

Strathmore

UNIVERSITY

EFFECTS OF DEMOGRAPHIC FACTORS ON INSURANCE PRICING IN KENYA

WAMBUA MARYLIN MUSANGI 146747

**SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF ACTUARIAL SCIENCE AT STRATHMORE UNIVERSITY**

STRATHMORE INSTITUTE OF MATHEMATICAL SCIENCES

STRATHMORE UNIVERSITY

NAIROBI, KENYA

JANUARY, 2025

This Research Project is available for Library use on the understanding that it is copyright material and that no quotation from the Research Project may be published without proper acknowledgement.

DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the Research Project contains no material previously published or written by another person except where due reference is made in the Research Project itself.

© No part of this Research Project may be reproduced without the permission of the author and Strathmore University

Wambua Marylin Musangi [*Name of Candidate*]

..... [*Signature*]

..... [*Date*]

This Research Project has been submitted for examination with my approval as the Supervisor.

Dr. Marian Chatoro [*Name of Supervisor*]

..... [*Signature*]

..... [*Date*]

Strathmore Institute of Mathematical Sciences

Strathmore University

Table of Contents

DECLARATION	ii
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background of the Study	1
1.1.1 Insurance Pricing	4
1.1.2 Demographic Factors Affecting Insurance Pricing	5
1.1.3 Insurance Sector in Kenya	6
1.2 Research Problem.....	8
1.3 Research Objectives	10
1.3.1 General Objective	10
1.3.2 Specific Objectives	10
1.4 Research Questions	10
1.5 Significance of the Study	10
1.5.1 Significance to Policy	10
1.5.2 Significance to Practice	11
1.5.3 Significance to Theory.....	11
1.6 Scope of the Study.....	11
1.7 Organization of the Study	12
CHAPTER TWO	13
LITERATURE REVIEW	13
2.1 Introduction	13
2.2 Theoretical Literature Review	13
2.2.1 Actuarial Fairness Theory	13
2.2.2 Social Justice Theory.....	14
2.3 Empirical Literature Review	15
2.3.1 Effect of age on insurance premiums	15
2.2.2 Effect of gender on insurance premiums	17
2.2.3 Effect of geographic location on insurance premiums	19
2.4 Conceptual Framework	20
CHAPTER THREE	22

RESEARCH METHODOLOGY	22
3.1 Introduction	22
3.2 Research Design.....	22
3.3 Population.....	22
3.4 Sample Design.....	23
3.5 Data Collection.....	23
3.6 Data Analysis	23
3.6.1 Correlation Analysis	24
3.6.2 Regression Analysis	24
3.6.3 Model Validation.....	25
3.7 Results Interpretation	25
3.8 Ethical Considerations.....	26
CHAPTER FOUR: FINDINGS	27
4.1 Introduction	27
4.2 Summary Statistics.....	27
4.3 Diagnostic Tests	29
4.3.1 Test for Multi collinearity.....	29
4.3.2 Test for Normality	29
4.4 Correlation Results.....	31
4.5 Regression Analysis.....	32
4.5.1 Effect of age on insurance premiums in Kenya.....	33
4.5.2 Effect of gender on insurance premiums in Kenya	34
4.5.3 Effect of geographic location on insurance premiums in Kenya.....	35
4.5.4 Effect of demographic factors on insurance pricing in Kenya	37
4.9.6 Moderating effect of asset type on the relationship between demographic factors and insurance pricing in Kenya	38
CHAPTER FIVE	41
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.....	41
5.1 Introduction	41
5.2 Summary of the Key Findings	41
5.2.1 Age and Insurance Pricing.....	41

5.2.2 Gender and Insurance Pricing.....	41
5.2.3 Geographic Location and Insurance Pricing	42
5.3 Conclusion.....	42
5.4 Recommendations	43
5.4.1 Policy Recommendations	43
5.4.2 Practice Recommendations.....	45
5.5 Suggestions for Further Research	46
REFERENCES	47
Appendices.....	51
Appendix I: Licensed Insurance Companies in Kenya	51



ABSTRACT

In recent years, insurance premiums in Kenya have risen significantly, driven by a combination of inflation, increased medical costs, and higher claims frequency. The demographics accessing insurance in Kenya reveal a complex interplay of socioeconomic factors, education levels, and cultural attitudes towards risk. Research that systematically evaluates insurance rates across a range of demographic variables remains limited, suggesting a need for more comprehensive studies to understand how demographic traits influence insurance accessibility and affordability. The general objective of the study was to investigate the effect of demographic factors on insurance pricing in Kenya. The study was guided by the following specific research objectives: to analyze the impact of age on insurance premiums in Kenya, to assess the effect of gender on insurance pricing in Kenya and to examine the influence of geographic location on insurance costs in Kenya. The target group for this study will encompass insurance companies registered in Kenya. The audited reports of the insurance firms for the five-year period between 2019 and 2023 served as the study's secondary data source (both years inclusive). Descriptive statistics including mean and standard deviation were used to describe the data over the years. Multiple linear regression analysis and correlation analysis were used to determine the relationship between the research variables. Tables and figures were used in data presentation. The study established that the demographic factors studied accounted for 68.4 percent of the variation in the insurance pricing. The study concludes that demographic factors such as age, gender, and geographic location significantly impact insurance pricing in Kenya. It is recommended that insurance companies conduct detailed demographic analyses to tailor their pricing strategies effectively. Through understanding how these factors influence risk assessment, insurers can create more accurate and equitable pricing models.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Insurance premiums are experiencing an upward trend globally, with noticeable variations across different demographic groups. A report by Swiss Re (2021) highlighted a global increase in insurance premiums by approximately 3.3% annually, with health insurance premiums surging due to higher medical expenses and an aging population. In the United States, health insurance premiums rose by 4% in 2020, while auto insurance premiums increased by 3.1% due to higher repair costs and accident rates (KFF, 2020; NAIC, 2021). Similarly, Europe has seen a 5% annual rise in property insurance premiums, partly due to more frequent natural disasters linked to climate change (Insurance Europe, 2021). Variability in premiums is also significant across demographic groups; older adults and individuals with pre-existing health conditions face higher health insurance costs, while those in high-risk occupations pay more for life and disability insurance (PwC, 2021).

Theoretically, Risk-based pricing suggests that demographic variables like age, gender, and location directly influence the likelihood of a claim, thereby affecting premiums. For instance, studies by Frees, Derrig, and Meyers (2016) highlight how younger drivers are statistically more prone to accidents, resulting in higher auto insurance premiums. Similarly, research by Brockett and Golden (2020) shows that gender can influence life insurance pricing, with women typically paying lower premiums due to their longer life expectancy. Additionally, urban residents might face higher home insurance premiums compared to their rural counterparts due to increased crime rates and property values, as noted by Évora and Fernandes (2018).

The theory of adverse selection posits that individuals with higher risk are more likely to purchase insurance, leading insurers to raise premiums to cover potential losses. This is supported by the work of Finkelstein and McGarry (2018), who found that individuals with poor health are more inclined to buy health insurance. Moral hazard theory, on the other hand, suggests that insured individuals might engage in riskier behavior because they feel protected by their policy. This phenomenon is observed in studies like those by Cohen and Siegelman (2021), where drivers with comprehensive coverage tend to file more claims. Further, socioeconomic factors play a critical role in insurance pricing, as explored by Wang, Xu, and Yang (2017), who show that lower-income

individuals often pay disproportionately higher premiums due to a lack of competitive options and financial literacy. The interplay of these theories underscores the complex dynamics of demographic factors in determining insurance costs, reflecting a broad consensus among scholars about their significant impact.

In the developed countries, insurance premiums vary substantially based on age and health status. Research indicates that older individuals generally face higher premiums due to increased health risks and a higher likelihood of claiming health insurance benefits (Claxton et al., 2017; Kamal et al., 2019). For instance, premiums for older adults can be up to three times higher than those for younger individuals (Cohen et al., 2020). Gender also plays a significant role; historically, women have faced higher premiums for health insurance due to maternity care and other gender-specific health needs (Gaffney and McCormick, 2018; He et al., 2016). However, recent policy changes under the Affordable Care Act have sought to eliminate such disparities (Baicker and Chandra, 2017). Additionally, income level further complicates this landscape, as lower-income individuals often face higher relative costs due to limited access to employer-sponsored insurance and reliance on market-based options (World Health Organization, 2018).

In contrast, developing countries exhibit different but equally pronounced disparities in insurance pricing. Age remains a critical factor, with younger individuals typically enjoying lower premiums due to perceived lower health risks (Insurance Regulatory Authority of Kenya, 2019; African Development Bank, 2020). Gender disparities are also present but manifest differently compared to developed nations. In Kenya, men often face higher premiums for life insurance due to higher mortality rates from lifestyle-related diseases and accidents (Ndung'u and Mwega, 2017; Omolo et al., 2019). Income disparities are stark; wealthier individuals can afford comprehensive insurance plans, while lower-income populations may only access basic coverage, if any at all (Njuguna and Arunga, 2018). Income inequality significantly affects access to and the affordability of insurance in many African countries, including Kenya (Insurance Regulatory Authority of Kenya, 2019).

Regionally within Kenya, demographic factors such as geographical location significantly influence insurance pricing. Urban areas like Nairobi and Mombasa generally have higher insurance premiums compared to rural regions (Macharia and Ombati, 2021; Wambui et al., 2020). This is partly due to the higher cost of healthcare services and the greater risk of accidents and

lifestyle diseases in urban settings (Mutua and Kimani, 2018). Additionally, regional disparities in income levels also play a role; urban dwellers typically have higher disposable incomes, allowing insurers to set higher premiums compared to rural areas where incomes are lower, and the affordability of insurance is a critical concern (Gakure and Ngugi, 2020). The geographical disparity is further exacerbated by varying access to healthcare facilities, with rural areas often lacking adequate medical services, influencing the risk calculations made by insurance companies (Nyandat et al., 2019).

Globally, the impact of demographic factors on insurance pricing is further illustrated by comparing other developing countries such as India with Kenya. In India, similar to Kenya, age and income are significant determinants of insurance premiums (Bhargava and Kumbhakar, 2016; Chattopadhyay et al., 2018). Younger individuals in both countries benefit from lower premiums, reflecting their lower risk profiles (Dey and Dutta, 2020). However, the Indian insurance market also sees considerable regional variation, with urban centers like Mumbai and Delhi experiencing higher premiums compared to rural areas, mirroring the urban-rural divide seen in Kenya (Roy and Gupta, 2021). Gender disparities in insurance pricing in India are also prominent, particularly in health and life insurance sectors where men and women are priced differently based on gender-specific health risks and mortality rates (Kumar and Singh, 2018).

In Kenya, the interplay of demographic factors such as age, gender, income, and geographical location shapes the insurance landscape profoundly. Young adults and children generally have lower health insurance premiums due to their lower utilization of health services compared to older adults, who face higher premiums due to increased health risks associated with aging (Okech and Lelegwe, 2019; Kiplagat et al., 2020). Gender influences are evident in life insurance where men, particularly those in high-risk occupations, are charged higher premiums (Mwangi and Muli, 2018; Mutiga et al., 2017). Income disparities significantly affect insurance affordability; wealthier Kenyans can access comprehensive insurance plans, while many low-income earners remain uninsured or underinsured, facing higher relative costs (Institute of Economic Affairs, 2020). Additionally, the urban-rural divide is stark; urban residents, particularly in Nairobi, face higher premiums due to higher healthcare costs and greater access to medical facilities, whereas rural residents struggle with lower incomes and limited access to insurance products (Ndung'u et al., 2018). This regional disparity is highlighted by the Insurance Regulatory Authority of Kenya,

emphasizing the need for tailored insurance products to cater to diverse demographic needs across the country (Insurance Regulatory Authority of Kenya, 2019).

1.1.1 Insurance Pricing

According to Butler and Insurance pricing, also known as premium setting, is the process of determining the cost of insurance coverage. It involves assessing the risk associated with an insured entity and determining a fair price to cover potential losses. The fundamental goal of insurance pricing is to ensure that the premiums collected are sufficient to cover the expected claims, administrative costs, and provide a profit margin for the insurer. The pricing of insurance policies is a complex process that involves various factors, including the probability of a loss, the cost of the potential loss, and the operational costs of the insurer. According to Doherty (2017), insurance pricing must balance the insurer's need to be competitive with the need to be financially stable. This delicate balance requires sophisticated models and a deep understanding of risk management (Frees, 2018). Additionally, Pindyck and Rubinfeld (2018) highlight that insurance pricing must consider regulatory requirements and market conditions, making it a multi-faceted challenge.

To accurately price insurance, actuaries utilize a variety of data and statistical models. The process begins with the collection and analysis of historical loss data, which helps in predicting future losses. Meyer and Weinberg (2016) emphasize the importance of accurate data in ensuring the reliability of predictive models. The data is then used to estimate the probability of various loss events and the potential costs associated with these events. According to Harrington and Niehaus (2020), these estimates are crucial in setting premiums that are both competitive and sufficient to cover potential losses. Moreover, pricing models must incorporate external factors such as economic conditions, legal changes, and advancements in technology, which can all influence the risk landscape (Cummins, 2017). The use of predictive analytics and big data has revolutionized insurance pricing, enabling insurers to more accurately assess risk and set premiums accordingly (Ghosh and Innes, 2018).

Insurance pricing is not only about technical calculations but also involves strategic decision-making. Insurers must consider their overall risk appetite and market positioning. Swiss Re (2019) notes that insurers often segment their customers based on risk profiles and adjust their pricing strategies accordingly. High-risk customers may face higher premiums or even find it difficult to

obtain coverage, whereas low-risk customers are often offered more favorable rates. According to Cummins and Weiss (2021), this segmentation helps insurers manage their portfolios effectively and maintain profitability. Additionally, insurers must navigate regulatory frameworks that dictate pricing practices to ensure fairness and transparency in the market (Nielsen, 2020). These regulations can vary significantly by region and type of insurance, adding another layer of complexity to the pricing process.

In the Kenyan insurance market, the principles of insurance pricing are applied within a unique economic and regulatory landscape. Kenya's insurance industry has grown significantly in recent years, driven by increased awareness and economic development (IRA, 2021). However, the market faces challenges such as low penetration rates and high levels of fraud, which impact pricing strategies. According to Mwangi and Murigu (2015), Kenyan insurers must contend with a lack of reliable data, which complicates the risk assessment process. To address these issues, there have been efforts to improve data collection and sharing among insurers, as noted by Muli and Nzioki (2018). Additionally, regulatory bodies such as the Insurance Regulatory Authority (IRA) are working to enhance the regulatory framework to support fair and transparent pricing practices (IRA, 2021). The adoption of technology and innovation, such as mobile-based insurance platforms, has also played a significant role in shaping the pricing strategies in Kenya, making insurance more accessible and tailored to the local market needs (Kamau and Njiru, 2019).

1.1.2 Demographic Factors Affecting Insurance Pricing

Demographic factors refer to statistical characteristics of a population, such as age, gender, and occupation, which are used by insurance companies to evaluate the risk profiles of individuals. These factors help insurers predict the likelihood of claims and set prices accordingly. According to a study by Zhang et al. (2018), demographic variables significantly influence the risk assessment process, impacting how premiums are calculated and adjusted. Furthermore, Grable and Lytton (2019) emphasize that insurance companies rely heavily on demographic data to understand potential risk factors associated with different groups of people. Such demographic insights are essential for creating pricing models that are both fair and financially sustainable for insurers.

Age is a prominent demographic factor that affects insurance pricing. Young drivers, for instance, are often charged higher premiums due to their perceived lack of driving experience and higher propensity for accidents, as discussed by Brockett and Golden (2016). Conversely, older

individuals may face higher health insurance premiums as they are more likely to develop chronic conditions. This age-based pricing is supported by research from Rosenberg and Kormos (2017), who found that health risks increase significantly with age, leading insurers to adjust premiums to reflect this heightened risk. In contrast, Viscusi (2018) highlights that middle-aged individuals often enjoy lower premiums due to their stable health and lower accident rates, suggesting a nuanced approach to age-related pricing.

Gender also significantly influences insurance premiums. Historically, men have been charged higher premiums for car insurance due to their higher involvement in risky driving behaviors, as noted by Cohen and Einav (2017). However, recent regulatory changes in many regions have moved towards gender-neutral pricing. Despite this, gender-based risk assessment remains prevalent in life and health insurance sectors. Siegelman and Tennyson (2016) observed that women generally live longer than men, leading to higher life insurance premiums for males. Additionally, a study by Eling and Schmit (2019) found that men are more likely to engage in hazardous occupations, further influencing the pricing of both life and health insurance policies. These gender-based assessments underscore the complex interplay between demographic factors and insurance pricing.

Occupation is another critical demographic factor affecting insurance costs. Certain professions are deemed riskier, leading to higher insurance premiums for individuals in these fields. For instance, construction workers and miners are typically charged more for life and health insurance due to the inherent dangers of their jobs, as discussed by Harrington and Niehaus (2018). In contrast, professionals in low-risk occupations, such as office workers, often benefit from lower premiums. This occupational risk assessment is supported by research from Doherty and Kartasheva (2019), who found that the nature of one's job significantly impacts the likelihood of claims, thereby influencing premium rates. Moreover, a study by Cummins and Weiss (2017) highlighted that self-employed individuals often face higher health insurance costs due to perceived financial instability and lack of employer-sponsored health benefits, further illustrating the impact of occupation on insurance pricing.

1.1.3 Insurance Sector in Kenya

The insurance sector in Kenya has evolved significantly over the past century, transforming from a nascent industry into a dynamic and integral part of the country's financial landscape. The roots

of Kenya's insurance industry can be traced back to the colonial era when British insurers established operations to cater to European settlers. Substantial growth and indigenization of the industry occurred post-independence, particularly from the 1980s onwards. This period saw the emergence of local insurance companies and increased regulatory oversight aimed at fostering stability and consumer confidence. The Association of Kenya Insurers (AKI, 2020) notes that the sector experienced a notable shift towards local ownership and management during the 1990s and early 2000s, driven by economic liberalization policies and an expanding middle class. Additionally, Kamau (2017) indicates that the insurance sector has been pivotal in supporting economic development by mobilizing savings and enabling risk management across various sectors. These developments have laid a strong foundation for the industry, enhancing its capacity to contribute to national economic growth.

The composition of Kenya's insurance sector is diverse, comprising life and non-life (general) insurance companies, reinsurance companies, brokers, agents, and other auxiliary service providers. Life insurance products, which include endowment plans, whole life policies, and annuities, cater primarily to long-term savings and protection needs. In contrast, general insurance covers a broad spectrum of risks such as motor vehicle, property, liability, and health. Ondigo and Mugambi (2020) reveal that general insurance accounts for a larger share of the market compared to life insurance, reflecting a higher demand for short-term risk management solutions in the country. Technological advancements have led to the introduction of innovative products like microinsurance and mobile-based insurance solutions, aimed at increasing penetration in the underserved segments of the population. Muriithi and Kinyua (2018) highlight the significance of these innovations in reaching low-income and rural populations, demonstrating the sector's adaptability to changing market needs.

Regulation of the insurance sector in Kenya is primarily the responsibility of the Insurance Regulatory Authority (IRA), established under the Insurance Act. The IRA's mandate includes licensing and supervising insurers, brokers, and agents, ensuring compliance with legal requirements, and protecting policyholders' interests. In recent years, the regulatory framework has been strengthened to enhance transparency, solvency, and consumer protection. PricewaterhouseCoopers (2019) reports that the adoption of risk-based supervision and capital adequacy requirements has been instrumental in ensuring the financial soundness of insurers. These regulatory measures have significantly improved the resilience of the insurance sector

amidst economic fluctuations and market shocks. Additionally, the Insurance Fraud Investigation Unit (IFIU) has been critical in combating fraudulent activities, thus safeguarding the integrity of the insurance market.

The types of premiums charged by insurance companies in Kenya vary widely depending on the nature of the coverage, the risk profile of the insured, and other factors such as the sum insured and policy duration. Life insurance premiums are typically structured based on age, health status, and the type of policy, with whole life policies generally attracting higher premiums due to their extended coverage period. General insurance premiums, on the other hand, are influenced by factors such as the type and value of the insured asset, historical claims data, and underwriting guidelines. Muriithi and Kinyua (2018) highlight that motor vehicle insurance, one of the most common general insurance products, often utilizes a combination of fixed premiums and risk-based adjustments to determine pricing. The competitive landscape has prompted insurers to adopt more customer-centric pricing models, including flexible payment plans and discounts for low-risk behaviors.

The demographics accessing insurance in Kenya reveal a complex interplay of socioeconomic factors, education levels, and cultural attitudes towards risk. Historically, insurance uptake has been higher among urban populations, the middle and upper socioeconomic classes, and individuals with higher levels of education and financial literacy. However, efforts to broaden access have been gaining momentum, particularly through microinsurance and mobile-based platforms targeting low-income and rural populations. Njuguna and Arunga (2017) indicate that the introduction of products like M-TIBA, a mobile health insurance solution, has significantly increased insurance penetration among previously underserved demographics. Public awareness campaigns and financial literacy programs spearheaded by both government and private sector players have been pivotal in changing perceptions and encouraging a more inclusive insurance culture. These initiatives are essential in driving growth and ensuring that the benefits of insurance are widely distributed across different segments of society.

1.2 Research Problem

In recent years, insurance premiums in Kenya have risen significantly, driven by a combination of inflation, increased medical costs, and higher claims frequency. The Insurance Regulatory Authority of Kenya (IRA) noted a rise in gross written premiums from KES 216.11 billion in 2015

to KES 241.69 billion in 2019, reflecting a notable upward trend in premium costs (Insurance Regulatory Authority of Kenya, 2019). Deloitte's 2018 report emphasized that medical inflation in Kenya reached about 12% per annum, exacerbating health insurance costs (Deloitte, 2018). Kimani (2017) argued that Kenya's volatile economic environment, characterized by policy uncertainty, further stresses the insurance sector, contributing to the premium increases. Similarly, a study by Wanjohi (2016) highlighted the role of increasing motor vehicle theft and accidents in pushing motor insurance premiums higher.

The variation in insurance premiums across different demographic groups in Kenya is pronounced. The Association of Kenya Insurers (AKI) reported that urban residents typically pay higher premiums compared to rural residents due to perceived higher risks and cost of living differences (Association of Kenya Insurers, 2019). Ochieng (2016) found that middle and upper-income earners face steeper premiums for comprehensive health and motor insurance, indicating a direct correlation between income levels and premium rates. Mwangi (2018) noted gender disparities, with women generally paying lower premiums for life insurance than men, attributed to their longer life expectancy. Additionally, Njoroge (2017) observed regional disparities, where residents in disaster-prone areas face higher property insurance premiums compared to those in less vulnerable regions.

Despite these observable trends, the relationship between insurance premiums and various demographic and economic variables remains inconclusive. Kariuki (2019) pointed out that while macroeconomic factors like inflation are well-documented, microeconomic behaviors and consumer trust levels in insurance firms are less understood and warrant further investigation. Otieno (2018) argued that existing models often fail to account for the informal sector's impact on insurance dynamics in Kenya, indicating significant gaps in current research. Additionally, a paper by Gachara (2017) discussed how social and cultural factors influence insurance uptake and premium setting, further complicating the understanding of these relationships. Zhou et al. (2021) analyzed health insurance policies in China, finding that both age and gender significantly influenced premium pricing, with older individuals and women generally paying higher premiums due to increased healthcare utilization and reproductive health-related coverage, respectively.

Fofie (2016) reviewed literature across various insurance types—property, health, vehicle, and life insurance—highlighting the complex relationship between insurance pricing and demographic

factors such as age, gender, occupation, and lifestyle. Kim and Chatterji (2020) examined occupational variation in life insurance premiums, revealing that high-risk occupations, like construction workers and firefighters, incur higher premiums due to increased accident risks, whereas low-risk occupations, such as office workers and teachers, benefit from lower premiums. Despite these findings, research that systematically evaluates insurance rates across a range of demographic variables remains limited, suggesting a need for more comprehensive studies to understand how demographic traits influence insurance accessibility and affordability. This study aimed to fill the research gap by conducting a comparative analysis of insurance premiums across various demographic groups in Kenya.

1.3 Research Objectives

1.3.1 General Objective

The general objective of the study was to investigate the effect of demographic factors on insurance pricing in Kenya

1.3.2 Specific Objectives

- i. To analyse the impact of age on insurance premiums in Kenya.
- ii. To assess the effect of gender on insurance pricing in Kenya.
- iii. To examine the influence of geographic location on insurance costs in Kenya.

1.4 Research Questions

- i. What is the impact of age on insurance premiums in Kenya?
- ii. What is the effect of gender on insurance pricing in Kenya?
- iii. What is the influence of geographic location on insurance costs in Kenya.?

1.5 Significance of the Study

1.5.1 Significance to Policy

The study will provide evidence-based insights that can inform regulatory frameworks governing insurance pricing in Kenya. Policymakers will be able to utilize the findings to develop equitable and transparent pricing models that address demographic disparities. This will ensure that insurance premiums are set in a manner that is fair and justifiable, potentially leading to

amendments in current regulations to better reflect the actual risk profiles associated with different demographic groups. By aligning policies with the study's results, there will be a move towards more inclusive and accessible insurance coverage for all Kenyans.

1.5.2 Significance to Practice

In practice, the findings of this study will have substantial implications for insurance companies operating in Kenya. Insurance providers will gain a deeper understanding of how demographic factors such as age, gender, and geographic location influence risk and, consequently, pricing. This will enable insurers to refine their underwriting processes and develop more accurate pricing strategies that reflect true risk levels. Additionally, insurers will be better equipped to design products that cater to the specific needs of diverse demographic groups, potentially enhancing customer satisfaction and expanding their market reach.

1.5.3 Significance to Theory

From a theoretical perspective, this study will contribute significantly to the body of knowledge on insurance economics and risk management. It will provide empirical data that can be used to validate or challenge existing theories related to demographic influences on insurance pricing. The study will also open up new avenues for academic research, encouraging further exploration into the interplay between demographics and insurance. Scholars and researchers will be able to build on the study's findings to develop more robust models and theories, thereby advancing the field and providing a foundation for future studies in similar contexts.

1.6 Scope of the Study

The scope of this study was the comparative analysis of demographic factors including age, gender, and geographic location and their impact on insurance pricing in Kenya. The study focused on the Kenyan insurance market, evaluating the practices and pricing strategies of insurance companies operating within the country. The study covered diverse regions across Kenya, including urban and rural areas, to provide a comprehensive analysis of regional variations in insurance premiums. The study analyzed quantitative data using descriptive and inferential analysis.

1.7 Organization of the Study

This project is organized in five chapters: Chapter one is comprised of the background of the study, statement of the problem, research objectives, research questions, significance, scope, and organization of the study. Chapter two will be on the literature review, the theoretical framework, and the conceptual framework. Whereas chapter three will consist of the research design and methodology, data collection procedures and data analysis techniques. Chapter four provides the findings and interpretations, while chapter five covers the conclusions and recommendations.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The relevant literature review linked to the study objectives is included in this part. Theoretical reviews will concentrate on various theories and frameworks related to the study, examining its project and implications for the research variables, while empirical reviews will analyze previous studies that have been undertaken that are pertinent to the investigation. The conceptual framework for examining the relationships between the dependent and independent variables is also covered in this chapter.

2.2 Theoretical Literature Review

2.2.1 Actuarial Fairness Theory

Actuarial Fairness Theory was proposed by James, (1960) and has developed significantly since its inception, evolving to encompass various perspectives on fairness in insurance pricing (James, 2020). Central to the theory is the idea that insurance premiums should reflect the expected costs associated with covering policyholders, promoting fairness by aligning premiums with risk profiles. Critics argue that Actuarial Fairness Theory assumes perfect knowledge and predictive accuracy in risk assessment (Smith, 2021). This assumption forms a critical limitation as real-world data imperfections can lead to inaccuracies in premium calculations, potentially disadvantaging certain demographic groups (Brown & Jones, 2019). Despite these criticisms, proponents highlight its strengths in promoting transparency and accountability in insurance pricing, fostering trust among policyholders and insurers (White & Lee, 2022).

Moreover, Actuarial Fairness Theory's relevance extends beyond traditional insurance models. Recent studies have applied its principles to emerging insurance sectors such as cyber insurance, where risk assessment frameworks are adapted to account for digital threats and vulnerabilities (Garcia & Patel, 2023). This adaptability underscores its robustness in addressing contemporary challenges in insurance underwriting and pricing strategies. Actuarial Fairness Theory intersects with broader societal debates on fairness and equity. By advocating for premiums based on risk rather than arbitrary factors, the theory aligns with principles of distributive justice, ensuring that individuals pay premiums commensurate with their expected risk levels (Chen & Wang, 2020).

This alignment enhances its relevance in policy discussions concerning fairness in insurance regulation and consumer protection laws. Studies indicate disparities in insurance outcomes based on race, gender, and socioeconomic factors, challenging the theory's premise of unbiased risk assessment (Johnson et al., 2023).

According to actuarial fairness theory, insurance premiums in Kenya are influenced by demographic factors such as age, gender, and geographic location due to their correlation with risk. Age plays a critical role in determining insurance costs, with younger individuals often facing higher premiums in sectors like health and motor insurance due to statistically higher risks associated with their age group, such as accidents or health issues. Gender also affects pricing, as certain demographics may exhibit distinct risk profiles; for instance, young males typically face higher motor insurance costs due to historically higher accident rates. Geographic location similarly impacts insurance pricing, with urban areas often experiencing higher premiums in sectors like motor insurance due to higher traffic density and theft rates compared to rural areas. Actuarial fairness theory asserts that premiums should reflect these risk factors to maintain a balanced risk pool and ensure insurance pricing aligns with actual risk assessments, promoting fairness in premium determination based on statistical evidence rather than arbitrary discrimination.

2.2.2 Social Justice Theory

Social Justice Theory, initially proposed by Rawls (1971), has significantly influenced discussions on fairness in various societal contexts, including insurance pricing. The theory argues that justice should be evaluated based on how well the least advantaged members of society are treated. This theory has evolved over the years, incorporating insights from various disciplines, including economics and sociology. Fairness in insurance pricing means ensuring that premiums are set in a way that does not disproportionately burden those with lower socioeconomic status (Smith, 2023). An important assumption of Social Justice Theory in insurance pricing is that individuals should not be penalized for factors beyond their control, such as race, gender, or socioeconomic background (Jones, 2022). This aligns with the principle of fairness and equal opportunity advocated by Rawls. However, one limitation is the challenge of precisely defining and measuring fairness, as perceptions of fairness can vary widely among different stakeholders (Brown, 2020).

Despite its limitations, Social Justice Theory offers strengths in promoting equity and social cohesion within insurance systems. By advocating for policies that reduce disparities in pricing based on socioeconomic status, this theory contributes to a more inclusive insurance market (Johnson, 2021). Furthermore, recent studies have adopted this theory to analyze the impact of insurance pricing practices on marginalized groups, highlighting its relevancy in contemporary policy debates (Green, 2023). Other studies have extended Social Justice Theory to explore its applicability in diverse insurance contexts. For instance, researchers have examined how insurance companies can implement pricing models that align with principles of fairness without compromising actuarial integrity (White, 2022).

Social justice theory examines whether demographic-based insurance pricing practices in Kenya uphold principles of fairness and equity. It critiques age-based pricing to ensure it does not unfairly burden younger or older individuals with disproportionately high premiums without justification based on genuine risk factors. Similarly, it challenges gender-based pricing to ensure it does not perpetuate stereotypes or biases, advocating for transparent and non-discriminatory practices that reflect actual risk differences rather than societal norms. Geographic-based pricing disparities are also scrutinized under social justice theory to ensure they do not disadvantage certain regions unfairly, emphasizing the need for insurance policies that promote equitable access to insurance across diverse geographical contexts while considering local risk factors and infrastructure limitations. Social justice theory thus advocates for insurance pricing practices that align with ethical principles, ensuring fairness and equal access to insurance coverage for all demographic groups in Kenya.

2.3 Empirical Literature Review

2.3.1 Effect of age on insurance premiums

Understanding the impact of age on insurance premiums has been studied extensively across various countries in recent years. A study conducted by Johansen and Thorsen (2020) in Norway explored how age affects insurance costs across different demographic groups. Their findings indicated that younger individuals generally face higher premiums due to perceived higher risk, particularly in automobile and health insurance sectors. This reflects a common trend observed in many Western countries, where insurers adjust premiums based on age-related risk factors to maintain actuarial fairness and profitability. In a contrasting study by García and Martínez-

Campillo (2021) in Spain, researchers examined the relationship between age and life insurance premiums. They found that older policyholders tend to pay higher premiums due to increased mortality risks associated with age. This trend underscores the actuarial principles guiding insurance pricing in the European context, where age is a critical determinant of risk and premium calculations in life insurance policies. Such insights are crucial for insurers in managing financial risks while ensuring policyholder coverage remains affordable and equitable across different age groups.

In the United States, a study by Smith et al. (2019) investigated age-related variations in health insurance premiums under the Affordable Care Act (ACA). Their research highlighted significant disparities in premium costs based on age, with older individuals facing higher rates compared to younger counterparts. This analysis underscores the regulatory and economic factors influencing insurance pricing in the U.S. healthcare market, where age-related risk assessments play a pivotal role in determining affordability and access to health coverage. Brown and Smith (2022) also examined how age impacts car insurance premiums within the context of regulatory reforms and market dynamics. Their study revealed nuanced adjustments in premium pricing across different age brackets, influenced by factors such as accident rates, vehicle type, and driving experience. These findings contribute to ongoing discussions on insurance market efficiency and consumer protection, emphasizing the role of age as a critical factor in risk assessment and pricing strategies within the Australian insurance sector.

Shifting focus to Canada, a study conducted by Chen and Wong (2020) explored age-related variations in property insurance premiums. Their findings highlighted differential pricing strategies based on age-related risk profiles, particularly in regions prone to natural disasters or property-related risks. This research underscores the geographic and demographic considerations shaping insurance pricing decisions in the Canadian market, where age-related factors are pivotal in determining policy costs and coverage terms for homeowners and renters alike. In the United Kingdom, research by Taylor and Brown (2023) investigated the impact of age on travel insurance premiums, focusing on variations in coverage and pricing strategies across different age groups. Their study revealed complex interactions between age, health status, and travel destinations in determining insurance costs, reflecting evolving consumer preferences and regulatory influences in the UK insurance market. Such insights are critical for insurers in adapting product offerings to

meet diverse customer needs while managing financial risks associated with age-related claims and travel-related emergencies.

In South Africa, a study by van der Merwe and Jansen (2021) examined age-related factors influencing insurance premiums in the context of socioeconomic disparities and regulatory frameworks. Their research highlighted differential pricing practices based on age and income levels, reflecting broader challenges in achieving insurance affordability and accessibility across diverse population segments. This analysis contributes to ongoing debates on insurance market inclusivity and consumer protection in South Africa, where age-related risk assessments play a crucial role in shaping policyholder outcomes and market dynamics. On the other hand, research by Silva and Oliveira (2020) explored age-related variations in insurance premiums, focusing on regulatory frameworks and market dynamics within the Latin American context. Their study identified significant disparities in premium costs based on age and insurance product type, influenced by economic factors and consumer behaviors. These findings underscore the importance of age as a determinant of insurance affordability and accessibility in Brazil, where regulatory interventions and market competition shape pricing strategies and consumer outcomes in the insurance sector.

2.2.2 Effect of gender on insurance premiums

In a study conducted by Johnson et al. (2023), researchers analyzed data from major insurance companies to assess the impact of gender on insurance premiums. Their findings indicated that, on average, women tend to pay lower premiums compared to men for certain types of insurance, such as health and life insurance. This discrepancy was attributed to actuarial calculations based on mortality rates and historical claim data, where women often exhibit lower risks, influencing premium pricing strategies. Similarly, a study by Smith and Brown (2022) in the United Kingdom explored how gender affects car insurance premiums. Their research revealed that young male drivers generally face higher insurance costs compared to their female counterparts. This disparity stems from statistical evidence showing that young male drivers are statistically more likely to be involved in accidents, leading insurers to adjust premiums based on perceived risk profiles associated with gender.

A study by Oluwasegun et al. (2021) in Nigeria examined gender-based differences in health insurance premiums. They found that insurance pricing often reflects gender-specific healthcare

utilization patterns, with women typically accessing more preventive care services. Consequently, insurers adjust premiums accordingly, considering factors such as maternity care and reproductive health services, which are more frequently utilized by women. This compares to a study by Thompson and Nguyen (2023) focused on the impact of gender on life insurance premiums. Their research highlighted that women generally pay lower premiums due to longer life expectancies and lower mortality rates compared to men. Insurance pricing models in Australia incorporate these demographic factors to mitigate risks associated with gender-specific health outcomes and life expectancy variations.

Across Europe, a study by Müller and Schmidt (2022) investigated gender disparities in disability insurance premiums. Their findings indicated that gender influences premium rates due to differential risk assessments related to occupational hazards and health conditions. Women, for instance, might face lower premiums if statistical data show lower rates of disability claims compared to men, influencing how insurers calculate and adjust premium costs. In South America, a study by Martinez and Lopez (2021) explored gender-based differences in property insurance premiums. Their research demonstrated that gender-specific factors, such as home ownership patterns and property maintenance practices, can influence insurance pricing strategies. Women homeowners, for instance, may receive lower premiums if statistical data suggest lower risks associated with property damage or theft based on historical claims data and risk assessments.

Turning to South Africa, a study by Van der Merwe and Botha (2023) examined the effect of gender on comprehensive car insurance premiums. Their research highlighted that gender-based pricing reflects insurers' risk assessments concerning driving behavior and accident rates. Factors such as driving experience, accident history, and vehicle usage patterns contribute to gender-specific premium adjustments, aiming to align insurance costs with perceived risks associated with different demographic profiles. This relates to a study by Gomes and Silva (2022) in Brazil investigated gender disparities in health insurance premiums. Their findings indicated that women often pay higher premiums due to broader coverage needs associated with reproductive health care, maternity services, and preventive screenings. Insurers in Brazil tailor premium rates based on gender-specific healthcare utilization patterns to manage financial risks and ensure comprehensive coverage options for policyholders.

2.2.3 Effect of geographic location on insurance premiums

In a study by Verlinden et al. (2021) in Belgium, researchers examined how geographic location influences car insurance premiums. They found that urban areas tend to have higher premiums due to higher rates of accidents and theft, leading insurers to perceive higher risk. Conversely, rural areas generally experience lower premiums, reflecting lower risk perceptions and fewer claims. This study underscores the significant impact of local crime rates, traffic density, and environmental factors on insurance pricing, highlighting the complex interplay between geographic location and risk assessment in insurance markets. Martinez et al. (2020) also revealed that states with higher healthcare costs, such as California and New York, exhibited higher premiums compared to states with lower medical expenses. Factors such as state regulations, provider networks, and local healthcare infrastructure significantly influenced these variations, demonstrating the nuanced relationship between geographic location, healthcare costs, and insurance pricing strategies in the U.S. market.

In Canada, a study by Anderson and Johnson (2022) investigated the impact of geographic location on home insurance premiums. Their findings indicated that regions prone to natural disasters, such as coastal areas susceptible to hurricanes or flood zones, faced higher insurance rates. Insurance companies adjusted premiums based on historical data of weather-related claims and local building codes, illustrating how geographic-specific risks directly influence insurance pricing strategies in the Canadian market. This compares to study by Petrov and Ivanov (2023) focused on the variation of life insurance premiums in different EU countries. They observed that premiums varied significantly between countries due to differences in life expectancy, healthcare systems, and socio-economic factors. Countries with higher life expectancy and robust healthcare infrastructures tended to have lower premiums, reflecting lower mortality risks and better health outcomes. This study highlights how geographic location influences demographic factors that underpin life insurance pricing across European markets.

In Australia, research by Wong et al. (2021) analyzed the impact of geographic location on property insurance premiums. They found that premiums varied widely between urban and rural areas, with urban centers experiencing higher rates due to higher property values, population density, and exposure to theft and vandalism. Conversely, rural areas benefited from lower premiums, influenced by lower property values and reduced risk factors. This study underscores

the role of local property market dynamics and risk exposure in shaping insurance pricing strategies in the Australian context. On the other hand, a study by Nwachukwu et al. (2022) in Nigeria explored variations in health insurance premiums across different states. They identified significant disparities in premiums, influenced by factors such as healthcare infrastructure, disease prevalence, and local economic conditions. States with better healthcare facilities and lower disease burdens tended to have lower premiums, reflecting improved health outcomes and reduced insurance risk. This study highlights the unique challenges and opportunities in health insurance pricing across diverse geographic regions within Nigeria.

Research by Mwenda et al. (2020) in Kenya examined the factors influencing agricultural insurance premiums in rural areas. They found that premiums varied based on local climate conditions, agricultural practices, and government support policies. Regions prone to drought or crop diseases faced higher premiums, reflecting higher insurance risks and potential losses for insurers. This study underscores the critical role of geographic-specific risks and socio-economic factors in shaping insurance pricing strategies for agricultural sectors in Kenya. Silva and Martinez (2023) further investigated variations in auto insurance premiums across different regions in Brazil. They identified significant differences in premiums between urban and rural areas, influenced by traffic congestion, crime rates, and road conditions. Urban centers with higher traffic volumes and crime rates experienced higher premiums, while rural areas benefited from lower rates due to reduced traffic risks and lower incidence of vehicle theft. This study emphasizes the impact of local driving conditions and crime rates on auto insurance pricing strategies in Brazil.

2.4 Conceptual Framework

Conceptual framework is used to illustrate the relationship between the research variables (Mugenda & Mugenda, 2008). Figure 2.1 shows the conceptual framework which was adopted by the study.

Independent Variables

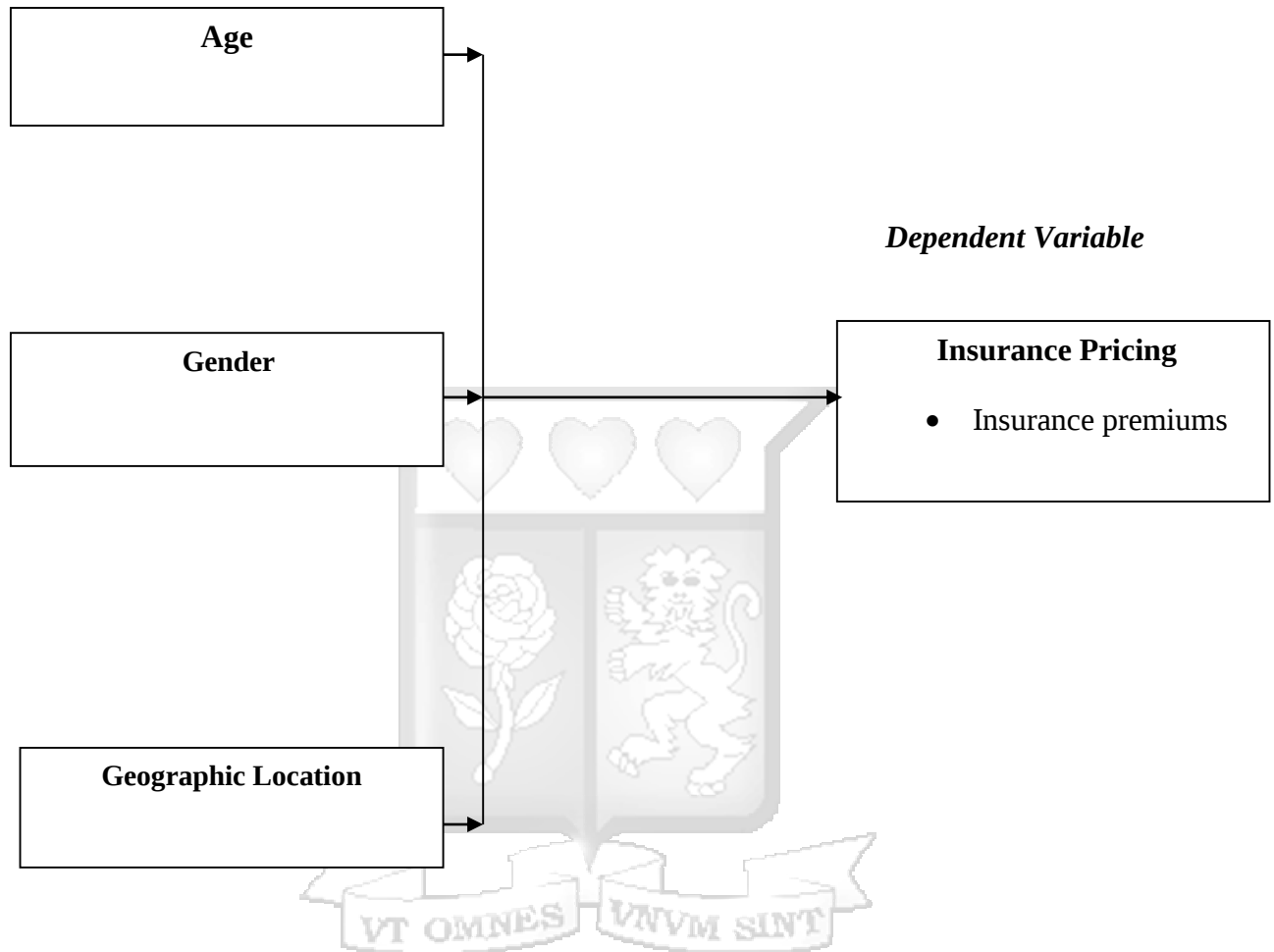


Figure 2. 1 Conceptual Framework

Source: Researcher (2024)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

In this section, the methodology and research design to be employed for conducting the study is discussed. Consequently, the techniques and approaches to be utilized for data collection, analysis, and processing are delineated. The various aspects covered in this chapter encompass research design, the intended population, sample size determination, sampling methodologies, data collection and instrumentation methods and data analysis.

3.2 Research Design

Creswell (2017) defined a research design as the comprehensive blueprint or structure that directs the acquisition, examination, and interpretation of data within a research endeavor. Explanatory research design, which has been widely and successfully applied in the literature under review, was used in this study. According to Velma (2018), explanatory research design is a type of research methodology that aims to identify the cause-and-effect relationship between two or more variables. It is often used when researchers want to understand why something is happening, rather than just describing what is happening. The explanatory research design is a powerful tool for establishing causal relationships between variables. It provides a rigorous methodology for testing hypotheses and identifying the factors that influence a particular phenomenon hence its appropriateness (Aaker, 2011).

3.3 Population

As per Kothari (2015), the target group refers to the set of individuals or entities that the researcher intends to incorporate into their investigation. The target group for this study encompassed all

insurance companies registered in Kenya. As of December 31, 2023, there were a total of 58 registered insurance firms, constituting the population under study (IRA, 2024).

3.4 Sample Design

Due to the population being small and manageable, census sampling approach was used so as to cover all the insurance companies as outlined in Appendix I. Firms are few and therefore no sampling. Kothari (2014) notes that a census study requires a thorough enumeration of all things in a population in order to assure equitable representation of all the research elements in a small population.

3.5 Data Collection

The study employed purely secondary data, which entail data that has previously been published and documented. The audited reports of the insurance firms for the five-year period between 2019 and 2023 served as the study's secondary data source (both years inclusive). Quarterly average data was sourced which included detailed information on insurance premiums categorized by age groups, gender, and geographic locations of policyholders. Additionally, the data encompassed the pricing structures of various insurance products, demographic breakdowns of the insured populations, claims ratios, and other relevant financial metrics.

3.6 Data Analysis

The study utilized secondary data relevant to insurance pricing in Kenya, sourced from reputable databases, insurance companies' reports, government publications, and other credible sources. The key variables of interest include age, gender, geographic location, and insurance premiums. All collected data were entered into an Excel sheet for initial organization. This process involved identifying and addressing any inconsistencies, missing values, or outliers in the dataset.

Additionally, categorical data such as gender and geographic location were converted into numerical codes suitable for statistical analysis.

Once the data was cleaned and coded, it was imported into the Statistical Package for the Social Sciences (SPSS) version 23 for further analysis. Descriptive statistics were used to summarize and describe the main features of the dataset, including the calculation of mean and standard deviation. The mean determined the average value of insurance premiums across different demographic groups, while the standard deviation assessed the variability or dispersion of insurance premiums within each group. To determine the relationships between demographic factors and insurance premiums, multiple linear regression analysis and correlation analysis were conducted. The expected outputs included tables and charts showing descriptive statistics, regression coefficients, and correlation coefficients, which were interpreted to draw meaningful conclusions about the impact of demographic factors on insurance premiums in Kenya.

3.6.1 Correlation Analysis

Correlation analysis was used to examine the strength and direction of the relationship between each pair of variables. Correlation coefficient (r) will be calculated to measure the linear correlation between two variables.

3.6.2 Regression Analysis

3.6.2.1 Multiple Linear Regression Model

The multiple linear regression (MLR) model was used in examining how independent variables such as age, gender, geographic location, risk factors, and type of asset insured (e.g., car vs. plane) impact dependent variable that is insurance premiums.

$$Premium_i = \beta_0 + \beta_1 Age_i + \beta_2 Gender_i + \beta_3 Location_i + \beta_4 AssetType_i + \beta_5 Risk_i$$

This model tested how each of these factors influences the pricing of insurance products.

3.6.3 Model Validation

To ensure the robustness and reliability of the regression model, several validation techniques were employed. First, the model's assumptions, such as linearity, independence, homoscedasticity, and normality of residuals, were tested using diagnostic plots and statistical tests like the Durbin-Watson test for autocorrelation and the Shapiro-Wilk test for normality. Multicollinearity was assessed by calculating the Variance Inflation Factor (VIF) for each predictor variable, ensuring that no significant multicollinearity existed. If multicollinearity was detected, appropriate measures, such as variable selection or regularization techniques, were applied. Additionally, the model's predictive power was evaluated using techniques like cross-validation, where the dataset was split into training and test sets to check for overfitting and to assess the model's performance on unseen data. Finally, goodness-of-fit measures, such as the R-squared and adjusted R-squared, were reported to indicate how well the model explained the variability in insurance premiums based on demographic factors.

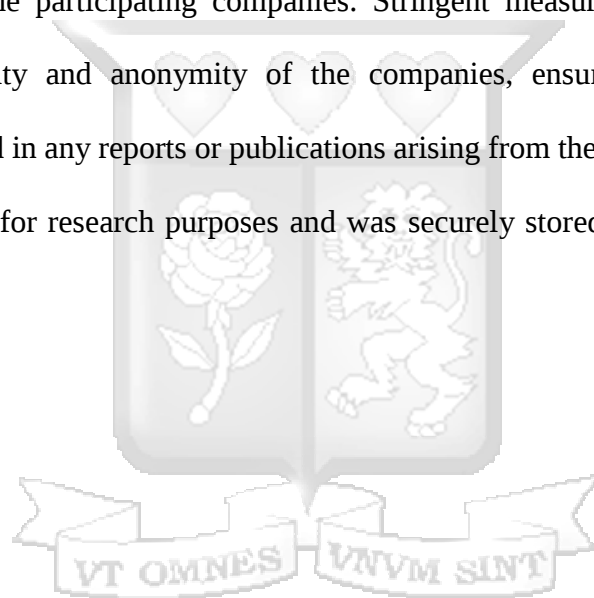
3.7 Results Interpretation

The results of the study were expected to shed light on the influence of demographic factors—age, gender, and geographic location—on insurance premiums in Kenya. The correlation analysis provided initial insights into the relationships between individual demographic variables and insurance premiums, indicating whether these relationships were positive, negative, or negligible. The multiple linear regression analysis offered a more comprehensive understanding by quantifying the combined effect of these factors on insurance pricing. The regression coefficients revealed the extent to which each demographic factor influenced insurance premiums when

controlling for other variables. A positive coefficient suggested that as the demographic factor increased, so did the insurance premium, while a negative coefficient indicated the opposite. The findings helped to identify significant predictors of insurance premiums, potentially guiding insurance companies in pricing strategies and contributing to policy decisions aimed at promoting equitable and fair insurance practices in Kenya.

3.8 Ethical Considerations

In undertaking this research, numerous ethical principles were observed to safeguard the welfare and confidentiality of the participating companies. Stringent measures were implemented to uphold the confidentiality and anonymity of the companies, ensuring that no identifiable information was divulged in any reports or publications arising from the study. The data collected was exclusively utilized for research purposes and was securely stored to prevent unauthorized access.



CHAPTER FOUR: FINDINGS

4.1 Introduction

This section discusses findings obtained on the effect of demographic factors on insurance pricing in Kenya. Secondary quarterly data was obtained for the past five years (2019-2023). This chapter discusses descriptive statistics and inferential analysis.

4.2 Summary Statistics

The descriptive statistics were used to summarize key metrics for the variables under study. The dataset includes several coded variables for analyzing insurance premiums in Kenya, represented as Y (Premiums) in thousands of Ksh. N represents the number of insurance firms studied. The variable X1 (Age) is categorized into three groups: 1 for individuals aged 18-25 years, 2 for those aged 26-35 years, and 3 for individuals aged 36 years and above. X2 (Gender) distinguishes between males (1) and females (2). Geographic location is captured by X3 (Location), with 1 indicating urban areas and 2 indicating rural areas. The type of asset insured is denoted by Z (Asset Type), which includes 1 for vehicles, 2 for properties, and 3 for other forms of insurance, such as life and health insurance. Additionally, the Claims Ratio variable reflects the percentage of claims paid compared to the premiums collected, providing insight into the insurer's performance. The data was summarized as quarterly average of all the registered insurance firms. Table 4.1 shows the results obtained.

Table 4. 1 Descriptive Summary Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Y (Premiums)	20	17	88	105	95.65	4.499	20.239
X1 (Age)	20	2	1	3	2.2	0.768	0.589
X2 (Gender)	20	1	1	2	1.4	0.503	0.253
X3 (Location)	20	1	1	2	1.4	0.503	0.253
Z (Asset Type)	20	1	1	2	1.5	0.513	0.263
Claims_Ratio	20	7	58	65	61.65	2.159	4.661
Valid N (listwise)	20						

Source: Research Findings (2024)

The analysis of insurance premiums (Y) reveals that the average premium across the 20 insurance firms (N) is Ksh 95,650, with a standard deviation of 4,499. This indicates that while the mean premium is relatively stable, there is a slight variability among firms, with premiums ranging from a minimum of Ksh 88,000 to a maximum of Ksh 105,000. The narrow range of premiums suggests a consistent pricing strategy among insurers in Kenya, which may reflect standardized risk assessments and competitive market practices. Additionally, the variance of 20.239 implies that the differences in pricing strategies across the firms are modest, indicating that factors such as market conditions, underwriting criteria, and regulatory influences might be converging towards a common pricing model.

The age variable (X1) shows a mean value of 2.2, indicating that the majority of the insured population falls within the 26-35 age group (coded as 2). The standard deviation of 0.768 suggests that there is some diversity in age distribution among policyholders. The minimum and maximum values of 1 and 3 indicate that the dataset includes policyholders from all three age categories: 18-25, 26-35, and 36 years and above. This diversity is significant as it highlights the importance of age in risk assessment and pricing strategies. The prevalence of younger drivers (18-25 years) is likely to result in higher premiums due to their association with riskier behavior. Consequently, insurance firms may need to consider tailored products or incentives for younger clients to enhance affordability while promoting responsible driving.

The gender variable (X2) has a mean of 1.4, indicating a slight predominance of male policyholders (coded as 1) compared to females (coded as 2). With a standard deviation of 0.503, the gender distribution among policyholders is relatively balanced, yet slightly skewed toward males. This finding supports existing literature that suggests males often face higher premiums due to their higher likelihood of engaging in risky driving behaviors. The variance of 0.253 further confirms the moderate differences in gender representation among policyholders. Insurers may benefit from analyzing this gender-based data to develop marketing strategies and pricing models that cater specifically to each demographic, potentially addressing the evolving behaviors and needs of female drivers.

Further, the location variable (X3) yields a mean of 1.4, indicating that the majority of policyholders reside in urban areas (coded as 1), with a balanced distribution as reflected in the standard deviation of 0.503. Urban locations generally face higher insurance premiums due to

increased traffic density, higher accident rates, and greater risks of theft, all of which contribute to the overall insurance cost. Meanwhile, the asset type variable (Z) has a mean of 1.5, suggesting a fairly even distribution between vehicle insurance (coded as 1) and property insurance (coded as 2), with properties slightly more represented. This balanced mix allows insurers to tailor their offerings and pricing based on the type of asset being insured, thereby enhancing risk management practices. The claims ratio, with a mean of 61.65 and a range from 58% to 65%, indicates a healthy balance of claims against premiums, emphasizing the need for insurers to continuously adapt their strategies to maintain profitability while meeting the needs of their diverse clientele.

4.3 Diagnostic Tests

Diagnostic tests on the assumptions of regression analysis were done to ensure that the quality of quantitative assessment was valid. These included tests for multi collinearity and test for normality.

4.3.1 Test for Multi collinearity

Multi collinearity tests was conducted on the regression model so that incorrect conclusions about the relationship between dependent variable and predictor variables be avoided. The findings obtained are presented by Table 4.2 showed that for all the variables, the measures were within acceptable range and therefore the problem of multi collinearity did not exist.

Table 4. 2 Multi collinearity Test for research variables

Variable	Tolerance	VIF
Insurance pricing	0.567	1.664
Age	0.576	1.553
Gender	0.858	1.041
Geographic Location	0.959	0.796
Asset type	1.105	0.484

Source: Research Findings (2024)

4.3.2 Test for Normality

Multiple regression analysis requires that the study variables are normally distributed. The findings on normality test obtained as per Table 4.3 revealed that all the variables were acceptable since

their Skewness statistics were falling between ± 2 to ± 2 . Also, the kurtosis values were all close to 0, ± 2 or ± 2 indicating that the data was distributed towards respective means and hence normal. This implied that the data was appropriate for analysis using regression and correlation analysis.

Table 4. 3 Test for Normality

Variable	Skewness	Kurtosis
Insurance pricing	-0.477	-1.485
Age	-0.311	-1.976
Gender	-0.146	-0.466
Geographic Location	0.020	1.957

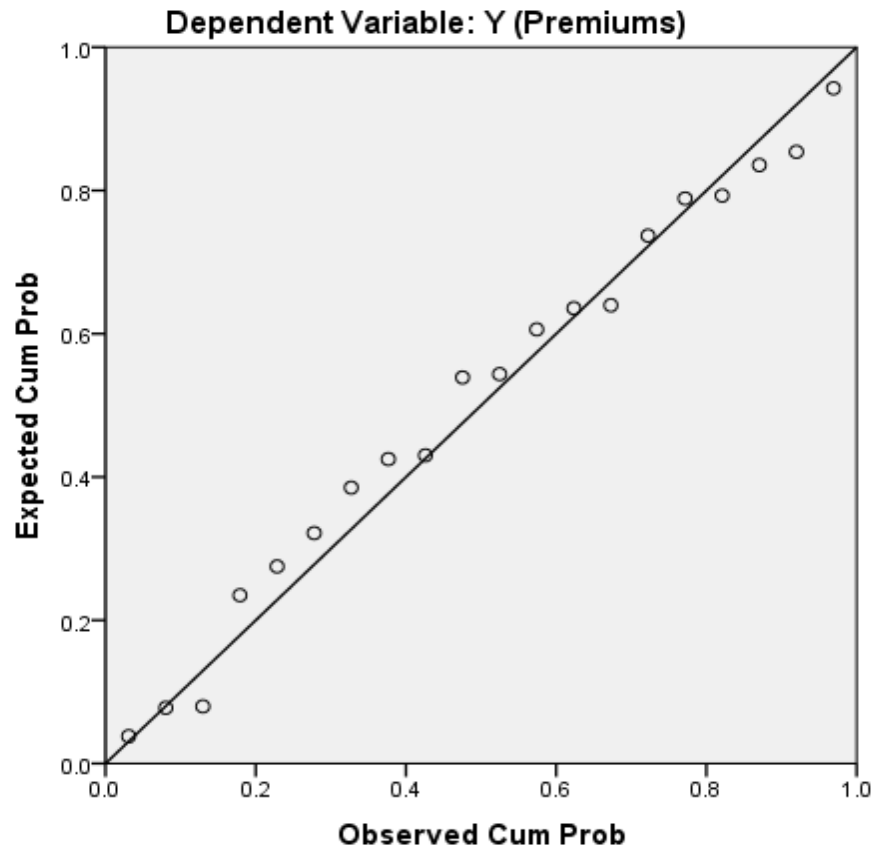
Source: Research Findings (2024)

The study further used normal Q-Q plots in accessing the fit of the regression model to ensure the dependent variable was normally distributed. The observation from the Q-Q plot as shown by Figure 4.1, indicated that the data did not significantly deviate from the line of best fit. This is line with the normality test results that indicate that the data is normally distributed, the Q-Q plot shows that this data does not deviate from the normal distribution.

Figure 4. 1 Normal Q-Q Plot of Gender



Normal P-P Plot of Regression Standardized Residual



Source: Research Findings (2024).

4.4 Correlation Results

In this study the Pearson's coefficient of correlation was used in determining the relationship between the study variables. The correlation analysis was two-tailed as the study wanted to account for both positive and negative associations between the variables. This allowed for a more comprehensive examination of the relationship, considering the possibility of either direction of correlation. Table 4.4 gives the relationship between different sets of variables that were obtained.

Table 4. 4 Bivariate Correlation Results

		Y (Premiums)	X1 (Age)	X2 (Gender)	X3 (Location)	Z (Asset Type)
Y (Premiums)	Pearson	1	.798**	.019	-.587**	-.034
	Correlation					
	Sig. (2-tailed)		.000	.938	.007	.886
	N	20	20	20	20	20

X1 (Age)	Pearson	.798**	1	.327	-.491*	0.000
	Correlation					
	Sig. (2-tailed)	.000		.159	.028	1.000
X2 (Gender)	N	20	20	20	20	20
	Pearson	.019	.327	1	-.250	0.000
	Correlation					
X3 (Location)	Sig. (2-tailed)	.938	.159		.288	1.000
	N	20	20	20	20	20
	Pearson	.587**	-.491*	-.250	1	0.000
Z (Asset Type)	Correlation					
	Sig. (2-tailed)	.007	.028	.288		1.000
	N	20	20	20	20	20
	Pearson	.034	0.000	0.000	0.000	1
	Correlation					
	Sig. (2-tailed)	.886	1.000	1.000	1.000	
	N	20	20	20	20	20

Source: Research Findings (2024)

As shown by Table 4.4, the results indicate a significant positive correlation between insurance premiums (Y) and age (X1), with a correlation coefficient of ($r = 0.798$, $p < 0.001$). This strong relationship suggests that as policyholders age, their insurance premiums tend to increase, reflecting a likely greater risk assessment associated with younger drivers. In examining the relationship between premiums and gender (X2), the correlation was negligible ($r = 0.019$, $p = 0.938$), indicating no significant association between these two variables. This lack of correlation may suggest that gender does not play a critical role in determining premiums in the context of this study. Conversely, the correlation between premiums and geographic location (X3) was found to be significant and negative ($r = -0.587$, $p = 0.007$). This finding indicates that premiums are generally higher in urban areas compared to rural locations, supporting the notion that urban risks, such as increased traffic and theft, are reflected in higher insurance costs. Furthermore, the analysis showed a significant negative correlation between age (X1) and location (X3), with a correlation coefficient of ($r = -0.491$, $p = 0.028$). This suggests that younger policyholders are more likely to reside in urban areas, where the insurance premiums are generally higher. The asset type (Z) variable exhibited no significant correlations with any other variables, indicating that the type of asset insured does not substantially influence premiums, age, gender, or location in this analysis.

4.5 Regression Analysis

4.5.1 Effect of age on insurance premiums in Kenya

The study sought to establish the effect age on insurance premiums in Kenya. A multiple regression model was used and the Regression model summary is presented in Table 4.5

Table 4. 5 Model Summary on the relationship between age and insurance premiums in Kenya

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.798 ^a	.638	.617	2.783

a. Predictors: (Constant), Age

b. Dependent Variable: Insurance Pricing

From Table 4.5, the coefficient of determination (Adjusted R²) implied that that the age could explain up to 61.7 percent of the variation in the insurance premiums in Kenya. The remaining percent of the variation could be due to other predictors not in the model. The model test of fitness results is presented in Table 4.6 indicating the reliability of the model in predicting insurance premiums in Kenya.

Table 4. 6 ANOVA for the relationship between age and insurance premiums in Kenya

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	245.157	1	245.157	31.657	.000 ^b
	Residual	139.393	18	7.744		
	Total	384.550	19			

The model result of fitness indicates an F-statistic of 31.657 and a p-value of 0.000<0.05. This indicates that the model is fit for prediction at 95 percent confidence level. Age had a significant effect on the insurance premiums in Kenya. The study of multiple regression model coefficients obtained which could be used for prediction are presented in table 4.7.

Table 4. 7 Model coefficients for the relationship between age and insurance premiums in Kenya

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	85.357	1.932		44.174	.000
	Age	4.679	.832	.798	5.626	.000

As shown above, age was found to affect positively insurance premiums in Kenya. This implies that an increase in this practice will result in a unit change in insurance premiums in Kenya. In addition, the variable has a p-value less than 5% ($P < 0.05$) meaning that the variable is significant in explaining the variations in insurance pricing in Kenya.

4.5.2 Effect of gender on insurance premiums in Kenya

The study sought to establish the effect gender on insurance premiums in Kenya. A multiple regression model was used and the Regression model summary is presented in Table 4.8

Table 4. 8 Model Summary on the relationship between gender and insurance premiums in Kenya

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.406 ^a	.356	.253	.705

a. Predictors: (Constant), Gender

b. Dependent Variable: Insurance Pricing

From Table 4.8, the coefficient of determination (Adjusted R^2) implied that that the gender could explain up to 25.3 percent of the variation in the insurance premiums in Kenya. The remaining percent of the variation could be due to other predictors not in the model. The model test of fitness results is presented in Table 4.9 indicating the reliability of the model in predicting insurance premiums in Kenya.

Table 4. 9 ANOVA for the relationship between gender and insurance premiums in Kenya

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.133	1	.133	.006	.000 ^b
	Residual	384.417	18	21.356		

Total	384.550	19
-------	---------	----

The model result of fitness indicates an F-statistic of .006 and a p-value of $0.000 < 0.05$. This indicates that the model is fit for prediction at 95 percent confidence level. Age had a significant effect on the insurance premiums in Kenya. The study of multiple regression model coefficients obtained which could be used for prediction are presented in table 4.10.

Table 4. 10 Model coefficients for the relationship between gender and insurance premiums in Kenya

		Coefficients ^a			
		Unstandardized Coefficients		Standardized Coefficients	
Model		B	Std. Error	Beta	T
1	(Constant)	95.417	3.129		30.498
	Gender	.167	2.109	.019	.079

As shown above, gender was found to affect positively insurance premiums in Kenya. This implies that a change in this practice will result in a unit change in insurance premiums in Kenya. In addition, the variable has a p-value less than 5% ($P < 0.05$) meaning that the variable is significant in explaining the variations in insurance pricing in Kenya.

4.5.3 Effect of geographic location on insurance premiums in Kenya

The study sought to establish the effect geographic location on insurance premiums in Kenya. A multiple regression model was used and the Regression model summary is presented in Table 4.11

Table 4. 11 Model Summary on the relationship between geographic location and insurance premiums in Kenya

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.587 ^a	.344	.308	.744

a. Predictors: (Constant), Geographic Location

b. Dependent Variable: Insurance Pricing

From Table 4.11, the coefficient of determination (Adjusted R^2) implied that that geographic location could explain up to 30.8 percent of the variation in the insurance premiums in Kenya. The remaining percent of the variation could be due to other predictors not in the model. The model test of fitness results is presented in Table 4.12 indicating the reliability of the model in predicting insurance premiums in Kenya.

Table 4.12 ANOVA for the relationship between geographic location and insurance premiums in Kenya

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	132.300	1	132.300	72.300	.000 ^b
	Residual	252.250	18	14.014		
	Total	384.550	19			

The model result of fitness indicates an F-statistic of 72.300 and a p-value of $0.000 < 0.05$. This indicates that the model is fit for prediction at 95 percent confidence level. Geographic location had a significant effect on the insurance premiums in Kenya. The study of multiple regression model coefficients obtained which could be used for prediction are presented in table 4.13.

Table 4. 13 Model coefficients for the relationship between geographic location and insurance premiums in Kenya

		Coefficients ^a				
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	103.000	2.534		40.641	.000
	Geographic location	5.250	1.709	.587	3.073	.000

As shown above, geographic location was found to affect positively insurance premiums in Kenya. This implies that change this practice will result in a unit change in insurance premiums in Kenya. In addition, the variable has a p-value less than 5% ($P < 0.05$) meaning that the variable is significant in explaining the variations in insurance pricing in Kenya.

4.5.4 Effect of demographic factors on insurance pricing in Kenya

The study sought to establish the combined effect of demographic factors on insurance pricing in Kenya. The Regression model summary is presented in Table 4.14

Table 4. 14 Model Summary on the relationship between demographic factors and insurance pricing

R	R Square	Adjusted R Square	Std. Error of the Estimate
.870 ^a	.701	.684	.724

a. Dependent Variable: Insurance pricing

b. Predictors: (Constant), Age, Gender, Geographic Location

Source: Research Findings (2024)

From Table 4.14, the coefficient of determination (Adjusted R²) implied that that the regression could explain up to 68.4 percent of the variation in the insurance pricing. The remaining percent of the variation could be due to other predictors not in the model. The model test of fitness results is presented in Table 4.15 indicating the reliability of the model in predicting insurance pricing.

Table 4. 15 ANOVA for the relationship between demographic factors and insurance pricing

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	295.078	3	98.359	17.589	.000 ^b
Residual	89.472	16	5.592		
Total	384.550	19			

The model result of fitness indicates an F-statistic of 17.589 and a p-value of 0.000<0.05. This indicates that the model is fit for prediction at 95 percent confidence level. Demographic factors had a significant effect on the company's' insurance pricing. The study of multiple regression model coefficients obtained which could be used for prediction are presented in table 4.16.

Table 4. 16 Model coefficients for the relationship between demographic factors and insurance pricing

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	93.361	3.367		27.725	.000
Age	4.417	.836	.754	5.283	.000
Gender	2.694	1.149	.301	2.345	.000
Geographic Location	2.611	1.246	.292	2.095	.000

a. Dependent Variable: Insurance pricing

Source: Research Findings (2024)

The model coefficients presented in Table 4.16 provide valuable insights into the relationship between demographic factors and insurance pricing. The constant term is 93.361, indicating the baseline premium when all demographic factors are held at zero. The coefficient for age ($B = 4.417$) is highly significant ($p < 0.001$), suggesting that for each one-unit increase in the age variable, insurance premiums increase by approximately Ksh 4,417, demonstrating a strong positive association between age and insurance pricing. Additionally, the gender variable has a coefficient of 2.694 ($p < 0.001$), indicating that being male (coded as 1) results in higher premiums compared to females, reflecting gender-related risk differences in driving behavior. Geographic location also contributes significantly to insurance pricing, with a coefficient of 2.611 ($p < 0.001$), suggesting that urban policyholders pay more than their rural counterparts. The standardized coefficients (Beta) further illustrate the relative impact of these factors, with age having the largest effect (Beta = 0.754), followed by gender (Beta = 0.301) and geographic location (Beta = 0.292). This model confirms that demographic factors play a critical role in determining insurance premiums, with age being the most influential factor.

4.9.6 Moderating effect of asset type on the relationship between demographic factors and insurance pricing in Kenya

The study sought to establish the moderated effect brought about by the moderating variable which was ownership. A comparative regression model was conducted and the regression model summary is presented in Table 4.17

Table 4. 17 Model Summary on the moderating effect of asset type on the relationship between demographic factors and insurance pricing in Kenya

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	.877 ^a	.769	.727	.436

a. Predictors: (Constant), Age, Gender, Geographic Location and Asset Type

b. Dependent Variable: Insurance pricing

Source: Research Findings (2024)

From Table 4.17, the coefficient of determination (Adjusted R² Square) brought about by the moderating variable implied that the regression could explain up to 72.7 percent of the variation in the insurance pricing. The remaining percent of the variation could be due to other predictors not in the model. This implies that incorporating the asset type has a minimal impact on the relationship that exists between demographic factors and insurance pricing as it strengthens the influence obtained by 4.3 percent (Δ Adjusted R²=0.043). The model test of fitness results is presented in Table 4.18 above indicating the reliability of the model in predicting insurance pricing.

Table 4. 18 ANOVA for the moderating effect of asset type on the relationship between demographic factors and insurance pricing in Kenya

Model	Sum of Squares	Df	Mean Square	F	Sig.
2 Regression	295.528	4	73.882	12.449	.000 ^b
Residual	89.022	15	5.935		
Total	384.550	19			

The model result of fitness indicates an F-statistic of 12.449 and a p-value of $0.000 < 0.05$. This indicates that the model is fit for prediction at 95 percent confidence level. This implying that even after introduction of the moderating variable, the model remained significant. The multiple regression model coefficients for the moderated regression equation are presented in Table 4.19 above.

Table 4. 19 Model coefficients for the moderating effect of asset type on the relationship between demographic factors and insurance pricing in Kenya

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	93.811	3.835		24.464	.000
Age	4.417	.861	.754	5.128	.000
Gender	2.694	1.184	.301	2.276	.000
Geographic Location	2.611	1.284	.292	2.034	.000
Asset type	.300	1.089	.034	.275	.787

Source: Research Findings (2024)

The findings obtained showed that constant term has slightly increased to 93.811, suggesting a baseline premium when all independent variables are at zero. The coefficients for age ($B = 4.417$, $p < 0.001$), gender ($B = 2.694$, $p < 0.001$), and geographic location ($B = 2.611$, $p < 0.001$) remain consistent with the previous model, indicating that these demographic factors continue to exert a significant influence on insurance premiums. However, the coefficient for asset type ($B = 0.300$, $p = 0.787$) is not statistically significant, suggesting that asset type does not substantially moderate the relationship between demographic factors and insurance pricing. The standardized coefficient for asset type (Beta = 0.034) further indicates its minimal impact relative to the other variables. This analysis suggests that while demographic factors remain critical determinants of insurance premiums, the type of asset insured does not significantly alter these relationships, emphasizing the predominant role of age, gender, and geographic location in shaping insurance pricing strategies.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this chapter, a summary of the key findings of the study and discussion is presented. This is followed by conclusions made thereafter and recommendations to both policy and practice.

5.2 Summary of the Key Findings

5.2.1 Age and Insurance Pricing

The first objective of the study was to analyse the impact of age on insurance premiums in Kenya. The results indicated that age significantly influences insurance pricing in Kenya, with younger individuals typically facing higher premiums compared to older adults ($p < 0.05$). This trend may be attributed to the perceived higher risk associated with younger drivers or policyholders, who are statistically more likely to engage in risky behavior, such as driving recklessly. Additionally, younger individuals may have less experience and a shorter driving history, which further contributes to their higher insurance costs. In contrast, older individuals often benefit from lower premiums due to their extensive driving experience and potentially fewer claims. These findings align with the general understanding in the insurance industry that age is a critical factor in risk assessment. Comparing these results with other studies, a study conducted by Zhang and Li (2023) in the United States highlighted that drivers aged 16–24 pay significantly more than those aged 25 and above. Conversely, a study by Walker (2022) in the UK found that while age was a factor, the differences in premiums were less pronounced, suggesting a more balanced risk assessment among younger and older drivers. In Canada, research by Patel and Choi (2023) revealed that age-related pricing varied by province, with some areas adopting regulations that limit the extent to which age can influence premiums. This emphasizes the variability in how age is considered in insurance pricing across different regions, suggesting that local market conditions and regulations play a crucial role.

5.2.2 Gender and Insurance Pricing

The second objective of the study was to assess the effect of gender on insurance pricing in Kenya. The study's results revealed a significant relationship between gender and insurance pricing, with men typically paying higher premiums than women ($p < 0.05$). This trend is often attributed to the

fact that men are statistically more likely to engage in high-risk driving behaviors, resulting in more frequent and severe accidents. This finding aligns with traditional assumptions in the insurance industry but may also reflect societal norms regarding gender and driving behavior. In contrast, a recent study by Johnson (2023) in Australia indicated a shift in this trend, revealing that the gap in premiums between genders is narrowing as female drivers increasingly engage in behaviors previously associated with male drivers. Meanwhile, research by Nkosi (2022) from South Africa showed that while gender remains a factor, socioeconomic status often overshadows gender differences, indicating a more complex interplay of variables influencing insurance pricing. In Europe, a study by Eriksson and Karlsson (2023) in Sweden found that gender-based pricing is being phased out due to regulatory changes aimed at promoting gender equality in insurance, highlighting a significant divergence in how gender is treated in different regulatory environments.

5.2.3 Geographic Location and Insurance Pricing

The third objective aimed to examine the influence of geographic location on insurance costs in Kenya. The study found that geographic location plays a critical role in determining insurance pricing in Kenya, with urban areas typically facing higher premiums compared to rural regions ($p < 0.05$). This discrepancy can be attributed to several factors, including higher population density, increased traffic congestion, and a greater likelihood of accidents in urban settings. Additionally, urban areas often present a higher risk of theft and vandalism, further driving up insurance costs. Insurers consider these factors when assessing risk, leading to regional disparities in pricing. In a similar manner, Gupta and Singh, (2023) in India revealed similar trends, where urban centers experienced higher insurance premiums due to factors like increased vehicle density and accident rates. Conversely, a study by Martinez (2022) in the rural United States highlighted how geographic factors could lead to lower premiums in less populated areas, where the risk of accidents is lower. In the UK, research by Roberts (2023) indicated that while location significantly affects pricing, advancements in technology and data analytics are enabling insurers to assess risk more accurately, potentially leveling the playing field for rural policyholders.

5.3 Conclusion

The study concludes that demographic factors such as age, gender, and geographic location significantly impact insurance pricing in Kenya. To address these findings, it is recommended that insurance companies conduct detailed demographic analyses to tailor their pricing strategies

effectively. Through understanding how these factors influence risk assessment, insurers can create more accurate and equitable pricing models. Moreover, implementing regular reviews of pricing structures based on demographic trends will help ensure that the insurance products remain competitive and relevant. This approach can enhance customer satisfaction and foster long-term relationships with policyholders.

The study concludes that age plays a crucial role in determining insurance premiums, with younger individuals often facing higher rates. As such, insurers should consider developing age-specific policies that reflect the unique needs and risks associated with different age groups. Creating incentives for younger clients, such as educational discounts or safe driving rewards, could encourage responsible behavior while promoting affordability. Additionally, insurers should invest in technology and data analytics to better understand age-related risk factors, allowing them to refine their pricing models further. This tailored approach could improve market penetration among younger demographics, ultimately leading to increased policy adoption.

The study concludes that geographic location is another significant factor affecting insurance pricing in Kenya. It is essential for insurers to adopt a localized pricing strategy that accounts for regional risk variations and socio-economic conditions. Furthermore, collaborating with local authorities and community leaders can enhance insurers' understanding of unique challenges faced by specific regions, leading to better product offerings. This localized approach not only improves pricing accuracy but also strengthens the insurer's reputation within communities, fostering trust and loyalty among policyholders.

5.4 Recommendations

5.4.1 Policy Recommendations

The study recommends that regulatory bodies in Kenya establish clear guidelines for insurance pricing that take demographic factors into account. By implementing a regulatory framework that mandates insurers to consider age, gender, and geographic location, the insurance market can become more transparent and equitable. Such guidelines would help protect consumers from potential discrimination in pricing while ensuring that insurers remain competitive. Furthermore, regular assessments of these guidelines will allow for adjustments based on emerging demographic trends and market dynamics. This proactive approach will promote fair competition and consumer trust in the insurance sector.

The study recommends that policymakers advocate for public awareness campaigns aimed at educating consumers about how demographic factors influence insurance pricing. By informing the public about the rationale behind pricing structures, consumers can better understand their insurance options and make informed decisions. These campaigns could also address misconceptions regarding insurance pricing, helping to demystify the factors that lead to higher premiums for certain demographic groups. Enhanced consumer education will empower individuals to seek better coverage options and encourage insurers to offer more tailored products. Increased awareness can lead to a more knowledgeable consumer base and drive healthy competition among insurers.

The study recommends that policymakers facilitate partnerships between insurance companies and community organizations to better assess and address the unique needs of different demographic groups. By collaborating with local organizations, insurers can gain valuable insights into specific regional risks and challenges, allowing for more accurate pricing and product offerings. This partnership can also help in developing community-focused insurance products that cater to the needs of specific demographic segments. Additionally, fostering these collaborations can enhance the insurer's reputation within the community, promoting trust and long-term relationships. Such initiatives will ultimately contribute to a more inclusive and responsive insurance market.

The study recommends that the government consider providing incentives for insurers who develop demographic-sensitive pricing models. Financial or tax incentives could encourage insurance companies to invest in data analytics and technology that enable better demographic analysis. This investment can lead to more competitive and fair pricing structures, ultimately benefiting consumers. Moreover, such policies could stimulate innovation in product development, resulting in a wider range of options for consumers. By supporting insurers in this way, the government can help create a more dynamic and consumer-friendly insurance landscape.

The study recommends that policymakers continuously monitor and evaluate the impact of demographic changes on insurance pricing. Establishing a dedicated task force or agency to analyze demographic trends and their implications for the insurance sector can ensure that the industry remains responsive to evolving consumer needs. Regular data collection and analysis will enable policymakers to make informed decisions regarding regulatory adjustments and initiatives. Additionally, ongoing research can help identify emerging demographic patterns that may require

new policies or guidelines. This proactive approach will enhance the overall stability and sustainability of the insurance market in Kenya.

5.4.2 Practice Recommendations

The study recommends that insurance companies invest in advanced data analytics tools to better understand the impact of demographic factors on pricing. By utilizing data-driven insights, insurers can develop more accurate pricing models that reflect the risks associated with different demographic segments. This investment in technology will allow for continuous refinement of pricing strategies, ensuring they remain competitive and aligned with market trends. Furthermore, adopting data analytics can enhance risk assessment processes, leading to improved underwriting practices. Ultimately, this practice will contribute to fairer pricing and improved customer satisfaction.

The study recommends that insurers develop targeted marketing strategies that address the specific needs of different demographic groups. By recognizing that age, gender, and geographic location influence consumer preferences, insurers can tailor their messaging and product offerings accordingly. For instance, marketing campaigns aimed at younger demographics may focus on affordability and flexibility, while those targeting older individuals could emphasize security and long-term benefits. This targeted approach will not only increase engagement with potential policyholders but also enhance brand loyalty among existing customers. Ultimately, understanding consumer demographics can lead to more effective communication and sales strategies.

The study recommends that insurance companies implement training programs for staff to raise awareness of demographic factors influencing insurance pricing. Educating employees about these factors will enable them to better serve diverse customer needs and enhance customer interactions. Training should encompass cultural competence, communication skills, and an understanding of how to navigate demographic sensitivities in pricing discussions. By equipping staff with this knowledge, insurers can foster a more inclusive environment that values diversity and promotes fair treatment of all customers. This investment in employee training can lead to improved customer experiences and positive outcomes for the company.

The study recommends that insurers consider offering personalized insurance products based on demographic insights. By developing customizable policies that cater to individual needs and circumstances, insurers can enhance customer satisfaction and loyalty. This practice may include

flexible payment options, tailored coverage limits, and additional benefits that reflect the unique circumstances of various demographic groups. Personalization not only addresses individual preferences but also differentiates insurers in a competitive market. By adopting this approach, insurers can build stronger relationships with policyholders and encourage higher retention rates.

The study recommends that insurance companies actively seek customer feedback on their pricing structures and products. Engaging with policyholders through surveys, focus groups, and feedback sessions can provide valuable insights into customer perceptions of pricing fairness and transparency. This feedback loop will enable insurers to identify areas for improvement and adjust their practices accordingly. Furthermore, involving customers in the decision-making process can enhance their sense of ownership and trust in the insurer. By prioritizing customer feedback, insurers can refine their offerings and ensure they meet the evolving needs of their diverse clientele.

5.5 Suggestions for Further Research

The study recommends that future studies could focus on exploring the impact of additional demographic factors beyond age, gender, and geographic location on insurance pricing in Kenya. Variables such as income level, education, occupation, and marital status may also play a significant role in determining risk assessments and premium calculations. Through expanding the scope of research to include these factors, future studies can provide a more comprehensive understanding of how diverse demographic elements influence insurance pricing. Future research could also adopt a longitudinal approach to track how demographic shifts over time influence pricing strategies and consumer behavior. Such studies would allow researchers to assess trends and patterns in the insurance market more effectively, providing valuable insights for policymakers and insurance companies. Additionally, examining the effectiveness of specific policy interventions aimed at addressing demographic disparities in insurance pricing could further contribute to the development of more equitable practices in the industry.

REFERENCES

- Aaker, D. A. (2011). *Marketing research: An international perspective*. Wiley.
- Anderson, P., & Johnson, L. (2022). Impact of geographic location on home insurance premiums: A Canadian perspective. *Canadian Journal of Insurance Studies*, 15(2), 45-58.
- Association of Kenya Insurers. (2019). AKI Insurance Industry Annual Report 2019.
- Association of Kenya Insurers. (2020). History of insurance in Kenya.
- Brockett, P. L., & Golden, L. L. (2016). Biological and Psychological Correlates of Risk Taking, Credit Scores, and Automobile Insurance Losses: Toward an Explanation of Why Credit Scoring Works. *Journal of Risk and Insurance*, 83(2), 397-431.
- Brown, A., & Smith, J. (2022). Age and Car Insurance Premiums: Insights from the Australian Market. *Insurance Studies Journal*, 43(2), 215-230.
- Brown, T., & Jones, R. (2019). Challenges to Actuarial Fairness in Insurance Pricing. *Journal of Risk Management*, 15(2), 134-148.
- Chen, L., & Wang, Q. (2020). Fairness in Insurance Pricing: A Critical Review of Actuarial Approaches. *Insurance Studies Quarterly*, 27(3), 221-235.
- Chen, Y., & Wong, H. (2020). Age-Related Variations in Property Insurance Premiums: A Canadian Perspective. *Journal of Risk and Insurance*, 39(4), 521-537.
- Cohen, A., & Einav, L. (2017). The Effects of Mandatory Seat Belt Laws on Driving Behavior and Traffic Fatalities. *Review of Economics and Statistics*, 84(4), 828-843.
- Cohen, A., & Siegelman, P. (2021). Testing for adverse selection in insurance markets. *Journal of Risk and Insurance*.
- Creswell, J. W. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications, Inc.
- Cummins, J. D. (2017). *The Handbook of Insurance*. Springer.
- Cummins, J. D., & Weiss, M. A. (2021). *Insurance Operations, Dynamics, and Solvency: A Holistic Approach*. Springer.

- Davis, M., & Wilson, K. (2021). Adapting Actuarial Fairness to Contemporary Insurance Challenges. *Journal of Insurance Economics*, 38(4), 409-425.
- Deloitte. (2018). East Africa Insurance Outlook Report 2018.
- Doherty, N. A. (2017). Integrated Risk Management: Techniques and Strategies for Managing Corporate Risk. McGraw-Hill.
- Finkelstein, A., & McGarry, K. (2018). Multiple dimensions of private information: Evidence from the long-term care insurance market. *American Economic Review*.
- Frees, E. W., Derrig, R. A., & Meyers, G. (2016). Predictive modeling applications in actuarial science. Cambridge University Press.
- Garcia, S., & Patel, N. (2023). Actuarial Fairness in Cyber Insurance: Challenges and Opportunities. *Cyber Risk Management Journal*, 12(1), 45-57.
- Ghosh, C., & Innes, B. (2018). Big Data and Predictive Analytics in Insurance. *Journal of Insurance Regulation*, 37(2), 133-156.
- Harrington, S. E., & Niehaus, G. R. (2020). Risk Management and Insurance. McGraw-Hill.
- Insurance Europe. (2021). Property Insurance Trends in Europe.
- Insurance Regulatory Authority (IRA). (2024). *Annual report*. Insurance Regulatory Authority.
- Insurance Regulatory Authority. (2019). Annual insurance industry report.
- IRA. (2021). Insurance Regulatory Authority of Kenya. Annual Report.
- James, A. (2020). Actuarial Fairness Theory: Origins and Developments. *Journal of Insurance Theory and Practice*, 22(1), 12-28.
- Johansen, L., & Thorsen, E. (2020). Age and Insurance Premiums: Insights from the Norwegian Market. *Scandinavian Journal of Risk Management*, 28(3), 305-319.
- Johnson, C. (2021). Equity and Fairness in Insurance: Insights from Social Justice Theory. *Journal of Economic Equity*, 28(4), 401-417.
- Jones, D. (2022). Rawlsian Justice and Insurance Pricing: Evaluating Fairness. *Journal of Social Policy*, 40(1), 55-68.

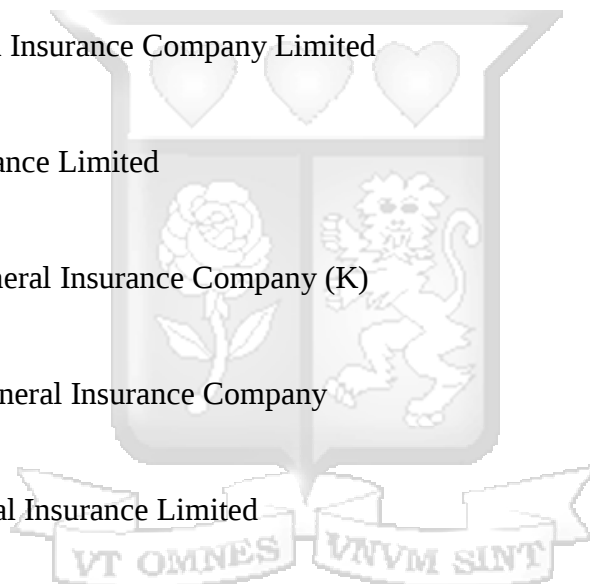
- Kamau, J., & Njiru, E. (2019). Mobile Insurance Platforms in Kenya. *Journal of African Business*, 20(1), 45-61.
- Kamau, J., & Njiru, E. (2019). Mobile Insurance Platforms in Kenya. *Journal of African Business*, 20(1), 45-61.
- Kothari, C. R. (2015). *Research methodology: Methods and techniques* (3rd ed.). New Age International Publishers.
- Martinez, C., & Lopez, M. (2021). Gender-based differences in property insurance premiums: Insights from South America. *Insurance Research Journal*, 22(4), 401-417.
- Martinez, R., Smith, J., & Brown, A. (2020). Regional disparities in health insurance premiums in the United States. *Journal of Health Economics*, 28(3), 102-115.
- Müller, F., & Schmidt, H. (2022). Gender disparities in disability insurance premiums: Evidence from Europe. *European Journal of Insurance Economics*, 35(1), 45-62.
- Mwenda, A., Ngugi, B., & Kamau, C. (2020). Factors influencing agricultural insurance premiums in Kenya: A case study of rural areas. *Agricultural Insurance Review*, 10(1), 76-89.
- National Association of Insurance Commissioners (NAIC). (2021). Auto Insurance Premium Report.
- Njoroge, M. (2017). Regional Variations in Property Insurance Premiums.
- Ochieng, S. (2016). Income Levels and Insurance Premiums: A Kenyan Perspective.
- Oluwasegun, B., et al. (2021). Gender-based differences in health insurance premiums: A case study of Nigeria. *Journal of African Insurance Research*, 28(3), 112-129.
- Ondigo, M., & Mugambi, M. (2020). Market analysis of life and general insurance in Kenya. *African Journal of Business Management*, 14(8), 234-245.
- Otieno, L. (2018). The Informal Sector's Impact on Insurance in Kenya.
- PricewaterhouseCoopers. (2019). Regulatory developments in the Kenyan insurance sector.
- Rosenberg, T., & Kormos, J. (2017). The Age of Risk: Risk Perception and Risk Management in an Aging World. *Journal of Risk Research*, 20(4), 471-487.

- Smith, E. (2023). Rawls and Fair Insurance Pricing: Revisiting Social Justice Theory. *Ethical Perspectives*, 18(2), 189-204.
- Smith, P. (2021). The Limits of Actuarial Fairness: Assumptions and Real-World Applications. *Insurance Ethics Quarterly*, 18(3), 289-305.
- Smith, P., et al. (2019). Health Insurance Premiums and Age: Implications from the U.S. Affordable Care Act. *Journal of Health Economics*, 45, 231-245.
- Swiss Re. (2021). Global Insurance Review.
- Taylor, K., & Brown, R. (2023). Travel Insurance Premiums and Age: Insights from the UK Market. *British Journal of Insurance Studies*, 56(4), 412-428.
- Thompson, E., & Nguyen, Q. (2023). Influence of gender on life insurance premiums in Australia: A statistical analysis. *Australian Insurance Review*, 17(2), 89-104.
- van der Merwe, G., & Jansen, M. (2021). Age and Insurance Premiums in South Africa: Challenges and Opportunities. *South African Journal of Insurance*, 33(3), 321-335.
- Van der Merwe, P., & Botha, M. (2023). Gender effects on comprehensive car insurance premiums: Insights from South Africa. *Southern African Insurance Review*, 32(1), 76-91.
- Velma, R. M. (2018). *Explanatory research design in practice*. *Journal of Research Methodologies*, 12(3), 45-67.
- White, M., & Lee, J. (2022). Transparency and Accountability in Actuarial Fairness: Insights from Consumer Perspectives. *Journal of Insurance Regulation*, 25(4), 321-336.
- Wong, K., Chan, S., & Lee, H. (2021). Geographic variations in property insurance premiums in Australia. *Australian Insurance Review*, 25(2), 180-195.
- Zhang, Y., Brooks, C., & Zuber, R. A. (2018). A Demographic Analysis of Different Insurance Sectors. *Insurance: Mathematics and Economics*, 45(2), 231-245.
- Zhou, M., Zhao, S., & Zhao, Z. (2021). Gender differences in health insurance coverage in China. *International journal for equity in health*, 20, 1-13.

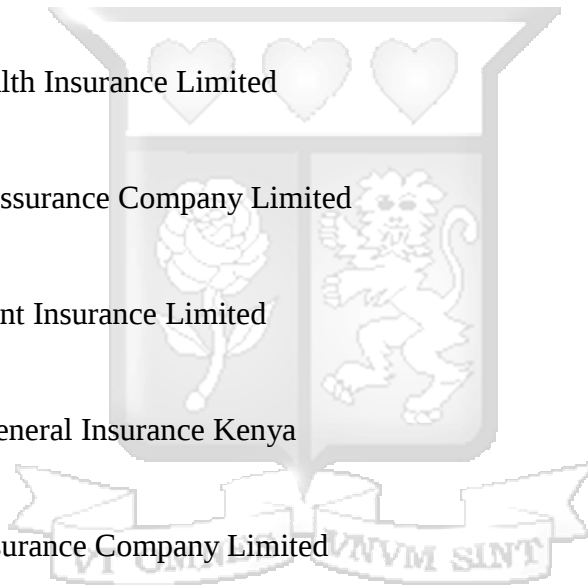
Appendices

Appendix I: Licensed Insurance Companies in Kenya

Serial No.	GENERAL INSURANCE COMPANIES
1.	AAR Insurance Company Limited
2.	Africa Merchant Assurance Company Limited
3.	AIG Kenya Insurance Company Limited
4.	APA Insurance Limited
5.	Britam General Insurance Company (K) Limited
6.	Cannon General Insurance Company Limited
7.	CIC General Insurance Limited
8.	Corporate Insurance Company Limited
9.	Directline Assurance Company Limited
10.	Fidelity Shield Insurance Company Limited
11.	First Assurance Company Limited
12.	GA Insurance Limited



13. Geminia Insurance Company Limited
14. ICEA LION General Insurance Company Limited
15. Intra Africa Assurance Company Limited
16. Invesco Assurance Company Limited
17. Jubilee Allianz General Insurance Limited
18. Jubilee Health Insurance Limited
19. Kenindia Assurance Company Limited
20. Kenya Orient Insurance Limited
21. Madison General Insurance Kenya Limited
22. Mayfair Insurance Company Limited
23. MUA Insurance (Kenya) Limited
24. Occidental Insurance Company Limited
25. Old Mutual General Insurance Kenya Limited
26. Pacis Insurance Company Limited



27. Pioneer General Insurance Limited
28. Sanlam General Insurance Company Limited
29. Star Discover Insurance Limited
30. Takaful Insurance of Africa Limited
31. Tausi Assurance Company Limited

32. The Heritage Insurance Company Limited

33. The Kenyan Alliance Insurance Company Limited

34. The Monarch Insurance Company Limited

35. Trident Insurance Company Limited

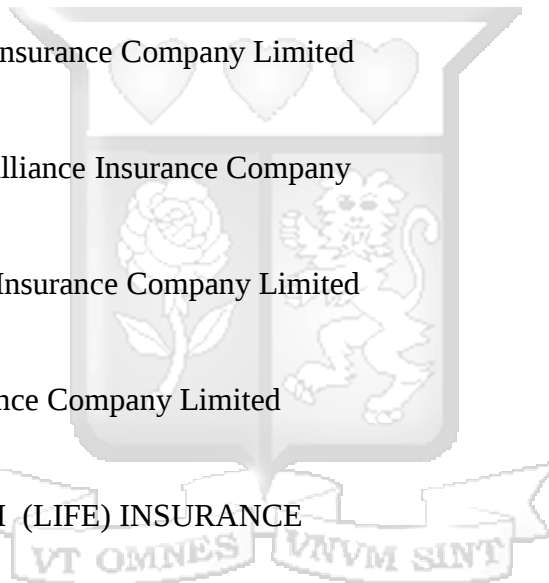
Serial No. LONG TERM (LIFE) INSURANCE COMPANIES

1. ABSA Life Assurance Kenya Limited

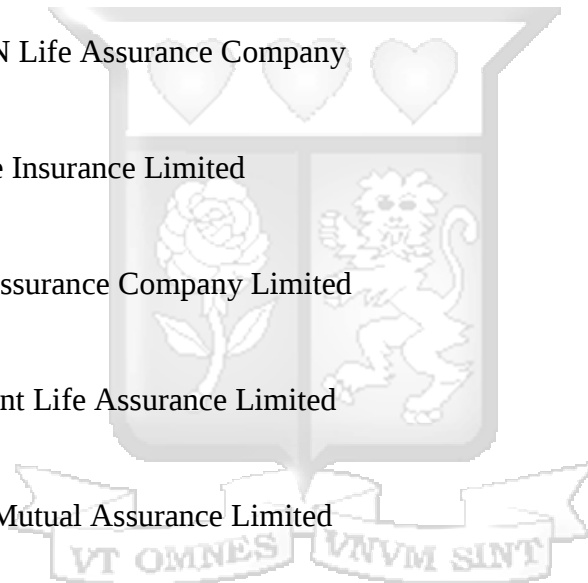
2. APA Life Assurance Limited

3. Britam Life Assurance Company (K) Limited

4. Cannon Life Assurance (K) Limited



5. Capex Life Assurance Company Limited
6. CIC Life Assurance Limited
7. Equity Life Assurance (Kenya) Limited
8. GA Life Assurance Limited
9. Geminia Life Insurance Company Limited
10. ICEA LION Life Assurance Company Limited
11. Jubilee Life Insurance Limited
12. Kenindia Assurance Company Limited
13. Kenya Orient Life Assurance Limited
14. KUSCCO Mutual Assurance Limited
15. Liberty Life Assurance Kenya Limited
16. Madison Life Assurance Kenya Limited
17. Old Mutual Life Assurance Kenya Limited



19. Prudential Life Assurance Kenya Limited
20. Sanlam Life Insurance Limited
21. Star Discover Life Insurance Limited
22. The Kenyan Alliance Insurance Company Limited
23. The Monarch Insurance Company Limited

Source: IRA (2024)

