

Innovations

Evaluating Earnings and Profitability Performance of Ethiopian Insurance Companies Using CAMEL Parameters: A Ten-Year Analysis

Demilie Eshetu Mahmud¹ & Jaladi Ravi²

¹Ph.D. Research Scholar & ²Professor

^{1&2} Department of Commerce and Management Studies, Andhra University, India

Abstract: *A business organization is invariably founded with the primary objective of generating profit through its activities. Profit serves as the lifeblood of any business, driving its growth, sustainability, and overall success. Without the ability to earn profit, a business faces significant challenges in maintaining its operations, let alone expanding or achieving stability in the long term. The study aims to investigate the earnings and profitability performance of selected insurance companies within the Ethiopian context from 2013 to 2022, utilizing indicators from the CAMEL framework. Based on secondary data sourced from annual reports of selected insurance companies, journals, and websites, eight insurance companies were examined. The analysis centered on key variables including return on equity, claims/loss ratio, expenses, and combined ratios. For the analysis of data, descriptive statistics was used and ANOVA has been applied to see the significance in performance in terms of the selected variables between the insurance companies and over the study period. The study revealed significant differences in performance between companies and over the study period in all the parameters selected for the study except in the expense ratio. While the expense ratios showed significant differences between companies, such disparities were insignificant over the study years.*

Keywords: *Profitability, statistical analysis, loss ratio, ROE, Expenses ratio, Insurance Company.*

1. Introduction

The insurance sector serves as a cornerstone of the financial landscape in both developed and developing countries, holding immense significance for economic vitality. Its role in driving economic growth is multifaceted, encompassing the facilitation of long-term savings, efficient transfer of funds, adept risk management, and fostering the development of capital markets (Jadi, 2015; Shan, 2018). Through

these mechanisms, the insurance industry not only provides financial security to individuals and businesses but also contributes to the stability and expansion of national economies, making it an indispensable component of modern financial systems. The absence or failure of a robust insurance sector within an economy not only precipitates instability within the financial services sector but also poses a significant threat to the overall economic vitality of a nation (Isayas, 2021; Wise, 2017).

Insurance companies operate on the principle of collecting premiums from policyholders in exchange for providing coverage against specified risks. When insurance companies are financially healthy and profitable, they are better equipped to meet their obligations to policy holders (Harrington, & Niehaus, (2013). Profit encourages shareholders and policyholders to give funds to insurance firms, which in turn strengthens the solvency of insurers. In today's dynamic and cutthroat globalized marketplace, an insurer cannot draw in outside funding unless it turns a profit. Profitability is therefore a primary objective of insurance company management and a prerequisite for carrying on any insurance operation. To ascertain if insurers are maintaining a reasonable level of profits and demonstrating a sustainable rise in earnings in Ethiopia, it became imperative and necessary to conduct a research study. To this effect, the study attempts to evaluate the trends in profitability and earnings performance of insurance companies in Ethiopia from 2013 to 2022.

2. Review of related literature

Several studies have scrutinized the profitability of insurance companies globally, examining a variety of factors to understand their financial performance. These studies have analyzed different variables to assess the profitability of insurance firms across various nations.

Tomar et al. (2019) used the CAMEL framework to evaluate the financial performance of selected insurance companies, concentrating on profitability and efficiency measures. They chose indicators from the CAMEL framework based on the availability and relevance of data. Their analysis drew from secondary sources like annual reports, IRDA reports, journals, and websites. Key ratios such as expenditure ratio, net claim incurred ratio, and combined ratio were highlighted as essential for underwriting performance, emphasizing the importance of minimizing them for general insurers to enhance their overall performance.

Monteiro and Nijumon (2017) conducted an extensive assessment of the profitability of general insurance companies in India, utilizing the CAMEL framework and analyzing secondary data from 2006-07 to 2015-16. Their research

focused on crucial financial metrics like net premium, incurred claims, commission expenses, operating expenditures, and net profit. Through statistical methods such as descriptive statistics, standard deviation, mean, correlation, and multiple regression, they discovered that public insurers outperformed private insurers in profitability and management effectiveness. Additionally, their study indicated that variables such as net premium, operating expenses, commission expenses, and investment income did not exhibit a significant relation with companies' net profit. The performance of ICICI and SBI, prominent life insurers in India, was assessed from 2010/11 to 2017/18 using CAMEL framework indicators. Data sourced from IRDAI facilitated the analysis. Apart from ratio analysis, statistical methods like mean, standard deviation, and t-test were employed. Results revealed significant disparities in earnings and profitability performance between ICICI and SBI. ICICI Life demonstrated superior performance, particularly in income on investment and return on equity ratios, indicating its greater profitability compared to SBI Life across the evaluated indicators.

Modi's (2011) study on four non-life insurance companies in India revealed significant enhancements in overall management and profitability over the study duration. However, the practice of offsetting underwriting losses with investment income, though common among insurance companies, poses considerable risk. The study emphasizes the imperative for insurance companies to prioritize effective underwriting to ensure market viability and sustainability, cautioning against overreliance on investment income to compensate for underwriting deficits

Limited attention has been directed towards scrutinizing the profitability performance of Ethiopian insurance firms, with prior research endeavors typically constrained within three to five-year years. Such short timeframes hindered the ability to draw comprehensive insights into shifts in insurer profitability. Given the escalating prominence of the insurance sector within Ethiopia, this research aims to offer invaluable insights, thereby enriching the existing body of knowledge.

3. Research Objectives

1. To study the trend of earnings and profitability performance of insurance companies on the basis of CAMEL parameters over the period of 10 years, spanning from 2013 to 2022.
2. To ascertain whether there exists any statistically meaningful variance in earnings and profitability performance among the insurance companies and across the individual years within the specified period.

4. Research Hypothesis

The following hypotheses are developed in light of the intended objectives.

1. **H01:** There is no statistically significant difference in terms of claim costs (loss ratio) between the insurance companies and with-in the years over the period of 10 years from 2013 to 2022.
2. **H02:** There is no statistically significant difference in terms of the expense incurred (expense ratio) between the insurance companies and with-in the years over the period of 10 years.
3. **H03:** There is no statistically significant difference in terms of the combined ratio between the insurance companies and with-in the years over the period of 10 years.
4. **H04:** There is no statistically significant difference in terms of the return on equity (ROE) between the insurance companies and with-in the years over the period of 10 years.

5. Research methodology

- **Research Approach and Design**

This study used a quantitative research approach with a longitudinal study design. A quantitative research approach was chosen as it allows for the systematic empirical examination of phenomena through numerical data collection and analysis. Quantitative research is characterized by its emphasis on quantifying data and generalizing results from a sample to a larger population (Creswell, 2014). Similarly, a longitudinal study design enables researchers to conduct an in-depth analysis of financial statements over a significant timeframe and can track changes, identify trends, and assess the long-term financial performance and stability of financial institutions.

- **Sample size and Sampling technique**

The NBE annual report for 2022 has revealed that Ethiopia's insurance sector consisted of a total of 18 insurance companies, with one being state-owned and the remaining 17 privately held. Within this thriving landscape, the researcher has carefully chosen to focus on eight specific insurance companies out of the total 18 currently active in the country. Eight insurance companies were purposely chosen for this study based on the fact that the majority of the market share is held by such insurance companies. The Selection criteria included a minimum of ten years' experience in the insurance sector to guarantee stability and expertise. Furthermore, the selected companies were required to provide consistent and comprehensive data

covering the entire study period from 2013 to 2022, ensuring the reliability and validity of the analysis. Consequently, the final selection comprised Ethiopian Insurance Corporation, Awash Insurance Company, Nile Insurance Company, Africa Insurance Company, Nyala Insurance Company, United Insurance Company, Oromia Insurance Company, and Nib Insurance Company, all meeting the requisite criteria for inclusion in this analysis.

- **Data type and source**

This research paper employed solely secondary data. The required secondary data was primarily gathered from the annual reports (income statement and balance sheet) of insurance companies operating in the country. This approach hinges on acknowledging the wealth of valuable insights stored within official financial documents. By focusing on established financial data such as income statements and balance sheets, this study aimed to leverage the rigorously audited and standardized reporting practices employed by these institutions. Utilizing this robust dataset provided a foundation of credibility and reliability, ensuring the integrity of the findings derived from the analysis.

- **Method of Data Analysis**

The study utilized the CARMEL model as its analytical framework to evaluate Financial Soundness Indicators (FSIs) relevant to the insurance sector. CARMEL, outlined in an IMF background paper from 2003, offers a systematic method for assessing various aspects crucial to insurers' stability. It encompasses Capital sufficiency, Asset quality, Reinsurance and Actuarial issues, Management soundness, Earnings/Profitability, and Liquidity. Within the CARMEL framework, particular attention was devoted to the earnings and profitability parameter, which served as the focal point of this investigation. The key variables taken from the CARMEL parameters that were used to evaluate the Earnings and profitability performance of the insurance company include the claims/loss ratio, the expenses ratio, the combined ratio and finally the return on equity ratio. Only those parameters which are suitable for the study have been selected and the choice of indicators is mainly based on data availability for calculation, their relevance and analytical significance for the study. Hence, the Earnings and profitability performance of the insurers has been appraised and a statistical test has been made for the components as well.

To analyze the quantitative data, statistical techniques including mean and standard deviation were used in addition to ratio analysis. Statistical Package for the Social Sciences (SPSS) software played a pivotal role in statistically testing the ratios. Furthermore, to validate the findings, Analysis of Variance (ANOVA) was employed, specifically ANOVA: Two-Factor without Replication has been used to verify the results.

Table1. Insurance Financial Soundness and Performance Indicators: Core Set

| Category | Indicator | Non-life | life |
|----------------------------------|--|----------|------|
| Earnings and profitability | Loss ratio (net claims/net premiums) | x | |
| | Expense ratio (expenses/net premiums) | x | x |
| | Combined ratio (Loss ratio + Expense ratio) | x | |
| | Revisions to technical reserves/technical reserves | x | x |
| | Investment Income/ Net Premiums | | x |
| | Investment Income/investment assets | x | x |
| | Return on Equity (ROE) | | |
| Liquidity | Current Assets/ Current Liabilities | x | x |
| Reinsurance and actuarial issues | Risk retention ratio (net premium/gross premium) | x | x |
| | Net technical reserves/average of net claims paid in last 3 years (survival ratio) | x | |
| | Net technical reserves/average of net premiums received in last 3 years | | x |
| Capital adequacy | Net premium/capital | x | |
| | Capital/ total assets | x | |
| | Capital/technical reserves | | x |
| Management soundness | Operating Expenses/Gross Premiums | x | x |
| | Gross premium/number of employees | x | x |
| | Asset per employee (total assets/ number of employees) | x | x |
| Asset quality | (Real estate + unquoted equities + debtors)/total assets | x | x |
| | Receivables/ (gross premium + reinsurance recoveries) | x | x |
| | Equities/ total assets | | x |
| | Non-performing loans to total gross loans | | |

Source: Das et al.,2003

6. Results and discussion

6.1. Earnings and profitability category

Profitability stands as a cornerstone for the sustenance and growth of any business entity, including insurers. It serves as a vital indicator of an insurer's operational health and capacity to navigate challenges effectively. Five key measures were employed to scrutinize the earning and profitability performance of insurers: Expense ratio, loss ratio, combined ratio, return on equity ratio, and investment income to net premium ratio. By delving into these metrics, a nuanced

understanding of insurers' financial dynamics and their ability to translate resources into profitable outcomes can be gleaned, offering valuable insights into their financial viability.

6.1.1. Claim costs/Loss ratio analysis

The profitability of insurance companies hinges significantly on the management of incurred claims. A pivotal metric in this regard is the loss ratio, also referred to as the claim ratio, which forms a crucial component of the earnings and profitability landscape. Calculated by dividing incurred claims (net) by net premium earned, the loss ratio serves as a barometer of risk retention, reflecting the proportion of earned premium available for settling incurred claims. A lower loss ratio is preferable, indicating effective risk management. It is widely acknowledged that maintaining a loss ratio below 70% of net premium is essential for insurers to enhance shareholder value. Notably, during the study period, private insurers Awash and United demonstrated robust risk management strategies, evidenced by consistently low loss ratios below the 70% threshold. Similarly, Ethiopian Insurance Corporation (EIC) exhibited adept control over claim expenses, mirroring commendably low loss ratios.

Table-2 Loss ratio analysis of selected insurers

| Insurers | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Mean |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Awash | 0.60 | 0.54 | 0.61 | 0.46 | 0.57 | 0.64 | 0.64 | 0.61 | 0.58 | 0.56 | 0.58 |
| Africa | 0.77 | 0.80 | 0.83 | 0.83 | 0.86 | 0.85 | 0.80 | 0.85 | 0.88 | 1.02 | 0.85 |
| EIC | 0.51 | 0.53 | 0.31 | 0.29 | 0.59 | 0.58 | 0.59 | 0.58 | 0.81 | 0.65 | 0.54 |
| Nile | 0.57 | 0.71 | 0.70 | 0.73 | 0.68 | 0.68 | 0.77 | 0.73 | 0.73 | 0.56 | 0.69 |
| Oromia | 0.36 | 0.33 | 0.39 | 0.45 | 0.77 | 0.56 | 0.66 | 0.70 | 0.58 | 0.60 | 0.54 |
| Nib | 0.14 | 0.23 | 0.22 | 0.27 | 0.70 | 0.69 | 0.71 | 0.71 | 0.81 | 0.66 | 0.51 |
| United | 0.55 | 0.69 | 0.63 | 0.53 | 0.51 | 0.52 | 0.62 | 0.68 | 0.68 | 0.57 | 0.60 |
| Nyala | 0.73 | 0.72 | 0.43 | 0.52 | 0.53 | 0.62 | 0.72 | 0.56 | 0.53 | 0.49 | 0.59 |
| Mean | 0.53 | 0.57 | 0.51 | 0.51 | 0.65 | 0.64 | 0.69 | 0.68 | 0.70 | 0.64 | |

6.1.1.1. Statistical Analysis of Loss/Claim ratio

In order to validate the stated hypothesis, the study employs both descriptive statistics, as outlined in Table-2, and the results derived from Analysis of Variance (ANOVA), presented in Table-4. These statistical analyses specifically focus on the claim ratios derived from the CAMEL framework across the selected insurers.

| Ratio | Insurers | N | Mean | Std. Deviation | Std. Error Mean |
|------------------------|----------|----|-------|----------------|-----------------|
| | Awash | 10 | .5810 | .05363 | .01696 |
| | Africa | 10 | .8490 | .06839 | .02163 |
| | EIC | 10 | .5440 | .15255 | .04824 |
| Net claims incurred to | Nile | 10 | .6860 | .06915 | .02187 |
| | United | 10 | .5980 | .07068 | .02235 |
| Net earned premiums | Nyala | 10 | .5850 | .10680 | .03377 |
| | Nib | 10 | .5140 | .26201 | .08285 |
| | Oromia | 10 | .5400 | .15114 | .04780 |

Based on the descriptive statistics presented in Table-3, notable variations in the mean and standard deviation of loss ratios among the insurers are evident.

▪ **Mean Loss Ratio:**

- The mean loss ratios range from 0.5140 to 0.8490 across the insurers.
- Awash Insurance demonstrates the lowest mean loss ratio at 0.5810, indicating relatively efficient claim cost management.
- Conversely, Africa Insurance exhibits the highest mean loss ratio at 0.8490, suggesting comparatively higher incurred claims relative to earned premiums.

▪ **Standard Deviation:**

- The standard deviation values range from 0.05363 to 0.26201, reflecting the dispersion of loss ratio data around the mean for each insurer.
- A lower standard deviation implies less variability in loss ratios, indicating greater consistency in managing claim costs.
- In contrast, Nib Insurance displays the highest standard deviation, implying greater variability in its loss ratio data, potentially indicating fluctuations in claim management effectiveness over the study period.

6.1.1.2. Testing of Hypothesis:

To scrutinize the statistical significance of claim costs across the selected insurers and over the study period, the loss ratios, as depicted in Table 2, were subjected to analysis using ANOVA: Two-Factor Without Replication.

H01: There is no statistically significant difference in loss ratios among insurance companies and across individual years throughout the 10-year study period, spanning from 2013 to 2022.

| Source of Variation | SS | df | MS | F | P-value | F crit |
|---------------------|---------|---------|--------|--------|---------|--------|
| Between companies | 0.829A4 | 7.0000 | 0.1185 | 8.3527 | 0.0000 | 2.1588 |
| With-in the years | 0.3978 | 9.0000 | 0.0442 | 3.1158 | 0.0037 | 2.0322 |
| Error | 0.8937 | 63.0000 | 0.0142 | | | |
| Total | 2.1209 | 79.0000 | | | | |

The ANOVA Two-Factor without Replication analysis for the loss ratio yields the following results:

▪ **Between companies Analysis**

The calculated F-statistic is 8.3527 with a corresponding p-value of 0.0001, which is less than the significance level of 0.05. This suggests a significant difference in loss ratios between insurance companies.

▪ **Within years Analysis**

The calculated F-statistic is 3.1158 with a corresponding p-value of 0.0037, which is less than the significance level of 0.05. This suggests a significant difference in loss ratios across individual years.

The statistical data derived in table-3 above relating to the loss ratio reveal a p-value of 0.0000 for between the companies, which is less than 0.05. Hence the p-value being less than 0.05 signifies strong evidence against the null hypothesis of no difference in loss ratios among companies. This suggests that there are notable variations in how insurance companies manage their claim costs, contributing to differences in their loss ratios. Similarly, the loss ratio reveals a p-value of 0.0037 for within the years, which is less than 0.05. Again, the p-value being less than 0.05 signifies strong evidence against the null hypothesis of no difference in loss ratios within the years. This implies that there are fluctuations in loss ratios over time, highlighting potential shifts in insurers' claim management strategies or external factors influencing claim costs.

6.1.2. Expense ratio analysis

The expenses to net premium ratio is a critical metric that illuminates the efficiency of an insurance company in managing its expenses relative to the premium it earns. A lower ratio signifies tighter control over expenses in proportion to premium earnings, thereby enhancing the company's profitability and shareholder value. In fact, it is widely acknowledged that maintaining an expense ratio below 20% is essential for insurers to demonstrate financial prudence and deliver superior returns to investors. In relation to this, the findings suggest that a

significant portion of private insurers are surpassing this level, with expense ratios exceeding 20%. This disparity underscores the imperative for insurers to streamline their operational costs and optimize efficiency to achieve a more favorable expense ratio, ultimately bolstering their bottom line.

Table-5 Expense ratio analysis of selected insurance companies

| Insurers | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Mean |
|----------|------|------|------|------|------|------|------|------|------|------|------|
| Awash | 0.20 | 0.16 | 0.13 | 0.14 | 0.16 | 0.18 | 0.23 | 0.18 | 0.32 | 0.35 | 0.21 |
| Africa | 0.15 | 0.12 | 0.15 | 0.15 | 0.21 | 0.23 | 0.21 | 0.23 | 0.21 | 0.24 | 0.19 |
| EIC | 0.17 | 0.18 | 0.19 | 0.12 | 0.18 | 0.12 | 0.13 | 0.17 | 0.23 | 0.18 | 0.16 |
| Nile | 0.26 | 0.24 | 0.20 | 0.24 | 0.24 | 0.27 | 0.22 | 0.20 | 0.16 | 0.20 | 0.22 |
| United | 0.13 | 0.26 | 0.23 | 0.23 | 0.26 | 0.29 | 0.26 | 0.31 | 0.29 | 0.32 | 0.26 |
| Nyala | 0.68 | 0.47 | 0.22 | 0.22 | 0.22 | 0.26 | 0.25 | 0.27 | 0.29 | 0.31 | 0.32 |
| Nib | 0.43 | 0.42 | 0.27 | 0.44 | 0.19 | 0.27 | 0.31 | 0.29 | 0.28 | 0.32 | 0.32 |
| Oromia | 0.55 | 0.26 | 0.14 | 0.13 | 0.12 | 0.15 | 0.16 | 0.20 | 0.19 | 0.17 | 0.21 |
| Mean | 0.32 | 0.26 | 0.19 | 0.21 | 0.20 | 0.22 | 0.22 | 0.23 | 0.25 | 0.26 | |

Throughout the study period, the analysis of insurers' expenses to net premium ratios revealed a trend marked by fluctuations and a varied performance, with some years reporting ratios within the desired limit and others exceeding it. Notably, the Ethiopian Insurance Corporation (EIC), serving as the sole public insurer in the country, demonstrated prudent control over its management expenses. The data indicates consistently low expense ratios for EIC, with all recorded rates falling within the acceptable range of below 20%, underscoring effective cost management practices. However, a slight deviation occurred in 2020/21, where the ratio rose to 0.23 (23 percent), momentarily surpassing the threshold. Nonetheless, EIC's overall performance suggests a commendable level of efficiency in managing expenses relative to its premium income across the study period.

6.1.2.1. Statistical Analysis of Expense ratio

To test the statement of hypothesis, the descriptive statistics (Table-6) and output of ANOVA (Table-7) relating to the expense ratios from CAMEL framework for the selected insurers are presented and analysed.

| Table-6 Descriptive Statistics for expense ratio | | | | | | |
|--|----------|----|-------|----------------|-----------------|-------|
| Ratio | Insurers | N | Mean | Std. Deviation | Std. Error Mean | Error |
| | Awash | 10 | .2050 | .07457 | .02358 | |
| | Africa | 10 | .1900 | .04295 | .01358 | |
| | EIC | 10 | .1670 | .03466 | .01096 | |

| | | | | | |
|----------------------|--------|----|-------|--------|--------|
| Expenses to Net | Nile | 10 | .2230 | .03335 | .01055 |
| Premium Underwritten | Nib | 10 | .3220 | .08230 | .02603 |
| | Nyala | 10 | .3190 | .14685 | .04644 |
| | Oromia | 10 | .2070 | .12720 | .04022 |
| | United | 10 | .2580 | .05432 | .01718 |

The analysis reveals that the mean expense ratios of private insurers throughout the study period relatively exceeded the acceptable standard range of less than 20 percent. This observation suggests that private insurers may have encountered challenges in containing their expenses within desired limits. One plausible explanation for these higher expense ratios could be the competitive environment characterized by a pursuit for a larger share of the country's underserved insurance market. In contrast, the Ethiopian Insurance Corporation (EIC) demonstrated superior efficiency in managing its expenses, reflected in its notably lower mean expense ratio score of 0.167. Additionally, the lower standard deviation of 0.03466 indicates relatively minimal fluctuation in the expense ratio over the study period for EIC. This stability underscores EIC's effective control over its operating costs, positioning it as a standout performer in expense management among its counterparts in the private insurance sector.

6.1.2.2. Testing of Hypothesis:

To scrutinize the statistical significance of the expenses across the selected insurers and over the study period, the expense ratios, as depicted in Table 5, were subjected to analysis using ANOVA: Two-Factor Without Replication.

H02: There is no statistically significant difference in the expense ratios Between insurance companies and across individual years throughout the 10-year study period.

| | Source of Variation | SS | df | MS | F | P-value | F crit |
|--|---------------------|----------|---------|--------|--------|---------|--------|
| | Between companies | 0.2362 | 7.0000 | 0.0337 | 5.2225 | 0.0001 | 2.1588 |
| | With-in the years | 0.1077 | 9.0000 | 0.0120 | 1.8526 | 0.0760 | 2.0322 |
| | Error | 0.4070 | 63.0000 | 0.0065 | | | |
| | Total | 0.750849 | 79 | | | | |

The summary of the ANOVA (Analysis of Variance) Two-Factor Without Replication test, aimed at assessing the disparity in expense ratios among insurance companies

and throughout individual years across the 10-year study duration, is outlined below.

- **Between companies Analysis**

The calculated F-statistic is 5.2225 with a corresponding p-value of 0.0001, which is less than the significance level of 0.05. This suggests a significant difference in expense ratios between insurance companies.

- **Within years Analysis**

The calculated F-statistic is 1.8526 with a corresponding p-value of 0.0760, which is greater than the significance level of 0.05. This suggests that there is no statistically significant difference in expense ratios across individual years.

The p-value for the between companies' variation is less than the significance level ($\alpha=0.05$), indicating that we reject the null hypothesis (H_0) and conclude that there is a statistically significant difference in the expense ratio among insurance companies. However, the p-value for the within years variation is greater than the significance level, suggesting that we fail to reject the null hypothesis and thus do not find a statistically significant difference in the expense ratio across individual years throughout the 10-year study period. This implies that while there are differences in expense ratios between companies, there is no consistent trend of change in expense ratios over time within the study period.

6.1.3. Combined ratio Analysis

The combined ratio serves as a pivotal metric in evaluating the operational efficiency and overall profitability of insurance enterprises. By combining the expense and loss ratios, it offers a comprehensive assessment of their day-to-day functioning. Typically expressed as a percentage, a combined rate below 100 percent signifies that insurers are generating an underwriting profit, whereas a rate exceeding 100 percent indicates that they have expended all premiums collected on expenses and claims. This scenario suggests that insurance companies with a combined rate surpassing 100% may face challenges in covering their incurred expenses and claims solely through underwriting activities. It also suggests potential mismanagement in risk selection and expenditure policies, resulting in a depletion of operational resources.

The combined ratio analysis for the selected insurers over the provided years is given below.

- Awash Insurance generally maintains a combined ratio below 100 percent, suggesting consistent underwriting profitability. Despite fluctuations, it manages to keep its combined ratio within acceptable limits for most years.

- Africa Insurance, on the other hand, frequently records combined ratios exceeding 100 percent, indicating that it is spending more on expenses and claims than it earns from underwriting operations. This suggests potential challenges in managing operational costs effectively.

Table 8. Combined ratio analysis for selected insurance companies

| Insurers | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Mean |
|----------|------|------|------|------|------|------|------|------|------|------|------|
| Awash | 0.80 | 0.70 | 0.74 | 0.60 | 0.73 | 0.82 | 0.87 | 0.79 | 0.90 | 0.91 | 0.79 |
| Africa | 0.92 | 0.92 | 0.98 | 0.98 | 1.07 | 1.08 | 1.00 | 1.09 | 1.09 | 1.26 | 1.04 |
| EIC | 0.68 | 0.70 | 0.50 | 0.40 | 0.76 | 0.71 | 0.71 | 0.75 | 1.03 | 0.83 | 0.71 |
| Nile | 0.82 | 0.95 | 0.89 | 0.97 | 0.92 | 0.95 | 1.00 | 0.93 | 0.88 | 0.77 | 0.91 |
| Nib | 0.57 | 0.65 | 0.49 | 0.72 | 0.89 | 0.96 | 1.02 | 0.99 | 1.09 | 0.97 | 0.84 |
| Nyala | 1.41 | 1.19 | 0.65 | 0.74 | 0.74 | 0.88 | 0.97 | 0.83 | 0.82 | 0.80 | 0.90 |
| Oromia | 0.91 | 0.59 | 0.54 | 0.59 | 0.89 | 0.71 | 0.82 | 0.90 | 0.77 | 0.77 | 0.75 |
| United | 0.69 | 0.95 | 0.86 | 0.75 | 0.76 | 0.81 | 0.89 | 1.00 | 0.97 | 0.90 | 0.86 |
| Mean | 0.85 | 0.83 | 0.71 | 0.72 | 0.85 | 0.87 | 0.91 | 0.91 | 0.94 | 0.90 | |

Overall, while some insurance companies consistently achieve underwriting profit with combined ratios below 100 percent, others face challenges in controlling expenses and claims, as evidenced by combined ratios surpassing the desired threshold. These trends underscore the importance of effective expense management in ensuring sustained profitability within the insurance sector.

6.1.3.1. Statistical Analysis of Combined ratio

For testing of our hypothesis, the descriptive statistics (Table-9) and output of ANOVA (Table-10) relating to combined ratios from CAMEL framework for the selected insurers are presented and analysed.

Table-9 Descriptive Statistics for combined ratio

| | N | Minimum | Maximum | Mean | Std. Deviation | Std. Error Mean |
|--------|----|---------|---------|--------|----------------|-----------------|
| Awash | 10 | .60 | .91 | .7860 | .09663 | .03056 |
| Africa | 10 | .92 | 1.26 | 1.0390 | .10192 | .03223 |
| EIC | 10 | .40 | 1.03 | .7070 | .17062 | .05396 |
| Nile | 10 | .77 | 1.00 | .9080 | .07021 | .02220 |
| Oromia | 10 | .54 | .91 | .7490 | .13755 | .04350 |
| United | 10 | .69 | 1.00 | .8580 | .10315 | .03262 |
| Nyala | 10 | .65 | 1.41 | .9030 | .23200 | .07336 |
| Nib | 10 | .49 | 1.09 | .8350 | .20999 | .06640 |

Throughout the ten-year study period, the mean combined ratio scores of all insurers remained largely favorable, consistently falling below 100 percent, indicating a generally sound financial position. Notably, Africa Insurance Company stands out as the sole insurer with a marginally higher mean combined ratio, slightly exceeding 100 percent. This deviation suggests a scenario where both operational and non-operational income may be depleted by losses and expenses. Among the insurers, Nyala Insurance exhibited the highest variability in combined ratios, as reflected in its standard deviation of 0.2320, closely followed by Nib Insurance with a standard deviation of 0.2100. These findings indicate significant fluctuations in expenses and claims incurred by both insurers over the study period. In contrast, Awash Insurance Company demonstrated the lowest fluctuation in combined ratios, with a standard deviation of 0.07021, suggesting relatively stable expense and claims management practices throughout the analyzed timeframe.

6.1.3.2. Testing of Hypothesis:

ANOVA: Two-Factor without Replication was used to see if the combined ratios calculated and given in table-8 for the selected insurers were statistically significant between the insurance companies and over the study period.

H03. There is no statistically significant difference in terms of the combined ratio between the insurance companies and with-in the years over the period of 10 years.

| Table-10 ANOVA Two-Factor Without Replication for combined ratio | | | | | | |
|--|--------|---------|--------|--------|---------|--------|
| Source of Variation | SS | df | MS | F | P-value | F crit |
| Between companies | 0.7690 | 7.0000 | 0.1099 | 5.8921 | 0.0000 | 2.1588 |
| With-in the years | 0.4566 | 9.0000 | 0.0507 | 2.7209 | 0.0096 | 2.0322 |
| Error | 1.1746 | 63.0000 | 0.0186 | | | |
| Total | 2.4002 | 79.0000 | | | | |

The ANOVA (Analysis of Variance) Two-Factor Without Replication test was conducted to examine the statistical significance of differences in combined ratios between insurance companies and within individual years over a 10-year period. The results are summarized as follows:

- **Between Companies Analysis:**

The calculated F-statistic is 5.8921 with a corresponding p-value of 0.0000, which is less than the significance level of 0.05. This indicates a statistically significant difference in combined ratios between insurance companies.

• **Within Years Analysis:**

The calculated F-statistic is 2.7209 with a corresponding p-value of 0.0096, which is less than the significance level of 0.05. This suggests a statistically significant difference in combined ratios within individual years.

The p-values for both the between companies and within years variations are less than the significance level ($\alpha=0.05$), indicating that we reject the null hypothesis (H03). Therefore, there is a statistically significant difference both between insurance companies and within the years in terms of the combined ratio over the period of 10 years. This suggests that both inter-company differences and temporal variations within the years significantly contribute to differences in the combined ratio.

6.1.4. Return on Equity

The return on equity (ROE) stands as a fundamental metric in evaluating the financial performance and efficiency of a company, particularly within the insurance industry. This ratio provides a clear insight into the profitability generated by the capital invested by shareholders. By assessing how effectively the shareholder's equity is utilized to generate profits, ROE serves as a key indicator of management efficiency and financial health. Calculated as the percentage of net profit, after accounting for interest and taxes, divided by the equity share capital, ROE offers a quantitative measure of the company's ability to generate returns on shareholder investments. ROE serves as a crucial tool for investors and stakeholders in assessing the financial performance and potential of insurance companies as higher ROE signifies that the insurance company has achieved greater profitability.

Table-11 ROE analysis of selected insurance companies (Figures in percentage)

| Insurers | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Mean |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Awash | 29.11 | 23.99 | 28.73 | 43.02 | 30.11 | 30.27 | 28.68 | 26.35 | 13.02 | 13.77 | 26.70 |
| Africa | 19.70 | 16.21 | 16.04 | 14.76 | 16.78 | 13.02 | 11.98 | 15.57 | 15.51 | -0.90 | 13.87 |
| EIC | 28.68 | 30.29 | 36.52 | 42.32 | 46.54 | 53.13 | 25.42 | 27.15 | 25.23 | 31.38 | 34.67 |
| Nile | 25.19 | 20.27 | 21.41 | 22.67 | 29.40 | 16.96 | 6.97 | 27.90 | 13.86 | 21.35 | 20.60 |
| Oromia | 19.4 | 22.4 | 21.45 | 33.08 | 24.4 | 32.8 | 20.2 | 18.6 | 24.3 | 23.1 | 24.00 |

| | | | | | | | | | | | |
|--------|-----------|-----------|-------|-------|-----------|-----------|-----------|-----------|-----------|-----------|-------|
| | 1 | 0 | | | 7 | 4 | 8 | 3 | 3 | 5 | |
| United | 17.8 1 | 22.1 6 | 25.65 | 26.42 | 24.9 4 | 26.1 4 | 17.2 3 | 28.1 1 | 23.3 2 | 23.8 3 | 23.56 |
| Nyala | 23.8 7 | 23.7 2 | 25.62 | 29.60 | 25.5 2 | 28.6 5 | 20.1 1 | 26.5 9 | 19.8 8 | 20.1 4 | 24.37 |
| Nib | 27.6 7 | 24.7 9 | 29.17 | 27.57 | 27.9 9 | 20.3 3 | 12.7 7 | 16.1 3 | 17.4 1 | 24.1 5 | 22.80 |
| Mean | 17.4 5 | 21.0 4 | 25.57 | 29.93 | 28.2 2 | 27.6 7 | 17.9 3 | 23.3 0 | 19.0 7 | 19.6 1 | |

Regarding the trends of the return on equity percentages:

- With respect to year-to-year trends in ROE, there is a fluctuating trend in ROE over the years among the selected insurers. Notable spikes or drops in ROE occur periodically, suggesting varying levels of profitability and financial stability.
- Awash, EIC, Nile, Nyala, and Nib generally maintain relatively higher ROE across the observed years. Some insurers, like EIC and Nile, show an increasing trend in ROE over the years, indicating improving financial performance.

6.1.4.1. Statistical Analysis of Return on Equity

In order to validate the stated hypothesis, the study employs both descriptive statistics, as outlined in Table-12 and the results derived from Analysis of Variance (ANOVA), presented in Table-13. These statistical analyses specifically focus on the Return on equity ratios derived from the CAMEL framework across the selected insurers.

Table-12 Descriptive Statistics of Return on equity ratio

| Insurance Company | N | Minimum | Maximum | Mean | | Std. Deviation |
|-------------------|-----------|-----------|-----------|-----------|------------|----------------|
| | Statistic | Statistic | Statistic | Statistic | Std. Error | Statistic |
| EIC | 10 | .2523 | .5313 | .346660 | .0305637 | .0966511 |
| Awash | 10 | .1302 | .4302 | .267050 | .0272103 | .0860464 |
| Nile | 10 | .0697 | .2940 | .205980 | .0211309 | .0668219 |
| Africa | 10 | -.0090 | .1970 | .138670 | .0176843 | .0559226 |
| Nyala | 10 | .1988 | .2960 | .243700 | .0110734 | .0350171 |
| United | 10 | .1723 | .2811 | .235610 | .0114034 | .0360606 |
| Oromia | 10 | .1863 | .3308 | .25855 | .0599320 | .0475216 |

| | | | | | | |
|-----|----|-------|-------|---------|----------|----------|
| Nib | 10 | .1277 | .2917 | .227980 | .0182577 | .0577358 |
| | | | | | | |

Based on the descriptive statistics presented in Table-12, notable variations in the mean and standard deviation of Return on equity ratio among the insurers are evident.

Ethiopian Insurance Corporation (EIC) has a mean return on equity (ROE) of approximately 34.67% with a standard deviation of around 9.67%. This relatively high standard deviation indicates significant variability in EIC's ROE, suggesting fluctuations in performance compared to other insurers. Nyala Insurance exhibits a mean ROE of approximately 24.37% with a standard deviation of around 3.50%. The low standard deviation suggests minimal variability in Nyala's ROE, indicating consistent and stable performance over the observed period.

6.1.4.2. Testing of Hypothesis:

ANOVA: Two-Factor Without Replication was used to see if the Return on equity ratios calculated and given in table-10 for the selected insurers were statistically significant between the insurance companies and over the study period.

H04: There is no statistically significant difference in terms of the return on equity (ROE) between the insurance companies and with-in the years over the period of 10 years.

| Table-13 ANOVA: Two-Factor Without Replication Return on equity ratio. | | | | | | |
|--|-----------|---------|----------|--------|---------|--------|
| Source of Variation | SS | df | MS | F | P-value | F crit |
| Between companies | 2740.4296 | 7.0000 | 391.4899 | 5.5771 | 0.0000 | 2.1588 |
| With-in the years | 1528.1596 | 9.0000 | 169.7955 | 2.4189 | 0.0199 | 2.0322 |
| Error | 4422.3117 | 63.0000 | 70.1954 | | | |
| Total | 8690.901 | 79 | | | | |

The ANOVA (Analysis of Variance) Two-Factor Without Replication test was conducted to assess the statistical significance of differences in return on equity (ROE) ratios between insurance companies and within individual years. The results are summarized as follows:

- **Between Companies Analysis:**

The calculated F-statistic is 5.5771 with a corresponding p-value of 0.0000, which is less than the significance level of 0.05. This indicates a statistically significant difference in ROE ratios between insurance companies.

- **Within Years Analysis:**

The calculated F-statistic is 2.4189 with a corresponding p-value of 0.0199, which is less than the significance level of 0.05. This suggests a statistically significant difference in ROE ratios within individual years.

Hence, the p-values for both the between companies and within years variations are less than the significance level ($\alpha=0.05$), indicating that we reject the null hypothesis (H04). Therefore, there is a statistically significant difference both between insurance companies and within the years in terms of the return on equity over the period of 10 years. This suggests that both inter-company differences and temporal variations within the years significantly contribute to differences in the return on equity ratio.

7. Conclusion

Based on the foregoing discussion, it can be stated that the company's performance in terms of earning and profitability parameters was found to be quite good in majority of the points.

Analysis of the descriptive statistics for the loss ratio reveals significant variations in both mean loss ratios and standard deviations among the insurers examined. These findings underscore the diverse performance levels in managing loss ratios, which have implications for risk management practices, financial stability, and profitability within the insurance industry.

The ANOVA result in relation to the expense suggest that while there are disparities in expense ratios among insurers, there is no consistent trend of change in expense ratios over time within the study period. This highlights the importance of considering both inter-company variations and intra-year fluctuations when assessing expense management practices within the insurance industry. Further research and analysis may be warranted to explore the underlying factors driving differences in expense ratios among insurers and to identify potential opportunities for improving expense management efficiency.

The analysis of combined ratio scores across the ten-year study period provides valuable insights into the financial performance and risk management practices of insurers. The consistent trend of combined ratios falling below 100 percent indicates a generally sound financial position for the industry as a whole. However, the slight

deviation observed in Africa Insurance Company's mean combined ratio, exceeding 100 percent, suggests potential challenges in maintaining profitability due to losses and expenses outweighing income.

The analysis of return on equity percentages among insurers reveals distinct trends over the years, influenced by various factors including financial performance, market conditions, and management strategies. While each insurer's return on equity percentages fluctuates over time, these variations underscore the dynamic nature of the insurance industry.

8. Recommendations

In relation to the claim costs (loss ratio), Insurers with higher mean loss ratios should focus on enhancing their claim cost management strategies to reduce incurred claims relative to earned premiums, thereby improving their overall profitability. Insurers with higher standard deviation values should strive to achieve greater consistency in their loss ratio performance. This entails implementing measures to reduce variability in claim management effectiveness over time, ensuring more stable financial outcomes.

Given the potential impact of external factors on expense ratios, insurers should prioritize risk mitigation strategies to buffer against unforeseen challenges. This may include diversifying revenue streams, maintaining adequate reserves, and investing in business continuity planning to ensure financial resilience in times of economic uncertainty. Private insurers can learn from EIC's success in expense management by benchmarking their performance against EIC's practices. Analyzing EIC's strategies for cost containment and operational efficiency can provide valuable insights for private insurers seeking to enhance their own expense management capabilities.

Insurers experiencing significant fluctuations in combined ratios, such as Nyala Insurance and Nib Insurance, should focus on optimizing their expense management practices. This could include reviewing cost structures, identifying areas for efficiency improvements, and exploring opportunities for cost reduction without compromising service quality.

EIC and awash demonstrate impressive mean ROE figures of around 34.67% and 26.71%, respectively. Nevertheless, their relatively high standard deviations of approximately 9.67% and 8.60% suggest notable fluctuations in ROE performance. To bolster stability, management of these insurers should prioritize strategies to mitigate factors contributing to this variability. This could include refining risk management practices, diversifying revenue streams, and optimizing operational

efficiency. Such measures are vital for ensuring sustained performance and resilience in dynamic market conditions.

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