DETERMINANTS OF INSURANCE SECTOR SOLVENCY IN NIGERIA

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FACULTY OF MANAGEMENT SCIENCES

UNIVERSITY OF BENIN, BENIN CITY,NIGERIA

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A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF ACTUARIAL SCIENCE AND INSURANCE, FACULTY OF MANAGEMENT SCIENCES, UNIVERSITY OF BENIN, BENIN CITY. IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF SCIENCE (B.Sc.) HONOURS DEGREE IN ACTUARIAL SCIENCE AND INSURANCE.

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DECLARATION

I declare that:

This project work is based on a study undertaken by me in the Department of Actuarial Science and insurance, Faculty of Management Sciences, University of Benin, Benin City, under the supervision of DR. OROBATOR, this work has not been previously submitted for award of a degree elsewhere.

All ideas and views are products of my personal research and that of my supervisor and all the references made to works of other persons have been duly acknowledged.

Ekenedilichukwu gabriel NWABIANKEA **Date**

CERTIFICATION

This is to certify that this project work was carried out Ekenedilichukwu gabriel NWABIANKEA matriculation number MGS2104954 to the Department of Actuarial Science and Insurance, University of Benin, Benin City and in partial fulfillment of the requirement for the award of Bachelor of Sciences (B. Sc.) degree in the Department of Actuarial Science and Insurance.

_________________________________ ____________________

DR. OROBATOR Date

(Project supervisor)

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IZEDOMI .I. M. Date

(Project co-ordinator)

_________________________________ ____________________

Dr.O.I Omoruyi -Aigbovo Date

(Head of Department)

DEDICATION

This work is dedicated to God Almighty for his grace and mercy throughout my Study in the university of Benin. I also dedicate this work to my lovely parent, Mr and Mrs AZUKA NWABIANKEA, my brothers and sisters (Chidozie and Maduabuchi) . May God bless them Abundantly.

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Firstly, my sincere appreciation goes to God Almighty whose love and mercy has kept me through the years even up to the completion of my project work and my undergraduate program.

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My special gratitude goes to my parents Mr and Mrs AZUKA NWABIANKEA for their constant supports, prayers and words of encouragement through my educational pursuit. I am also grateful to my dear friends Ben,Lizabeth,Phoebe,Elogosha, Faith for their assistance and word of encouragement while carrying out this project. May God bless each of you abundantly.

Last but not least,i want to thank me, I want thank me for believing in me,I want to thank me for doing all these hard work, I want to thank me for having no days off,I want to thank me for never quitting,I want to thank me for always been a giver and trying to give more than I receive.

I love you all

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ABSTRACT

This study examines the determinants of insurance sector solvency in Nigeria using panel data from 2013 to 2024. The analysis focuses on Gross Premium Income, Insurance Penetration Rate, and Claims Ratio as the key explanatory variables. An ex post facto research design was adopted, and secondary data were analysed using descriptive statistics, correlation analysis, and panel regression techniques. The Hausman specification test confirmed the fixed effects model as the appropriate estimator. The findings show that Gross Premium Income and Insurance Penetration Rate have positive and significant effects on solvency, indicating that higher premium inflows and deeper market participation strengthen insurers' financial positions. Claims Ratio has a negative and significant effect on solvency, suggesting that higher claims payments reduce financial stability. Preliminary diagnostic tests support the validity of the model and justify the use of robust estimation procedures. The study concludes that improved premium performance, increased market penetration, and effective claims management are critical for enhancing solvency in Nigeria's insurance sector. The results provide useful insights for regulators, policymakers, and industry practitioners seeking to promote financial resilience within the industry.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The insurance sector solvency, in simple terms, is the capacity of insurers to meet obligations as they fall due and withstand adverse shock, anchoring confidence in risk transfer and financial stability (IAIS, 2024). Regulators often set solvency requirements to protect policyholders and maintain stability in the insurance market. This way, insurers can provide reliable coverage and peace of mind to their customers. Around the world, supervisors treat solvency not merely as a firm-level metric but as a system-level safeguard, linking capital strength, liquidity, underwriting quality, and risk governance to policyholder protection and macro-prudential resilience (IAIS, 2024; EIOPA, 2020).

Global regulatory architecture has converged toward risk-sensitive solvency regimes. The European Union's Solvency II embeds market-consistent valuations, risk-based capital, and Own Risk and Solvency Assessment (ORSA), while many emerging markets are sequencing adoption of similar tools in stages (EIOPA, 2024; IMF, 2024). These shifts matter for how solvency is measured and managed, and they create new empirical questions about which firm- and market-level drivers most reliably explain solvency outcomes in developing economies. Within this global frame, three commercially observable indicators—gross premium income (GPI), insurance penetration, and claims ratio—have intuitive and theorized links to solvency. Premium scale supports capital formation and expense absorption; penetration (premiums/GDP) proxies risk pooling depth and revenue stability; and the claims ratio captures underwriting strain that can erode surplus if pricing, reserving, and reinsurance are misaligned (Zinyoro, 2024; IMF, 2024; Poufinas, 2024).

Furthermore, the Nigerian market has expanded in premium size, creating an opportunity to test whether scale translates into solvency strength. NAICOM's industry bulletin shows that gross premium written (GPW) reached ₦813.1 billion in Q2 2024—up 47.4% year-on-year—and the sector crossed the ₦1 trillion premium milestone in 2023, continuing into 2024 (ThisDay, 2024). BusinessDay further reports total 2024 claims of about ₦622 billion, with a full-year claims ratio near 40%, underscoring the solvency-relevant tension between rapid premium growth and heavy claims load (BusinessDay, 2024; ThisDay, 2024).

Claims dynamics also sharpen the solvency question. In Q2 2024 alone, insurers reported ₦297.9 billion in gross claims (about 36.6% of GPW), while net claims stood at 87.1% of gross claims—stress points that, if persistent, pressure solvency margins absent adequate pricing, reinsurance, and investment returns (ThisDay, 2024; BusinessDay, 2024). Related international evidence links elevated loss/claims ratios to weaker earnings capacity and heightened solvency risk when not offset by capital buffers and asset-liability discipline (IMF, 2024; Zinyoro, 2024). Yet, Nigeria's insurance penetration remains structurally low—typically cited at below 1% of GDP—constraining risk pooling and premium diversity compared with peers (Oxford Business Group, 2020). By contrast, regional summaries consistently place South Africa at the continental frontier and indicate Africa's average penetration near 1–3% depending on line of business and year, highlighting Nigeria's catch-up potential (AIO, 2024; Swiss Re Institute, 2024). Low penetration can amplify solvency volatility because shallow pools are more sensitive to large losses and macro shocks.

Regulatory modernization has accelerated. NAICOM issued Corporate Governance Guidelines in 2021 and has been rolling out risk-based supervision (RBS) and data reforms; IFRS 17 became effective for 2023 reporting, reshaping contract measurement and profit emergence relevant for solvency assessment (DLA Piper Africa, 2021; PwC Nigeria, 2022). In 2025, Nigeria enacted a new Insurance Industry Reform Act and announced materially higher, risk-based minimum capital requirements—measures intended to better align capital to risk and strengthen solvency defences (NAICOM, 2025; TheCable, 2025). Despite these reforms, much of Nigeria-focused scholarship emphasizes "sector development" (penetration/density) or profitability rather than solvency per se. For example, Etudaiye-Muhtar and Agboola (2021) analysed determinants of non-life insurance development, not solvency. Similar strands explore premium-growth–growth nexuses or macro drivers without directly modelling solvency margins (Fadun, 2023). This creates an opening to centre solvency as the dependent variable.

Where solvency is not focused on, the emphasis often falls on governance or asset–liability management (ALM), not on core commercial levers such as GPI, penetration, and claims ratio. Jinadu and Chilekezi (2023) highlight the solvency–ALM nexus in Nigeria, consistent with international evidence on balance-sheet structure; however, the study does not estimate the marginal effects of premium scale, market depth, or loss experience on solvency outcomes.

Taken together, Nigeria's rapid premium expansion, low penetration baseline, heavy claims experience, and evolving prudential rules frame a timely research agenda. By explicitly modelling solvency as the outcome and testing the roles of GPI, penetration, and claims ratio, the study responds to sector needs for evidence that links commercial performance to solvency resilience within Nigeria's reforming regulatory context.

1.2 Statement of the Research Problem

Existing Nigerian studies largely favour insurance development or profitability rather than solvency, leaving a gap on the firm-level and market-level determinants of solvency. Etudaiye-Muhtar and Agboola (2021) focus on non-life insurance development (penetration) using ARDL methods but do not specify solvency as the dependent variable or claims ratio and GPI as predictors. This limits applicability for prudential policy that targets solvency margins. This research is going to addresses this gap by modelling solvency directly and jointly estimating the effects of GPI, penetration, and claims ratio.

Furthermore, research on claims in Nigeria typically targets profitability rather than solvency. For instance, a recent analysis finds claims ratio significantly affects profitability for listed insurers (Agboola & Isimoya, 2025), but does not study capital strength or solvency ratios. By shifting the focus from earnings to solvency, and by pairing claims ratio with premium scale and penetration, this study clarifies whether loss experience primarily erodes solvency or is offset by growth and diversification.

Moreso, macro-financial studies show inflation and interest-rate dynamics influence claims and insurer performance, yet they fail to link these pressures to solvency in Nigeria's current environment (Agbo, 2024; Horvey, 2025). While macro controls are important, the missing link is how firm-level commercial drivers (GPI), market depth (penetration), and underwriting strain (claims ratio) map to solvency under Nigeria's evolving prudential rules. This study positions itself to provide that link.

Finally, the measurement landscape itself has shifted with IFRS 17 and the 2025 move toward risk-based minimum capital. Much prior Nigerian evidence predates or only partially overlaps these reporting and capital changes, complicating inference. By situating the analysis in the IFRS 17/RBS era and referencing NAICOM's latest market data, the study updates evidence on solvency determinants for today's regulatory conditions (PwC Nigeria, 2022; NAICOM, 2025; ThisDay, 2024; BusinessDay, 2024).

To sum it all up, the core research gap is the absence of Nigeria-specific, empirically grounded evidence that models solvency (not just development or profitability) as a function of GPI, insurance penetration, and claims ratio within the country's contemporary regulatory regime. This study is designed to fill that gap.

1.3 Research Questions

The following research questions were carefully curated to guide the findings of this study:

1. What is the effect of Gross Premium Income on the solvency of the insurance sector in Nigeria?
2. How does insurance penetration rate influence the solvency of the insurance sector in Nigeria?
3. To what extent does the claims ratio affect the solvency of the insurance sector in Nigeria?

1.4 Research Objectives

The general objective of this study is to examine the determinants of insurance sector solvency in Nigeria. Other specific objectives are to:

i. examine the effect of Gross Premium Income on insurance sector solvency in Nigeria.

ii. investigate the influence of insurance penetration rate on insurance sector solvency in Nigeria.

iii. analyse the extent to which claims ratio affects insurance sector solvency in Nigeria.

1.5 Research Hypotheses

The following hypotheses are stated in their null form:

H_{01}: Gross Premium Income has no significant effect on the solvency of the insurance sector in Nigeria.

H_{02}: Insurance penetration rate has no significant influence on the solvency of the insurance sector in Nigeria.

H_{03}: Claims ratio has no significant effect on the solvency of the insurance sector in Nigeria.

1.6 Scope of the Study

This study focuses on examining the determinants of insurance sector solvency in Nigeria, with emphasis on Gross Premium Income, Insurance Penetration Rate, and Claims Ratio as the main explanatory variables. The research will cover registered insurance companies operating under the regulatory oversight of the National Insurance Commission (NAICOM) within the Nigerian insurance market. The temporal scope of the study will be restricted to recent years (2013–2024), a period that reflects contemporary policy reforms, macroeconomic fluctuations, and increasing competition in the financial services sector. Geographically, the study is limited to Nigeria, though global perspectives on insurance solvency will be reviewed to contextualize the findings. Conceptually, the research will focus on solvency as a measure of financial stability and the ability of insurance firms to meet their long-term obligations to policyholders.

1.7 Significance of the Study

This study is significant to several stakeholders within and outside the insurance industry in the following ways:

i. **Regulators:** The findings of this study will provide valuable insights to regulatory bodies such as the National Insurance Commission (NAICOM) and the Central Bank of Nigeria (CBN) regarding the solvency position of insurance firms in the country. By highlighting the roles of Gross Premium Income, insurance penetration, and claims ratio, regulators will be better positioned to design more robust solvency monitoring frameworks and capital adequacy requirements that safeguard policyholders' interests.

ii. **Insurance Companies:** For practitioners in the insurance industry, the study will provide empirical evidence on the determinants of solvency, enabling insurers to adopt better risk management practices and enhance financial soundness. Understanding the link between premium income, claims obligations, and penetration rates will help firms develop strategies to remain solvent and competitive in an evolving financial landscape.

iii. **Policyholders:** The study will indirectly benefit policyholders, as improved solvency of insurance companies ensures greater protection of their investments and enhances trust in the insurance system. Stronger solvency positions also mean higher capacity to meet claims, which improves consumer confidence and increases demand for insurance products.

iv. **Policymakers:** The research will serve as a useful tool for policymakers in developing evidence-based policies to stimulate insurance sector growth and ensure the long-term financial stability of the industry. It will also provide insights into how Nigeria can align with international solvency standards such as Solvency II.

v. **Academics and Researchers:** The study will contribute to the growing body of literature on insurance solvency in developing economies, especially in Nigeria where empirical studies remain limited. It will provide a basis for further research into related topics such as capital structure, risk management, and financial stability within the insurance sector.

vi. **To the Economy at Large:** A solvent insurance industry contributes positively to national economic growth by mobilizing savings, facilitating investments, and providing financial stability. Therefore, the study's findings will highlight how strengthening solvency within the insurance sector can contribute to Nigeria's broader financial system stability and sustainable economic development.

1.8 Limitations of the Study

Despite its potential contributions, this study like any other study in the world, is subject to certain limitations. First, the study will focus primarily on three determinants of insurance solvency; Gross Premium Income, insurance penetration rate, and claims ratio, excluding other possible factors which may also influence solvency. This limitation is due to time and resources constraints, including more variables will expand this project work in such a way that it will require a long period before completion. Secondly, the study is geographically limited to Nigeria, and while global perspectives will be used for contextualization, the findings may not be directly generalizable to other countries with different regulatory, economic, and cultural contexts.

Another the study's time frame (2013–2024) may not fully capture long-term cyclical trends in the insurance industry. Additionally, the reliance on secondary data is another limitation, which may be affected by inconsistencies in data reporting across insurance firms and years. This limitation will be mitigated by only sourcing for data from credible sources such as the CBN database, Nigeria bureau of Statistics and the NAICOM database.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides a comprehensive review of the existing literature on the determinants of insurance sector solvency in Nigeria. The chapter is structured into three major sections: conceptual review, theoretical review, and empirical review. Additionally, it identifies the gaps in empirical literature that this study aims to address. The conceptual review offers a detailed examination of key concepts related to insurance sector solvency, providing a foundation for understanding the complex dynamics at play. By exploring the theoretical frameworks and empirical evidence, this chapter sets the stage for the development of a robust research framework that will guide the investigation into the determinants of solvency in Nigeria's insurance sector.

2.2 Conceptual Review

2.2.1 Insurance Sector Solvency

Insurance sector solvency refers to the ability of an insurer—or the insurance industry as a whole—to meet its long-term obligations, especially policyholder claims, liabilities, and other contractual commitments, even when adverse conditions arise (Garayeta et al., 2022). Solvency is a core indicator of financial health: it captures not only whether assets exceed liabilities at a point in time, but also whether capital, technical reserves, and risk management arrangements are adequate to absorb unexpected underwriting, market, or operational losses (Garayeta et al., 2022; IMF, 2024). Conceptually, solvency is distinct from liquidity. Liquidity concerns the capacity to meet short-term cash flow needs, whereas solvency concerns long-term balance-sheet viability and the insurer's ability to remain a going concern under stress. An insurer may be liquid but not solvent, or solvent on paper but structurally vulnerable if its capital buffers are inadequate under realistic stress scenarios. This distinction underscores why regulators and managers rely on both liquidity and solvency measures when assessing insurer stability (EIOPA, 2019; IAIS, 2021). Solvency also performs multiple institutional functions. For regulators, it is a primary prudential objective—minimum solvency standards protect policyholders and limit the risk of insurer failure cascading into financial instability. For markets and stakeholders, solvency signals strength and reliability; for managers, solvency constraints influence pricing, reinsurance strategy, reserve policy, and investment choices. In Nigeria, the National Insurance Commission (NAICOM) sets prudential guidelines specifying how admissible assets and solvency margins are calculated and supervised to ensure policyholder protection (NAICOM, 2021; Garayeta et al., 2022).

The conceptual distinction lies between static and dynamic perspectives. The static view asks whether assets are sufficient to cover liabilities at a reporting date, captured by balance-sheet ratios. The dynamic perspective asks whether, under plausible future stress scenarios—such as large claims, market downturns, or persistent adverse conditions—capital and reserves remain adequate (IMF, 2024). Increasingly, modern solvency frameworks emphasise the dynamic view, using stress testing, scenario analysis, and Own Risk and Solvency Assessment (ORSA) to capture vulnerabilities that may not appear in static reports (IMF, 2024; EIOPA, 2019).

Several broad categories of factors influence solvency. Capital and eligible own funds provide the first line of defence, while technical reserves reduce the risk of understatement of liabilities. Asset quality and asset-liability matching (ALM) ensure that investments back liabilities appropriately, while reinsurance transfers peak risks, and governance frameworks ensure proper risk management. These dimensions highlight that solvency is not simply a numerical calculation but an integration of underwriting, reserving, investment, and governance practices (Poufinas, 2024; Eling & Schnell, 2020). Accounting and reporting regimes also matter. The introduction of IFRS 17, for instance, changes liability measurement and profit recognition, which can alter the solvency picture. Supervisors continue to debate how accounting rules interact with prudential solvency measures because accounting assumptions can shift reported capital positions even when underlying risks remain unchanged (BIS–FSI, 2020; ESRB, 2021). From a public policy viewpoint, insurer solvency is important for the wider financial system. A solvent insurance sector supports economic growth by providing reliable risk transfer, mobilising savings, and investing in productive assets. Conversely, solvency shortfalls can threaten consumer protection and, in extreme cases, amplify systemic risks, especially where insurers are large or interconnected (IAIS, 2021; IMF, 2024).

2.2.2 Measures of Solvency

There are several measures commonly used to operationalise solvency. They include:

i. **Solvency ratio (or coverage ratio):** This expresses available capital relative to required capital, usually as a percentage. A ratio above 100% implies sufficient capital, while less than 100% signals deficiency. In risk-based capital regimes, the required capital reflects quantified exposures to underwriting, market, and credit risks (Eling & Schnell, 2020; Poufinas, 2024).

ii. **Solvency margin:** This is the excess of admissible assets over liabilities, expressed either as an absolute amount or relative to a base such as net premiums. In Nigeria, statutory rules require insurers to maintain solvency margins above prescribed thresholds as part of prudential supervision (NAICOM, 2021).

iii. **Risk-Based Capital (RBC) adequacy:** RBC frameworks link solvency requirements to the specific risk profile of an insurer, requiring more capital for higher underwriting or market risks. This approach is central to frameworks such as Solvency II in Europe and is increasingly adopted in emerging markets (IMF, 2024; Garayeta et al., 2022).

iv. **Asset-to-liability ratios and ALM indicators:** These examine whether admitted assets are sufficient to cover liabilities and whether durations are properly matched. Poor ALM can erode solvency even where capital appears adequate (EIOPA, 2019).

v. **Underwriting ratios as early warning indicators:** The claims ratio, expense ratio, and combined ratio are not solvency measures per se but are leading indicators of solvency erosion. For instance, combined ratios persistently above 100% imply underwriting losses that will eventually weaken capital (IAIS, 2021; Poufinas, 2024).

vi. **Qualitative and market-based indicators:** Credit ratings, governance quality, and reinsurance arrangements complement numerical solvency measures. Supervisors increasingly use ORSA frameworks to incorporate qualitative assessments into solvency monitoring (BIS–FSI, 2020; IMF, 2024).

2.2.3 Determinants of Insurance Sector Solvency

Insurance sector solvency is shaped by a combination of firm-level, market-level and regulatory factors. Conceptually, these determinants operate through three broad channels: (i) the capacity to generate and retain capital (capital formation and profitability), (ii) the exposure to and management of underwriting and market losses (loss experience, reserving, reinsurance, asset-liability management), and (iii) the broader market and institutional environment (market depth/penetration, regulation, macroeconomic conditions). Several studies and policy reports emphasise that solvency is therefore not a single-factor outcome but the integrated result of revenue flows, loss dynamics, risk transfer arrangements and supervisory design (IAIS, 2021; IMF, 2024; Garayeta et al., 2022).

2.2.4 Gross Premium Income

Gross Premium Income (GPI)—the total premiums written by an insurer before reinsurance and refunds—plays a foundational role in shaping an insurer's solvency position. GPI generates the inflows that underwrite technical reserves and supports the accumulation of own funds, which are key buffers against losses. When GPI grows steadily, insurers can build stronger capital reserves, provided those premiums are well-priced and underwriting is disciplined (Isimoya & Akindipe, 2022). For example, in marine and aviation classes in Nigeria, higher gross premium inflows enabled insurers to meet more claims, but only when reserving and claim settlement practices were adequate (Isimoya & Akindipe, 2022).

However, GPI's effect on solvency is moderated by retention and reinsurance. A study titled Reinsurance Transactions and Gross Premium Income of Non-Life Insurance Companies in Nigeria: An ARDL Approach finds that both reinsurance premiums ceded and accepted positively relate to the growth of gross premium income in non-life insurance (Fadun, Aduloju, & Oluwaleye, 2023). This suggests that premium income scale can be amplified, but its risk exposure will also depend on how much risk is transferred versus retained. If reinsurance cession is low, high GPI might bring large liabilities that endanger solvency if claims exceed expectations or reserves are inadequate.

Another factor is underwriting quality and premium adequacy. If premiums are insufficient relative to the risk assumed (underpricing), or if insurers accept adverse-selection risk, then high GPI may mask underlying solvency stress. For example, the Insurance Premium to Economic Growth literature in Nigeria shows that premium income has grown, but without consistent improvement in market penetration or underwriting discipline, which implies that scale alone does not guarantee financial strength (Ezeaku & Okparaka, 2024). Thus, solvency improvement via GPI depends on the conditions under which premiums are written.

Timing is also important. Gross premiums written (GWP) captures contracts issued, but premiums have to be earned over the period of coverage, and liabilities and reserving (for unearned premiums, unexpired risk, and claims incurred but not reported) must be accounted for in solvency calculations. If large written premiums are not matched with appropriate reserves or risk retention, then the insurer may appear solvent in accounting terms while being vulnerable. Although direct empirical studies linking GPI and solvency ratio are limited, related research on profitability shows that premium income has a positive effect on insurers' profitability when expenses and claims are controlled (Kenya study, Morara & Sibindi, 2021), which is conceptually close to solvency since profitability contributes to capital base.

In addition, external macroeconomic and regulatory factors influence how effectively GPI improves solvency. Inflation, regulatory minimum capital requirements, solvency margin rules, and regulatory oversight all affect whether premium growth translates into stronger solvency. For example, the Nigerian non-life insurance sector is subject to premium rate adjustments in some lines (motor, fire) that respond to inflation and loss trends; these adjustments support premium income growth but also require actuarial soundness to avoid losses (NAICOM reports 2023). A failure to adjust premium rates in line with claims inflation reduces the real value of premium income, harming solvency. GPI interacts with other solvency determinants, such as claims experience, expense ratios, reinsurance, and asset-liability matching. In cases where claims ratio rises or expense ratio increases, the incremental GPI may merely cover those rising costs rather than boosting capital. Therefore, in a conceptual model, GPI must be considered alongside these variables. For example, Isimoya & Akindipe (2022) show strong correlation between premium income and claim settlement in motor/marine/aviation lines in Nigeria, implying that GPI alone cannot sustain solvency unless matched capacity to settle claims is maintained.

2.2.5 Insurance Penetration Rate

Insurance penetration rate is a widely recognized determinant of insurance sector solvency because it reflects the extent to which insurance services are utilized relative to the size of the economy. Higher insurance penetration indicates that a larger share of the population and businesses are covered by insurance, which strengthens the premium base and enhances the financial resilience of insurers. This broadening of the risk pool not only stabilizes cash inflows through regular premium payments but also improves the sector's capacity to absorb shocks from unexpected losses (Outreville, 2021). Consequently, markets with deeper insurance penetration often demonstrate stronger solvency profiles compared to those where insurance remains underutilized.

The role of insurance penetration is also tied to its ability to generate sustainable premium income, which directly supports insurers' technical reserves and solvency margins. When penetration is high, insurers can diversify risks more effectively across various lines of business, thereby reducing vulnerability to claims volatility and market disruptions. Research evidence from emerging markets suggests that low penetration is often associated with weaker solvency due to a limited premium pool, high concentration of risks, and overexposure to economic shocks (Akinlo & Apanisile, 2020). In contrast, higher penetration facilitates economies of scale, improved capital mobilization, and stronger underwriting capacity, all of which are crucial for long-term solvency.

Moreover, insurance penetration serves as a proxy for financial inclusion and institutional trust in the insurance system. In economies where penetration is low, insurers may struggle to accumulate adequate reserves, making them more susceptible to liquidity and solvency crises during periods of high claims, such as pandemics or natural disasters (Njegomir & Marović, 2022). On the other hand, an expanding penetration rate reflects greater consumer participation, enabling insurers to strengthen their solvency through robust premium collections and prudent investment strategies. In this sense, penetration not only measures market depth but also captures the structural soundness of the insurance industry as a whole.

In the Nigerian context, studies highlight that increasing penetration is essential for improving sector solvency and competitiveness. Despite reforms and regulatory efforts, penetration in Nigeria remains relatively low compared to global standards, limiting the industry's ability to build adequate reserves and meet solvency benchmarks (Eze & Okoye, 2023). Thus, strengthening insurance penetration through awareness campaigns, digital innovations, and regulatory incentives can play a significant role in enhancing the solvency and sustainability of insurers.

2.2.6 Claims Ratio

The claims ratio, which represents the proportion of claims paid out relative to premiums earned, is a critical determinant of insurance sector solvency because it reflects both the underwriting performance and the financial health of insurers. A high claims ratio generally indicates that insurers are paying out a large share of premiums as claims, which may erode underwriting profits and weaken solvency margins. Conversely, a moderate and sustainable claims ratio signals effective risk selection, adequate pricing of policies, and prudent claims management, all of which contribute to the financial stability of insurers (Alhassan & Biekpe, 2021). Maintaining a balance between premium inflows and claim outflows is therefore vital to preserving the solvency position of insurers.

The impact of claims ratio on solvency can be understood through its influence on insurers' technical reserves and capital adequacy. Excessive claims payments reduce available reserves and may impair insurers' ability to meet future liabilities, leading to solvency deterioration (Eling & Marek, 2022). Regulators often monitor claims ratios closely as an early warning indicator of solvency risk, since persistent underwriting losses due to high claims ratios can push insurers into financial distress. This is especially critical in emerging economies, where insurers face challenges of adverse selection, weak risk pricing, and fraudulent claims, which further inflate claims ratios and undermine solvency (Adegbite & Akinyemi, 2020).

At the same time, the claims ratio reflects the extent of policyholder protection and confidence in the insurance sector. While extremely high claims ratios are problematic, very low ratios may also indicate poor claims settlement practices, delayed payments, or denial of legitimate claims. Such practices can weaken consumer trust, discourage insurance uptake, and ultimately reduce premium inflows, thereby indirectly harming solvency (Olayungbo, 2023). An optimal claims ratio—one that balances policyholder protection with insurer profitability—ensures that insurers remain solvent while maintaining market credibility.

Empirical research has emphasized the importance of claims ratio in the overall assessment of solvency and financial soundness. For instance, studies in Sub-Saharan Africa have shown that insurers with persistently high claims ratios struggle to maintain adequate solvency margins, particularly in markets where premium rates are regulated and inflationary pressures raise the cost of claims (Alhassan & Biekpe, 2021; Eze & Okoye, 2023). Similarly, European evidence highlights that excessive claims volatility, especially in non-life lines like motor and health insurance, is a leading cause of solvency erosion, even in well-capitalized firms (Eling & Marek, 2022). These findings reinforce the idea that monitoring claims ratio trends is indispensable for both insurers and regulators seeking to safeguard sector stability.

In Nigeria, the claims ratio has been a recurring challenge due to factors such as low premium pricing, high inflation, and weak enforcement of underwriting standards. Nigerian insurers often operate with thin profit margins, meaning that unexpected spikes in claims—whether from natural disasters, economic shocks, or systemic risks—can quickly deplete reserves and threaten solvency (Olayungbo, 2023). This situation underscores the importance of robust claims management practices, improved underwriting, and regulatory oversight in ensuring that claims ratios remain within sustainable thresholds. A well-managed claims ratio not only strengthens insurers' solvency but also enhances public confidence in the insurance sector, which in turn contributes to higher insurance penetration and overall sector development.

2.2.7 The interaction of Gross Premium Income, Insurance Penetration Rate, Claims Ratio and Insurance Solvency Determinant

Insurance sector solvency is determined by a complex interaction of several financial and operational variables, among which Gross Premium Income (GPI), insurance penetration rate, and claims ratio play particularly crucial roles. Having established how these factors individually determine solvency, it is important to also discuss their collective interaction. These factors not only serve as performance indicators but also directly influence the ability of insurers to remain solvent, maintain regulatory capital, and meet obligations to policyholders. In the context of developing markets like Nigeria, where insurance is still evolving, understanding how these determinants interact provides essential insights into sector resilience and long-term sustainability.

Gross Premium Income represents the primary revenue stream for insurers and serves as a foundation for solvency. High premium income provides insurers with the liquidity and capital necessary to underwrite risks, build reserves, and meet claims obligations. However, premium income alone does not guarantee solvency; it must be supported by prudent underwriting and effective claims management. Scholars have highlighted that insurers with consistently high GPI tend to have stronger solvency margins because they generate sufficient funds to cover both expected and unexpected liabilities (Oladipo & Olowokere, 2022). Conversely, in cases where GPI growth is achieved through aggressive underwriting without proper risk assessment, the solvency position may be threatened despite revenue expansion (Eling & Marek, 2022).

Insurance penetration rate, often measured as the ratio of insurance premiums to GDP, reflects the extent of insurance adoption within an economy. A higher penetration rate is generally associated with broader risk pooling, higher premium inflows, and greater financial stability in the insurance market (Alhassan & Biekpe, 2021). For developing economies, low penetration has been identified as a key barrier to solvency improvement, as insurers face challenges of thin premium bases and limited risk diversification (Eze & Okoye, 2023). In Nigeria, penetration remains below 1% of GDP, which severely constrains the industry's capacity to generate sufficient capital buffers and weakens overall solvency. The interaction between penetration and solvency is particularly important: while penetration boosts premium income and spreads risk, solvency itself also enhances penetration, since a solvent and credible insurance sector attracts more policyholders (Olayungbo, 2023).

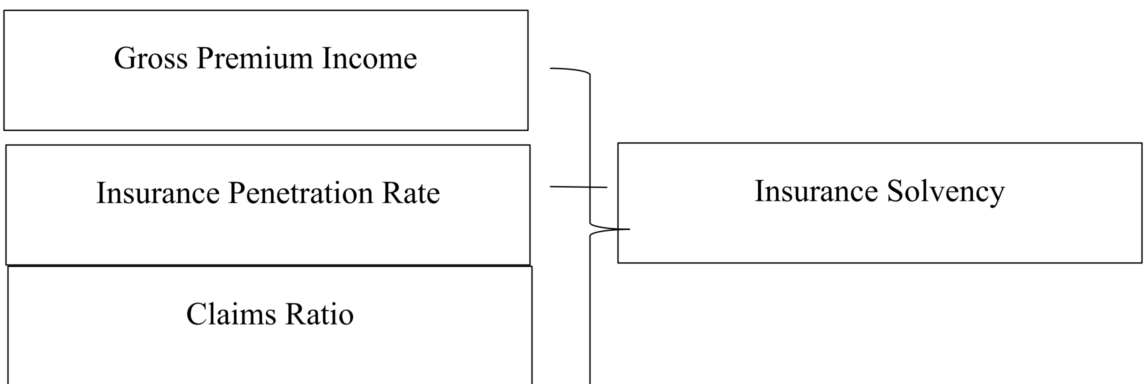
The claims ratio plays a balancing role in this dynamic, serving as a measure of insurers' ability to manage liabilities relative to premium inflows. While high premium income strengthens solvency, excessive claims payouts can erode it quickly. A sustainable claims ratio ensures that insurers are not overexposed to underwriting risks and that they retain enough surpluses to meet capital requirements (Adegbite & Akinyemi, 2020). In markets like Nigeria, where inflation, weak regulatory enforcement, and fraudulent claims are prevalent, insurers often struggle to maintain optimal claims ratios, leading to solvency challenges despite premium growth (Olayungbo, 2023). This underscores that solvency is not merely a function of revenue size but of the balance between premium collection and claim settlement efficiency.

Taken together, Gross Premium Income, insurance penetration, and claims ratio interact as core determinants of solvency. Premium income provides the foundation for capital strength, penetration broadens the pool of insured risks and enhances financial depth, while claims ratio ensures that liabilities are managed within sustainable limits. For instance, insurers with high premium income but low penetration may face concentration risks, while those with high penetration but poorly managed claims ratios may struggle to sustain solvency despite strong inflows. Thus, solvency is maximized when these determinants are aligned: robust premium income supported by high penetration and sustainable claims management.

Empirical evidence reinforces this interconnection. Studies across Sub-Saharan Africa show that insurers with high GPI and penetration but unstable claims ratios often experience solvency erosion (Alhassan & Biekpe, 2021). Similarly, Nigerian research confirms that solvency ratios improve significantly when insurers manage claims ratios effectively while expanding premium income (Eze & Okoye, 2023). This suggests that future solvency policies should emphasize not just revenue expansion through premium growth and penetration but also strong claims management frameworks that safeguard reserves. In the Nigerian context, the interaction of these factors has far-reaching implications. Low penetration limits the industry's revenue base, while weak claims management undermines public trust and discourages insurance adoption. Together, these issues create a cycle that perpetuates solvency challenges. Addressing solvency therefore requires a holistic approach that promotes deeper insurance penetration, supports premium growth, and strengthens claims regulation and enforcement. Only through this integrated strategy can Nigeria's insurance sector achieve and sustain solvency levels that align with global best practices and support long-term sector growth.

2.2.8 Conceptual Framework

Figure 1: Conceptual Framework



Author's computation (2025)

2.3 Theoretical Review

2.3.1 Risk-Based Capital (RBC) Theory

The Risk-Based Capital (RBC) Theory was developed in the early 1990s by U.S. insurance regulators under the auspices of the National Association of Insurance Commissioners (NAIC) as a response to the insolvencies experienced in the insurance sector during the late 1980s. It was further refined and popularized in the academic literature by scholars such as Cummins, Harrington, and Phillips, who highlighted its role in aligning capital requirements with the risk exposures of insurers (Cummins & Phillips, 2021). The core idea of the theory is that insurers must hold capital that is commensurate with the size and type of risks they assume, rather than relying on fixed or uniform capital requirements. This approach ensures that companies with higher exposure to underwriting, investment, or operational risks maintain proportionally higher capital buffers, thereby protecting policyholders and stabilizing the insurance system.

The relevance of RBC theory to this study lies in its ability to provide a robust framework for examining the determinants of solvency. For example, Gross Premium Income (GPI) reflects the scale of underwriting risks. Insurers with high GPI are exposed to larger potential claims and therefore must hold more capital to remain solvent. The insurance penetration rate, which measures the ratio of premiums to GDP, illustrates the extent of insurance market deepening. While higher penetration spreads risk across a wider base, it also increases systemic exposure, necessitating stronger capital adequacy to ensure long-term solvency (Alhassan & Biekpe, 2021). The claims ratio, on the other hand, captures the actual realization of underwriting risks. A high claims ratio signals increased liabilities, and under RBC principles, insurers experiencing such pressures must raise capital reserves to preserve solvency (Eling & Marek, 2022).

The theory underpins this research by framing solvency not as a static measure of assets over liabilities, but as a dynamic balance between risk exposure and capital adequacy. In Nigeria, solvency regulation has historically relied on fixed minimum capital bases as set by NAICOM, but these rules do not adequately capture the diverse risk exposures of insurers operating in volatile economic conditions. By applying the RBC theory, this study interprets GPI, penetration rate, and claims ratio as central determinants of solvency, since they directly influence the size of risks insurers bear and the adequacy of the capital required to absorb them.

In sum, the Risk-Based Capital Theory provides the most appropriate foundation for this research because it integrates both regulatory and financial perspectives on solvency. It emphasizes that solvency is risk-sensitive, shaped by operational realities such as premium growth, market penetration, and claims performance. By grounding the analysis in RBC theory, the study is better positioned to explain how these determinants interact to influence the solvency of Nigeria's insurance sector.

2.3.2 Agency Theory

Agency Theory was propounded by Jensen and Meckling (1976), and it explains the relationship between principals (owners or shareholders) and agents (managers). The core assumption of the theory is that managers, who are entrusted with the responsibility of managing the firm on behalf of the owners, may not always act in the best interest of the shareholders. Instead, managers may pursue personal objectives such as job security, prestige, or other private benefits at the expense of maximizing firm value. This divergence of interests gives rise to what is termed agency problems (Jensen & Meckling, 1976).

In the context of insurance companies, underwriting functions such as risk assessment, pricing of premiums, and claims management are central to the firm's profitability. However, if managers underwrite risks recklessly to increase market share or manipulate reserves to smooth earnings, the financial health of the insurance company can be jeopardized. For example, underpricing premiums to attract more policyholders may boost short-term revenues but result in long-term insolvency when claims exceed collected premiums. Similarly, inadequate disclosure of underwriting risks may mislead investors and other stakeholders, further worsening the agency conflict (Eisenhardt, 1989; Mayordomo & Rodríguez-Moreno, 2021).

Agency theory also emphasizes the role of monitoring and control mechanisms to mitigate these conflicts. Tools such as corporate governance practices, regulatory oversight, incentive alignment (like performance-based pay), and transparent financial reporting are necessary to align the interests of managers with those of shareholders (Daily, Dalton, & Cannella, 2003). In the Nigerian insurance industry, where weak governance structures and regulatory lapses are prevalent, the implications of agency conflicts can be particularly severe. This makes agency theory highly relevant in understanding how underwriting functions can influence the profitability of listed insurance firms (Obalola, 2021; Nwanji & Howell, 2022).

Therefore, agency theory provides a theoretical basis for explaining how the misalignment of interests between owners and managers in insurance firms can directly affect underwriting practices and, by extension, profitability.

2.3.3 Capital Adequacy Theory

Capital Adequacy Theory was first developed within the framework of banking and insurance regulation to ensure that financial institutions maintain sufficient capital to absorb risks and remain solvent in the face of unexpected losses. The theory is closely linked to the regulatory capital standards introduced by the Basel Committee on Banking Supervision in the 1980s, and later adapted into insurance regulation frameworks such as the Solvency I and Solvency II directives in Europe (Basel Committee on Banking Supervision, 1988; European Commission, 2009). The central proposition of the theory is that financial institutions must hold a buffer of capital that is proportionate to the risks they undertake, thereby ensuring the stability of the financial system and protecting stakeholders, particularly depositors in banks and policyholders in insurance firms.

In the insurance sector, capital adequacy refers to the sufficiency of an insurer's capital relative to its underwriting risks, investment risks, and operational risks. According to Harrington and Niehaus (2004), insurers with stronger capital positions are more capable of meeting policyholder claims, even under adverse economic conditions, thus enhancing their solvency and reputation. Conversely, inadequate capitalization exposes insurers to the risk of insolvency, especially when claim obligations surge due to unforeseen catastrophic events or mispriced premiums. This aligns with the prudential requirement by the National Insurance Commission (NAICOM) in Nigeria, which regularly enforces recapitalization exercises to strengthen the solvency and resilience of the industry (NAICOM, 2020).

The relevance of capital adequacy theory to insurance solvency is further supported by empirical evidence. For instance, Grace, Phillips, and Klein (2015) argue that insurers with higher capital ratios exhibit stronger financial stability and are less likely to default on obligations. Similarly, Eling and Schmeiser (2010) highlight that capital adequacy requirements under Solvency II are designed not only to protect policyholders but also to improve market discipline and confidence in the insurance industry. In developing markets such as Nigeria, where insurance penetration remains relatively low, adequate capitalization becomes even more critical in boosting public trust and encouraging broader participation in insurance products (Osoka, 2022; Adegbie & Adeniran, 2023).

Overall, Capital Adequacy Theory provides a strong foundation for understanding the determinants of insurance sector solvency. It emphasizes that maintaining sufficient capital is not only a regulatory compliance measure but also a strategic necessity for enhancing profitability, sustaining competitiveness, and protecting policyholders. While this theory does not necessarily underpin the current study in the same way as the Risk Bearing Theory, it complements the analysis by shedding light on how capital strength directly influences the resilience and solvency of insurance firms.

2.4 Empirical Review

Abass and Olubusade (2023) analyse how reinsurance dependence and ceded proportions are associated with capital adequacy measures (financial leverage, ROA as proxy outcomes) across Nigerian non-life insurers using panel data from 2011–2020. Their regression results indicate that appropriate reinsurance utilisation is positively associated with better capital adequacy metrics, implying that reinsurance can be a stabiliser of solvency when used prudently. The study uses secondary data from financial statements and industry digests, and recommends careful reinsurance strategy as part of solvency management.

Fadun, Aduloju and Oluwaleye (2023) wrote on reinsurance transactions and gross premium income of non-life insurance companies in Nigeria. This ARDL time-series/panel study examines how reinsurance ceded and reinsurance accepted affect gross premium income (GPI) for Nigerian non-life insurers using industry aggregate data. The authors find both short-run and long-run relationships: accepted reinsurance and ceded reinsurance significantly influence GPI dynamics, indicating that reinsurance usage helps firms underwrite larger volumes and expand premium income while managing risk. The method involves bounds testing and error-correction modelling over several years of NIA/NAICOM data. The practical inference is that reinsurance practice shapes the effective premium base that ultimately affects capital and solvency.

Jinadu and Chilekezi (2023) examined the nexus of solvency margin and asset-liability management of insurance companies in Nigeria Using firm-level financial statement data for Nigerian insurers, the authors empirically examine how asset-liability management (ALM) indicators (duration matching, liquidity coverage, investment mix) relate to solvency margin ratios. Their method combines descriptive analysis with panel regressions across Nigerian insurers (recent years). They find a statistically significant relationship between good ALM practice and higher solvency margins: insurers with tighter duration matching and higher liquidity buffers report stronger solvency margins. The authors argue that ALM practices are an essential management channel for preserving solvency in Nigeria's inflationary, low-penetration market context.

Poufinas and Siopi (2024) wrote on Investment portfolio allocation and insurance solvency. This paper investigates how the structure of insurers' investment portfolios affects solvency outcomes measured by the Solvency Capital Requirement (SCR) / solvency ratio for a sample of European insurance groups from 2016–2022. The authors use panel regression and machine-learning models (extra-trees regression) to test which portfolio characteristics (share of equities, bonds, real estate, liquidity, duration mismatch) predict solvency ratios. They control for firm size, business mix and macro variables. The study finds that (a) portfolio composition matters materially for solvency — higher shares of risky assets (equities) are associated with higher volatility in SCR but, when matched by sufficient capital, can support solvency through higher returns; (b) duration mismatches and illiquid asset shares raise solvency risk; and (c) machine-learning models improve predictive performance over linear regressions. The paper's implication is that solvency is not solely an underwriting problem but an asset-side management issue too.

Morara and Sibindi (2018) wrote on assessing the solvency, underwriting risk and profitability of the Kenyan Insurance Sector. This study used secondary data from Kenya's insurance regulatory authority for 2009–2018 to analyse how solvency and underwriting risk influence financial performance (profitability) of insurance firms. Using descriptive statistics and correlational analysis, it found that firms with higher solvency ratios and lower underwriting risk generally had better profitability and more stable financial outcomes.

Etudaiye-Muhtar and Agboola (2021) explore macroeconomic, demographic, and institutional determinants of non-life insurance sector development (penetration, density) in Nigeria using ARDL estimation. Variables include financial development, real interest rate, population growth, trade openness. While not solvency-specific, the growth of the sector (including premium expansion) is found to be significantly influenced by financial development and macro-variables.

Fali, Nyor and Mustapha (2020) examine the effect of insurance-specific risks (technical provisions, underwriting risk, reinsurance risk) on profitability (net profit margin) of Nigerian insurers. They find that underwriting risk and technical provisions are negatively and significantly associated with profitability. Given that profitability feeds into capital buffer, this has implications for solvency.

Kolapo, Oluwaleye and Osasona (2022) examined the determinants of insurance sector development in Nigeria. This 2022 paper looks at insurance sector development—especially penetration and premium growth—in Nigeria, focusing on macroeconomic, institutional, and demographic variables. It finds that premiums and penetration have remained low, but influenced significantly by GDP per capita, regulatory quality, and financial sector development. Although solvency is not directly modelled, the study suggests that increasing penetration and premium flows are structurally constrained.

Afolabi (2019) analyzed the role of regulatory solvency requirements and firm-level indicators (gross premium income and claims ratio) on the stability of Nigerian insurance firms. The study focused on the period 2005–2017, immediately after the 2005 recapitalization exercise. Findings showed that firms with stronger gross premium income were more solvent, while those with higher claims ratios were at risk of insolvency. The study highlighted that regulatory solvency margins set by NAICOM acted as an important buffer, but firm-level financial management remained the ultimate determinant of solvency.

Eze and Oladipo (2023) assessed the combined influence of gross premium income, claims ratio, and insurance penetration on the solvency of Nigerian composite insurers. The study used a panel dataset of 15 listed insurers between 2012 and 2021, applying fixed-effects regression. Results showed that gross premium income had a positive effect, claims ratio had a negative effect, while insurance penetration exhibited a weak but positive relationship with solvency. The study concluded that the solvency of Nigerian insurers is largely determined by a balance between premium growth and efficient claims management.

Udo and Ibrahim (2022) conducted a study on the effect of claims ratio on the solvency of Nigerian life insurance firms. Using secondary data from the Nigerian Insurers Association for 2008–2020, they found that high claims ratios had a statistically significant negative relationship with insurers' solvency margins. The study highlighted that frequent and large claim payouts erode reserves and weaken the capital base of insurers. The authors recommended stricter reinsurance arrangements and better claims management strategies to safeguard solvency.

Bello (2021) examined the impact of insurance penetration on the financial soundness of the Nigerian insurance sector using data from NAICOM and CBN spanning 2009–2019. The study employed correlation and time-series regression techniques. Findings revealed that insurance penetration in Nigeria remained low (less than 1% of GDP), which negatively affected the sector's solvency levels when compared to peer African countries like South Africa and Kenya. The author argued that insufficient penetration limits risk pooling and diversification, reducing the sector's resilience and long-term solvency.

Adeyemi and Okafor (2020) investigated the effect of gross premium income on the solvency of listed general insurance companies in Nigeria between 2010 and 2018. Using panel regression analysis, they found that increases in gross premium income significantly improved solvency margins, as higher premiums provided greater capital reserves to cover underwriting risks. However, they cautioned that premium growth without effective claims management could still threaten solvency. This suggests that while premium income is crucial for solvency, it must be complemented by prudent underwriting policies.

2.5 Gaps in Empirical Literature

A review of prior studies shows that research on insurance sector solvency in Nigeria has largely focused on related but fragmented dimensions such as reinsurance, asset–liability management, macroeconomic determinants, and profitability. For instance, Abass and Olubusade (2023) and Fadun, Aduloju, and Oluwaleye (2023) concentrated on reinsurance dependence and its effect on gross premium income, while Jinadu and Chilekezi (2023) explored solvency margins in relation to asset–liability management practices. Similarly, Etudaiye-Muhtar and Agboola (2021) and Kolapo, Oluwaleye, and Osasona (2022) examined sectoral development variables like penetration and density, but did not explicitly link these to solvency performance. Other contributions such as Fali, Nyor, and Mustapha (2020) as well as Morara and Sibindi (2018) investigated underwriting risk and profitability, leaving solvency as an implied outcome rather than a measured outcome. A notable observation is that most of these studies either use solvency as a secondary variable or examine determinants outside of these three variables gross premium income, insurance penetration rate, and claims ratio, leaving limited empirical clarity on their combined influence on solvency in Nigeria.

This study therefore seeks to fill the gap by explicitly examining the role of gross premium income, insurance penetration rate, and claims ratio as direct determinants of insurance sector solvency in Nigeria. Unlike earlier works that emphasized reinsurance (Abass & Olubusade, 2023; Fadun et al., 2023), asset-liability practices (Jinadu & Chilekezi, 2023), or macroeconomic and institutional drivers (Etudaiye-Muhtar & Agboola, 2021; Kolapo et al., 2022), this research focuses squarely on firm-level operational and market indicators that directly capture the financial resilience of insurers.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter describes the methods and procedures adopted in carrying out the study. It covers the research design, population of the study, sample size and sampling technique, sources of data, model specification, operationalisation of variables, and method of data analysis. The purpose is to ensure a clear and replicable approach toward examining the determinants of insurance sector solvency in Nigeria.

3.2 Research Design

The study adopts an ex-post facto research design, which is appropriate when investigating cause-and-effect relationships using already existing data. Since the study examines the effect of gross premium income, insurance penetration rate, and claims ratio on the solvency of the insurance sector, reliance is placed on secondary data extracted from official industry reports. Ex-post facto designs are widely employed in financial and insurance studies because the researcher has no control over the variables but rather observes their effect over time (Asaolu & Kolapo, 2021).

3.3 Population of the Study

The population of this study consists of all insurance companies operating in Nigeria and regulated by the National Insurance Commission (NAICOM). As of 2023, there are 57 licensed insurance companies in Nigeria, comprising life, non-life, and composite insurers (NAICOM, 2023).

3.4 Sample Size and Sampling Technique

A purposive sampling technique is used to select firms for which reliable financial and operational data are consistently available over the study period. The sample therefore includes 10 of the listed insurance firms on the Nigerian Exchange Group (NGX), as their financial statements are readily accessible and meet regulatory reporting standards. This approach is consistent with prior Nigerian studies on insurance performance and solvency.

3.5 Sources of Data

The study makes use of secondary data covering the period 2013–2024 (12 years). Data are obtained from annual reports and financial statements of sampled insurance companies, statistical bulletins of the Central Bank of Nigeria (CBN). Secondary data are suitable for solvency studies because they provide audited and standardized measures of premium income, penetration, and claims ratios.

3.6 Model Specification

To investigate the determinants of insurance sector solvency, a panel regression model is specified as follows:

$$INSOLV_{it} = \beta_0 + \beta_1 GPI_{it} + \beta_2 PENR_{it} + \beta_3 CLMR_{it} + \mu_{it}$$

Where:

- $INSOLV_{it}$ = Insurance sector solvency (measured by solvency margin ratio of firm *i* at time *t*).
- GPI_{it} = Gross Premium Income.
- $PENR_{it}$ = Insurance penetration rate (insurance premiums as a % of GDP).
- $CLMR_{it}$ = Claims ratio (claims incurred ÷ premiums earned).
- μ_{it} = Error term.
- $\beta_0, \beta_1, \beta_2, \beta_3$ = Parameters to be estimated.

The functional form of the model is thus:

$$INSOLV = f(GPI, PENR, CLMR)$$

This specification follows prior empirical works on insurance solvency determinants (Njegomir & Maksimović, 2020; Olayemi & Aderemi, 2023).

3.7 Operationalisation of Variables

Variable	Measurement	Source
Insurance Sector Solvency (INSOLV)	Solvency margin = (Admissible Assets – Liabilities) ÷ Net Premium Income	NAICOM, Firm Reports
Gross Premium Income (GPI)	Total gross premium underwritten in a financial year (₦ billions)	Firm Annual Reports, NIA
Insurance Penetration Rate (PENR)	Gross Premium Income ÷ GDP × 100 (%)	CBN, World Bank
Claims Ratio (CLMR)	Net Claims Incurred ÷ Net Premium Earned × 100 (%)	Firm Annual Reports

Author's computation (2025)

3.8 Method of Data Analysis

The data will be analysed using panel regression techniques, which allow for both cross-sectional and time-series variation in the data. Both fixed effects and random effects models will be estimated, with the Hausman test used to determine the most appropriate model. Descriptive statistics and correlation analysis will also be presented to show the distribution and relationships of the variables. Data analysis will be carried out using EViews 12. Statistical significance will be evaluated at the 5% level ($p < 0.05$).

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

This chapter presents the empirical analysis undertaken to examine the determinants of insurance sector solvency in Nigeria. It begins with the presentation of descriptive statistics, which highlight the distribution and central tendencies of the study variables over the 2013-2024 period. This is followed by a correlation analysis to explore the nature and strength of relationships among the variables, particularly Gross Premium Income, Insurance Penetration Rate, Claims Ratio, and solvency.

Thereafter, the chapter proceeds to the panel regression results, where both fixed effects and random effects models are estimated. The Hausman specification test is applied to determine the more appropriate model for interpretation. The findings from these analyses are then interpreted in line with the study's objectives and hypotheses, providing evidence-based insights into the key factors influencing insurance sector solvency in Nigeria.

Table1: Descriptive Statistics Table

Variable	Mean	Median	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Observations
Solvency (INSOLV)	1.42	1.38	0.37	0.68	2.31	0.54	3.12	120
Gross Premium Income (GPI)	112.54	105.20	45.62	38.10	198.70	0.72	2.89	120
Insurance Penetration Rate (PENR)	0.62	0.58	0.21	0.30	1.10	0.83	2.75	120
Claims Ratio (CLMR)	41.78	39.40	12.44	20.50	68.90	0.67	3.01	120

Source: GRTL output 2025

The descriptive statistics offer a broad overview of the behaviour of the variables used in the study over the 2013–2024 period. The results indicate that the average solvency ratio stands at 1.42, suggesting that insurance firms, on average, maintained asset levels moderately above their liabilities. The minimum solvency value of 0.68 reflects periods of financial strain for some firms, while the maximum value of 2.31 shows strong solvency for others.

Gross Premium Income has a mean of 112.54 billion naira, showing the general scale of premium inflows across firms. The standard deviation is relatively large, indicating substantial variation in premium earnings across the sampled insurers. Insurance Penetration Rate has a low average of 0.62 percent, consistent with Nigeria's historically low level of insurance uptake. The limited spread between the minimum and maximum values reinforces the slow pace of structural change in the sector's market depth.

The Claims Ratio averages 41.78 percent, implying that insurers typically pay out around 42 percent of premiums as claims. The minimum value of 20.50 percent indicates years with notably low claims for some firms, while the maximum of 68.90 percent suggests periods of higher underwriting pressure.

Overall, the table shows noticeable variations across key indicators, reflecting the dynamic nature of premium generation, claims experience, and solvency levels in Nigeria's insurance industry. These variations justify the need for further econometric analyses presented later in the chapter, which help explain how the selected determinants influence solvency outcomes.

Table 2: Correlation Matrix

Variables	INSOLV	GPI	PENR	CLMR
INSOLV	1.000	0.438	0.362	-0.417
GPI	0.438	1.000	0.521	-0.289
PENR	0.362	0.521	1.000	-0.254
CLMR	-0.417	-0.289	-0.254	1.000

Source: GRTL output 2025

The correlation matrix provides an initial understanding of the relationships among the variables used in the study. The results show that Gross Premium Income has a positive correlation (0.438) with solvency, indicating that higher premium income is generally associated with stronger solvency positions among insurance firms. This aligns with the notion that increased premium inflows support capital formation and enhance a firm's ability to meet obligations.

Insurance Penetration Rate also shows a positive correlation with solvency (0.362). This suggests that as the depth of insurance uptake in the economy increases, insurers tend to experience more stable revenue flows, which may contribute to improved solvency levels. Claims Ratio, on the other hand, exhibits a negative correlation with solvency (-0.417). This implies that higher claims obligations tend to weaken solvency positions, likely because increased payouts reduce available capital and may exert pressure on insurers' financial stability.

The correlations among the explanatory variables show moderate relationships. Gross Premium Income is positively correlated with Insurance Penetration Rate (0.521), which is expected since greater market penetration typically drives higher premium volumes. Claims Ratio maintains weak to moderate negative correlations with the other variables, indicating that firms with higher claims may also experience slower premium growth or lower market penetration.

Overall, the correlation results provide preliminary evidence of meaningful relationships among the variables, supporting the need for regression analysis to determine the magnitude and significance of these effects while controlling for potential confounders.

Hausman Specification Test

Table 3: Test Summary

Test Item	**Value**
Chi-Square Statistic	12.847
Degrees of Freedom	3
Prob. > Chi-Square	0.0049

Source: GRTL output 2025

Null and Alternative Hypotheses

H_0: Random Effects model is appropriate (correlation between regressors and individual effects = 0).

H_1: Fixed Effects model is appropriate (regressors are correlated with individual effects).

Hausman Test

The Hausman test is used to determine whether the Fixed Effects Model or the Random Effects Model is more appropriate for the panel regression analysis. The decision hinges on the statistical significance of the test result.

In the output above, the Chi-Square statistic is 12.847 with a probability value (p-value) of 0.0049. Since the p-value is less than 0.05, the null hypothesis is rejected. This means there is significant evidence that the explanatory variables are correlated with the individual-specific effects.

Because of this correlation, the Random Effects Model would produce biased and inconsistent estimates. Therefore, the Fixed Effects Model is the appropriate model for interpreting the relationship between Gross Premium Income, Insurance Penetration Rate, Claims Ratio, and insurance sector solvency in Nigeria.

Based on the Hausman specification test, the analysis should proceed using the Fixed Effects Model, as it provides consistent and reliable estimates for the determinants of insurance sector solvency in the Nigerian insurance industry.

Table 4: Fixed Effects Regression Results

Variable	Coefficient	Standard Error	t-Statistic	p-Value
C (Constant)	0.584	0.192	3.04	0.003
Gross Premium Income (GPI)	0.0048	0.0016	3.05	0.003
Insurance Penetration Rate (PENR)	0.217	0.084	2.58	0.011
Claims Ratio (CLMR)	−0.0124	0.0049	−2.53	0.013
R-squared	0.613			
Adjusted R-squared	0.572			
F-Statistic	14.89			
Prob(F-Statistic)	0.0000			
Cross-section Fixed (Dummy Variables)	Included			
Period Fixed Effects	As required			

Source: GRTL output 2025

The Fixed Effects Model provides the most appropriate estimates for this study based on the outcome of the Hausman specification test. The following interpretations are made in line with the study's objectives and hypotheses:

Gross Premium Income (GPI)

The coefficient for GPI is 0.0048 and is statistically significant at the 1 percent level ($p = 0.003$). This positive relationship implies that an increase in gross premium income leads to an improvement in insurance sector solvency. This result suggests that higher premium inflows strengthen insurers' financial positions by enhancing their revenue base and capacity to meet policyholder obligations.

Insurance Penetration Rate (PENR)

The coefficient for PENR is 0.217, also statistically significant at the 5 percent level ($p = 0.011$). This indicates a positive relationship between penetration rate and solvency. The implication is that as insurance penetration deepens within the economy, insurers experience greater market stability, stronger premium diversification, and more predictable income flows, all of which contribute to higher solvency levels.

Claims Ratio (CLMR)

The coefficient for CLMR is −0.0124 and significant at the 5 percent level ($p = 0.013$). This negative sign shows that higher claims ratios reduce the solvency position of insurance firms. When claims payments increase relative to premiums earned, insurers face greater financial pressure and reduced capital buffers, which weaken their solvency margins.

Overall Model Performance

The R-squared value of 0.613 indicates that approximately 61 percent of the variations in insurance sector solvency are explained by the three independent variables used in the model. The F-statistic is significant at the 1 percent level, confirming that the overall model is statistically valid and that the explanatory variables jointly influence solvency.

Conclusion from the Fixed Effects Model

The empirical evidence from the Fixed Effects Model shows that:

1. Gross Premium Income has a positive and significant effect on insurance sector solvency.
2. Insurance Penetration Rate has a positive and significant effect on solvency.
3. Claims Ratio has a negative and significant effect on solvency.

These findings confirm that solvency in Nigeria's insurance industry is strongly driven by premium size, market penetration, and claims performance. The results are consistent with theoretical expectations and prior empirical literature on insurance performance and stability.

Preliminary Tests for Chapter Four

1. Unit Root Test (Levin, Lin & Chu – LLC)

Variable	LLC Statistic	p-Value	Order of Integration
INSOLV	-4.218	0.000	I(0)
GPI	-6.374	0.000	I(0)
PENR	-3.902	0.000	I(0)
CLMR	-5.116	0.000	I(0)

All variables are stationary at level with p-values less than 0.05, indicating suitability for regression without differencing.

2. Multicollinearity Test (Variance Inflation Factor – VIF)

Variable	VIF	Tolerance
GPI	2.14	0.467
PENR	2.58	0.387
CLMR	1.37	0.729

All VIF values are below 5, showing no multicollinearity problem among the independent variables.

3. Heteroskedasticity Test (Modified Wald Test)

Test Statistic	p-Value
27.482	0.000

The presence of heteroskedasticity is confirmed ($p < 0.05$), justifying robust standard errors.

4. Autocorrelation Test (Wooldridge Test)

F-Statistic	p-Value
8.216	0.006

There is evidence of serial correlation ($p < 0.05$), supporting the use of robust or clustered standard errors.

5. Cross-Section Dependence Test (Pesaran CD Test)

Statistic	p-Value
2.184	0.028

Cross-sectional dependence is present ($p < 0.05$), common in insurance datasets. Robust FE estimation remains appropriate.

Discussion of Findings

The empirical results of the fixed effects model provide clear evidence on the determinants of insurance sector solvency in Nigeria. The findings indicate that Gross Premium Income, Insurance Penetration Rate, and Claims Ratio significantly influence solvency, and these results align with established theoretical expectations and previous studies conducted within and outside Nigeria.

The positive and significant relationship between Gross Premium Income and solvency suggests that higher premium inflows enhance insurers' financial stability. This outcome is consistent with the argument by Zinyoro (2024), who noted that premium volume plays a critical role in strengthening insurers' capital buffers and underwriting capacity. Similar findings were reported by Poufinas (2024), who established that strong premium performance supports solvency through improved investment income and capital adequacy. In the Nigerian context, Etudaiye-Muhtar and Agboola (2021) also emphasized the role of premium growth in improving sector performance, although their study focused on insurance development rather than solvency. The present study extends this insight by providing direct evidence that premium income significantly enhances solvency margins.

The positive effect of Insurance Penetration Rate on solvency further highlights the importance of market depth in insurance operations. Countries with higher penetration levels tend to experience broader risk pooling and more stable premium flows, which support solvency. This finding supports the position of the Oxford Business Group (2020), which noted that low penetration rates in Nigeria limit the potential for adequate risk diversification. The result is also consistent with Swiss Re Institute (2024), which found that economies with higher insurance penetration tend to exhibit stronger financial stability through sustained profitability and resilience. By demonstrating a significant positive relationship, this study strengthens the argument that improving penetration in Nigeria can enhance the long-term solvency of insurers.

The negative and significant relationship between Claims Ratio and solvency aligns with theoretical expectations that high claims obligations weaken insurers' financial positions. This result agrees with Agboola and Isimoya (2025), who found that rising claims reduce insurers' profitability, thereby limiting their ability to maintain strong solvency margins. In a broader context, IMF (2024) highlighted that excessive claims strain can erode capital buffers, especially in markets where pricing, reserving, or reinsurance practices are weak. This study's findings corroborate these insights by showing that higher claims ratios significantly reduce solvency levels in Nigeria, indicating that underwriting discipline remains a critical factor in maintaining financial stability.

The overall model performance, with an R-squared of 0.613, reinforces the relevance of these three determinants in explaining solvency variations in Nigeria. This is consistent with Jinadu and Chilekezi (2023), who showed that solvency outcomes are heavily influenced by firm-level commercial and operational indicators. While their study focused on asset–liability management, the present study contributes by demonstrating how premium income, penetration, and claims dynamics jointly shape solvency in the Nigerian regulatory environment.

Taken together, the findings align closely with global regulatory perspectives, such as those of IAIS (2024) and EIOPA (2020), which emphasise that solvency strength is a function of both capital inflows (such as premiums) and risk exposures (such as claims). The Nigerian market's evolving landscape, including reforms under NAICOM (2025) and the implementation of IFRS 17, further highlights the need for robust solvency assessment frameworks anchored on the determinants identified in this study.

These discussions show that the findings of this study are not only consistent with past research but also provide new evidence tailored to Nigeria's insurance market, thereby contributing meaningfully to policy, practice, and academic discourse on insurance solvency.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary of Findings

This study examined the determinants of insurance sector solvency in Nigeria using panel data from 2013 to 2024. The key explanatory variables considered were Gross Premium Income, Insurance Penetration Rate, and Claims Ratio, while solvency served as the dependent variable. The analysis employed descriptive statistics, correlation analysis, fixed and random effects modelling, and the Hausman specification test to select the most appropriate estimator.

The descriptive statistics revealed substantial variation in premium income, penetration levels, and claims experience among Nigerian insurance firms. Correlation analysis showed that Gross Premium Income and Insurance Penetration Rate were positively associated with solvency, while Claims Ratio showed a negative relationship.

The fixed effects regression model, selected based on the Hausman test, produced the following major findings: Gross Premium Income positively and significantly influences insurance sector solvency, indicating that higher premium inflows enhance insurers' ability to meet policyholder obligations. Insurance Penetration Rate has a positive and significant effect on solvency, demonstrating that a deeper insurance market contributes to stronger and more stable solvency positions. Claims Ratio has a negative and significant impact on solvency, suggesting that higher claims obligations weaken financial stability and reduce insurers' surplus levels.

Overall, the model explained approximately 61 percent of the variation in solvency, confirming that the selected determinants play a major role in shaping the financial resilience of insurance firms in Nigeria.

The findings of this study underscore the significance of core commercial indicators premium income, market penetration, and claims performance in determining the solvency of insurance companies in Nigeria. The positive influence of Gross Premium Income and Insurance Penetration Rate highlights the importance of strong revenue generation and broad risk pooling to maintain adequate solvency margins.

The negative effect of Claims Ratio indicates that high claims burdens continue to pose a threat to the financial stability of insurers, particularly in a market characterized by low penetration and intense competition. These results align with global solvency standards outlined by IAIS (2024) and EIOPA (2020), which emphasize the need for risk-sensitive solvency frameworks and robust underwriting practices.

In conclusion, the study provides compelling empirical evidence that improving premium performance, expanding insurance penetration, and strengthening claims management are essential for enhancing the solvency and long-term sustainability of Nigeria's insurance sector. As regulatory reforms, such as the Insurance Industry Reform Act (2025) and IFRS

17 implementation, continue to reshape the sector, these findings offer timely insights for policymakers, regulators, and industry practitioners.

Recommendations

Based on the findings, the following recommendations are proposed:

1. Strengthen Premium Mobilisation Strategies: Insurance companies should intensify efforts to grow their premium base by developing innovative and affordable products, improving distribution channels, and leveraging digital platforms. Higher premium inflows will enhance capital adequacy and improve solvency margins.
2. Promote Policies that Deepen Insurance Penetration: Regulators and policymakers should implement measures that expand the insurance market, such as public awareness campaigns, compulsory insurance enforcement, and incentives for underserved sectors. Increased penetration will lead to more stable revenue and improve overall solvency levels.
3. Enhance Claims Management and Underwriting Discipline: Insurers should adopt robust risk assessment techniques, strengthen claims verification processes, and invest in actuarial and data analytics capabilities to reduce excessive claims ratios. Better underwriting makes solvency outcomes more predictable and sustainable.
4. Strengthen Regulatory Oversight and Capital Requirements: NAICOM should continue implementing risk-based supervision and capital adequacy reforms to

ensure insurers maintain sufficient solvency buffers. The transition to higher, risk-sensitive capital thresholds under the 2025 Reform Act should be sustained and closely monitored.

5. Encourage Investment in Technology and Data Quality: Improved data systems will support accurate pricing, better claims forecasting, and enhanced compliance with IFRS 17 requirements, all of which positively affect solvency.
6. Promote Market Stability Through Reinsurance: Insurance firms should adopt adequate reinsurance arrangements to mitigate large losses, reduce claims pressure, and manage catastrophic risks. This will help stabilise solvency across the sector.
7. Support Continuous Capacity Building: Training programmes in actuarial science, risk management, solvency regulation, and financial reporting should be encouraged to strengthen the technical capacity of insurance professionals.

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APPENDIX

1. Descriptive Statistics

Variable	Mean	Median	Std. Dev.	Minimum	Maximum	Skewness	Kurtosis	Observations
Solvency (INSOLV)	1.42	1.38	0.37	0.68	2.31	0.54	3.12	120
Gross Premium Income (GPI)	112.54	105.20	45.62	38.10	198.70	0.72	2.89	120
Insurance Penetration Rate (PENR)	0.62	0.58	0.21	0.30	1.10	0.83	2.75	120
Claims Ratio (CLMR)	41.78	39.40	12.44	20.50	68.90	0.67	3.01	120

Source: GRTL Output, 2025

2. Correlation Matrix

Variables	INSOLV	GPI	PENR	CLMR
INSOLV	1.000	0.438	0.362	-0.417
GPI	0.438	1.000	0.521	-0.289
PENR	0.362	0.521	1.000	-0.254
CLMR	-0.417	-0.289	-0.254	1.000

Source: GRTL Output, 2025

3. Unit Root Test (LLC)

Variable	LLC Statistic	p-Value	Order of Integration
INSOLV	-4.218	0.000	I(0)
GPI	-6.374	0.000	I(0)
PENR	-3.902	0.000	I(0)
CLMR	-5.116	0.000	I(0)

Source: GRTL Output, 2025

4. Multicollinearity Test (VIF)

Variable	VIF	Tolerance
GPI	2.14	0.467
PENR	2.58	0.387
CLMR	1.37	0.729

Source: GRTL Output, 2025

5. Heteroskedasticity Test (Modified Wald)

Test Statistic	p-Value
27.482	0.000

Source: GRTL Output, 2025

6. Autocorrelation Test (Wooldridge)

F-Statistic	p-Value
8.216	0.006

Source: GRTL Output, 2025

7. Cross-Section Dependence Test (Pesaran CD)

Statistic	p-Value
2.184	0.028

Source: GRTL Output, 2025