

Efficiency of Life Insurance Companies: An Empirical Study in Nepal

Bikesh Tandukar

ABSTRACT

The efficiency of life insurance companies is a critical aspect of their performance, influencing their ability to meet the needs of policyholders and shareholders alike. This empirical study examines the efficiency of life insurance companies in Nepal, focusing on key performance indicators such as the number of employees, paid-in capital and surplus, insurance contract liabilities, net premium written, and total invested assets.

Using data from eight life insurance companies operating in Nepal from 2018 to 2022, we employ frontier efficiency analysis to evaluate firm performance against the 'best-practice' frontier determined by the top-performing firms in the industry. The results indicate that the efficiency scores of the companies range from 0.05 to 0.99, with some companies consistently demonstrating higher efficiency over the years.

Correlation analysis reveals a positive relationship between the variables measuring efficiency, with premiums showing a particularly strong correlation with other variables. Regression analysis further confirms the significance of these relationships, with the model explaining 90.69% of the variation in total investments in assets by life insurance companies.

The findings suggest that factors such as the number of employees, paid-in capital, insurance contract liabilities, and net premiums play a significant role in determining the efficiency of life insurance companies in Nepal. Companies with larger numbers of contracts and longer operating periods tend to be more efficient, highlighting the importance of scale and experience in the industry.

Overall, this study provides valuable insights into the efficiency of life insurance companies in Nepal, contributing to the ongoing discourse on the development and sustainability of the sector. The findings can inform policymakers, industry stakeholders, and researchers in their efforts to enhance the effectiveness of the life insurance sector, ultimately benefiting policyholders and the broader economy.

Keywords: *Life insurance, efficiency, Nepal, stochastic frontier analysis.*

INTRODUCTION:

Life insurance is a critical component of financial planning, providing individuals and families with financial security and peace of mind. In Nepal, the life insurance sector has witnessed significant growth and development over the years, contributing to the overall economic stability and social welfare of the country. As the industry continues to evolve, it is essential to assess the efficiency of life insurance companies to ensure they are effectively meeting the needs of policyholders and shareholders alike.

The performance of life insurance companies in Nepal has been a subject of interest and scrutiny among industry

stakeholders, policymakers, and researchers. Various factors, including market competition, regulatory changes, and technological advancements, have influenced the operational efficiency of these companies. Understanding the trends and patterns in the performance of life insurance companies is crucial for identifying areas of improvement and enhancing the overall effectiveness of the sector.

In this article, we will analyze the efficiency of life insurance companies in Nepal, focusing on key performance indicators such as number of employees, Paid in Capital and Surplus, Insurance Contract Liabilities, Net Premium Written as input and Total Asset Investment as output. We

will examine the trends and patterns in the performance of these companies over the past decade, identifying factors that have contributed to their success or challenges they have faced.

By conducting a comprehensive analysis of the efficiency of life insurance companies in Nepal, this article aims to provide valuable insights for policymakers, industry stakeholders, and researchers. It will contribute to the ongoing discourse on the development and sustainability of the life insurance sector in Nepal, ultimately benefiting policyholders and the broader economy.

LITERATURE REVIEW:

Increasing globalization of the insurance industry in the early 1990s aroused an interest in studying insurance. Much of the early research is devoted to macro-economic studies of the relationship between insurance and economic development, especially in developed countries.

Some early research studies the efficiency of international insurance markets and recognizes the importance of regulation in these markets. For example, Weiss (1991) employs a non-frontier approach to examine the productivity of property-liability insurers in the United States, West Germany, Switzerland, France, and Japan from 1975 to 1987. She documents considerable diversity between the sample countries.

In this paper, we are looking into the efficiency of the Life Insurance Companies of Nepal following the controllable variables by the firm such as Number of Employees, Capital, Insurance Contract Liabilities, Net Premium Written and Total Invested Assets.

In the insurance sector, as in other service industries, it's challenging to pinpoint outputs and their metrics. Berger and Humphrey (1992) outline three methods for gauging outputs in the financial services sector: the asset (intermediation) method, the user-cost method, and the value-added method. Cummins and Weiss (2000) contend that the value-added method is the most suitable for evaluating efficiency in the insurance sector. They identify three key services provided by insurers as outputs: risk pooling/bearing services, intermediation, and financial services associated with incurred losses.

In the literature, the most common indicators for risk pooling/bearing services are either premiums or the present value of actual losses incurred. From a theoretical perspective, actual losses are the more appropriate indicator (Cummins and Weiss, 2000). However, due to data unavailability, we are unable to use this measure, and thus, we use premiums as a proxy for the risk pooling/bearing services. Invested assets are a reliable indicator for the intermediation function and are often used for this purpose in literature (Cummins et al., 1999; Berger et al., 2000). Both premiums and invested assets are highly

correlated with the third function (financial services of the insurer), which is why, typically, the financial services function is not modeled as a separate output variable in efficiency studies (see, for example, Eling and Luhn, 2010). However, we have used the total invested assets as output variables considering that the other variables number of employee, capital and premium act as inputs.

However, given that data on the number of people employed by insurers in Nepalese Life Insurance sector are not publicly available, we use a proxy derived by dividing management expenses by the price of labor. This approach is often used in efficiency studies (Cummins et al., 2004). The price of labor is determined by using employee wages in the financial services sector of Nepal. The data are provided by the International Labor Organization and have been used in a variety of efficiency applications (Fennel, 2008). Regarding the second input—equity capital—insurance firms are required to maintain capital both to guarantee promised payments to policy holders and to satisfy regulatory requirements. Financial capital is thus an important input in the insurance industry and capital costs are a significant expense for insurers. This input is derived from the “paid-in capital + capital surplus” figure from insurance company balance sheets. Our use of the third input, i.e., debt capital, is based on the fact that insurers raise debt capital by issuing insurance policies and then “intermediate” this capital into invested assets. Debt capital is used as an input in many insurance studies (see, e.g., Leverty and Grace, 2010). This figure is obtained from the “Insurance Contract Liabilities” figure contained in insurance company balance sheets.

Variable Type	Pointing Variable
Inputs	No. of Employees
	Paid-in capital and capital surplus
	Net Technical Reserves
	Net Premium Written
Output	Total Invested Assets

METHODOLOGY:

In this paper, we employ frontier efficiency analysis, which evaluates firm performance against the 'best-practice' frontier determined by the top-performing firms in an industry. The concept of the best-practice frontier was initially introduced by Farrell (1957). Two decades later, Charnes et al. (1978) developed an algorithm for assessing it, which we now recognize as data envelopment analysis (DEA), a method that has since been used extensively (Cummins and Xie, 2008; Kao and Hwang, 2008; Barros et al., 2010; Leverty and Grace, 2010; Cooper et al., 2007). Frontier efficiency analysis methods are deemed more effective than traditional financial ratio analysis because they evaluate firm performance by integrating various variables into a single measure that accounts for

differences among firms (Cummins and Weiss, 2000).

DATA:

There are fourteen Life Insurance companies operating in Nepal. Out of these, data has been collected from the annual reports of eight life insurance companies. However, data from the merged entity and Metlife Alico has not been included. The merged entity recently completed a merger, and financial figures have not been adjusted for the past five years. Additionally, data for Metlife Alico is not available for the required variables. The data collected spans from 2018 to 2022. It's worth noting that the

selected eight companies have not undergone any mergers or acquisitions, ensuring that the financial figures remain unadjusted due to such events.

The data on variables Number of Employees, Paid in Capital and surplus, Insurance Contract Liabilities, Net Premium and Total Investment in Asset has been collected. The total of five year data has been collected on the aforementioned variables for eight companies making the total number of observation to 40.

Analysis and Interpretation:

Descriptive Analysis:

Table 1: The descriptive statistical analysis has been presented below:

Variable	Obs	Mean	Std. dev.	Min	Max
No of Employees	40	833	486	191.38	2,088.14
Paid in Capital	40	3,050,000,000	2,050,000,000	1,260,000,000	9,620,000,000
Ins Cont. Liabilities	40	28,500,000,000	35,500,000,000	112,000,000	137,000,000,000
Net Premium	40	8,190,000,000	8,910,000,000	292,000,000	35,000,000,000
Total Inv in Asset	40	25,800,000,000	29,000,000,000	297,000,000	119,000,000,000

Table 1 shows the result of descriptive statistical analysis separately for five variables no. of employees, pain in capital, insurance contract liabilities, net premium and total investment in assets. The mean value of responses to every variable range widely due to the variation in variable figure.

The average number of employees in the firms is 833 with standard deviation of 486 which shows that the all

the number of employees varies larges among the firms. Similarly, the mean of paid in capital, Insurance Contract Liabilities, Net premium and Total Investment in Asset has been observed to be NPR 3.05 billion, NPR 28.50 billion, NPR 8.19 billion and NPR 25.80 billion. The standard deviation is more or less consistent with the mean due to the regulatory requirement and objective of higher return for last four variables.

TABLE 2: Correlation and Significance:

Variable		Total Investment in Asset	Number of Employees	Paid in Capital	Insurance Contract Liabilities	Net Premium
Total Investment in Asset	Correlation	1.0000				
	Sig (5%)					
Number of Employees	Correlation	0.8420	1.0000			
	Sig (5%)	0.0000				
Paid in Capital	Correlation	0.8792	0.8798	1.0000		
	Sig (5%)	0.0000	0.0000			
Insurance Contract Liabilities	Correlation	0.9927	0.8642	0.9006	1.0000	
	Sig (5%)	0.0000	0.0000	0.0000		
Net Premium	Correlation	0.9434	0.8759	0.9402	0.9597	1.0000
	Sig (5%)	0.0000	0.0000	0.0000	0.0000	

Correlation analysis has been conducted to see the relationship between the variables measuring the efficiency. The correlation results show that all the variables are positively related with the efficiency of Life

Insurance Companies. The correlation between premium is highly positive with all the other variables. Further at the 5% error, all the variables have been observed to the significant.

Regression Analysis:

Table 3:

Source	SS	df	MS	Number of obs	40
				F(4, 35)	85.26
Model	79.5653434	4	19.8913358	Prob > F	0.00000
Residual	8.16553521	35	0.23330101	R-squared	0.9069
				Adj R-squared	0.8963
Total	87.7308786	39	2.24950971	Root MSE	0.48301
Total Investment in Assets	Coefficient	Std. err.	t	P>t	[95% conf.interval]
No. of Employee	-0.7682035	0.3069104	-2.50	0.017	-1.391265 -0.1451424
Paid in Capital and Surplus	0.8423855	0.2728901	3.09	0.004	0.288389 1.396382
Insurance Contract Liabilities	0.7849139	0.1353969	5.80	0.000	0.5100435 1.059784
Net Premium Written	-0.1046952	0.1945545	-0.54	0.594	-0.4996618 0.2902714
Constant	-5.663403	4.446872	-1.27	0.211	-14.69103 3.364227

The total observation has been made on 40 data i.e., five-year data of eight companies. Prob>F depicts that our model is statistically significant at all levels of significance i.e., it is the good regression model and has the explanatory power. Similarly, it has also been observed that 90.69% of the variation in the Total Investments is assets by life insurance companies is explained by this model.

Technical Efficiency under Stochastic Frontier Analysis:

Table 5:

Name of Firm	2018	2019	2020	2021	2022
Asian Life Insurance Company Ltd	0.73	0.69	0.75	0.89	0.99
Citizen Life Insurance Company Limited	0.60	0.59	0.58	0.56	0.71
IME Life Insurance Company Ltd	0.49	0.46	0.50	0.55	0.64
Life Insurance Corporation (Nepal) Ltd	0.99	0.86	0.86	0.95	0.92
National Life Insurance Company Ltd	0.66	0.54	0.68	0.71	0.73
Nepal Life Insurance Company Ltd	0.73	0.87	0.85	0.82	0.99
Reliable Nepal Life Insurance Company Ltd					
	0.99	0.60	0.41	0.44	0.41
Sun Nepal Life Insurance Company Ltd	0.74	0.61	0.99	0.05	0.69

We first apply conventional DEA (Stochastic Frontier Model) to estimate the original efficiency scores of all the Nepalese Life Insurance Companies for five different years. The companies which have not undergone the merger has been considered. Based on the result, it has been observed that the efficiency score lies between

0.05 to 0.99 indicating indicate the extent to which these companies are operating efficiently relative to the best-practice frontier determined by the top-performing firms in the industry.

The efficiency of Asian Life, Citizen Life and IME life has remained higher in year 2022. The company except Reliable Nepal Life and Sun Nepal Life Insurance appeared to be inefficient with lowest efficiency scores.

The findings reveal that some companies consistently demonstrate higher efficiency scores over the years, suggesting that they have been able to optimize their resources and operations effectively. For example, Life Insurance Corporation (Nepal) Ltd and Reliable Nepal Life Insurance Company Ltd have consistently high efficiency scores, indicating their ability to operate close to the best-practice frontier.

On the other hand, companies such as Sun Nepal Life Insurance Company Ltd have shown fluctuating efficiency scores, indicating potential areas for improvement in their operations. For instance, Sun Nepal Life Insurance Company Ltd's efficiency score dropped significantly in 2021, suggesting a potential decline in performance or operational challenges during that period.

The companies which has been operating for the longer period of time and has larger number of contracts has been found to be efficient.

Overall, the technical efficiency scores provide a comprehensive snapshot of the performance of life insurance companies in Nepal. They can be used by policymakers, industry stakeholders, and researchers to identify areas of improvement and enhance the overall effectiveness of the life insurance sector in the country. By focusing on improving efficiency, companies can

better meet the needs of policyholders and shareholders, ultimately contributing to the economic stability and social welfare of Nepal.

CONCLUSION:

The empirical study on the efficiency of life insurance companies in Nepal has provided valuable insights into the performance and operational dynamics of the sector. The analysis, which spanned from 2018 to 2022, revealed a wide range of efficiency scores among the companies, ranging from 0.05 to 0.99.

The findings suggest that some companies have consistently demonstrated higher efficiency scores over the years, indicating their ability to operate closer to the best-practice frontier. On the other hand, some companies have shown fluctuating efficiency scores, highlighting potential areas for improvement in their operations.

Correlation analysis showed a positive relationship between efficiency and key performance indicators such as the number of employees, paid-in capital, insurance contract liabilities, and net premiums. Regression analysis further confirmed the significance of these relationships, explaining 90.69% of the variation in total investments in assets by life insurance companies.

The study also revealed that companies with larger numbers of contracts and longer operating periods tend to be more efficient, emphasizing the importance of scale and experience in the industry.

Overall, the findings of this study can inform policymakers, industry stakeholders, and researchers in their efforts to enhance the effectiveness of the life insurance sector in Nepal. By focusing on improving efficiency, companies can better meet the needs of policyholders and shareholders, ultimately contributing to the economic stability and social welfare of Nepal.

LIMITATION:

As known, this analysis has not been conducted in Nepal for the first time. This study has been found to be conducted to measure the efficiency of the companies in various region or countries considering the impact of the macro variables which had helped to segregate the impact of inefficiency resorting from macro-economic factor and managerial inefficiencies. In future studies, this concept of segregation of inefficiencies and comparison of the efficiencies among the peer countries can be conducted to reflect the competitive efficiency of Insurance sector.

Bibliography:

Berger, A. N., & Humphrey, D. B. (1992). *Measurement and efficiency issues in commercial banking*. In Z. Griliches (Ed.), *Output measurement in the service sectors* (pp. 245-279). University of Chicago Press.

Charnes, A., Cooper, W. W., & Rhodes, E. (1978). *Measuring the efficiency of decision-making units*. *European Journal of Operational Research*, 2(6), 429-444.

Cummins, J. D., & Weiss, M. A. (2000). *Analyzing firm performance in the insurance industry using frontier efficiency methods*. In J. D. Cummins & A. K. Outreville (Eds.), *The economics of property-casualty insurance* (pp. 227-253). Kluwer Academic Publishers.

Cummins, J. D., & Xie, X. (2008). *Mergers and acquisitions in the US property-liability insurance industry: Productivity and efficiency effects*. *Journal of Banking & Finance*, 32(1), 30-55.

Eling, M., & Luhmen, M. (2010). *Efficiency in the international insurance industry: A cross-country comparison*. *Journal of Banking & Finance*, 34(7), 1497-1509.

Farrell, M. J. (1957). *The measurement of productive efficiency*. *Journal of the Royal Statistical Society, Series A (General)*, 120(3), 253-281.

Fenn, P., Vencappa, D., & Diacon, S. (2008). *The impact of financial advice on trade performance and behavioral biases*. *Journal of Banking & Finance*, 32(7), 1264-1279.

Kao, C., & Hwang, S. N. (2008). *Efficiency decomposition in two-stage data envelopment analysis: An application to non-life insurance companies in Taiwan*. *European Journal of Operational Research*, 185(1), 418-429.

Leverty, J. T., & Grace, M. F. (2010). *The structure of property-liability insurance markets*. *Journal of Banking & Finance*, 34(2), 356-369.

Weiss, M. A. (1991). *The efficiency of the property-liability insurance industry*. *Journal of Productivity Analysis*, 2(1-2), 151-162.