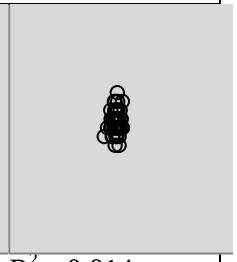
Registered Non Life Insurers in Uganda As At 31 December 2015

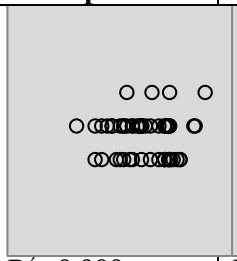
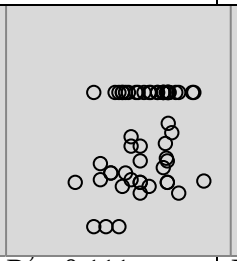
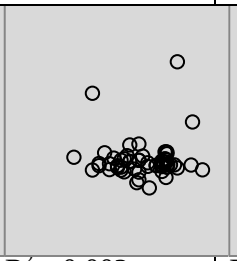
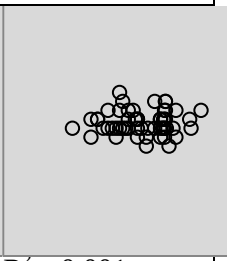
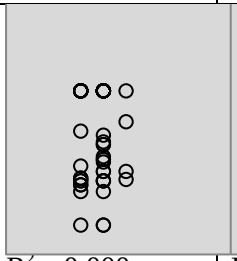
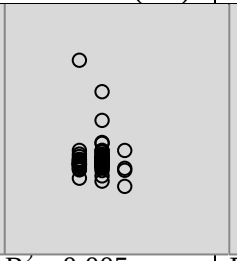
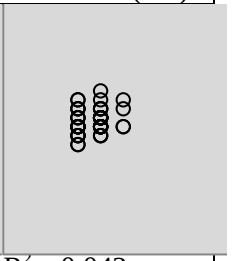
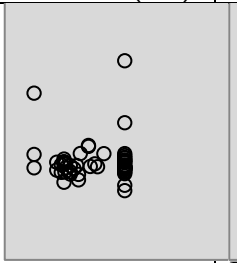
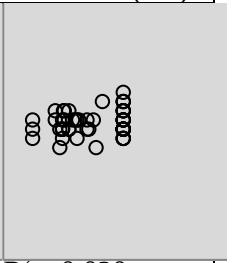
1. AIG Uganda Ltd
2. Alliance Africa General Insurance Ltd
3. APA Insurance (U) Ltd.
4. Britam Insurance Ltd
5. CIC General Insurance Ltd
6. East African Underwriters Ltd
7. Excel Insurance Co. Ltd
8. First Insurance Company Ltd.
9. GoldStar Insurance Co. Ltd
10. ICEA General Insurance Company Ltd
11. Lion Assurance Company Ltd.
12. NIC General Insurance Co Ltd.
13. Sanlam General Insurance (U) Ltd.
14. Nova Insurance Co. Ltd.
15. Pax Insurance Company Ltd.
16. Phoenix Assurance Ltd.
17. Rio Insurance Company Ltd.
18. Statewide Insurance Co. Ltd.
19. The Jubilee Insurance Co. of Uganda.
20. TransAfrica Assurance Ltd.
21. UAP Insurance Uganda Ltd

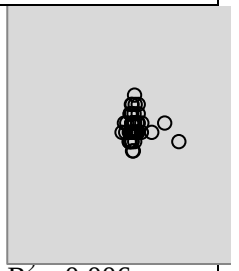
Source: Source www.ira.go.ug

Appendix IV

Scatterplot of the Relationships between Variables

	UR	Size	Age	Managerial competence	Ownership Structure	FP	NFP
ARMP	 $R^2 = 0.016$ P = 0.352 (NS)	 $R^2 = 0.011$ P = 0.436 (NS)	 $R^2 = 0.190$ P = 0.001*	 $R^2 = 0.016$ P = 0.353 (NS)	 $R^2 = 0.081$ P = 0.032*	 $R^2 = 0.164$ P = 0.027*	 $R^2 = 0.185$ P = 0.001*
UR		 $R^2 = 0.034$ P = 0.173 (NS)	 $R^2 = 0.013$ P = 0.405 (NS)	 $R^2 = 0.001$ P = 0.820 (NS)	 $R^2 = 0.003$ P = 0.666 (NS)	 $R^2 = 0.032$ P = 0.184 (NS)	 $R^2 = 0.162$ P = 0.023*
Size			 $R^2 = 0.095$ P = 0.020*	 $R^2 = 0.027$ P = 0.225 (NS)	 $R^2 = 0.006$ P = 0.557 (NS)	 $R^2 = 0.106$ P = 0.013*	 $R^2 = 0.014$ P = 0.389 (NS)

	UR	Size	Age	Managerial competence	Ownership Structure	FP	NFP
Age				 R^2 =0.000 P = 0.977 (NS)	 R^2 = 0.111 P = 0.011*	 R^2 = 0.002 P = 0.766 (NS)	 R^2 = 0.001 P = 0.808 (NS)
MC					 R^2 = 0.000 P = 0.945 (NS)	 R^2 = 0.005 P = 0.602 (NS)	 R^2 = 0.042 P = 0.126 (NS)
OS						 R^2 = 0.001 P = 0.844 (NS)	 R^2 = 0.020 P = 0.289 (NS)

	UR	Size	Age	Managerial competence	Ownership Structure	FP	NFP
FP							 $R^2 = 0.006$ P = 0.560 (NS)
NFP							

Key: NS – Linear Regression Model Not Significant; * - Linear Regression Model Significant; R^2 – Linear Regression Coefficient;

ARMP= Actuarial Risk Management Practices; UR= Underwriting Risk; MC= Managerial Competence, OS= Ownership structure; FP= Financial Performance; NFP= Non-Financial Performance

Appendix V:

Conversion Rates to Kenya Currency Equivalent (2010-2014)

Year	Uganda (kshs. Equivalent)	Tanzania (1 kshs. Equivalent)
2010	32.00	17.8
2011	27.00	15.4
2012	29.5899	18.5411
2013	29.2327	19.3842
2014	30.60205	21.54423
Total	148.42465	92.66953
Average	29.68493	18.533906

Source: www.centralbank.go.ke (extract)

Appendix VI
Summary of Variables Scores

No.	Country (Names of companies not disclosed due to ethical considerations)	Size (log of total assets)	Age (Years)	Managerial Competence	Majority 0wnership	Underwriting av Score	Pricing ave. Score	Ave. retention ratio (%)	Retention ratio (Likert)	Reinsurance Practices av.Score	Reins & Ret. Composite(mean)	Claims Mgt av Score
1	Kenya	21.7	16	3	Local-(100%)	4	4	76	4	4	5	4
2	Kenya	22.2	43	2	Local -(70%)	3	3	58	3	4	4	4
3	Kenya	23.1	39	2	Local -(100%)	4	4	84	4	4	5	4
4	Kenya	21.8	39	4	Local -(77%)	4	4	70	4	4	4	4
5	Kenya	21.7	52	2	Foreign (75%)	4	4	74	4	4	4	4
6	Kenya	22.5	38	2	Local (100%)	5	4	89	4	5	5	4
7	Kenya	20.8	48	2	Local (100%)	4	4	72	4	4	4	4
8	Kenya	21.9	11	3	Local (100%)	3	2	98	5	3	4	4
9	Kenya	21.5	76	3	Local (100%)	4	4	77	4	4	5	4
10	Kenya	22.2	36	3	Local (62%)	4	4	70	4	4	4	4
11	Kenya	21.4	34	2	Foreign (56%)	4	3	88	4	4	5	3
12	Kenya	21.7	34	3	Local (100%)	3	4	71	4	4	4	4
13	Kenya	22.5	37	3	Local (100%)	3	3	60	3	3	3	3
14	Kenya	22.4	40	2	Local (100%)	4	4	68	3	5	5	4
15	Kenya	22.8	39	3	Local (100%)	4	3	57	3	4	4	4
16	Kenya	21	39	3	Local (100%)	4	4	81	4	4	5	4
17	Kenya	22.6	38	3	Foreign (51%)	4	4	63	3	4	4	4
18	Kenya	21.1	34	2	Local (100%)	4	4	86	4	4	5	4
19	Kenya	21.1	29	2	Local (100%)	4	4	77	4	4	5	4
20	Kenya	21.7	11	3	Local (100%)	5	5	56	3	5	4	4
21	Kenya	21.4	29	3	Local (100%)	5	3	68	3	4	4	4
22	Kenya	20.9	12	3	Local (100%)	4	4	86	4	4	5	5
23	Kenya	21.5	104	4	Foreign (66%)	5	5	52	3	5	4	4
24	Kenya	21.1	14	3	Local (60%)	3	4	66	3	4	4	4

Appendix VI
Summary of Variables Scores

No.	**Country-** (Names of companies not disclosed due to ethical considerations)	Size (log of total assets)	Age (Years)	Managerial Competence	Majority Ownership	Underwriting av Score	Pricing ave. Score	Ave. retention ratio (%)	Retention ratio (Likert)	Reinsurance practices av.Score	Reins & Ret. Composite(mean)	Claims Mgt av Score
25	Kenya	21.1	23	2	Foreign (70%)	5	4	41	2	5	4	4
26	Kenya	20.5	5	2	Local (100%)	3	4	88	4	4	5	4
27	Kenya	22	37	3	Local (51%)	4	3	90	5	5	5	4
28	Kenya	22	34	3	Local (100%)	4	5	67	3	5	5	4
29	Kenya	20.3	38	3	Foreign (67%)	4	3	87	4	4	5	3
30	Kenya	23.1	38	2	Foreign (67%)	4	4	81	4	4	5	4
31	Kenya	21.3	23	3	Local (100%)	3	3	65	3	4	4	4
32	Kenya	19.9	79	3	Local (100%)	5	4	72	4	4	4	4
33	Tanzania	23.1	14	2	Foreign (65%)	4	4	54	3	4	4	4
34	Tanzania	20.7	6	3	Foreign (53%)	4	4	27	1	4	3	4
35	Tanzania	21.6	18	3	Foreign (51%)	4	4	46	2	4	4	4
36	Tanzania	20	17	3	Local (100%)	5	5	64	3	5	5	4
37	Tanzania	21.7	14	3	Local (67%)	3	4	40	2	4	3	4
38	Tanzania	21	18	3	Local (60%)	3	3	62	3	4	4	4
39	Tanzania	21.9	3	3	Foreign (67%)	4	4	34	2	3	3	4
40	Tanzania	22	12	4	Foreign (60%)	4	4	30	2	3	2	4
41	Tanzania	21.2	18	3	Foreign (67%)	4	5	52	3	3	3	4
42	Tanzania	20.2	18	2	Foreign (67%)	4	4	45	2	4	3	4
43	Tanzania	21.3	11	2	Foreign (70%)	4	4	35	2	5	4	4
44	Tanzania	19	8	3	Foreign (60%)	3	3	39	2		1	4
45	Uganda	21.1	8	3	Foreign (60%)	4	4	80	4	5	5	4
46	Uganda	18.1	52	2	Local (100%)	4	3	74	4	4	4	4

Appendix VI

Summary of Variables Scores

No.	Country- (Names of companies not disclosed due to ethical considerations)	Size (log of total assets)	Age (Years)	Managerial Competence	Majority Ownership	Underwriting av Score	Pricing ave. Score	Ave. retention ratio (%)	Retention ratio (Likert)	Reinsurance practices av.Score	Reins & Ret. Composite(mean)	Claims Mgt av Score
47	Uganda	20.1	5	3	Foreign (100%)	4	4	57	3	4	4	4
48	Uganda	20.2	6	2	Foreign (65%)	4	4	63	3	4	4	4
49	Uganda	21.2	13	2	Local (100%)	4	3	30	2	4	3	4
50	Uganda	20	20	3	Local (100%)	3	4	71	4	4	4	4
51	Uganda	22	7	3	Foreign (100%)	3	4	36	2	4	3	4
52	Uganda	21.7	18	3	Foreign (75%)	3	3	72	4	4	4	4
53	Uganda	22.2	10	2	Foreign (100%)	3	3	56	3	3	3	4
54	Uganda	22.2	10	3	Local (100%)	4	5	92	5	3	4	3
55	Uganda	21.5	34	2	Local (100%)	3	4	67	3	4	4	4
56	Uganda	22.1	24	4	Local (100%)	4	4	42	2	4	3	4
57	Uganda	19.9	9	2	Local (100%)	3	3	83	4	4	5	3

Appendix VI
Summary of Variable Scores

No.	**Country** (Names of companies not disclosed due to ethical considerations)	Average Net Income	Average Total Assets	ROA (%)	Average Premium growth rate(%)	Composite Financial Performance Score(%)	Quality of service average Score	Innovation average. Score	Reputation Average Score	Composite Non financial Performance Score	Average net claims incurred	Average net earned premiums	Average loss Ratio (%)
1	Kenya	113,429,800	2,562,651,200	4.4	10	7.21	4	4	5	4	797,032,000	1,478,980,600	54
2	Kenya	507,381,200	4,181,073,000	12.1	11	11.57	4	2	3	3	844,885,400	1,772,816,800	48
3	Kenya	422,527,200	10,304,529,800	4.1	14	9.05	5	4	5	5	3,210,748,000	4,586,057,000	70
4	Kenya	885,616,000	2,921,751,000	30.3	18	24.16	5	4	5	5	800,324,000	1,246,188,000	64
5	Kenya	254,538,400	2,651,452,400	9.6	7	8.30	4	4	5	4	436,613,600	614,885,000	71
6	Kenya	827,899,200	6,172,064,000	13.4	35	24.21	5	4	4	4	3,321,481,200	5,021,417,200	66
7	Kenya	231,142,000	1,061,324,800	21.8	1	11.39	4	3	4	4	118,743,000	319,563,000	37
8	Kenya	245,221,800	3,377,897,600	7.3	11	9.13	4	5	4	4	1,151,978,600	1,489,857,000	77
9	Kenya	165,977,200	2,231,673,200	7.4	15	11.22	4	4	4	4	499,557,800	821,988,200	61
10	Kenya	408,610,000	4,237,890,000	9.6	14	11.82	4	3	4	4	1,294,301,200	1,342,973,000	96
11	Kenya	184,155,200	1,973,500,400	9.3	10	9.67	4	4	4	4	244,294,800	521,510,000	47
12	Kenya	229,169,800	2,648,510,400	8.7	18	13.33	4	3	4	4	365,871,200	706,094,200	52
13	Kenya	421,734,800	6,020,882,800	7.0	28	17.50	4	3	4	4	900,917,600	1,357,210,200	66
14	Kenya	600,533,800	5,547,029,800	10.8	13	11.91	4	3	4	4	972,233,600	2,105,457,600	46
15	Kenya	732,458,200	8,296,843,400	8.8	36	22.41	4	4	4	4	984,798,600	1,946,911,600	51
16	Kenya	85,554,400	1,258,442,600	6.8	12	9.40	4	4	5	4	353,526,200	567,304,400	62
17	Kenya	180,308,000	6,534,200,000	2.8	-5	-1.12	4	4	4	4	1,482,964,200	1,992,314,800	74
18	Kenya	70,650,400	1,492,666,600	4.7	26	15.37	4	4	4	4	503,392,000	1,072,199,600	47
19	Kenya	104,533,600	1,442,839,200	7.2	14	10.62	5	4	5	5	470,361,200	808,739,200	58

Appendix VI
Summary of Variable Scores

No.	**Country** (Names of companies not disclosed due to ethical considerations)	Average Net Income	Average Total Assets	ROA (%)	Average Premium growth rate(%)	Composite Financial Performance Score(%)	Quality of service average Score	Innovation average. Score	Reputation Average Score	Composite Non financial Performance Score	Average net claims incurred	Average net earned premiums	Average loss Ratio (%)
20	Kenya	159,327,200	2,623,465,000	6.1	26	16.04	5	5	5	5	418,860,800	647,652,000	65
21	Kenya	172,395,400	1,913,059,200	9.0	13	11.01	4	2	5	4	637,920,000	1,421,850,000	45
22	Kenya	127,908,000	1,169,409,000	10.9	24	17.47	5	5	4	5	233,333,600	530,444,400	44
23	Kenya	226,201,000	2,073,652,800	10.9	2	6.45	5	4	4	4	120,799,400	277,130,000	44
24	Kenya	(24,861,250)	1,485,280,750	-1.7	64	31.16	4	3	4	4	665,681,750	1,331,363,500	50
25	Kenya	90,188,800	1,519,365,400	5.9	21	13.47	5	1	3	3	145,003,400	268,811,800	54
26	Kenya	(44,046,250)	799,220,250	-5.5	18	6.24	4	2	4	3	149,739,750	324,410,000	46
27	Kenya	362,493,200	3,424,639,400	10.6	38	24.29	4	3	5	4	325,990,800	783,346,000	42
28	Kenya	289,378,400	3,560,797,000	8.1	14	11.06	4	4	4	4	326,040,600	452,842,000	72
29	Kenya	52,386,200	669,691,600	7.8	25	16.41	3	3	4	3	102,611,400	305,800,800	34
30	Kenya	1,049,548,800	11,061,585,400	9.5	19	14.24	4	3	4	4	2,695,973,400	4,497,528,600	60
31	Kenya	176,002,600	1,781,610,600	9.9	10	9.94	3	3	4	3	225,134,400	442,386,600	51
32	Kenya	36,979,935	460,568,876	8.0	100	54.01	4	3	4	4	109,635,665	206,424,930	53
33	Tanzania	1,233,333,200	11,263,202,400	11.0	19	14.98	4	4	5	4	3,545,205,800	5,495,266,000	65
34	Tanzania	33,448,649	946,259,460	3.5	22	12.77	4	3	5	4	102,972,973	164,821,622	62
35	Tanzania	58,172,973	2,505,945,946	2.3	6	4.16	4	3	3	3	232,962,162	452,994,595	51
36	Tanzania	(22,476,843)	485,437,989	-4.6	-8	-6.32	4	3	5	4	420,817,524	515,311,503	82
37	Tanzania	177,372,973	2,651,416,216	6.7	22	14.34	4	3	5	4	445,437,838	716,681,081	62
38	Tanzania	(36,405,405)	1,292,837,838	-2.8	67	32.09	4	4	4	4	217,918,919	487,108,109	45

Appendix VI
Summary of Variable Scores

No.	**Country** (Names of companies not disclosed due to ethical considerations)	Average Net Income	Average Total Assets	ROA (%)	Average Premium growth rate(%)	Composite Financial Performance Score(%)	Quality of service average Score	Innovation average. Score	Reputation Average Score	Composite Non financial Performance Score	Average net claims incurred	Average net earned premiums	Average loss Ratio (%)
39	Tanzania	183,978,379	3,093,989,189	5.9	32	18.97	4	3	4	4	599,589,189	885,210,811	68
40	Tanzania	172,616,216	3,524,800,000	4.9	4	4.45	4	3	4	4	323,805,406	618,972,973	52
41	Tanzania	84,918,919	1,685,556,757	5.0	27	16.02	4	4	4	4	312,432,432	571,275,676	55
42	Tanzania	(81,967,568)	592,547,600	-13.8	7	-3.42	4	3	4	4	130,097,297	244,670,270	53
43	Tanzania	24,205,406	1,849,729,730	1.3	11	6.15	4	3	4	4	137,989,189	230,075,676	60
44	Tanzania	(45,162,162)	181,135,135	-24.9	50	12.53	4	3	4	4	29,621,622	43,756,757	68
45	Uganda	157,546,821	1,526,238,054	10.3	3	6.66	4	4	5	4	61,266,727	219,629,030	28
46	Uganda	(10,560,522)	73,166,961	-14.4	242	113.78	4	2	4	3	1,768,249	5,748,081	31
47	Uganda	(50,859,562)	510,645,926	-10.0	175	82.52	3	4	5	4	26,717,770	79,629,495	34
48	Uganda	62,926,115	617,395,050	10.2	11	10.60	4	3	5	4	115,233,711	266,473,919	43
49	Uganda	417,934,997	1,668,653,118	25.0	16	20.52	4	3	4	4	67,843,973	179,668,471	38
50	Uganda	20,763,188	489,562,290	4.2	36	20.12	4	3	4	4	100,322,283	194,102,727	52
51	Uganda	981,946,357	3,525,904,875	27.8	19	23.42	4	3	4	4	491,575,374	789,621,542	62
52	Uganda	215,139,717	2,760,155,165	7.8	24	15.90	4	4	4	4	121,543,778	1,058,520,424	11
53	Uganda	42,500,633	4,218,709,192	1.0	20	10.50	4	3	3	3	64,743,232	317,599,616	20
54	Uganda	34,035,852	4,215,132,021	0.8	17	8.90	3	4	4	4	58,411,710	276,305,212	21
55	Uganda	36,413,933	2,089,577,845	1.7	8	4.87	4	2	4	3	69,720,640	150,194,707	46
56	Uganda	114,343,434	3,829,403,132	3.0	-26	-11.51	4	3	4	4	14,009,017	176,978,162	8
57	Uganda	14,629,051	452,320,943	3.2	33	18.12	4	3	4	4	14,009,017	61,281,360	23

Appendix VII:

Summary of Results of Hypothesis Testing

Objective	Hypothesis	Results	Conclusion
Objective 1 To establish the relationship between ARMP and performance of property and casualty firms in East Africa	**Hypothesis 1a:** There is no significant relationship between ARMP and financial performance of property and casualty firms in East Africa	Adjusted R^2 = .002, F= 1.022, $p > 0.05$ No significant relationship exists. ARMP explains only 0.2% of the variations in firm performance.	The null hypothesis is confirmed. No significant relationship exists between ARMP and financial firm performance.
	Hypothesis 1b: There is no significant relationship between ARMP and non financial firm performance of property and casualty firms in East Africa	Adjusted R^2 = .298, F= 6.195, $p \leq 0.05$. A Significant relationship exists between ARMP and non-financial firm performance. ARMP explains 29.8% of the variations in non-financial firm performance.	The null hypothesis is rejected and alternate hypothesis is confirmed. The predicting equation is: **NFP = 1.558+.242PR+.141RR .355CM+ε**
Objective 2 To determine the influence of underwriting risk on the relationship between ARMP and performance of property and casualty firms in East Africa	**Hypothesis 2a:** Underwriting risk does not have a significant intervening effect on the relationship between ARMP and financial performance of property and casualty firms in East Africa.	No relationship exists between ARMP and financial performance in 1(a) above hence intervention was not tested as it does not exist.	The null hypothesis is confirmed. Underwriting risk has no statistically significant mediating effect on the relationship between ARMP and financial firm performance.
	Hypothesis 2b: Underwriting risk does not have a significant intervening effect on the relationship between ARMP and non financial performance of property and casualty firms in East Africa.	Adjusted R^2 = .284, F = 4.887, $p \leq 0.05$. There is a significant relationship between ARMP, Underwriting risk and non financial firm performance. The variables explain 28.4 % of variation in non financial firm performance	The null hypothesis is rejected and the alternate one confirmed, implying that underwriting risk has a statistically significant mediating effect on the relationship between ARMP and non financial firm performance. predicting equation is: **NFP = .904 .235PR+.155RR +.344CM + ε**

Objective	Hypothesis	Results	Conclusion
Objective 3 To establish the effect of firm characteristics on the relationship between ARMP and performance of property and casualty firms in East Africa	**Hypothesis 3a:** The strength of the relationship between ARMP and financial performance of property and casualty firms in East Africa. is not significantly moderated by firm characteristics.	(ΔR^2) = .387, $p \leq .05$, F= 4.114. The change in the variation in financial firm performance explained by introduction of the firm characteristics (size) is statistically significant.	The null hypothesis is rejected and the alternate one confirmed, implying that firm characteristics has a moderating effect on the relationship between ARMP and financial firm performance. The predicting equation is: **FP = -78.955+3.86SZ +16.121 (PR*SZ)** + ε
	Hypothesis 3b: The strength of the relationship between ARMP and non financial performance of property and casualty firms in East Africa. is not significantly moderated by firm characteristics.	(ΔR^2) = -.023, -.021, -.025 and .099, $p \leq .05$, respectively for size, age, managerial competence and country of domicile change in the variation in non-financial firm performance explained by introduction the firm characteristics is statistically significant.	The null hypothesis is rejected and the alternate one confirmed implying that firm characteristics has a moderating effect on the relationship between ARMP and non financial firm performance. The predicting equation is: **NFP = 1.558 +.242PR+141RR+.355CM+ ε**
Objective 4 To establish the joint effect of ARMP, firm characteristics and underwriting risk on performance of property and casualty firms in East Africa	**Hypothesis 4a:** ARMP, firm characteristics and underwriting risk have no significant joint effect on financial performance of property and casualty firms in East Africa.	Adjusted R^2 = 0.025, F = 1.159, p >.05. There is no significant relationship between ARMP, firm characteristics, underwriting risk and financial firm performance which jointly explain 2.5% of the variations in financial firm performance.	The null hypothesis is confirmed, implying that there is no statistically significant joint effect of ARMP, firm characteristics and underwriting risk on financial firm performance of P & C firms in east Africa.
	Hypothesis 4b: ARMP, firm characteristics and underwriting risk have no significant joint effect on non financial performance of property and casualty firms in East Africa.	Adjusted R^2 = 0.243, F = 2.999, $p \leq .05$. There is a significant relationship between ARMP, firm characteristics, underwriting risk and non-financial firm performance which jointly explain 24.3% of the variations in non-financial firm performance .	The null hypothesis is rejected implying that there is a statistically significant joint effect of ARMP, firm characteristics and underwriting risk on non financial firm performance of P & C firms in east Africa. The predicting equation is**:** **NFP = .161 +.223RR+.+.154CM +.159MC+.125LR + ε**

Source: Research Data