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Research Article

A Comparative Study on Capital Adequacy and Liquidity Parameters between LIC and Selected Private Life Insurers of India

T. Geeta Madhuri Naidu[1], Prof. A. Narasimha Rao[2]
[1]*Assistant Professor, GITAM School of Business, GITAM University*
[2]*Principal, College of Arts and Commerce, Andhra University*

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ABSTRACT

The life insurance industry plays a crucial role in ensuring financial security for loved ones in the event of an untimely demise. In India, this sector has witnessed remarkable growth in recent years. However, insurers face challenges like increase in competition, strict regulatory requirements, policy lapses, low persistency ratios and raise in customers' expectations. Cyber security threats and data privacy concerns add further risks, while inflation, economic uncertainty, and rising mortality rates increase claims and reduce capital. In this challenging environment, life insurers must balance maintaining adequate liquidity and capital with the need for meeting regulatory compliance, maintaining solvency, protecting policyholders, and sustaining business operations over time. Hence, an understanding of the performance of the life insurers is necessary for different stakeholders for taking key decisions. This study aids marketers, academicians, and policymakers in evaluating the performance of life insurers for taking critical decisions.

This study primarily measures the capital adequacy and liquidity performance of the selected private life insurers and the public insurer LIC over ten years, from 2013 to 2022. Key factors considered include capital to total assets, capital to technical reserves, solvency margin, liquid assets to current liabilities and liquid assets to total assets ratios. Statistical tools including mean, standard deviation, and Mann Whitney U test were employed. The analysis highlights that the performance of the LIC has been superior to that of private life insurers in the capital-to-total assets and capital-to-technical-reserves ratios. On the other hand, private life insurers outperform the LIC in the solvency, liquid assets to current liabilities and liquid assets to total assets ratios.

Keywords: Life Insurance, Capital, Liquid Assets, Total Assets, Technical Reserves, Current Liabilities, Solvency Margin.

INTRODUCTION

The Indian life insurance industry is one among the world's largest insurance industries. It has grown remarkably over the years due to increased awareness, support from the government and economic progress. The Insurance sector is regulated by the Insurance Regulatory and Development Authority of India (IRDAI). Currently, the Indian life insurance market consists of 26 companies, including the state-owned Life Insurance Corporation of India (LIC) and 25 private insurers. LIC, founded in 1956, has been the leading insurer for decades. It is known for its wide reach and public trust. However, since the insurance industry opened to private players in 2000, companies like HDFC Life, ICICI Prudential, SBI Life, Max Life, Bajaj Allianz Life and others have gained a strong presence by offering new products and focusing on customer needs.

The life insurance sector currently contributes 4% to India's GDP and holds substantial potential for further expansion. Growth in this industry is driven by factors such as rising incomes, a young population, and evolving customer preferences. A crucial aspect of the industry's financial stability is capital adequacy and liquidity

performance. Therefore, this study aims to assess the financial soundness of insurers in terms of their ability to fulfill policyholder commitments, manage financial risks, and maintain long-term sustainability.

REVIEW OF LITERATURE

Worku et al. [1] studied the factors influencing the profitability of insurance companies in Ethiopia. They studied nine insurance companies over the period from 2011 to 2020. They used classical linear regression model with ordinary least squares estimation and identified key determinants of profitability at a 5% level of significance.The findings revealed that the age of the company, asset tangibility, company size, managerial efficiency, leverage ratio, premium growth, and GDP exhibited a positive relationship with return on assets. On the other hand, the loss ratio and inflation had a negative relationship with return on assets.

Zimik et al. [3], studied the factors affecting the financial success of public and private life insurers in India. Their study considered both traditional financial indicators and non-monetary indicators. They studied ten insurers, including LIC and nine commercial firms, from 2015-16 to 2019-20. Using secondary data sources, the study employed descriptive statistics, multiple linear regression, and correlation analyses to evaluate the impact of liquidity, leverage, solvency, and workforce size on financial performance. Findings revealed significant differences in Return on Equity and Expense Ratio between public and private insurers. Return on Assets showed no notable variation.

Rohilla et al. [4], emphasized the crucial role of financial stability, in the insurance sector for the economic health of a nation. The Indian insurance industry has seen significant growth recently. This expansion has been driven by customer-centric approaches and transparent financial reporting. Regulatory changes have highlighted the need for evaluating insurers' financial solvency and operational efficiency. Their study examined the financial performance of six leading life insurers in India using the CARAMEL approach and a two-tailed analysis.

Ketankumar G Sumesara [5], analysed and compared the financial soundness and efficiency of the Indian General Insurance Company and the Bajaj Allianz General Insurance co. ltd. They used CARAMEL Framework and Independent Samples T-test as a statistical tool to compare the financial efficiency between the companies. The results showed that the companies performed and reacted differently to economic challenges and risks.

Kamaleshwar Rao S and K. Hanumantha Rao [7], studied the financial performance of three life insurers from India namely LIC of India, SBI Life and ICICI Prudential Life using ratios in CARAMEL approach and One Way ANOVA. Their study relies on secondary data extracted from the annual reports of the selected companies covering a ten-year period from 2009 to 2018. The results indicated a significant difference in CARAMEL indicators during the study period at 5% significance level. The hypotheses were rejected, concluding that all CARAMEL indicators showed significant variation among the selected insurers. Additionally, it was observed that premium income was the primary revenue source for all insurers, with SBI and ICICI showing strong underwriting capacities.

R. Radhika and Ramesh Kumar Satuluri [8], focused on the key indicators which influenced the operations of life insurers and also studied the factors that influenced ROI. The paper says that, on the investment front, profitability of the life insurers largely depends on their Assets under management. Technological disruptions, Intelligence and IOT are transforming various functions within insurance companies. Investing in digital and Robotic underwriting will save huge money for companies. Companies use technology to bring in efficiency and scalability in operations, thus leading to an increase in the ROI for the investors.

Chandan [9], aimed to study the expansion of the Indian life insurance industry after the entry of private insurers as a result of reforms. Their study showed that the private sector showed higher growth in total premium compared to public sector, while both sectors showed a decline in the number of policies issued during the study period. Additionally, the life insurance industry expanded its reach to regions beyond metropolitan and urban areas.

Shilpa Agarwal and A. K. Mishra [10], studied the LIC's performance in both the pre- and post-liberalization eras. They projected its future business trends amidst intense competition. Their analysis revealed that LIC has been experiencing growth in its business, indicating significant potential for further expansion in the life insurance sector.

Dar and Bhat [11], assessed the financial performance of selected public and private life insurance companies. To evaluate financial performance and soundness, three key parameters from the CARAMEL model were applied. They used a set of financial ratios to analyze insurer's financial and statistical returns.

Bawa and Chattha [12], analyzed the financial performance of 18 life insurance companies in India over a five-year period from 2007-08 to 2011-12. Using multiple regression analysis, they found that the profitability of life insurers was positively impacted by liquidity and company size but negatively affected by capital. However, no significant relationship was observed between profitability and solvency or insurance leverage.

Sharma Vikas and Chowhan Sudhinder Singh [13], analyzed the performance of public and private life insurance companies in India, using data from 2006-07 to 2011-12. They used statistical tools such as percentages, ratios, growth rates, and the coefficient of variation to assess industry trends. The findings revealed that LIC continued to dominate the sector, while private insurers actively sought to expand their market share. Compared to LIC, private life insurers relied more on new business marketing channels. Differences were observed in the investment patterns of LIC and private insurers. Despite facing significant losses, private insurers maintained a stronger solvency ratio than LIC. However, their lapsation ratio was higher, while LIC demonstrated better efficiency in servicing death claims.

Gour and Gupta [14], analyzed the solvency ratio of Indian life insurance companies over a three-year period from 2009-10 to 2011-12. Their study examined whether the performance of different insurers was similar or exhibited significant differences. Companies were ranked based on their solvency ratios. ICICI stood as the best among the selected insurers, followed by Birla Sun Life, SBI, HDFC, and LIC. The study also highlighted that the solvency of life insurers is influenced by returns from total investible funds and prevailing interest rates.

Alamelu [15], analysed the financial soundness of all existing life insurance companies in India during the periods from 2005-06 to 2007-08. The evaluation was based on 14 Financial Soundness Indicators recommended by the IMF. The indicators used are capital adequacy, asset quality, reinsurance, management soundness, earnings and profitability, liquidity, and solvency ratios. The study concluded that the financial soundness of Indian life insurance companies was satisfactory during the selected period.

Harpreet Singh Bedi and Preeti Singh [16], studied the overall performance of the Indian life insurance sector comparing the pre- and post-economic reform eras. Their research assessed the industry's current status, competition levels, challenges faced by the Life Insurance Corporation of India (LIC), and the effectiveness of LIC's investment strategy from 1980 to 2009. They highlighted LIC's role as the dominant player in the life insurance sector and how economic liberalization (LPG policy) contributed to the industry's growth. Findings revealed that LIC's total investments raised from ₹4,587.7 crores in 1979 to ₹7,62,891.7 crores in 2009. However, the proportion of total industry premiums collected by LIC declined from 97% in 2001-02 to 74% in 2007-08, indicating rising competition from private insurers. ICICI Prudential, in particular, emerged as a strong competitor, capturing a significant share of LIC's business through its flexible product offerings. Despite these challenges, the study emphasized that the life insurance sector still holds vast potential for development, with private insurers posing an increasing challenge to LIC's market dominance.

Murthy R. Babu and Ansari [17], studied the impact of globalization and economic liberalization on the LIC of India. They aimed to study the growth and development of LIC before and after liberalization. Their study revealed that the Indian life insurance industry has expanded significantly following the introduction of private players and the LIC's market share has gradually declined over the years. The researchers suggested that LIC should adopt a more effective marketing strategy, introduce innovative products, and enhance customer service to retain existing policyholders and attract new customers.

Tripathi [18], made a comparative study on the financial performance of LIC and private life insurers. The comparison was based on factors such as size, growth, productivity, and grievance handling mechanisms. They concluded that LIC holds a vast customer base and remains a dominant brand due to its long-established presence. But it lacks an aggressive and superior marketing strategy compared to private insurers.

Krishnamurthy, Mony, Jhaveri, Bakhshi, Bhat, and Dixit [19], studied the growth and status of the Indian insurance industry post-liberalization. Their research also explored future challenges and opportunities within the sector. Their study emphasized that the industry's future growth will depend on how effectively insurers meet

customer expectations, reshape consumer perceptions, and raise awareness about insurable risks. Additionally, they highlighted that insurers hold responsibilities not only towards the broader social sector but also in catering to the needs of rural communities.

Tapan Sinha [20], aimed to explore the current status and future prospects of the insurance industry. His analysis focused on key aspects such as overall expenses as a percentage of premium income, the rural share of the life insurance business, and the investment portfolio of the Life Insurance Corporation from 1980 to 2000. The study concluded that India would emerge as an attractive insurance market in the coming decades.

The reviewed research papers primarily focused on analyzing the performance and growth of the life insurance industry in the post-liberalization era, as well as comparing the financial performance of public and private non-life insurance companies across different periods. Some studies have assessed life insurers' financial performance using selected dimensions of the CARAMEL model in earlier years. With increasing competition, rising mortality rates, stringent regulatory requirements, policy lapses, low persistency ratios, and growing customer expectations, there is a need for updated research on the capital adequacy and liquidity of life insurers. In light of this, the present study aims to assess the capital adequacy and liquidity performance of LIC in comparison to seven selected private life insurance companies in India from 2012-13 to 2021-22.

OBJECTIVES

The objectives of this research paper are

- To assess the capital adequacy and liquidity performance of the public life insurer LIC and the selected private life insurers of India.
- To conduct a comparative statistical analysis of the capital adequacy and liquidity soundness between LIC and the selected private life insurers.

HYPOTHESIS FRAMED FOR TESTING

Ho: There is no statistically significant difference in the capital adequacy and liquidity performance between private life insurers and LIC of India.

H1: There is a statistically significant difference in the capital adequacy and liquidity performance between private life insurers and LIC of India.

METHODOLOGY OF THE STUDY

The methodology used in this study involves a non-probability, purposive sampling method [2] to select a total of 8 life insurers. The first 8 companies based on total premiums collected during the years 2020-21 and 2021-22 are selected for the study. In addition to total premiums, profits made by the companies are also considered for selection. Thus the following eight companies shown in table 1 are studied in this paper:

TABLE 1- SELECTED LIFE INSURERS

S.No	Insurers Name	Total Premium (Rs in Crore)		Profits (Rs in crore)	
		2020-21	2021-22	2020-21	2021-22
1	Life Insurance Corporation of India	40328655	42802497	290057	404312
2	SBI Life Insurance Co. Ltd	5025417	5875964	145585	150600
3	HDFC Standard Life Insurance Co. Ltd	3858349	4596283	136010	120769
4	ICICI Prudential Life Insurance Co. Ltd	3573282	3745799	96016	75413
5	Max Life Insurance Co. Ltd	1901790	2241417	52299	38666
6	Bajaj Allianz Life Insurance Co. Ltd	1202484	1612705	58025	32441
7	Tata AIA Life Insurance Co. Ltd.	1110509	1444503	4711	7072
8	Kotak Mahindra Old Mutual Life	1110022	1301511	69193	42539

	Insurance Co. Ltd.				
[22] Source: IRDA Annual Report 2020-21and 2021-22					

MEASURING OF CAPITAL ADEQUACY AND LIQUIDITY SOUNDNESS

Capital adequacy and liquidity measures are crucial for life insurance companies as they ensure financial stability and the ability to meet long-term obligations. Capital adequacy ensures that life insurers can meet their long-term liabilities and manage risk effectively, while liquidity ratios help them in meeting their short-term financial needs. Both are important for regulatory compliance, maintaining solvency, protecting policyholders, and sustaining business operations over time. Hence, this paper focuses on this critical aspect. The selected companies in the industry are compared and judged on their Capital Adequacy and Liquidity position using certain parameters. The authors have selected five ratios to evaluate the Capital Adequacy and Liquidity, out of numerous ratios proposed in the IMF working paper [21]. The five ratios selected are Capital to Total Assets Ratio, Share Capital to Technical Reserve Ratio, Solvency Ratio, Liquid Assets to Current Liabilities and Liquid Assets to Total Assets ratios [6].

CAPITAL TO TOTAL ASSETS RATIO

The Shareholder's Fund or Capital to Total Assets ratio represents the percentage of capital deployed to expand the company's overall asset portfolio. The study takes capital as shareholders' funds, including the share capital, share application money pending allotment, employees' stock option outstanding, reserves and surplus, and credit/debit fair value change account. The study takes assets as the sum total of the balance sheet minus the debit balance and plus the credit balance of the Profit &Loss Account. A preferable scenario involves a lower ratio, as there are no specified minimum or maximum ratio requirements. This signifies a more robust and resilient asset base, as long as the company meets the minimum capital requirement. While a higher ratio may offer short-term advantages, it is advantageous for the company to maintain a lower ratio in the long run, signaling a stronger foundation in terms of assets. A lower ratio value indicates a decrease in dependency on the shareholders' funds to create a solid asset base for the company. Table 2 below shows the capital to total assets ratio of public and private life insurance companies.

TABLE 2 - CAPITAL TO TOTAL ASSETS RATIO

Insurer	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
BAlinz	0.1264	0.1495	0.1547	0.172	0.1716	0.1767	0.1669	0.1707	0.1442	0.1273
BirlaSun	0.102	0.0843	0.07	0.0688	0.061	0.0582	0.0524	0.0523	0.045	0.0413
HDFC	0.0534	0.0433	0.0385	0.0427	0.0421	0.0449	0.0453	0.0535	0.0499	0.0759
ICICI	0.0653	0.0622	0.0532	0.0519	0.0526	0.0498	0.0442	0.0473	0.0427	0.0383
KOTAK	0.0738	0.0864	0.0837	0.0911	0.0877	0.0897	0.0904	0.0962	0.0875	0.0794
MAX	0.1037	0.0864	0.0654	0.0562	0.0561	0.0508	0.0434	0.0369	0.033	0.0295
SBI	0.0518	0.0567	0.0559	0.0586	0.056	0.0552	0.053	0.0538	0.0467	0.0433
LIC	0.0003	0.0003	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0017	0.0025
Pvt-Avg	0.0823	0.0813	0.0745	0.0773	0.0753	0.075	0.0708	0.0729	0.0642	0.0622
Ind-Avg	0.0721	0.0711	0.0652	0.0677	0.0659	0.0657	0.062	0.0639	0.0564	0.0547
[22] Source: IRDA Annual Report 2020-21and 2021-22										

CAPITAL TO TECHNICAL RESERVES RATIO

The Capital to Technical Reserves ratio is a measure of relationship between capital and specific provisions set aside for various purposes. These provisions include contingencies, claims payments, unforeseen business

expenditures, and other essential needs. Reserves play an important role in smooth functioning of a business without adversely impacting its profit and loss position. Surplus, on the other hand, represents the remaining amount in the profit and loss account after accounting for dividends, bonuses, taxes, etc. In the realm of insurance, reserves and surpluses are established to facilitate prompt settlement of claims made by policyholders. Insurance companies create these financial buffers to meet the liabilities arising from policy claims. Actuaries, appointed by the insurance companies, play a crucial role in estimating actual losses, and the reserves should be set at a level sufficient to cover the anticipated liabilities. This proactive approach ensures that insurance companies are well-prepared to meet their financial obligations arising from policy claims. Table 3 below illustrates the capital-to-technical reserves ratio for both public and private life insurance companies.

TABLE 3 - CAPITAL TO TECHNICAL RESERVES RATIO

Insurer	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
BAlinz	1.0316	1.0263	1.0228	1.0201	1.0181	1.0178	1.0227	0.996	1.0535	1.0542
BirlaSun	5.1031	8.0869	8.0864	8.0852	8.0862	8.241	8.0962	7.3236	5.4319	4.2419
HDFC	10.033	10.2701	4.327	2.6222	2.1233	1.7542	1.5532	1.3673	1.3477	1.1654
ICICI	1.4389	1.4798	1.5344	1.4622	1.3635	1.3392	1.2954	1.1823	1.2903	1.207
KOTAK	2.7453	1.9601	1.6711	1.5047	1.3882	1.2953	1.2283	1.1794	1.1442	1.1317
MAX	11.6842	11.7848	21.5797	21.2189	4.2769	3.5039	3.2565	3.7819	2.8405	2.5047
SBI	1.6103	1.4493	1.3582	1.2825	1.2435	1.2146	1.1728	1.109	1.1438	1.1156
LIC	1.2647	1.2526	1.2481	1.2363	1.2085	1.2346	1.2237	1.189	1.0218	2.5746
Pvt-Avg	4.8066	5.151	5.6542	5.3137	2.7857	2.6237	2.5179	2.4199	2.036	1.7744
Ind-Avg	4.3639	4.6637	5.1035	4.804	2.5885	2.4501	2.3561	2.2661	1.9092	1.8744

[22] Source: IRDA Annual Report 2020-21and 2021-22

SOLVENCY RATIO

The term solvency indicates that the company can pay its liabilities on time and the business can run smoothly. The company being solvent means that it has a substantial capital and asset base that can absorb its losses and meet its obligations. The solvency ratio of an insurance company gauges the proportion of its capital in relation to all the risks it has assumed. It serves as a metric to assess the company's ability to meet potential claims that may exceed its capacity. The insurance regulator IRDA has defined the minimum requirement of 1.5 as a solvency ratio. This ratio indicates the company's solid financial position, which implies the company's good paying capacity towards its customers. A high ratio indicates the creditworthiness and sound position of the insurer in the long term whereas lower ratio indicates the probability of it's becoming insolvent. The table 4 below shows the solvency ratio of public and private life insurance companies.

TABLE 4 - SOLVENCY RATIO

Insurer	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
BAlianz	6.34	7.34	7.61	7.93	5.82	5.92	8.04	7.45	6.66	5.81
BirlaSunLife	2.67	1.86	2.05	2.11	2.00	2.14	1.98	1.78	1.80	1.88
HDFC	2.17	1.94	1.96	1.98	1.92	1.92	1.88	1.84	2.01	1.76
ICICI	3.96	3.72	3.37	3.20	2.81	2.52	2.15	1.94	2.17	2.04
Kotak	2.93	3.02	3.13	3.11	3.00	3.05	3.02	2.90	2.90	2.73

MaxLife	5.21	4.85	4.25	3.43	3.09	2.75	2.42	2.07	2.02	2.01
SBI	2.15	2.28	2.16	2.12	2.04	2.06	2.13	1.95	2.15	2.05
LIC	1.54	1.54	1.55	1.55	1.58	1.58	1.60	1.55	1.76	1.85
Avg. of Pvt Insurers	3.63	3.57	3.50	3.41	2.95	2.91	3.09	2.85	2.82	2.61
Avg. Industry	3.37	3.32	3.26	3.18	2.78	2.74	2.90	2.69	2.68	2.52
[22] Source: IRDA Annual Report 2020-21and 2021-22										

LIQUID ASSETS TO CURRENT LIABILITIES

Liquid assets are those that one can readily convert into cash without experiencing a substantial loss in value. The most liquid asset is cash; other liquid assets include debtors, bill receivables, and marketable securities. For the current study, liquid assets are defined explicitly as cash and bank balances based on the information provided in the balance sheets of the respective insurers and the current liabilities are considered as the amounts reported under current liabilities in the balance sheets of the respective insurers. Liquid assets to current liabilities ratio is a standard benchmark for evaluating liquidity. The standard of 1:1 is generally deemed satisfactory for this ratio. The Table 5 below shows the public and private life insurance companies' liquid assets to current liabilities ratio.

TABLE 5 - LIQUID ASSETS TO CURRENT LIABILITIES

Insurer	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
BAlinz	0.4508	0.4442	0.2351	0.2043	0.2708	0.2049	0.3698	0.1328	0.1948	0.1041
BirlaSun	0.5343	0.5699	0.6076	0.5662	0.6221	0.7112	0.6199	0.4184	0.2015	0.3497
HDFC	0.3092	0.3045	0.2768	0.2486	0.2085	0.2386	0.2423	0.1366	0.1593	0.1744
ICICI	0.1609	0.0981	0.1186	0.091	0.0753	0.0591	0.1804	0.2434	0.1495	0.1276
KOTAK	0.3409	0.3215	0.3476	0.2533	0.3219	0.3359	0.3447	0.2117	0.2373	0.2312
MAX	0.2206	0.233	0.167	0.2021	0.2028	0.2469	0.2148	0.2002	0.1963	0.1778
SBI	1.5093	1.5698	1.3404	0.9676	0.8061	0.7443	0.6479	0.4709	0.6395	0.6246
LIC	3.524	5.3623	2.8733	1.8445	1.1176	0.4249	0.7505	0.3583	0.3656	0.5254
Pvt-Avg	0.5037	0.5059	0.4419	0.3619	0.3582	0.363	0.3743	0.2591	0.254	0.2556
Ind-Avg	0.8812	1.1129	0.7458	0.5472	0.4531	0.3707	0.4213	0.2715	0.268	0.2894
[22] Source: IRDA Annual Report 2020-21and 2021-22										

LIQUID ASSETS TO TOTAL ASSETS

This ratio is an essential tool to assess the extent of liquid assets proportioned to maintain liquidity. Here, liquid assets are the cash and bank balances taken from the balance sheets of the respective insurers. Total assets are taken as the sum total of the balance sheet minus the debit and credit balance of the P&L Account. The amount of liquid assets in a year shows the quickness of an insurance company to pay its unforeseen and sudden liabilities. It also indicates the efficiency of its management in managing its working capital. However, no benchmarks are defined for maintaining such a ratio, yet it should be enough to pay for any contingency. The Table 6 shows the public and private life insurance companies' liquid assets to total assets ratio.

TABLE 6 - LIQUID ASSETS TO TOTAL ASSETS

Insurer	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
BAlinz	0.0186	0.0186	0.0104	0.0077	0.0124	0.0096	0.0128	0.005	0.0053	0.0035
BirlaSun	0.0238	0.0205	0.0142	0.0155	0.0142	0.0161	0.0156	0.0105	0.0048	0.0114
HDFC	0.012	0.0087	0.0085	0.0087	0.0087	0.0105	0.0099	0.0053	0.006	0.0053

ICICI	0.0044	0.0024	0.0026	0.002	0.0018	0.0015	0.0041	0.0053	0.0026	0.0028
KOTAK	0.015	0.0133	0.0133	0.0133	0.0156	0.0174	0.0152	0.0103	0.0105	0.0105
MAX	0.0152	0.0125	0.007	0.0092	0.0077	0.0083	0.0079	0.0058	0.0063	0.0061
SBI	0.0412	0.0431	0.035	0.0324	0.0245	0.0224	0.0169	0.0088	0.0122	0.0119
LIC	0.0567	0.047	0.0323	0.0198	0.0129	0.0081	0.0138	0.0091	0.0081	0.009
Pvt-Avg	0.0186	0.017	0.013	0.0127	0.0121	0.0123	0.0118	0.0073	0.0068	0.0074
Ind-Avg	0.0234	0.0208	0.0154	0.0136	0.0122	0.0117	0.012	0.0075	0.007	0.0076
[22] Source: IRDA Annual Report 2020-21and 2021-22										

RESULTS AND DISCUSSION:
CAPITAL TO TOTAL ASSETS RATIO

As shown in Table 2, the capital-to-total assets ratio of the public sector company LIC had been low and consistent till 2020 but significantly increased from 2020 to 2022, standing at 0.0017 in 2020-21 and 0.0025 in 2021-22. The increase in this ratio can be attributed to the rise in share capital and its reserves, which makes its capital strong. The performance of private sector insurers concerning this ratio improved over the years as the ratio declined from 0.0823 in 2013 to 0.0622 in 2022. The average industry ratio decreased from 0.0721 in 2013 to 0.0547 in 2022, suggesting that the industry's capital-to-total assets ratio has declined. Overall, in terms of private insurers and the industry average, the insurance industry has shown a trend of decreasing Capital to Total Assets Ratio over the years.

CAPITAL TO THE TECHNICAL RESERVES RATIO

As shown in Table 3, the LIC's capital to technical reserves ratio remained low and relatively stable during the entire study period, indicating that it maintained enough reserves to meet its claims. The ratios of LIC ranged between 1.265 to 1.022 from 2012-13 to 2020-21. In the year 2021-22, its ratio had increased to 2.575, showing an increase in its capital and a comparative decrease in its reserves. The average ratios of the private insurers ranged from 5.654 to 2.036 from 2012-13 to 2020-21 and reduced to 1.774 in 2021-22. The above analysis shows that, compared to the private sector, the public sector company LIC has been doing reasonably well. LIC's ratio is far better than private insurers and the industry average, except for 2021-22, where the reserves compared to its capital had decreased.

SOLVENCY RATIO

As shown in Table 4, the public insurer LIC maintained the minimum requirement of 1.5 during the entire study period with a slightly increasing trend. LIC's ratio ranged from 1.54 to 1.85, stating that the company had slowly increased its solvency position, which is a good sign, but its range is much below the private sector's average. The solvency margin of all the private life insurers was above the public sector. Overall, the performance of the public sector concerning this ratio has improved a little over the years as the ratio had increased from 1.54 in 2013 to 1.85 in 2022. The industry average decreased from 3.37 in 2013 to 2.52 in 2022. The private sector average also reduced from 3.63 in 2013 to 2.61 in 2022 but was comparatively higher than the industry average, suggesting that private insurers perform better than public insurer LIC.

LIQUID ASSETS TO CURRENT LIABILITIES

It can be observed from the Table 5, that the public insurer LIC has the highest liquid assets to current liabilities ratio among all the selected life insurers. LIC had fluctuations in its ratio, which ranged from 0.3583 to 5.3623. The trend of ratios indicated that the insurer had maintained significantly higher and excess liquid assets from 2012-13 to 2016-17. However, it couldn't meet the standard from 2017-18 to 2021-22. The LIC's ratios were either in excess or inadequate, indicating that the company needed to handle the alarming situation. The private sectors average ratios ranged between 0.5059 to 0.2556 during the study period, indicating that they couldn't maintain enough of liquid assets during the entire study period. Overall, concerning this ratio, LIC performed better than that of the rest of the selected life insurers. Still, at the same time, it should keep a check on its ratio so that it does not get hold excess or inadequate liquid assets.

LIQUID ASSETS TO TOTAL ASSETS

As shown in Table 6, the ratio of liquid assets to total assets of LIC is the highest out of all the selected insurers, ranging from 0.0081 to 0.0567. It gradually declined from 0.0567 in 2012-13 to 0.0081 in 2021-22, with minor fluctuations indicating it had reduced the proportion of its liquid assets in the current years. The private sector and life industry averages declined, indicating that the companies needed to pay more importance to proportionate the liquid assets to meet their sudden and unforeseen obligations. The proportion of liquid assets in LIC's total assets was much better as its ratios are above the private sector and industry's average, indicating strong financial stability.

STATISTICAL EVALUATION FOR CAPITAL ADEQUACY AND LIQUIDITY INDICATORS

Table 7 below presents the descriptive statistics for capital adequacy indicators of public and private life insurers.

TABLE 7 – DESCRIPTIVE STATISTICS OF CAPITAL ADEQUACY INDICATORS

Sector		Capital to Total Assets Ratio	Capital to Technical Reserves Ratio	Solvency Ratio
Public	Minimum	0.0002	1.022	1.54
	Maximum	0.0025	2.57	1.85
	Mean	0.0006	1.35	1.61
	Deviation	0.0008	0.438	0.107
Private	Minimum	0.0295	0.996	1.76
	Maximum	0.1767	21.58	8.04
	Mean	0.0736	3.51	3.13
	Deviation	0.0386	4.239	1.726
Total	Minimum	0.0002	0.996	1.54
	Maximum	0.1767	21.58	8.04
	Mean	0.0645	3.24	2.94
	Deviation	0.0435	4.029	1.691

The results of the descriptive statistics for the capital adequacy indicators of India's public and private life insurance companies reveal that the mean values for the capital-to-total-assets ratio, capital-to-technical-reserves ratio, and solvency ratio are lower for public life insurers than for private insurers. The lower mean values for LIC in the capital-to-total assets and capital-to-technical-reserves ratios suggest that LIC performs better than private life insurers in these aspects. However, the lower mean value for LIC in the solvency ratio indicates that private insurers outperform the sole public insurer LIC in this ratio. Furthermore, the table demonstrates a lower degree of variability in the performance of LIC compared to private life insurers, as indicated by the smaller standard deviation values.

The test statistics of capital adequacy indicators of public and private life insurance companies are shown in the table 8 below.

TABLE 8 – TEST STATISTIC OF CAPITAL ADEQUACY INDICATORS

	Capital to Total Assets Ratio	**Capital to Technical Reserves Ratio**	**Solvency Ratio**
Mann-Whitney U	0.000	223.000	4.500
Wilcoxon W	55.000	278.000	59.500
Z	-5.090	-1.840	-5.020
Asymp. Sig. (2-tailed)	0.000	0.066	0.000

The results of Man Whitney U test revealed that there is a statistically significant difference between LIC and private life insurers concerning the capital-to-total assets and solvency ratios as the p-values are less than 0.05 at a 5% significance level. However, there is a statistically insignificant difference between LIC and private life insurers regarding the capital-to-technical reserves ratio as the p-value is more than 0.05 at a 5% significance level. Therefore, the null hypothesis is partially rejected.

Table 9 below presents the descriptive statistics for liquidity indicators of public and private life insurers.

TABLE 9 – DESCRIPTIVE STATISTICS OF LIQUIDITY INDICATORS

Sector		Liquid Assets to Current Liabilities Ratio	Liquid Assets to Total Assets Ratio
Public	Minimum	0.3583	0.0081
	Maximum	5.36	0.0567
	Mean	1.715	0.0217
	Deviation	1.698	0.0177
Private	Minimum	0.0591	0.0015
	Maximum	1.57	0.0431
	Mean	0.368	0.0119
	Deviation	0.306	0.0085
Total	Minimum	0.0591	0.0015
	Maximum	5.36	0.0567
	Mean	0.536	0.0131
	Deviation	0.782	0.0104

The results of descriptive statistics of liquidity indicators for both public and selected private life insurance companies in India reveal that the liquid assets to current liabilities ratio and liquid assets to total assets ratio for the public life insurer are higher than the corresponding mean values for private life insurers, indicating superior performance by the public insurer. However, the standard deviation values indicate a higher variability in liquid assets to current liabilities and liquid assets to total assets ratios for LIC compared to lower variability in private life insurance companies, suggesting a more consistent performance by private insurers relative to LIC.

The test statistics of liquidity indicators of public and private life insurance companies are shown in the table 10 below.

TABLE 10 – TEST STATISTIC OF LIQUIDITY INDICATORS

	Liquid Assets to Current Liabilities Ratio	**Liquid Assets to Total Assets Ratio**
Mann-Whitney U	85.000	229.000
Wilcoxon W	670.000	526.000
Z	-3.848	-1.753
Asymp. Sig. (2-tailed)	0.000	0.080

The Mann-Whitney U test statistical results for liquidity indicators indicate that there exists a statistically significant difference between LIC and private life insurers concerning the liquid assets to current liabilities ratio since the p-value is less than 0.5 at 5% significance level. However, a statistically insignificant difference exists between LIC and private life insurers regarding the ratio of liquid assets to total assets since the p-value is more than 0.5 at 5% significance level. Therefore, the null hypothesis is partially rejected.

CONCLUSION

The financial stability of life insurance companies is essential for ensuring policyholder protection, regulatory compliance, and overall industry growth. This research paper focused on comparative capital adequacy and liquidity performance of eight selected life insurers for a ten-year period from 2012-13 to 2021-22. This study emphasizes the need for maintaining adequate capital reserves and liquidity levels to meet long-term obligations, manage financial risks, and sustain operations effectively. The findings revealed that the public life insurer performed better than private life insurers in Capital to Total Assets, Capital to Technical Reserves, Liquid Assets to Current Liabilities and Liquid Assets to Total Assets dimensions. In contrast, private life insurers performed better than public life insurer in Solvency dimension. Statistical analysis showed that the null hypothesis was only partially rejected, signifying significant differences in some financial ratios while others remained statistically insignificant. A significant difference was observed between LIC and private life insurers concerning Capital-to-Total Assets, Solvency, and Liquid Assets-to-Current Liabilities, as indicated by p-values below 0.05 at a 5% significance level. However, no significant difference was found in Capital-to-Technical Reserves and Liquid Assets-to-Total Assets, where p-values exceeded 0.05 at the same significance level. Based on these findings, specific areas require attention from life insurers. LIC, as the public sector insurer, should focus on improving its relatively low solvency, while private insurers need to strengthen their liquid asset positions to enhance financial stability.

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