Factors Influencing the Profitability of Non-Life Insurance Companies in Nepal: An Empirical Analysis

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ABSTRACT

This study investigates the factors influencing the profitability of non-life insurance companies in Nepal, focusing on the impact of company age, leverage, liquidity, and size. A quantitative research methodology is used, employing descriptive and correlational research designs. Secondary data from seven non-life insurance companies in Nepal from 2014 to 2023, totaling 70 observations, were analyzed. The dependent variables—Return on Assets (ROA) and Return on Equity (ROE)—are examined in relation to the independent variables. Data were sourced from the Nepal Insurance Authority and the companies' websites. Descriptive statistics show that the average ROA is 8.82% and the average ROE is 14.37%. The average values for the independent variables are 24.35 years (age), 63.66% (liquidity), 94.73% (leverage), and 2.07 billion NPR (company size). Correlation and regression analyses reveal that leverage is the most consistent factor influencing profitability. The unit root test confirms the stability of the variables, making the regression model applicable. The Hausman test indicates that the fixed effect model is more suitable for ROA, while the random effect model works better for ROE. The analysis finds that company age negatively impacts ROE, and liquidity shows a negative correlation with both ROA and ROE. However, leverage and company size are positively correlated with profitability.

Keywords: profitability, non-life insurance, return on assets, return on equity, leverage, company age

Introduction

Inventions and innovations are frequently created to make our lives easier, cleaner, and more comfortable. However, these advancements also come with serious risks. Even a minor mistake or oversight can lead to harmful side effects, injuries, or even fatalities. As a result, innovators and inventors are held to high standards of responsibility. These potential hazards underscore the importance of insurance as a crucial tool for managing risk (Malik, 2011).

Two primary financial institutions—banking and insurance—form the backbone of any nation's financial system. Together, banks and insurance companies play a vital role in facilitating trade and resource allocation, mobilizing savings, and transferring risk between economic entities. The insurance sector, in particular, plays a significant role in the financial and economic development of a nation by providing a steady flow of funds to various sectors (Krishnamurthy, 2005). Insurance is essential in managing risks and ensuring financial

stability by offering a range of risk protection solutions to individuals and businesses (Malik, 2011).

Insurance companies play a pivotal role in providing affordable policies that address the varied needs of individuals and businesses. The insurance sector is typically divided into three categories: life, health, and non-life insurance. These sectors address a range of risks, such as health issues, premature death, income reduction post-retirement, property loss, and legal liabilities. To mitigate these risks, insurance companies offer life insurance, pension plans, property insurance, and liability coverage. They also provide tailored products designed to meet the specific requirements of individuals and enterprises (Krishnamurthy, 2005). As a financial intermediary, insurance is indispensable to the economic growth of any nation. Although there has been some debate regarding the contribution of insurance companies to economic development, studies have shown a positive relationship between insurance profitability and efficiency (Keramidou, 2013; Mishra et al., 2021; Mishra & Aithal, 2021; Mishra, 2020).

Insurance is a mechanism for risk transfer that provides financial protection against unforeseen losses. In today's environment, which is rife with risks and uncertainties due to globalization, liberalization, and technological advancement, insurance plays an essential role in mitigating risks beyond human control (Skipper, 2001). It serves as a means of compensating for unexpected losses.

General insurance companies undertake three primary tasks: risk management, resource mobilization, and risk pooling. Additionally, they focus on diversification and loss compensation (Skipper, 2001). Scholars agree that insurance has a positive impact on developed, underdeveloped, and developing nations by fostering financial stability, mobilizing funds, easing business operations, managing risks, alleviating losses, promoting effective capital distribution, and replacing social security programs managed by governments. As such, insurance contributes significantly to the economy (Skipper, 2001).

Profitability is a common metric for assessing financial performance and plays a crucial role in understanding a company's past performance and future prospects. Economic planners and policymakers closely monitor business performance, as it directly impacts the real sector of the economy. Insurance companies, in particular, provide unique financial services that support economic growth by transferring risk, boosting private investment, generating employment, and funding development initiatives (Hamal, 2020). Consequently, recent academic focus has been placed on the profitability of insurance companies due to their importance in driving economic expansion. Several profitability metrics, such as return on equity (ROE), return on assets (ROA), profit margin, technical profitability ratio, and return on invested capital (ROIC), are employed by various stakeholders to assess financial performance. Among these, ROA and ROE are the most commonly used indicators due to their ease of calculation and availability of necessary data (Hamal, 2020; Mishra & Kandel, 2023).

However, multiple factors influence the profitability of non-life insurance firms. Understanding these factors is crucial for investors, regulators, and insurers who seek to improve financial performance. This essay aims to examine the internal and external factors that affect non-life insurance firms' profitability. By evaluating these factors, this analysis will identify the key drivers of profitability and provide recommendations for enhancing the financial outcomes of non-life insurance companies.

Problem Statement

The insurance sector serves as a dual-purpose financial intermediary within the broader financial system, acting both as a catalyst for economic growth and a safeguard against financial instability caused by unforeseen risks and uncertainties. Its role in providing financial stability and mitigating potential losses makes it a significant area of interest for academics, particularly those in finance-related fields.

In Nepal, the insurance industry, especially non-life insurance, is expanding rapidly and has shown profitable growth in recent years. However, despite the industry's importance, there is a noticeable gap in research regarding the specific factors that contribute to the profitability of Nepalese non-life insurance companies. While several studies have explored the general performance of insurance firms, detailed analyses focusing on the drivers of profitability in Nepal's non-life insurance sector remain limited. This knowledge gap poses challenges for developing strategies that could enhance the sector's sustainability and overall profitability.

The non-life insurance market in Nepal plays a vital role in risk mitigation, offering individuals and businesses financial protection against various hazards, including property damage, natural disasters, and accidents. Despite this critical role, Nepal's non-life insurance companies face profitability issues, which have yet to be thoroughly examined. Although the sector has gradually expanded, there is a lack of comprehensive understanding regarding the factors influencing its profitability, including underwriting practices, investment strategies, regulatory frameworks, market competition, and the overall economic environment. These factors have not been adequately explored within the context of Nepal, hindering the development of effective policies to improve the financial performance and long-term viability of the sector.

Research Objective

The primary objective of the study is to examine the variables that affect the profitability of the non-life insurance industry in Nepal. Specifically, the study aims to investigate the relationship between various variables and the profitability of non-life insurance companies in Nepal and assess the significance of these variables in influencing the profitability of non-life insurance companies in Nepal.

Literature Review

Ozen and Cankal (2020) conducted a study to investigate the significant macroeconomic and firm-specific factors influencing the profitability

of non-life insurance firms in Turkey. The research focused on 21 non-life insurance companies over the period from 2006 to 2017, with return on assets (ROA) serving as the primary indicator of profitability. The study's findings, derived from a fixed-effects panel data model, revealed that factors such as firm size, liquidity, investment yield, age, GDP growth rate, and interest rate were positively related to profitability. Conversely, premium growth rate, loss ratio, leverage ratio, solvency, and profitability had a negative relationship with ROA.

Hussaine and Joo (2019) examined the factors affecting the profitability of life insurance firms in India, focusing on a sample of 12 companies from 2005 to 2015. Using econometric techniques, the study identified liquidity, the ratio of fixed assets to total assets, operating margin, loss ratio, investment performance, and premium growth rate as significant determinants of profitability. However, factors such as company size, commission ratio, and leverage were found to have no discernible effect on profitability.

Hamal (2020) analyzed the impact of liquidity ratio, leverage ratio, firm size, company age, and total debt on the profitability of non-life insurance companies in Nepal. The study, which utilized secondary data from nine companies over a ten-year period, found that higher liquidity improved profitability, while increased leverage reduced it. However, firm size, age, and total debt did not significantly influence profitability. The study recommended that non-life insurance companies focus on managing liquidity efficiently and maintaining low leverage to enhance profitability.

Ahmed et al. (2011) explored the factors influencing the performance of listed life insurance firms in Pakistan over the period from 2001 to 2007. The study found that size, risk, and leverage were key determinants of profitability, while growth, profitability, age, and liquidity showed statistically negligible relationships with return on assets (ROA).

Veleva (2017) investigated the relationship between company-specific characteristics and

profitability for 23 non-life insurance companies in Bulgaria, using panel data from 2006 to 2014. The study concluded that leverage ratio and loss ratio had a negative effect on ROA, while the capital ratio, market share, and firm age had a positive effect. However, the study found no significant relationship between ROA and company size.

Ahmad and Prasetyo (2018) examined the variables affecting ROA for Indonesian non-life insurance firms from 2011 to 2014. The findings indicated that premium income, underwriting income, and risk-based capital had a significant positive impact on ROA. Although growth and liquidity also had a positive effect on ROA, their impacts were not statistically significant.

Sah and Magar (2021) conducted a study on the profitability of Nepalese insurance companies, using both ROA and return on equity (ROE) as dependent variables. The study analyzed secondary data from 21 insurance companies, including 168 observations from 2011/12 to 2018/19. The results indicated that larger firms, higher premium growth, and greater asset tangibility positively influenced both ROA and ROE. In contrast, higher liquidity ratios were found to negatively impact profitability, suggesting that firms with higher liquidity may experience lower returns.

Al-Shami (2008) examined the factors influencing the profitability of insurance companies in the United Arab Emirates (UAE), focusing on key independent variables such as company size, age, leverage ratio, loss ratio, and capital volume. The study utilized data from the annual reports of UAE insurance companies for the period 2004 to 2007, measuring profitability using Return on Assets (ROA). The findings revealed a significant positive correlation between company size and profitability, as well as between capital volume and profitability. However, no significant correlation was found between profitability and company age. Additionally, the study highlighted a negative and substantial association between both leverage ratio and loss ratio with profitability, which aligns with the study's hypotheses. These findings underscore

the importance of certain internal factors in driving profitability within the UAE insurance sector.

Dogan (2013) conducted a study on the profitability of insurance companies listed on the Istanbul Stock Exchange, analyzing the impact of firm-specific factors such as loss ratio, leverage ratio, liquidity, company size, and company age over the period 2005 to 2011. Using multiple regression and correlation methods, the study found a positive and significant relationship between company size and profitability. However, the results also revealed that factors such as loss ratio, leverage ratio, current ratio, and company age had a significantly negative impact on profitability. This study highlights the importance of firm-specific factors in determining the profitability of insurance companies in Turkey.

Doumpos (2012) extended the analysis to an international context, examining the firm-specific and country-specific characteristics influencing the financial performance of property and casualty insurance companies across 91 countries from 2005 to 2009. The study found that higher GDP growth, lower inflation rates, lower income inequality, and more developed stock markets positively affected the performance of these companies. This research emphasizes the broader economic and macroeconomic factors that shape the profitability of insurance firms on a global scale.

Majumdar (1997) investigated the effects of firm size and age on productivity and profitability in India, using data from 1020 firms. The study found that older firms tended to be more productive but less profitable, while larger firms were more profitable but less productive. This paradoxical relationship was explained by the market-restricting industrial policies in India during the past three decades. The study highlights the complex interaction between firm characteristics and the broader economic environment in influencing performance.

Farhan et al. (2021) focused on the profitability determinants of life insurance companies in Saudi Arabia, specifically analyzing the public data of three life insurance firms from 2016 to 2020. Using factor analysis, the study identified key factors directly linked to profitability, including

net earned premiums, investment activity earnings, and other revenue sources. Conversely, factors such as reinsurance commissions, net paid claims, underwriting costs, fluctuations in the value of mathematical reserves, and general and administrative expenses were found to have a negative correlation with profitability. The researchers recommended raising awareness among policyholders about the importance of evaluating profitability based on these key determinants and advocated for fair and objective distribution of profits to policyholders.

These studies collectively emphasize the critical role of both internal factors, such as company size, leverage, and capital, and external factors, such as macroeconomic conditions and market policies, in shaping the profitability of insurance firms across different regions. They underline the complexity of profitability determinants and suggest that a multi-faceted approach is needed for insurance companies to optimize their financial performance.

Adams and Buckle (2003) conducted an analysis of the financial performance of insurers within the Bermuda insurance sector, which is known as an offshore financial hub. The study examined data from 47 insurers over a period of 12 years, with corporate characteristics considered as independent variables. The results revealed that insurers with higher leverage ratios, lower liquidity ratios, and reinsurance companies with higher underwriting risk ratios outperformed their counterparts in terms of financial performance. The study also noted that factors such as company size and business operations had minimal impact on financial performance, suggesting that underwriting practices played a more significant role in determining performance outcomes.

Kung (2006) analyzed the financial performance of 16 non-life insurance companies by assessing 24 financial ratios. These ratios were categorized into five major performance indicators: solvency, capital structure, profitability, management effectiveness, and capital operational competence. The study utilized Grey Relational Analysis (GRA) to identify the most influential ratios on the performance of non-life insurers. The findings indicated that return on assets, funds usage efficiency, current debt to capital ratio, equity, and net operational profit to retention premium had the greatest impact on the performance of non-life insurance firms, highlighting the importance of these financial metrics in evaluating profitability.

Charumathi (2012) explored the factors affecting the profitability of life insurance companies in India, focusing on a sample of 23 life insurers, including 22 private and 1 public insurer. The study examined six independent factors: leverage, size, liquidity, premium growth, underwriting risk, and capital. The results showed that the size of the insurer and its liquidity had a significant positive effect on profitability. Additionally, increases in stock capital, premium growth, and debt were found to influence profitability. However, the study did not find any conclusive evidence linking underwriting risk with profitability, suggesting that other factors were more influential in determining financial performance.

Jaishi (2021) investigated the impact of ownership and firm-specific characteristics on the profitability of insurance companies. The study found that return on assets (ROA) was negatively correlated with tangibility and liquidity, while profitability was positively correlated with business size, age, and leverage. Furthermore, the study revealed that return on equity (ROE) was negatively correlated with liquidity but positively correlated with firm size, age, leverage, and tangibility. Based on the regression analysis, the study concluded that firm size was the most important factor affecting the profitability of insurance companies.

Batool and Shahi (2019) compared the financial performance determinants of the insurance industries in the USA and the UK, particularly during the global financial crisis. They collected quarterly data from 24 insurance companies between 2007 and 2016 and applied panel data techniques. The explanatory variables included both internal (firm size, liquidity, leverage, and asset turnover) and external factors (GDP, CPI, interest rate, and WTI). The study found that, in the

USA, firm size, liquidity, leverage, asset turnover, GDP, and WTI positively impacted profitability, while CPI and interest rates had a negative impact. In the UK, firm size, liquidity, GDP, CPI, and WTI were positively correlated with profitability, while leverage, asset turnover, and interest rates had a negative correlation. The study concluded that the US insurance industry was more efficient than the UK insurance industry, offering valuable insights for industry stakeholders, policymakers, and investors seeking to improve performance.

Bin Dhiab (2021) analyzed the factors influencing the profitability of insurance companies in Saudi Arabia by examining a sample of 20 insurance businesses from 2009 to 2017. The study found that the fixed-assets ratio, tangibility ratio, and growth rate of written premiums positively affected profitability. Although liquidity and company size were positively correlated with profitability, these relationships were not statistically significant. On the other hand, the loss ratio, liabilities ratio, insurance leverage ratio, and company age negatively affected profitability. These findings highlight the complex and multifaceted nature of profitability determinants within the Saudi insurance industry.

Together, these studies provide a comprehensive view of the factors influencing profitability in the global insurance industry. While firm-specific characteristics such as size, liquidity, leverage, and underwriting risk play critical roles, macroeconomic factors such as GDP, interest rates, and inflation also significantly impact financial performance. The evidence across these studies underscores the need for a multifaceted approach in assessing the profitability of insurance companies, considering both internal and external factors that shape financial outcomes.

Msomi (2003) examined the financial performance of 121 non-life insurance companies across 48 African countries between 2008 and 2019, utilizing ordinary least squares and the two-step System Generalized Method of Moments estimators on 1,452 observations. The study found that factors such as lagged return on assets, equity capital, operational efficiency, leverage,

investment capabilities, and GDP significantly influenced financial performance. Notably, equity capital, leverage, and operational efficiency had a negative relationship with profitability. The study recommended restructuring capital structures and adopting automated systems to reduce operational costs and improve financial performance.

Chen and Wong (2004) investigated the solvency of general and life insurance firms in Asia, using firm and macroeconomic data. The study identified key factors influencing the financial health of general insurers, such as company size, investment performance, liquidity ratio, surplus growth, combined ratio, and operating margin. For life insurers, company size, asset mix changes, investment performance, and product mix changes were crucial, with the latter being particularly relevant to Japan. The study provided insights into the factors that determine the financial stability of insurance firms in Asian economies.

Muthulakshmi and Muthumoni (2003) studied the factors affecting the financial performance of public-sector non-life insurance firms in India, focusing on commission, claims, investment income, net premiums, management quality, and operating costs. Using data from the 2009–2022 fiscal years, the study found that net premiums earned and the number of claims significantly influenced net profits after taxes. The New India Insurance Company Limited outperformed United India Insurance Company Limited in terms of financial performance.

Malik (2011) explored the firm-specific factors affecting the profitability of insurance companies, focusing on company age, size, capital volume, leverage ratio, and loss ratio, with return on assets (ROA) as the profitability metric. The study found that company size and capital volume had a strong positive impact on profitability, while company age had no significant relationship. In contrast, the loss ratio and leverage ratio were negatively correlated with profitability.

Ghimire (2013) assessed the financial health of Nepal's non-life insurance sector by analyzing

16 private non-life insurance companies from 2007 to 2011. The study revealed mixed results: some financial ratios improved over time, while others deteriorated. Key indicators such as the Expense Ratio, Return on Equity, and Return on Assets showed improvement, whereas the Investment Ratio and Capital to Liabilities Ratio worsened. The study highlighted the importance of monitoring financial indicators to maintain sector stability and emphasized the challenges regulators face in ensuring financial health while recognizing the sector's economic contributions.

Figure 1

Conceptual Framework
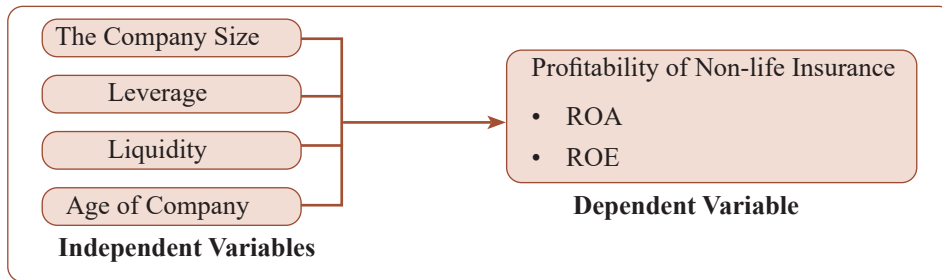
Company Size

Company size refers to the scale of a business, often measured by total assets, market capitalization, revenue, and employee count. Larger firms tend to benefit from economies of scale, positioning them for higher profitability (Nasrudin, 2023). Non-life insurers' profitability typically rises as their total assets grow (Omondi, 2013).

Leverage

Leverage involves using borrowed funds to enhance investment returns. While it can accelerate growth, excessive leverage increases financial risk, particularly during periods of economic instability (Hayes, 2024).

Liquidity

Liquidity measures how easily an asset can be converted into cash without impacting its market value. It reflects a company's ability to meet short-term liabilities, with liquidity typically represented by the current ratio (Asokan, 2022). Insurance companies' liquidity is essential for covering operational costs and claims.

Company Age

Company age denotes the duration since a firm's establishment. Older companies tend to have established reputations and operational experience, but age alone does not determine profitability or growth capacity.

Return on Assets (ROA)

ROA measures how effectively a company uses its assets to generate profit. A higher ROA indicates efficient resource use, crucial for the long-term success of an insurance firm (White et al., 2024).

Return on Equity (ROE)

ROE evaluates how well a company generates profits from shareholder equity. A higher ROE signifies better profitability relative to shareholder investment, providing insights into the firm's performance from both underwriting and investment returns (Fernando, 2024).

Research Design

Research design is a comprehensive plan outlining the objectives, methods, steps, and materials for conducting an organized study. It provides a framework for researchers to follow from initial planning to final dissemination of results (Deeba, 2019). This study, which investigates the factors influencing profitability in Nepal's non-life insurance sector, employs a descriptive and informal comparative research design to gather relevant information regarding the determinants affecting profitability. Additionally, a

correlation research design is used to explore the relationship between firm-specific factors such as age, liquidity, leverage, and size, and profitability indicators (ROA and ROE) for the period from 2014 to 2023.

Population, Sample, and Sampling Design

According to the Nepal Insurance Authority, there are 14 non-life insurance companies in Nepal. This study focuses on all these companies. However, due to practical constraints, judgmental sampling was employed to select a sample of seven companies that have not undergone mergers or acquisitions, as these firms provide consistent data over the ten-year period.

Selected Non-Life Insurance Companies

- Neco Insurance Limited
- Nepal Insurance Company Limited
- NLG Insurance Company Limited
- Prabhu Insurance Company Limited
- Rastriya Beema Company Limited
- Shikhar Insurance Limited
- The Oriental Insurance Company Limited

Nature and Sources of Data

Secondary data covering a ten-year period (2014-2023) was used for the analysis. The data was obtained from the annual reports, balance sheets, P&L statements, and websites of the selected non-life insurance companies. Key profitability indicators, such as return on equity (ROE) and return on assets (ROA), as well as regulatory variables (company size, age, liquidity, and leverage), were analyzed.

Method of Data Analysis

The study employs statistical and econometric techniques, including regression, correlation, and descriptive analysis. Descriptive statistics (mean, standard deviation, minimum, and maximum values) are used to summarize the data. Correlation analysis assesses the relationships between dependent and independent variables, while regression analysis examines the impact of independent variables on profitability.

A linear regression model is employed to assess the sensitivity of profitability to changes in each explanatory variable. The F-test, using EViews12, is applied to determine individual impacts.

Model Specification

A panel data model is used to analyze the variables affecting profitability in Nepal's non-life insurance sector. Panel data, which combines cross-sectional and time-series data, enhances the test's strength and allows for a more robust analysis of dynamic behaviors over time.

The following linear regression model is used:

Profitability = f(Age, Liquidity, Leverage, Size)

Where the dependent variables are:

ROA = Return on Assets

ROE = Return on Equity

The panel data model is represented as:

$$ROA_{it} = (\alpha + \tau_i) + \beta_{it}X + \varepsilon_{it}$$
$$ROE_{it} = (\alpha + \tau_i) + \beta_{it}X + \varepsilon_{it}$$

Where,

ROA_{it} = The measure of ROA of insurance at time

ROE_{it} = The measure of ROE of insurance at time

α = the intercept of equation for insurance

β = Coefficient for X_{it}

X = Independent variables for profitability

ε = Error term

τ_i = Fixed effect specific to insurance

i = Number of insurance
i.e. = 1,2,3,… N

t = The time period i.e. = 1,2,3,... T

The following is an expression of the model for insurance firms and time periods:

$$ROA_{it} = (\alpha + \tau_i) + \beta_1 Age + \beta_2 Liquidity + \beta_3 Leverage + \beta_4 Size + \varepsilon_{it}$$
$$ROE_{it} = (\alpha + \tau_i) + \beta_1 Age + \beta_2 Liquidity + \beta_3 Leverage + \beta_4 Size + \varepsilon_{it}$$

Where,

ROA_{it} = The measure of ROA of insurance at time

ROE_{it} = The measure of ROE of insurance at time

α = the intercept of equation for insurance

β_1 = Coefficient of Age of company

β_2 = Coefficient of Liquidity of company

β_3 = Coefficient of Leverage of company

β_4 = Coefficient of Size of company

ε = Error term

τ_i = Fixed effect specific to insurance

Model Assumptions

Fixed Effect Model

Assumes that all parameters are non-random and that there is a correlation between the independent variables and their respective specific effects. The model is estimated using "Least Squares Dummy Variable Regression."

Random Effect Model

Assumes that individual unobserved heterogeneity is uncorrelated with the independent variables. This model is estimated using "Generalized Least Squares."

Tests for Model Validation

Unit Root Test

Used to check for stationarity and cointegration in the data series.

Hausman Test

Determines the appropriateness of the fixed or random effect models for panel data analysis. A p-value greater than 0.05 suggests the use of the random effect model.

Autocorrelation Test

Assesses whether error terms are correlated over time. The Durbin-Watson test is applied to detect autocorrelation.

This methodology ensures a robust and comprehensive analysis of the factors affecting profitability in Nepal's non-life insurance industry.

Results and Discussion

The dependent and independent variable descriptive statistics for non-life insurance businesses from 2014 to 2023 are displayed in Table 1 ROE (defined as Net Income / Shareholder's Equity) and ROA (defined as Net Income / Total Assets) are the dependent variables. The independent variables are size (defined as the net worth of the companies at the respective year sample), leverage (defined as the use of borrowed funds (debt) to increase the potential return on investment), liquidity (defined as current assets/current liabilities), and age (defined as the length of time it has been in operation since its establishment or in corporation).

Table 1

Descriptive Analysis

	Mean	STD. Deviation	Minimum	Maximum	CV
ROA	8.82	6.57	-16.14	44.93	74.46
ROE	14.37	14.53	-129.40	69.90	101.9
Age	24.36	18.43	1.00	67.00	75.68
Liquidity	63.66	51.09	5.51	408.93	80.25
Leverage	94.74	14.83	28.62	173.15	15.65
Size	2068056757	1148045496	263246138	7091371000	55.51

Table 1 demonstrates that the return on equity of non-life insurance samples varied from -129.40 to 69.93 percent over the study period with a mean of 14.37 and a standard deviation of 14.52, while the return on asset varied from -16.14 to 44.93 percent with a mean of 8.82 and a standard deviation of 6.56. Similarly, during the study period, the independent variables, such as the minimum age, which was 1 year, and the maximum age, which was 67 years, had a mean of 24.35 and a standard deviation of 18.43. Similarly, over the course of the investigation, the liquidity of the

chosen samples ranges from 5.51 to 408.93 percent, with a mean of 63.66 and a standard deviation of 51.08. Over the course of the study, the leverage fluctuates between 28.62 and 173.15 percent, with a mean of 94.73 and a standard deviation of 14.82. Similarly, the company's size is determined by its net worth, which ranges from a maximum of 709137100 to a minimum of 263246138, as well as its mean of 2068056758 and standard deviation of 1148045497.

Liquidity had a higher degree of dispersion around the mean than the other independent variables, such as age, leverage, and size, according to the analysis of the coefficient of variation during the course of the study. A greater dispersion around the mean of the selected insurance companies during the course of the study is shown by the fact that return on equity (ROE) has a higher coefficient of variation than return on asset (ROA).

Unit Root Test

For the analysis of time series and panel data, stationarity is crucial. The Levin Lin Chu test can be used to evaluate the stationarity of panel data. (Levin, 2002) use the common unit root process as their null hypothesis.

Table 2

Result of Unit Root Test

	Level	
Variables	**Levin Lin and Chu**	**Prob**
Age	-1.6668	0.00001
Liquidity	-3.3407	0.0004
Leverage	-1.5886	0.0561
Size	-3.98942	0.0001
ROA	-6.4772	0.0001
ROE	-13.8343	0.0001

To determine whether the study variables had a unit root, which would indicate non-stationarity, the Levin-Lin-Chu test was used. The significance threshold should normally be higher than 5% if a unit root is found. Nonetheless, Table 2 demonstrates that all variables have p-values below 5%, suggesting that they are stationary and stable across time.

However, for leverage, the p-value at the first level is 0.0561, which is just above 5% at tenth place. This implies that leverage may exhibit non-stationarity at the initial level, although with a little variation, but the other variables remain stable.

Hausman Test

The Hausman test of model efficiency was used to determine which model—the "Fixed Effect Model" or the "Random Effect Model"—was more suitable. Tables 3 and 4 present the cross-section random effect summary of the results. At the 1% significance level, the Hausman test indicates that the fixed effect model outperforms the random effect model for return on asset (ROA) because the probability of the Hausman test is less than 0.05. However, for ROE, the outcome is entirely different, with the probability of the Hausman test being greater than 0.05, indicating that the random effect model outperforms the fixed effect model.

Table 3

Result of Hausman Test for ROA

Test Summary	Chi square Statistics	Degree of freedom	Probability
|Cross Section Random	23.193847	4	0.0001

Table 3 summarizes the cross-section random effect. The Hausman test is significant at a significance level of 4%, indicating that the fixed effect model outperforms the random effect model for return on asset. Furthermore, when using the cross section random effects test comparison, there is a significant difference between fixed and random effects in all independent variables except size.

Table 4

Result of Hausman Test for ROE

Test Summary	Chi square Statistics	Degree of Freedom	Probability
Cross section random	4.752429	4	0.3137

The cross section random effect summary is shown in Table 4 The Hausman test is not significant at a significance level of 4%, indicating that the random effect model is better than the fixed effect model when it comes to return on equity. Furthermore, when comparing the cross section random effects test, there is a significant difference between fixed and random effects in all independent variables except size.

Random Effect Model

Another statistical technique for panel data analysis is the random effect model, which is comparable to the fixed effect model but differs significantly in how it deals with unobserved variables. A random effect model makes the assumption that these unseen individual qualities

Fixed Effect Model
Fixed effect model for Return on Assets

Using a random effect model as recommended by the Hausman Test, the results are based on a panel of seven non-life insurance businesses with 70 observations for the years 2014–2023. The dependent variable is return on assets, while the independent variables are size, age, leverage, and liquidity.

Table 5

Results of Panel Least Square for Return on Assets

Variable	Coefficient	Std. Error	T- Statistic	Prob
C	25.57549	13.35522	1.915018	0.0603
Age	-0.937042	0.651632	-1.437993	0.1557
Leverage	0.02088	0.050392	0.414344	0.6801
Liquidity	-0.004107	0.01461	-0.281112	0.7796
Size	2.10E-09	1.67E-09	1.25749	0.2135

Note: F statistics = 5.162461, R- Square = 0.466665, Prob (F- statistic) = 0.000021, Adjusted R- Square = 0.376269, Durbin - Watson Stat = 1.323411

Age, leverage, liquidity, and size were found to be responsible for 46.67 percent of the variation in return on assets; when degree of freedom is taken into consideration, this number falls to 37.63 percent. Additionally, the model is deemed significant at the one percent significance level.

are random and uncorrelated with the independent variables, whereas a fixed effect model makes the assumption that these unobserved individual characteristics (such as company-specific features) remain consistent over time. According to the Hausman test for a dependent variable, such as return on equity, the random effect model is fitted to ascertain the relationship between independent and dependent variables. All of the relationships between independent variables and return on equity (ROE) are shown in Table 6, along with the independent variables' substantial influence over the dependent variables.

Random Effect Model for Return on Equity

Using a random effect model as recommended by the Hausman test, the results are based on a panel of seven non-life insurance businesses with 70 observations for the years 2014–2023. The dependent variable is return on equity, while the independent variables are size, age, leverage, and liquidity.

Table 6

Results of Panel Least Square for Return on Equity

Variable	Coefficient	Std. Error	T- Statistic	Prob
C	91.07611	48.04316	1.895714	0.0629
AGE	-4.263365	2.344136	-1.818736	0.074
Leverage	0.088095	0.181276	0.485972	0.6288
Liquidity	-0.000539	0.052558	-0.010252	0.9919
Size	9.10E-09	6.02E-09	1.512683	0.1357

Note: F statistics = 0.589220, R- Square = 0.090800, Prob (F- statistic) = 0.816279, Adjusted R- Square = 0.063302, Durbin - Watson Stat = 2.672016

Age, leverage, liquidity, and size were found to be responsible for 9% of the variation in return on equity; when degree of freedom is taken into consideration, this number falls to 6.33%. Return on Equity (ROE) is significantly impacted by age, with a 0.074 likelihood indicating some influence. Although age plays a significant role in the profitability of non-life insurance companies, the t-statistic's negative value suggests that the ROE has occasionally been negative. To put it another way, older businesses have had times when their returns were negative, despite the fact that they may typically be more profitable.

Durbin-Watson Test

One statistical method for determining if autocorrelation exists in the residuals of a regression analysis is the Durbin-Watson (DW) test. When a model's residuals, or mistakes, are not independent of one another, autocorrelation arises. This might result in inefficient estimations of the regression coefficients and possibly render the analysis's findings inaccurate.

For Return on Assets

Given that the Durbin-Watson value of 1.32 is below the usual lower limit, it is possible that the residuals exhibit positive autocorrelation. This indicates that rather than being independent, the model's errors are related to one another and exhibit a consistent pattern, proving that they are not random.

For Return on Equity

A Durbin-Watson score of 2.67 indicates the presence of negative autocorrelation in the residuals because it is higher than the usual lower limit. This suggests that positive and negative errors are consistently tied to one another rather than independent of one another, as the errors have a tendency to alternate in sign.

Table 7

Results of Hypothesis Testing

Hypothesis	Description	P-Value		Result	
		ROA	ROE	ROA	ROE
H1	There is significant relationship between age and profitability of non- life insurance.	0.156	0.074	Rejected	Rejected
H2	There is significant relationship between leverage and profitability of non-life insurance	0.68	0.629	Rejected	Rejected

Hypothesis	Description	P-Value		Result	
		ROA	**ROE**	**ROA**	**ROE**
H3	There is significant relationship between liquidity and profitability of non-life insurance.	0.78	0.992	Rejected	Rejected
H4	There is significant relationship between size and profitability of non- life Insurance	0.214	0.136	Rejected	Rejected

The study focuses on variables influencing the profitability of Nepal's non-life insurance industry, specifically size, liquidity, leverage, and age. Profitability is measured using return on equity (ROE) and return on assets (ROA). Secondary data from seven non-life insurance companies between 2014 and 2023 was analyzed using descriptive statistics, unit root tests, and a random effect model.

ROA measures how efficiently a business uses its resources to generate profits (White, 2024), while ROE indicates the return on shareholder capital (Fernando, 2024). These profitability measures are affected by firm age, leverage, liquidity, and size. Age reflects the number of years a firm has been in operation. Leverage allows businesses to use borrowed capital to enhance growth, and liquidity represents the ability to convert assets into cash for business operations (Hayes, 2023). Company size is typically measured by total assets, and non-life insurance profitability tends to rise with asset growth (Omondi & Muturi, 2013).

Studies show that leverage can positively impact profitability (Hamal, 2020; Veleva, 2017; Adams & Buckle, 2003), while firm age is often positively related to profitability (Sah, 2021). Liquidity's effect on profitability is debated, with some studies suggesting a positive influence (Charumathi, 2012; Bin Dhiab, 2021) and others finding a negative relationship (Jaishi & Poudel, 2019). Company size is generally positively linked to profitability (Mehari & Aemiro, 2013). However, the relationship between age and liquidity varies across different contexts.

Conclusion

This study's main goal is to evaluate the variables affecting Nepal's non-life insurance businesses' profitability. The four primary independent factors at the heart of the study are company size, liquidity, leverage, and age. Return on Equity (ROE) and Return on Assets (ROA), two dependent variables, are examined in connection with these variables.

The findings from the structure and pattern analysis revealed that various factors influencing profitability show fluctuations and do not follow a consistent trend of either increasing or decreasing, except for the Age of the company. The fixed effect model also indicated that over the research period, the Age of the company had a significant impact on Return on Equity (ROE) at tenth unit place. However, this impact was negative, as ROE was in the negative range for some of the sampled insurance companies during certain periods. Additionally, it was found that both Liquidity and Company Size had a positive correlation with profitability, though Leverage had a negative effect on profits.

Overall, the results suggest that most of the independent variables have a positive relationship with the profitability of non-life insurance companies in Nepal throughout the study period. However, there are some deviations from this trend, as Age and Liquidity show a negative relationship with both Return on Assets (ROA) and Return on Equity (ROE). To enhance the profitability of non-life insurance companies, regulatory authorities should consider adjusting the factors that influence these outcomes.

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