OPERATIONAL LOSS, AND UNDERWRITING PERFORMANCE OF LIFE INSURANCE COMPANIES IN NIGERIA.

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ABSTRACT

The Nigerian life insurance industry faces persistent challenges in maintaining stable underwriting performance amid rising operational inefficiencies and unpredictable claim patterns. Despite its crucial role in financial stability, limited empirical research has examined how operational loss influence underwriting profitability within a risk management framework. This study investigates the impact of operational loss on the underwriting performance of life insurance companies in Nigeria. Using panel data from eight life insurers covering the period 2012–2024, the research employed robust regression techniques to mitigate the influence of outliers and ensure reliable estimation. Descriptive statistics revealed significant variability in underwriting profits and premiums, reflecting disparities in business scale and efficiency across firms. Diagnostic tests indicated no severe multicollinearity, heteroscedasticity, or autocorrelation, thereby validating the suitability of panel regression analysis. The findings reveal that operational loss has a statistically significant negative effect on underwriting performance, implying that inefficiencies, governance weaknesses, and internal process failures diminish profitability. The study contributes to actuarial and risk management literature by highlighting the implications for underwriting sustainability. The study underscores the necessity for Nigerian life insurers to strengthen internal control systems, improve data-driven claims forecasting, and adopt integrated enterprise risk management frameworks.

Keywords: *Claims, Operational Loss, Performance, Life Insurance,*

1.0 INTRODUCTION

The underwriting performance of the insurance sector is a core activity and of utmost significance to actuaries, regulators, and investors and insurance companies, as the insurance industry is crucial for maintaining financial stability and facilitating risk transfer within the economy. The insurer's ability to accurately price risk and effectively manage claims is shown by its underwriting performance, often assessed by metrics like the underwriting profit or the combined ratio. Sustained underwriting profitability ensures both firm-level solvency and systemic resilience within the broader financial ecosystem (Swiss Re Institute, 2018). The insurer's capacity to quantify and evaluate risk, together with proficient management, is crucial for successful underwriting.

Despite this, one prevalent factor that is frequently undervalued is operational loss. This factor persists in compromising underwriting performance (measured by underwriting profit) across both mature and emerging insurance markets (Morlidge, 2021). Operational loss refers to the actual negative financial consequences resulting from operational risk events, such as internal fraud, external fraud, business disruptions, damage to physical assets, execution failures, and employment practices, quantified as the direct monetary value lost and documented in loss event data systems. (Basel Committee on Banking Supervision, 2019). The underwriting performance of life insurance firms significantly influences their success, since it is a vital actuarial metric that reflects the profitability of risk-taking endeavors (Owolabi & Inyang, 2022). A favorable underwriting profit, as shown by the 2018 Swiss Re Institute, demonstrates the efficacy of premium assessment and risk aggregation. Conversely, persistent underwriting losses might jeopardize the company's existence.

Nonetheless, attaining a sustainable underwriting profit is becoming more challenging due to operational loss which is one major source of uncertainty inadequately addressed by conventional pricing systems. Despite the significant impact of operational loss (L_o), it is often excluded from comprehensive risk-based capital models and actuarial pricing computations.

The Nigerian life insurance sector is vulnerable in maintaining profitability and sustainability, largely due to increasing **operational losses, claims volatility**, and declining **underwriting performance**. These issues threaten the stability and credibility of life insurance companies, thereby limiting their contribution to the financial system and public trust in the industry.

Underwriting profitability is increasingly challenged for life insurance businesses as they navigate complicated risk exposures in today's volatile and heavily regulated insurance landscape. While underwriting performance significantly influences insurer solvency and shareholder value, conventional performance evaluations often neglect the impact of operational loss, arising from operational failures, system errors, and external events. A comprehensive actuarial model that quantifies and elucidates the impact of operational loss ratio on underwriting performance is essential. This model must include risk aggregation, and statistically robust methodologies such as the Loss Distribution Approach (LDA). This study seeks to address the knowledge gap using a risk-sensitive framework based on actuarial science, empirically tested with data from multiple life insurance firms, and proposes a model that captures operational loss and its impact on underwriting performance. The objective of the study is to evaluate the effect of operational loss on underwriting performance of life insurance companies in Nigeria. This study provides valuable insights into the impact of operational loss on underwriting performance in Nigerian life insurance companies. It holds relevance for several key stakeholders. For academia and researchers, the study fills existing gaps in literature, enriches the curriculum in finance, insurance, and risk management.

2.0 Literature Review

2.1 Conceptual Review

2.2.1 Operational Loss

Operational loss refers to financial detriment arising from insufficient internal systems, personnel, policies, or external occurrences. Operational loss, as defined by the Basel Committee on Banking Supervision (BCBS, 2019), include incidents related to internal, external, employment, system, legal, or regulatory violations. Operational losses in the insurance business may stem from several factors, including flawed underwriting choices, cybersecurity breaches, and the mis-selling of insurance products. This ratio is characterized as:

$$Operational\ Loss\ Ratio = \frac{L_o\ (Incurred\ losses + operational\ expense)}{Earned\ premium} \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

This statistic measures the extent to which operational concerns diminish underwriting income (Bessis, 2015). An elevated operational loss ratio indicates that non-claim-related failures constitute a larger portion of the premiums, hence diminishing the underwriting profitability of the organization. In insurance, underwriting performance denotes the profitability of the insurer's core operations, excluding investment income: underwriting and risk evaluation. The combined ratio, which include both spending and loss ratios, is often used for measurement purposes. An insurer achieves an underwriting profit when the combined ratio is below 100%; conversely, it incurs a loss when the ratio is beyond that threshold (Swiss Re, 2022).

2.2.2 Underwriting Performance

Underwriting performance is a fundamental indicator of financial health and operational efficiency in insurance companies (Lee, 2019). It reflects the profitability and effectiveness of risk selection, pricing, and claims management strategies. In actuarial science, underwriting performance is commonly measured through ratios such as the loss ratio, expense ratio, and the combined ratio, which together indicate whether an insurer is gaining or losing money on its core underwriting activities, excluding investment income (Olalekan & Akanni, 2018). Actuaries are deeply involved in assessing, monitoring, and projecting underwriting performance, as it influences capital adequacy, solvency, pricing adequacy, and product sustainability. At its core, underwriting performance is driven by the balance between premium income and claim outflows. The underwriting margin defined as $Undrwriting\ Margin = \frac{\boldsymbol{\pi}}{P}$ offers a concise measure of underwriting efficiency. A ratio below 100% indicates underwriting profitability, while a ratio above 100% suggests an underwriting loss.

2.2.3 Operational loss and Underwriting Performance

The operational loss is a crucial indicator of life insurance companies' operational efficiency and underwriting quality. It is quantitatively represented as the ratio of operational losses incurred relative to the net earned premiums: $\text{Operational Loss Ratio} = \frac{L_o\ (Incurred\ Losses + expense)}{Earned\ premium}$ This ratio differs from the conventional loss ratio, which includes claims-related losses, since it specifically identifies the financial impact resulting from internal process failures, fraud, system malfunctions, compliance violations, and human mistakes. Operational risks in life insurance

companies including inadequate policy administration, misrepresentation of life products, underwriting deficiencies, and data management inaccuracies (Moosa, 2017). These risks arise from internal organizational operations rather than the covered occurrence, potentially leading to long-term adverse consequences on solvency and profitability.

2.2.4 Operational Risk and underwriting Performance in Nigeria Insurance Companies

Underwriting performance is a critical determinant of sustainability and profitability in the Nigerian life insurance sector. Claims expertise, price suitability, and the insurer's capacity to manage operational risks all have impact. The operational loss ratio, measured against net produced premiums, serves as a critical indicator of the impact of internal inefficiencies on underwriting performance proxied by underwriting margin which is given as:

$$Underwriting\ Margin = \frac{\pi}{P} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

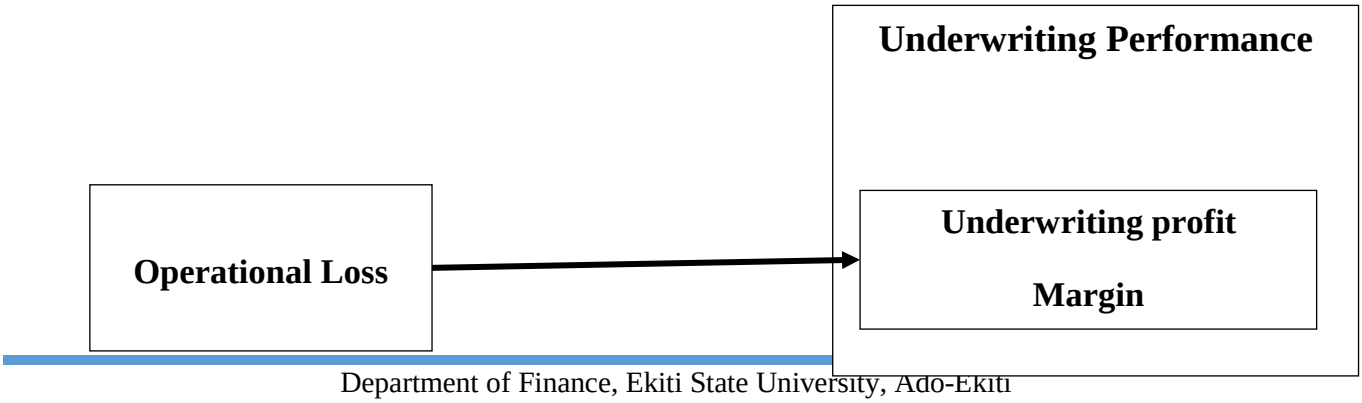
Operational losses in Nigerian life insurance businesses often originate from administrative mistakes, regulatory fines, malfunctioning digital technology, fraud, and delays in claims processing. The losses arise from inadequate internal controls, deficient governance structures, and little technical investment, rather than from insured occurrences (NAICOM, 2021).

2.2.6 Conceptual Framework for the effect of Operational Loss and Claims Volatility on

Underwriting performance of Life Insurance companies in Nigeria

This framework shows how the operation loss and claims volatility affect underwriting profit margin of the selected life insurance companies as well as the joint effect of how operational loss claims volatility affect the underwriting profit margin of the insurance companies using net premium as a control variable

Figure 1: Conceptual Framework



Source: Author's creation

2.3 Theoretical Review

2.3.1 Coherent Risk Measure Theory

In insurance operations, where operational and volatility risks significantly threaten underwriting performance and solvency, coherent risk measure theory offers a vital framework for assessing and managing risk. This is particularly applicable within the realm of insurance operations. The theory, initially introduced by Artzner et al. (1999), delineates a set of essential attributes that every risk management strategy should possess. Monotonicity, translation invariance, positive homogeneity, and subadditivity are the axiomatic features that underpin the formulation of capital models. These attributes ensure that risk evaluations are rational, coherent, and economically substantiated. In the realm of insurance, specifically within actuarial science, consistent risk assessments form the basis for estimating the capital requirements necessary to mitigate unforeseen losses arising from operational failures or fluctuations in claims experience and market dynamics.

2.3.2 Collective Risk Model

The collective risk model (CRM) serves as a fundamental framework in actuarial science for modelling aggregate losses and is central to both underwriting and operational risk assessment. This model considers total loss, denoted by S_{i} as the sum of random claim amounts X_{i} over a period N_{i} such that

$$S = \sum_{\mathrm{i}=1}^{N} X_{\mathrm{i}} \quad \text{..... (3)}$$

The N represent the number of claims or loss events, modeled as a discrete random variable, typically following a Poisson distribution, i.e., N ~ Poisson (λ) where λ is the average number of claims. Each claim amount X_{i} is modeled as an independent and identically distributed random variable representing the severity or size of the individual claim. This formulation accommodates both frequency and severity risk and makes CRM particularly valuable for evaluating aggregate risk exposure, pricing and capital requirements in insurance and risk management contexts (Bowers et al., 1997). The expectation and variance of the loss *S* under the assumption of independence between *N* and X_{i} are given by:

$$\mathbb{E}[S] = \mathbb{E}[N] \bullet \mathbb{E}[X], \;\; Var(X) + Var(N).(E[X])^{2} \quad \text{..... (4)}$$

Actuaries require estimates of projected losses and their unpredictability to price insurance products, establish reserves, and assess solvency capital; thus, this data is crucial for insurance operations.

The model's structure enables a clear distinction and analysis of the effects of claim frequency and claim severity, both of which are critical in addressing underwriting and operational risks. The significance of CRM in operational risk modeling is equally essential. Fraud, systemic failures, legal penalties, and procedural deficiencies exemplify operational losses that often manifest in irregular ways and may vary in magnitude. Further instances encompass procedural errors.

2.4 Empirical Review

The empirical literature has extensively examined operational loss, claims volatility, and underwriting performance within the insurance sector in Nigeria.

Adebayo and Musa (2021) examined the impact of operational loss on the financial performance of several insurance companies operating in Nigeria. Their analysis was to determine if the claims ratio and spending ratio, used as proxies for operational loss, significantly impacted insurer return on equity. From 2011 to 2020, they acquired secondary data from the financial accounts of ten independent insurance companies throughout a decade. Their research strategy was a combination of descriptive and explanatory methods. The data was obtained using panel regression methods. Their study shown that both operational loss proxies negatively impacted performance, suggesting that efficient control of operational inefficiencies is essential for improving the profitability of insurance firms.

Onyeogaziri *et. al.* (2021) examined volatility risk and its effect on the profitability of insurance firms in Sub-Saharan Africa. Their study aimed to ascertain the degree to which the underwriting profit of insurance firms is affected by the volatility of premiums and claims. From 2012 to 2019, data was gathered from twenty to twenty-four enterprises across five different countries utilizing a quantitative, cross-sectional study approach. Employing fixed effect regression and generalized least squares, their study revealed that underwriting profit was considerably influenced by claims volatility; in contrast, the effect of premium volatility was negative but statistically insignificant. Their result led them to acknowledge that the variations in claims need more judicious reserve and price rules.

Mohammed and Yusuff (2019) strategically addressed the relationship between operational risk measured by operational loss and underwriting performance problem by concentrating on the execution of operations. Their research aimed to elucidate the impact of efficiency criteria, such as spending and claims ratios, on the underwriting performance of Nigerian insurance businesses. They chose twelve composite insurers and, employing a correlational methodology, acquired secondary data from 2008 to 2017. Their multiple regression analysis indicated that underwriting success was negatively correlated with operational inefficiencies. This finding underscores the need for organizations to enhance their cost control and process monitoring systems.

3.0 Methodology

The ex post facto research design was employed in this study as it is a retrospective investigation that relies on pre-existing data. the population consists of all thirteen (13) life insurance companies currently active in Nigeria as of 2023 (NAICOM, 2024). These businesses are the main providers of life insurance products. For the avoidance of practical difficulties owing to non- availability of data and absence of unified data, used as risk factor in underwriting process. the study adopted purposive sampling method to select eight (8) life insurance companies from the study population based on various criteria that include market share, duration of operation, asset size, diversity of products, geographical scope, financial performance, history of regulatory compliance, and ownership structure and most importantly availability of complete and accessible data.

3.1 Measurement of variables

Dependent Variable

Table 3.1 ***Underwriting Performance*** (U)

Variable	***Symbol***	***Desciption***
Underwriting Profit Margin	$\frac{\pi}{P}$	*Profit margin from underwriting perfor*

Independent Variables

. *Table* 3.2 ***Operational Loss Ratio*** (OL)

Variable	***Symbol***	***Description***
operational Loss Ratio	$\frac{L_o\ (Losses + expense)}{Net\ premium}$	*Mean severity*

the functional model for the study is given as:

$$UP_{it} = \beta_0 + \beta_1 OL_{it} + \mu_t \ldots\ldots\ldots\ldots\ldots (5)$$

Where:

UP_{it}: Underwriting performance of insurance company i at time t (Dependent Variable)
OL_{it}: Operational loss proxied by operational loss ratio
μ_t: error term**.** Robust regression analysis was adopted for the study to cater for the outliers.

4.0 Discussion of Results

Table: 4.1 Descriptive Statistics

Variable	Mean	Medium	STD Dev	Min	Max
Underwriting Profit	76.53	54.75	51.66	24.40	154.69

Operational loss	18.33	14.70	8.95	8.89	35.87

The descriptive statistics provided the understanding of the central tendency and variability of the variables used in the analysis of the effects of operational loss and claims volatility on underwriting performance in selected insurance firms. The average underwriting profit of 76.53 signifies the typical profitability derived from underwriting operations across the surveyed life insurance firms throughout the research period. The substantial standard deviation of 51.66 indicates significant variability in underwriting performance, highlighting disparities in underwriting efficiency, claims handling, and risk exposure across the organizations. The median underwriting profit of 54.75, which is less than the mean, suggests a positive skewness, suggesting that few businesses may have reported much larger underwriting profits, elevating the average. This research indicates that operational loss, has a mean of 18.33 and a standard deviation of 8.95. This indicates a moderate exposure to operational loss across enterprises, characterized by a significant variation in risk levels. The minimal operational loss score of 8.89 and maximum of 35.87 indicate that although several organizations have effectively controlled their operational exposures, others have encountered comparatively elevated risk levels, maybe due to inadequate internal controls, human mistakes, or systemic inefficiencies. The median of 14.70, which is lower than the mean, implies a little rightward skew in the distribution, signifying that the majority of enterprises are concentrated below the norm, with a few outliers facing elevated operational loss.

Table 4.2: Correlation matrix of the Variables

	Underwriting Performance	***Operational Loss***	***Claims Volatility***	***Net Premium***
Underwriting Performance	1.000	-0.42	-0.50	0.73
Operational Loss	-0.42	1.000	0.53	-0.56

Source: *Authors Computation*

The correlation matrix provides insight into the linear correlations among the primary variables used in the study. Included among these considerations are net premium, operational loss, claims volatility, and underwriting performance. The correlation coefficient of -0.42 between operational loss and underwriting performance indicates a somewhat unfavorable association between the two variables. According to this research, underwriting performance declines as operational loss rises. This conclusion aligns with actuaries' predictions, since increasing operational inefficiencies such as claims processing mistakes, system failures, or mismanagement could diminish underwriting operations' profitability.

4.2 Regression Analysis

The study investigates the interaction between the dependent variable (underwriting performance), and the independent factor (operational Loss), using robust regression. Robust regression was adopted to reduce the impact of outliers. The regression equation is structured as:

$$Uderwriting\ profit = \beta_0 + \beta_1 operational\ loss + \mu$$

Table 4.3*: Robust Regression Result (dependent variable is underwriting profit)*

Variable	Coefficient	Std Error	T-Value	P-Value
Intercept	0.312	0.045	6.933	<0.001
Operational Risk	-0.145	0.032	-4.531	<0.001

Source: *Authors Computation*

The panel regression findings provide empirical evidence on the correlation between underwriting profit and its explanatory factors, namely operational loss, claims volatility, and net premium, within the context of life insurance firms. The intercept coefficient of 0.312 indicates the baseline level of underwriting profit, with a statistically significant t-value of 6.933 and a p-value below 0.001. This is the scenario in which all independent variables are maintained at a constant level. The positive intercept indicates that underwriting activities sustain a fundamental level of profitability, even without additional risk factors or concerns of scale. The coefficient for operational loss, -0.145, exhibits a statistically significant connection with a t-value of -4.531 and a p-value of less than 0.001. Assuming all other parameters remain constant, it can be deduced from this negative and substantial correlation that the underwriting profit is anticipated to decrease by 0.145 units for each unit rise in operational loss. The findings of this research align with the principles of actuarial science, which posits that increased operational loss potentially stemming from management inefficiencies, insufficient systems, or internal process failures may result in elevated loss ratios, increased expenditures, and diminished profitability. The significant statistical significance underscores the need for effective internal control systems in insurance companies and the imperative of operational efficiency in maintaining underwriting performance.

4.3 Hypothesis testing

Regression analysis examined the developed null hypotheses based on panel analysis findings. The key conclusions are summarized below:

Hypothesis I

Ho_1: Operational loss does not have a significant effect on the underwriting performance of selected life insurance companies in Nigeria.

The t-value is -4.531, while the coefficient of operational risk is -0.145. Furthermore, the p-value is below 0.001. This outcome is statistically significant at the 1% level, indicating that underwriting profit is adversely affected by operational loss. The null hypothesis H_1 is rejected, since the p-value is significantly below the customary thresholds of 0.05 and 0.01. Thus, it may be

said that underwriting performance is significantly affected by operational loss. A diminished underwriting profitability is associated with an elevated operational loss, since operational inefficiencies augment loss and expense ratios beyond actuarial expectations. The adverse indication further substantiates this assertion.

Table 4.4: Summary of hypothesis Testing decision

Hypothesis	***Variables***	***P-value***	***Decision***	***Conclusion***
H_{01}	Operational loss	<0.001	Reject H_{01}	Operational loss significantly and negatively affects underwriting profit

This study's results illustrate the significant impact of operational loss on the underwriting performance of Nigerian life insurance firms. The strong regression analysis findings clearly demonstrate significant negative correlation between risk variables and underwriting profit. The underwriting performance seems to decline as operational loss escalates, as shown by the statistically significant negative coefficient of operational risk ($\beta = -0.145$, $p < 0.001$). This discovery aligns with the findings of Cummins and Rubio-Misas (2019), who identified that operational inefficiencies, such as inadequate internal processes and governance deficiencies, adversely impact insurers' underwriting outcomes. Harrington and Niehaus (2021) observed that operational difficulties may result in inaccurately priced insurance products, erroneous reserves, and increased expenses associated with claim processing. Collectively, these factors contribute to a decline in underwriting profitability. The significant influence of operational loss on insurers' solvency margins underscores the need for Solvency II frameworks to include operational risk as a fundamental element, aligning with actuarial perspectives (European Insurance and Occupational Pensions Authority, 2010).

5.0 Summary, Recommendations and conclusion

5.1 Summary of Findings

Table 5.1: Summary of the Hypotheses

S/N	**Hypotheses**	**Decision Rule**	**Implication**
H_{01}	operational loss does not have significant effect on the underwriting performance of life insurance companies in Nigeria	Rejected	operational loss does not have significant effect on the underwriting performance of life insurance companies in Nigeria

The study used robust regression techniques to examine the intricate linkages among operational loss, claims volatility, and underwriting performance of several life insurance companies in Nigeria. The research provides significant insights into how internal operational inefficiencies and claims volatility

affect insurers' underwriting performance. These insights originate from the collective risk model, anticipated utility theory, and coherent risk metrics. The dataset included eight life insurance firms

in Nigeria, with a focus on underwriting profit, operational loss, claims volatility, and net premium. The study yielded significant findings that contribute both theoretically and practically to the discussion on insurance risk management. This research has thoroughly elucidated the multifaceted link among operational loss, and underwriting performance in Nigeria's life insurance industry using net premium as a control variable. The outcome of this inquiry has provided valuable knowledge. This research clearly demonstrates that operational loss is more vital in determining insurers' profitability. The negative coefficient associated with operational loss in the regression output indicates that the probability distribution of total losses skews unfavorably, thus diminishing underwriting profits. This indicates that the probability distribution alters when these internal vulnerabilities are significant. This aligns with the theoretical framework of anticipated utility theory, which posits that risk-averse economic players, such as insurers, seek to minimize predicted disutility resulting from operational inefficiencies (Bernstein, 2019). This aligns with the aforementioned observation.

The findings emphasize the need for more stringent internal controls and underwriting requirements, as well as the need for enhanced actuarial expertise to effectively forecast and manage these risk variables. To effectively mitigate the persistent issues arising from operational loss, insurance companies must invest substantially in the improvement of their internal control systems. Operational loss events, including human mistake, process inefficiencies, system failures, and regulatory infractions, need significant attention. This need improved governance frameworks.

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