



(RESEARCH ARTICLE)



Financial soundness of life insurers in India

Roshan Lal Rohilla *

Department of Commerce, Government College, Sampla, District Rohtak, Haryana, India.

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Abstract

Financial sector is an integral part of economy; an effective financial system helps to grow productivity and economy. Insurance is a constituent of Indian financial system, which is working for risk mitigation, mobilization of savings and transfer of surplus to deficit economic units. Insurance industry in India has grown exponentially over the years and there are opportunities for further growth too, growth in insurance industry not only comes from customer focus and market offerings, but also from better capabilities and presentation of financial position of the insurers. After amendment in IRDAI regulations, 23 private and foreign companies have been allowed to carry on life insurance business along-with Life Insurance Corporation of India; therefore, it has become essential to understand, whether life insurance industry is financially solvent, operationally sound and have adequate capital base, so the present study has been undertaken vide which six life insurance companies comprising one from public and five from private sector have been selected on the basis of their highest market share, further these companies are occupying lion's share of the life insurance business in India, to arrive at the framed objectives their financial position have been tested using CAMEL Model and its' constituents have been tested using two tailed ANOVA.

Keywords: Financial System; Productivity; Mitigation; Insurers; Rapid liquidity

1. Introduction

It has been witnessed during the past decade that the global economy is slowing down and risk of inflationary recession has increased in the number of economies. Bangladesh and Pakistan are the recent examples before the world. These trends have impacted the financial system and the insurance industry as well, global premium growth in life insurance sector have strongly bounced back by 4.5 percent in both advanced and emerging insurance markets. Life insurance premium in China contracted by 2.6 percent, due to weak trends in life savings and critical illness business; but, advanced markets have been supported by a surge in asset values and labour market recovery that lifted demand for savings linked business but advanced Asia Pacific market shifts towards protection products. The growth of real premium in life and non-life sector in the advanced market has been 3.9 percent, emerging market 1.5 percent and Asia-Pacific 0.7 percent, whereas life insurance sector has remained 5.4 percent in advanced market, 1.5 percent in emerging market and 0.6 percent in Asia-Pacific region. The real premium growth in life insurance sector in India has witnessed 8.5 percent during 2021, which is higher than the life insurance sector growth rate depicted by the advanced, emerging and Asia-Pacific markets as well as the world's average growth rate in terms of real premium receipt. In global insurance business, India has been ranked tenth in 2021 with market share of 1.85 percent because total insurance premium has been increased by 13.46 percent in 2021 after adjustment of 7.8 percent inflation rate as compared to 9.04 percent of the global insurance premium, India has been ranked ninth in the world in terms of real premium growth in life sector with market share of 3.23 percent. Life insurance premium in India has increased by 14.16 percent in 2021 as compared to 9.91 percent of 2020 after adjustment of 4.5 percent inflation rate. The new business premium accounted for 45.46 percent of the total premium with a growth rate of 12.98 percent, Life Insurance Corporation of India continued to have a higher market share of 63.18 percent in new business and 60.65 percent in renewal business premium. Indian

* Corresponding author: Dr. Roshan Lal Rohilla

economy has opened the door for the development of insurance sector in India in 1999, when Insurance Regulatory Development Authority was established to regulate the insurance sector in India and to open the door for private and foreign players to establish insurance business in India, at present 23 private life insurance companies are working with almost 38.2 percent market share in 2021-22 financial year. Due to the emergence of private and foreign companies in this sector there is need for evaluation of soundness and profitability due to the reasons, firstly, insurers are large investors in financial markets, secondly, insurers often have close links to banks and financial institutions, any adverse effect on life insurance companies will ultimately affect the banks too, and thirdly, insurers contribute to safeguarding and stability of households' savings by insuring their risks. In the early years of establishment of these private insurance companies, they are mainly focusing on business expansion and distribution building, this process continued till 2010, but after 2010, these private companies are focusing on profitability or bottom line. Indian insurance industry is facing disadvantage of front loaded charges, this is making companies to report losses with new customer acquisition. The companies are emphasizing on reducing operating and other administration expenses in order to bring efficiency and to improve profitability, therefore, to understand the complete financial system of life insurance companies, this study will enrich the readers. The main objective of this study is to evaluate the financial soundness using selected parameters and further to find out the scope for growth of life insurance business in India.

1.1. Insurance Penetration and Density in India

The potential and performance of Insurance industry throughout the world is measured by two metrics namely penetration and density, these two parameters measure the development of insurance in a country. Insurance penetration is calculated by dividing gross premium to gross domestic product and insurance density is found out by dividing the insurance premium to total population of a country, it is also denoted as 'per capita premium.' The insurance penetration in life insurance sector during the year 2001-02 was 2.15 percent as compared to insurance industry penetration of 2.71 percent. In 2005-06 it rose up to 2.53 percent in life insurance sector as compared to total of 3.14 percent. It further rose to 4.40 percent in 2010-11 in comparison of the total 5.10 percent. The economic slowdown which was prevailing globally in the last decade did not spare India, as after 2010-11 insurance penetration started declining and during the accounting year 2019-20 it was at bottom of 2.81 percent, thereafter it started rising again and the report of Swiss Re Sigma depicts that during the financial year 2020-21 and 2021-22 it was 3.20 percent as compared to average insurance penetration throughout the world that remain at 3.00 percent in 2020-21 and 2021-22. Insurance density in India during 2001-02 was 9.10 USD against Industry total of 11.5 USD; it rose up to 18.30 USD in 2005-06 and 55.70 USD in 2010-11 as compared to total of 64.40 USD. Thereafter it started decreasing and remained at 41 USD in 2013-14 against total insurance density of 52 USD, it started rising again from accounting year 2014-15 and it was 69 USD against total insurance density of 91 in 2021-22 as compared to world's life insurance density of 382 USD in the same financial year. (Source: Report of Swiss Re Sigma) It is concluded that life insurance penetration is increasing and is greater than the world's average and on the other hand insurance density is decreasing when compared with world's average. The spending on the life insurance products in India is showing slowest increasing rate. The reasons for low insurance density may be increasing population, unemployment, lack of awareness about insurance products.

2. Review of Literature

- Greene & Segal (2004), conducted research on "Profitability and Economical Efficiency in the U.S. Life Insurance Industry", published in Journal of Productivity Analysis, in which they studied the relationship between cost inefficiency and sustainability in the US Life Insurance Industry. They concluded that an established and dynamic life insurance market can be the primary engine of sustainability and cost-effectiveness. The study indicates that cost inefficiency is significant in comparison to profits in the life insurance sector and that inefficiencies are adversely correlated with performance ratio including equity income.
- Akotey, Sackey, Amoah & Manso (2013) examines in particular the main drivers of Ghana's life insurance industry's profitability. The annual financial statements of ten life insurance companies covering a period of 11 years (2000-2010) were sampled and analysed through panel regression. The results showed that while gross written premiums relate positively to the performance of profits by insurers, their relationship to investment income is negative. The findings also revealed that life insurers suffered considerable damages as a result of overtrading and price reductions.
- Bawa & Chattha (2013), in their paper titled, "Financial Performance of Indian life Insurance Companies" published in Pacific Business Review International, they analysed the profitability using financial ratios and concluded that Public Sector LIC is the most liquid among all 17 life insurance companies. Sahara and SBI Life insurance are more solvency-friendly than other insurers. Bajaj Allianz and ICICI Prudential Return on Asset Measurements sound good.

- Valeed A. Ansari and Wubshnet Fola (2014) in their paper titled, “Financial Soundness and Performance of Life Insurance Companies in India, published in International Journal of Research, concluded that financial soundness and performance is dependent on regulatory parameters and standards in India. The study further concluded that there was a significant difference between capital adequacy, asset quality, management efficiency, earnings and profitability and liquidity position in private and public life insurance.
- Dar & Bhat (2015) in their research titled, “Financial Statements and Soundness of Selected Public and Private Life Insurance Companies”, published in Pacific Business Review revealed that there are significant statistical variations in the capital adequacy, revenue, profitability and liquidity ratio in selected insurers of public and private life. The overall result revealed that private life insurers in spite of having greater capital adequacy lacking in terms of profitability.
- Parmasivan (2015), conducted a research on, “Comparative Analysis of Insurance Providers in India in the Public and Private Life Insurance Companies” published in Journal of Productivity Analysis, concluded that current ratio and debt equity ratio is estimated to measure the solvency ratio for financial efficiency. The analysis shows that LIC already dominates the market. The new commercial channels of promotion are used by private sector insurance providers in comparison to LIC. The sale of more plan-linked units allows private insurers to capture LIC market share. Private insurers are also better than LIC's solvency and lapse ratios. In comparison with private life insurance the service of death law suits was higher for LIC.
- Bodla, Bodla & Tondon, (2017), in their research paper titled, “Profits of Life Insurance Firms in India (Public and Private)”, published in Research Gate International Journal of Computing and Business Research, they analysed the seven factors net premium, investment income, underwriting income, asset return, combined ratio, solvency ratio and profit from 2007 to 2016. They concluded that among the private life insurers ICICI prudential, HDFC Standard and SBI Life were on the top with respect to gross premium receipt, while the IDBI Federal was among the bottom. They further concluded that the CAGR's underwriting revenue has decreased during the last five years among all the private life insurance companies.

Objectives of the Study

- To find out the scope of life insurance business in India.
- To compare financial soundness of Life Insurance Corporation of India, Bajaj Allianz Life Insurance Company Ltd, HDFC Standard Life Insurance Company Ltd, ICICI Prudential Life Insurance Company Ltd, Max Life Insurance Ltd and SBI Life Insurance Company Ltd and to test these ratios using CAMEL Model.
- To make a comparison between public and selected private life insurers working in India.

3. Research Methodology

The period of present study is 2011-12 to 2021-22, the nature of data used is historical, which has been derived from the annual reports and financial statements of both public and selected private sector life insurance companies, after deriving required information and data from the annual reports different ratios have been calculated using accounting techniques, which are required to implement CAMEL Model, the output of the CAMEL's framework consists of ratios like Capital Adequacy, Asset Quality, Reinsurance and actuarial, Management Soundness, Earning and Profitability, Liquidity and Sensitivity to market risk. These ratios have been tested with the help of Statistical technique like mean, standard deviation, F-Test and two tailed ANOVA at 01 percent level of significance and 99 percent level of confidence. The set of ratio is illustrated in the table 1 below:

Table 1 Ratios and Methodology

No.	Parameter	Ratio used	Methodology applied
1.	Capital Adequacy	Solvency ratio	(Net income after tax + Depreciation)/ Total liabilities inclusive of both short term and long term.
		Capital to Asset Ratio	Proportion of shareholders equity to the total asset of the company
		Capital to Reserves and Surplus	Ratio is the proportion of share capital to reserves and surplus.
2.		Retention Ratio	Net Premium/Gross Premium

	Reinsurance and Actuarial	Survival Ratio	Reserves and Surplus divided by Average of Net Premium of Three Years
3.	Management Soundness	Operational efficiency	Operating expenses divided by Gross Premium
		First Year Premium	First Year Premium divided by Gross Premium
4.	Earning and Profitability	Return on Equity	Profit after Tax to Equity
		Return on Assets	Profit after Tax to Total Assets
		Operating Expenses	Operating Expenses divided by Net Premium
5.	Liquidity	Current Ratio	Current Asset to Current Liability
		Current Asset	Current Asset to Total Asset
		Liquid Liability	Liquid Liability to Total Liability

3.1. Hypothesis

- H_0 = There is no significant difference between the period of study within the life insurance company with respect to Total Capital Adequacy Ratio, Asset Quality Ratio, Reinsurance and Actuarial Issues Ratio, Management Soundness Ratio, Earning and Profitability Ratios, and Liquidity Ratio.
- H_1 = There is significant difference between the period of study within the selected life insurance company with respect to Capital Adequacy Ratio, Asset Quality Ratio, Reinsurance and Actuarial Issues Ratio, Management Soundness Ratio, Earning and Profitability Ratios, and Liquidity Ratio.
- H_0 = There is no significant difference between the selected life insurance companies with respect to Capital Adequacy Ratio, Asset Quality Ratio, Reinsurance and Actuarial Issues Ratio, Management Soundness Ratio, Earning and Profitability Ratios, and Liquidity Ratio.
- H_1 = There is significant difference between the selected life insurance companies with respect to Capital Adequacy Ratio, Asset Quality Ratio, Reinsurance and Actuarial Issues Ratio, Management Soundness Ratio, Earning and Profitability Ratios, and Liquidity Ratio.

3.2. Sampling Area

The universe of the life insurance in India is 23 private and one public life insurance companies, it is difficult to study all the companies, keeping in view money and time constraints, however, on the basis of average premium underwritten during the last three years six best life insurance companies have been selected for the present study, these companies are the best representative of the life insurance business in India, out of six companies one Life Insurance Corporation of India is Public Company and other five are Private Life Insurance companies, Life Insurance Corporation of India underwritten 61.20 percent premium during the year 2021-22 and the companies listed in the table 1 below are having 26.09 percent share out of total 38.8 percent private sector share. On the basis of the average market share of the last three years, the companies listed below are having maximum market share. Hence, these companies have been selected for the purpose of present study.

Table 2 Top Six Companies in Terms of Market Share among Public and Private Life Insurance Companies

Life Insurer	2019-20	2020-21	2021-22	Average
Life Insurance Corporation of India	3,79,389.60	4,03,286.55	4,28,024.97	4,03,567.04
SBI Life Insurance Co. Ltd.	40,634.73	50,254.17	58,759.64	49,882.85
HDFC Life Insurance Co. Ltd.	32,706.89	38,583.49	45,962.83	39,084.40
ICICI Prudential Life Insurance Co. Ltd.	33,430.70	35,732.82	37,457.99	35,540.50
Max Life Insurance Co. Ltd.	16,183.65	19,017.90	22,414.17	19,205.24
Bajaj Allianz Life Insurance Co. Ltd.	9,752.53	12,024.84	16,127.05	12,634.81

(Source: Annual Reports of IRDAI 2019-20 to 2021-22)

3.3. Significance of Study

Since the life insurance companies are actively attracting the domestic savings in the country and insurance density is increasing in India and the share of private sector is increasing on year on year basis, therefore, in the interest of investors at large, it is desired to conduct this study measuring the soundness of the selected life insurance companies having major share of life insurance business in India, secondly life insurance penetration and density start decreasing from the year 2013-14 till 2018-19. Further, this study will help investors to understand financial efficacy of life insurance companies.

3.4. Data Analysis and Interpretation

3.4.1. Capital Adequacy Ratio

Capital Adequacy Ratio is the ratio of an insurance company in relation to its risk weighted assets and current liabilities. It is decided by the regulatory authorities to prevent insurance companies from taking excess leverage and becoming insolvent in the process; according to the recent guidelines issued by RBI investments in the instruments issued by insurance companies, which are not deducted from capital of the investing insurance company, shall attract 100 percent risk weight for capital adequacy purpose. The Capital Adequacy Requirement is a measurement used for a company to demonstrate having sufficient capital at fund and company level. The Fund Solvency Requirement is applied to each fund whether participating or non-participating. To meet the Financial Strength Rating, an insurer must have sufficient financial resources in excess of Trade Repository Reporting of each fund. For a non-participating fund the FR is simply the excess of assets over liabilities, for a participating fund, the FR is made up of 50 percent of the provision for future bonuses or non-guaranteed benefits, an insurer must have a CAR of at least 100 percent in India.

3.4.2. Solvency Ratio

The Solvency Ratio is mainly applied to insurance companies, non-banking financial institutions and banking companies to assess the ability to honour the claims. It is a metric that indicates how well the company can cover both its short term and long term outstanding financial obligations in other words it is the insurers' ability to honour claims and refers to excess of assets over liabilities maintained prudently. If it is below 20 percent, it indicates an increased likelihood of default, as it measures actual cash flow rather than net income, not all of which may be readily available to a company to meet obligations. It is best employed in comparison with similar firms within the same industry, as certain industry tends to be significantly more debt-heavy than others. The Insurance Regulatory and Development Authority of India issued guideline regarding standard solvency ratio which is 1.5 and the standard capital to be employed to start Life Insurance Company is one billion in India.

Table 3 Solvency Ratios of Selected Life Insurance Companies

Year/ Company	Bajaj Allianz Life	HDFC Life	ICICI Prudential life	Max Life	SBI Life	LIC
2011-12	5.15	1.88	3.71	5.34	5.34	1.54
2012-13	6.34	2.17	3.96	2.07	2.15	1.54
2013-14	7.34	1.94	3.72	4.85	2.28	1.54
2014-15	7.61	1.96	3.37	4.25	2.16	1.55
2015-16	7.93	1.98	3.20	3.43	2.12	1.55
2016-17	5.82	1.92	2.81	3.09	2.04	1.58
2017-18	5.92	1.92	2.52	2.75	2.06	1.58
2018-19	5.92	1.92	2.52	2.75	2.06	1.58
2019-20	7.45	1.84	1.94	2.07	1.95	1.55
2020-21	6.66	2.01	2.17	2.02	2.15	1.76
2021-22	5.81	1.76	2.04	2.01	2.05	1.85

(Source: Annual Reports of IRDAI 2011-12 to 2021-22)

Solvency ratio of Life Insurance Corporation of India is just above the standard limit in the initial period of study, but slightly improving and during the year 2021-22 it increased from 1.54 of 2011-12 to 1.85 during the year 2021-22. Bajaj Allianz maintaining the higher ratio as compared to other selected life insurers and found to be very financial strong company as compared to other as its' solvency ratio was 5.15 in 2011-12 and 5.81 in 2021-22. During the study period the mean solvency ratio of the company remained 6.54, which is considered as very strong. HDFC Standard Life Insurance Company maintained an average solvency ratio of 1.94, the company maintained greater than mean in the accounting year 2012-13 and 2020-21 only, rest of the study period the ratio remained less than mean. The mean ratio of ICICI Prudential Life Insurance was 2.91, the company maintained this ratio 2011-12 to 2015-16 greater than mean and rest of the study period it remained less than the mean. However, company maintained solvency ratio greater than standard ratio throughout the study period. Max life has also maintained higher solvency ratio in the early period of study and thereafter it start decreasing. SBI Life average solvency ratio remained 2.4 and throughout the study period it remained near to average except the year 2011-12 when it was noted 5.34.

Table 4 ANOVA Calculation and Analysis of Solvency Ratio

Source of Variation	Sum of Square	Degree of Freedom	Mean Sum of Square	F-Ratio
Between the Period	175.70	5	35.14	4.73
Between the Companies	-81.19	10	-8.12	-1.09
Standard Error	118.82	16	7.43	
Total	213.33	31		

(Source: Excel)

ANOVA analysis depicts that sum of square of solvency ratio between the periods of study is 175.7 and between the selected life insurance companies with respect to solvency ratio is -81.19, whereas sum of square of residual/error is 118.82. Mean sum of square between the periods of study is 35.14 and between the selected life insurance companies with respect to solvency ratio is -8.12, the degree of freedom between the columns and rows is 5 and 10 respectively i.e. V_1 is 5 and V_2 is 10, residual/error in degree of freedom is 16 and calculated value of F-Ratio between the period of study is 4.73 and the table value is 3.69, $F > F_{01}$, the calculated value of F is greater than table value, H_0 is rejected and H_1 accepted, therefore it is concluded that there is significant difference in the solvency ratio within the period of study, secondly calculated value of F within the Life Insurance Companies with respect to solvency ratio is -1.09, which is less than the table value of 4.20, $F < F_{01}$. Therefore, H_0 is accepted and H_1 is rejected, so it is concluded that there is no significance difference between the solvency ratios maintained by the selected companies as all the companies are having greater than the standard ratio fixed by the IRDAI in this respect.

3.4.3. Capital to Assets Ratio

Table 5 Capital to Assets Ratio of Selected Life Insurance Companies

Year/ Company	Bajaj Allianz Life	HDFC Life	ICICI Prudential life	Max Life	SBI Life	LIC
2011-12	9.13	6.57	6.89	12.75	4.60	0.038
2012-13	12.23	5.34	6.90	10.37	5.16	0.219
2013-14	14.95	4.33	6.22	8.64	5.67	0.304
2014-15	15.47	3.85	5.32	6.55	5.59	0.028
2015-16	17.20	4.27	5.19	5.62	5.86	0.264
2016-17	17.16	4.21	5.26	5.61	5.60	0.236
2017-18	17.67	4.49	4.98	5.08	5.52	0.131
2018-19	16.69	4.53	4.42	4.34	5.30	0.122
2019-20	17.07	5.35	4.73	3.69	5.38	0.138
2020-21	14.42	4.99	4.27	3.30	0.47	0.159
2021-22	12.73	7.59	3.83	2.95	0.43	45.834

(Source: Calculated from Annual Reports for the Year 2011-12 to 2021-22)

This ratio is calculated to assess that company is able to cover its' asset from the available capital, it is expressed in percentage and shed light on the company's financial status. Under this ratio capital is measured as total capital and reserves as reported in the balance sheet, sometimes debts which need not to pay are also included in the capital while calculating this ratio with the total assets or other terms total of balance sheet.

Capital to Total Assets ratio indicates that the proportion of capital in the total assets portfolio of the companies, growth in the assets of the business indicates how efficiently the capital has been invested to create assets. Lower ratio may be preferred to higher one, as higher ratio indicates high reliance on capital and inefficient use of capital to create assets, whereas lower ratio indicates the greater assets base of the company. All the Companies are having satisfactory ratio except LIC in the year 2021-22, when floated its IPO, the company is using more capital, Bajaj Allianz is having higher ratio and its reliance for paying out liabilities is on capital. Max Life, SBI Life and ICICI Prudential companies are increasing their vast asset base; therefore, the ratio is at minimum during the last two year of the study. The LIC is having it as 45.834 percent in 2021-22, this is because LIC has floated its' IPO during 2021-22, otherwise it is poor throughout the study period as well as compared with other companies. The Life Insurance Companies should have certain amount of capital; otherwise they could never reach greater risk taking or borrowing. The higher Capital Adequacy requirement by the regulator leads to decreasing competition in life insurance sector.

Table 6 ANOVA Calculation of Capital to Asset Ratio

Source of Variation	Sum of Square	Degree of Freedom	Mean Sum of Square	F-Ratio
Between the Period	923.03	5.00	184.61	1.25
Between the Companies	-238.45	10.00	-23.84	-0.16
Standard Error	2367.75	16.00	147.98	
Total	3052.34	31.00		

(Source: Excel)

ANOVA analysis depict that sum of square of Capital to Asset Ratio between the periods of study is 923.03 and between the selected life insurance companies with respect to Capital to Total Asset Ratio is -238.45, whereas sum of square of residual/error is 2367.75. Mean sum of square between the periods of study is 184.61 and between the selected life insurance companies with respect to Capital to Total Asset ratio is -23.84, the degree of freedom between the columns and rows is 5 and 10 respectively i.e. V_1 is 5 and V_2 is 10, residual/error in degree of freedom is 16 and calculated value of F-Ratio between the period of study is 1.25 and the table value is 3.69, $F < F_{01}$, the calculated value of F is less than table value, H_0 is accepted and H_1 is rejected, therefore it is concluded that there is no significant difference in the Capital to Total Asset ratio within the period of study, secondly calculated value of F within the Life Insurance Companies with respect to Capital to Total Asset ratio is -0.16 which is less than the table value of 4.20, $F < F_{01}$. Therefore, H_0 is accepted and H_1 is rejected, so it is concluded that there is no significance difference between the Capital to Total Asset ratio maintained by the selected companies.

3.4.4. Capital to Reserves Ratio

Insurance companies create reserves on the basis of estimate of losses and to cover potential liabilities arisen from claims made on policies, they underwritten; it is a practice to maintain high value of reserves. This ratio up to 200 percent or more is acceptable by regulators. This ratio may vary from year to year and high ratio is not a sign that an insurer is or will become insolvent. However lower ratio is good for the health of shareholders, it means company is able to meet its liabilities out of the created reserves and surpluses, whereas higher ratio indicates dependence on capital for payment of liabilities.

From the table, it is observed that Max Life is having ratio more than 200 percent from financial year 2011-12 to 2019-20, it is improving a little during the financial year 2020-21 and 2021-22; in case of HDFC Standard Life Insurance Company, this ratio is increasing, reserves of HDFC Life are decreasing, therefore, this ratio is increasing, this implies that company is using its reserves to payoff claims, this further implies that claims in the company are increasing. Bajaj Allianz Life Insurance Company is having lower ratio to all other companies, this implies higher reserves are maintained by the company and it is meeting out its claims out of reserves, it is equal to capital in 2021-22 and improved throughout the study period from 4 to 1. All other companies are maintaining the ratio within the satisfactory limit. In life insurance reserves and surpluses are created to cover their liabilities and reflect the insurer's financial obligation with respect to the insurance policies it has issued. Higher ratio indicates that company is dependent on capital for meeting liabilities and lower ratio means company is able to cover financial obligations out of reserves.

Table 7 Capital to Reserves Ratio of Selected Life Insurance Companies

Year/ Company	Bajaj Allianz Life	HDFC Life	ICICI Prudential life	Max Life	SBI Life	LIC
2011-12	4	11	42.98	506.16	89.37	2.34
2012-13	3	10	40.90	1051.23	59.42	1.86
2013-14	3	11	40.23	956.48	43.36	2.33
2014-15	2	30	37.32	1406.30	33.62	2.22
2015-16	2	58	36.80	1826.52	27.10	2.12
2016-17	2	92	28.86	324.93	22.40	1.99
2017-18	2	136	26.34	245.98	18.09	1.90
2018-19	2	180	25.59	227.86	15.21	35.57
2019-20	2	237	24.83	292.91	12.92	29.19
2020-21	1	327	18.69	176.19	8.25	14.91
2021-22	1	633	23.41	150.25	9.60	128.54

(Source: Annual Reports from 2011-12 to 2021-22)

Table 8 ANOVA calculation of Capital to Reserves and Surplus Ratio

Source of Variation	Sum of Square	Degree of Freedom	Mean Sum of Square	F-Ratio
Between the Period	3501491.71	5.00	700298.34	3.18
Between the Companies	138203.43	10.00	13820.34	0.06
Standard Error	3520940.88	16.00	220058.80	
Total	7160636.02	31.00		

(Source: Excel)

ANOVA analysis depict that sum of square of Capital to Reserves and Surplus Ratio between the periods of study is 3501491.71 and between the selected life insurance companies with respect to Capital to Reserves and Surplus Ratio is 1038203.43, whereas sum of square of residual/error is 3520940.88. Mean sum of square between the periods of study is 700298.34 and between the selected life insurance companies with respect to Capital to Reserves and Surplus ratio is 13820.34, the degree of freedom between the columns and rows is 5 and 10 respectively i.e. V_1 is 5 and V_2 is 10, residual/error in degree of freedom is 16 and calculated value of F-Ratio between the period of study is 3.18 and the table value is 3.69, $F < F_{0.1}$, the calculated value of F is less than table value, H_0 is accepted and H_1 is rejected, therefore it is concluded that there is no significant difference in the Capital to Total Asset ratio within the period of study of any individual company, secondly calculated value of F within the Life Insurance Companies with respect to Capital to Reserves and Surplus is 0.06 which is less than the table value of 4.20, $F < F_{0.1}$. Therefore, H_0 is accepted and H_1 is rejected, so it is concluded that there is no significance difference between the Capital to Reserves and Surplus ratio maintained by the selected companies.

3.5. Asset Quality Ratio

The risk of the life insurers originates from the balance sheet, basically the quality of assets the company is maintaining. Asset Quality is one of the most important determinants of the overall financial condition of Insurance Company. The primary factor affecting overall asset quality is the quality of the loan portfolio and the credit administration program. It is calculated as the ratio of overdue loans divided by total gross loans and allowance for loan losses divided by total gross loans, it is also calculated as non-performing loan and real estate owned and other processed assets of the borrower to total assets. AQR is regarded as a crucial financial ratio that assesses the health of policy firms by considering the quality of assets acquired by an insurance company. Higher the Asset Quality Ratio greater is the risk. Lower volume of this ratio is considered as good.

Table 9 Asset Quality Ratio of Selected Life Insurance Companies

Year/ Company	Bajaj Allianz Life	HDFC Life	ICICI Prudential life	Max Life	SBI Life	LIC
2011-12	0.5	1.15	0.1	0	0.005	7.38
2012-13	0.6	0.93	0.3	0	0.004	6.98
2013-14	0.7	0.85	0.2	0	0.004	6.80
2014-15	0.7	0.60	0.4	0	0.31	6.10
2015-16	0.8	0.54	0.4	0.3	0.45	5.76
2016-17	0.9	0.33	0.7	0.3	0.57	4.86
2017-18	0.8	0.25	0.6	0.5	0.47	4.42
2018-19	1.0	0.29	0.7	0.9	0.38	4.09
2019-20	1.3	0.42	0.8	1.40	0.46	4.22
2020-21	1.1	0.53	0.7	1.61	0.48	3.52
2021-22	1.0	0.74	0.7	1.56	0.42	3.20

(Source: Annual Reports of companies from 2011-12 to 2020-21)

The higher AQR symbolises that there are non-performing assets as well as prices of real estate assets held by the company are decreasing. From observation of the above table, LIC is having greater AQR, rest of the companies are having lower AQR even zero in initial period of study and thereafter start increasing, so it is concluded that non-performing assets of all the life insurance companies are increasing. Max life has controlled the AQR in the initial period of study, but increased rapidly in the late period of study.

Table 10 Calculation of ANOVA Values of AQR

Source of Variation	Sum of Square	Degree of Freedom	Mean Sum of Square	F-Ratio
Between the Period	198.51	5	39.70	14.23
Between the Companies	-16.58	10	-1.66	-0.59
Standard Error	44.63	16	2.79	
Total	226.55	31		

(Source: Excel)

ANOVA analysis depicts that sum of square of Asset Quality Ratio between the periods of study is 198.51 and between the selected life insurance companies with respect to Asset Quality Ratio is -16.58, whereas sum of square of residual/error is 44.63. Mean sum of square between the periods of study is 39.70 and between the selected life insurance companies with respect to Asset Quality Ratio is -1.66, the degree of freedom between the columns and rows is 5 and 10 respectively i.e. V_1 is 5 and V_2 is 10, residual/error in degree of freedom is 16 and calculated value of F-Ratio between the period of study is 14.23 and the table value is 3.69, $F > F_{01}$, the calculated value of F is greater than table value, H_0 is rejected and H_1 is accepted, therefore it is concluded that there is significant difference in the AQR within the period of study, secondly calculated value of F within the Life Insurance Companies with respect to AQR is -0.59 which is less than the table value of 4.20, $F < F_{01}$. Therefore, H_0 is accepted and H_1 is rejected, so it is concluded that there is no significance difference between the AQR maintained by the selected companies.

3.6. Management Soundness

It is very crucial to measure the financial soundness of any insurance company, there are many factors to measure financial soundness, like efficiency in expenses, exposure to control expenses, better sales management etc, but to measure the financial soundness of the insurance companies IMF has suggested two parameters firstly first year premium to gross premium to measure the efficiency of the employees working in operation department and second the operational expenses as compared with business brought in by the management.

3.6.1. First Year Premium Ratio

First year premium ratio indicates amount of new business carried on by the company, this ratio directly reflects the efficiency in the operation of the company. The higher ratio indicates, more efficiency and lower ratio means company is unable to carry new business or issue new policies during the year. Further, the issue of long term policies means better survival of the company in the long run.

Table 11 First Year to Gross Premium Ratio of Selected Life Insurers

Year/ Company	Bajaj Allianz Life	HDFC Life	ICICI Prudential life	Max Life	SBI Life	LIC
2011-12	24.74	29.42	26.00	24.27	16.70	14.14
2012-13	28.61	27.49	30.91	23.04	25.05	14.52
2013-14	27.36	19.53	26.43	24.56	27.91	13.47
2014-15	24.95	19.74	29.88	23.55	25.89	9.64
2015-16	23.63	20.21	25.70	22.60	29.25	5.20
2016-17	32.36	18.37	28.38	24.48	29.54	5.82
2017-18	22.58	20.11	27.18	25.73	32.10	7.89
2018-19	22.92	17.33	22.56	26.87	27.45	7.88
2019-20	21.67	18.48	19.47	25.20	24.19	7.74
2020-21	20.46	17.78	14.52	25.37	20.57	8.41
2021-22	22.67	18.18	15.93	23.64	22.02	8.55

(Source: Annual Reports from 2011-12 to 2021-22)

The above table reveals that the first year premium to gross premium is lowest in case of Life Insurance Corporation of India, it indicates that company is losing in terms of new business or new policies issue matter, in case of Bajaj Allianz life first year premium ratio ranges between 20.46 percent in 2020-21, but showing 22.67 percent in 2021-22 and depicting growth over the previous year, it shows highest ratio of 32.36 percent in 2016-17. All the Companies are gaining in terms of first year premium during the initial period of study but showing down trend after 2016-17. Life Insurance business had started decreasing from the year 2014-15 on an average basis and started increasing from the year 2019-20. It is concluded that in the case of selling new policies, private life insurance companies are gaining and public life insurance company is losing.

Table 12 ANOVA Calculations of First Year Premium

Source of Variation	Sum of Square	Degree of Freedom	Mean Sum of Square	F-Ratio
Between the Period	2096.56	5.00	419.31	1.34
Between the Companies	-4112.90	10.00	-411.29	-1.31
Standard Error	5016.91	16.00	313.56	
Total	3000.56	31.00		

(Source: EXCEL)

ANOVA analysis depict that sum of square of First Year Premium to Gross Premium Ratio between the periods of study is 2096.56 and between the selected life insurance companies with respect to Asset Quality Ratio is -4112.90, whereas sum of square of residual/error is 5016.91. Mean sum of square between the periods of study is 419.31 and between the selected life insurance companies with respect to Asset Quality Ratio is -411.29, the degree of freedom between the columns and rows is 5 and 10 respectively i.e. V_1 is 5 and V_2 is 10, residual/error in degree of freedom is 16 and calculated value of F-Ratio between the period of study is 1.34 and the table value is 3.69, $F < F_{01}$, the calculated value of F is less than table value, H_0 is accepted and H_1 is rejected, therefore it is concluded that there is no significant difference in the First Year Premium to Gross Premium ratio within the period of study, secondly calculated value of F within the Life Insurance Companies with respect to First Year Premium to Gross Premium -1.31 which is less than the table value

of 4.20, $F < F_{0.1}$. Therefore, H_0 is accepted and H_1 is rejected, so it is concluded that there is no significance difference between the First Year Premium to Gross Premium Ratio of the selected companies.

3.6.2. Operation Efficiency Ratio

Operation efficiency is measured by dividing the operating expenses related to insurance business to gross premium underwritten during the year; however, operating expenses are mostly incurred to bring new business for the company. The higher it is considered as adverse and lower it is considered as better. The regulators have allowed it equal to the 100 percent of the first year premium from the year 2018-19; however, there were no regulations for measuring this efficiency prior to 2015-16.

Table 13 Operation Efficiency Ratio of Selected Life Insurance Companies

Year/ Company	Bajaj Allianz Life	HDFC Life	ICICI Prudential life	Max Life	SBI Life	LIC
2011-12	18.79	12.51	14.32	19.63	7.80	6.34
2012-13	23.22	10.79	15.06	18.51	11.01	8.00
2013-14	14.31	10.69	15.50	17.38	10.28	10.03
2014-15	20.30	10.09	12.79	15.20	9.15	9.34
2015-16	20.45	11.57	11.69	13.56	9.21	8.52
2016-17	18.61	12.38	12.43	14.76	7.83	9.63
2017-18	21.41	13.52	9.60	13.76	6.78	9.47
2018-19	22.11	13.14	10.48	14.13	6.34	8.65
2019-20	21.29	13.24	10.48	15.39	5.94	9.11
2020-21	16.36	12.03	9.37	15.09	4.80	8.68
2021-22	17.61	12.36	11.66	14.32	5.06	9.09

(Source: Annual Reports 2011-12 to 2021-22)

SBI Life and LIC are maintaining lower operation efficiency ratio, it means their management is more efficient as compared to other insurers, all other companies are also showing downwards trends. The new business premium for life insurers has grown at a CAGR of 13 percent over financial year 2014-22 led by the financialisation of savings and new product launches. The average growth of life insurance is 12.93 percent in 2021-22 comprising 22.74 percent of private life insurers. Bajaj Allianz Life is incurring more operating expenses to sell new more policies, operating expenses to first year premium ratio ranges between 70 to 80 percent, which is higher than any other company.

Table 14 ANOVA Calculation of Operational Efficiency Ratio

Source of Variation	Sum of Square	Degree of Freedom	Mean Sum of Square	F-Ratio
Between the Period	1056.39	5.00	211.28	2.00
Between the Companies	-1464.38	10.00	-146.44	-1.39
Standard Error	1686.41	16.00	105.40	
Total	1278.42	31.00		

(Source: Excel)

ANOVA analysis depict that sum of square of Operational Efficiency Ratio between the periods of study is 1056.39 and between the selected life insurance companies with respect to Operational Efficiency Ratio -1464.38, whereas sum of square of residual/error is 1686.41. Mean sum of square between the periods of study is 211.28 and between the selected life insurance companies with respect to Operational Efficiency Ratio is -146.44, the degree of freedom between the columns and rows is 5 and 10 respectively i.e. V_1 is 5 and V_2 is 10, residual/error in degree of freedom is 16 and calculated value of F-Ratio between the period of study is 2 and the table value is 3.69, $F < F_{0.1}$, the calculated value of F is less than table value, H_0 is accepted and H_1 is rejected, therefore it is concluded that there is no significant difference in

the Operation Efficiency of the selected companies within the period of study, secondly calculated value of F within the Life Insurance Companies with respect to First Year Premium to Gross Premium -1.39 which is less than the table value of 4.20, $F < F_{01}$. Therefore, H_0 is accepted and H_1 is rejected, so it is concluded that there is no significant difference between the Operational Efficiency of selected companies.

3.7. Reinsurance and Actuarial Efficiency

3.7.1. Retention Ratio

The retention ratio is the difference of gross premium and reinsurance ceded divided by gross premium, in other words, it is the proportion of earnings kept back by the insurance company for investment in the business, earnings of the company can be used for a number of purposes such as pay the profit to the shareholders as dividend, reinvest in the business for growth, it helps investors to determine how much money a company is keeping to reinvest for the growth of the company's operation and what is the rate of reinvestment, a company which is not retaining the earnings has an increased likelihood of taking additional debt or issuing new equity to finance growth. In the insurance sector retention means keeping the premium and risk at their own destiny.

Table 15 Retention Ratio of Selected Life Insurance Companies

Year/ Company	Bajaj Allianz Life	HDFC Life	ICICI Prudential life	Max Life	SBI Life	LIC
2011-12	98.22	99.49	99.30	99.97	99.60	99.90
2012-13	98.10	99.43	99.64	99.00	99.72	99.94
2013-14	98.56	99.25	99.33	99.00	99.24	99.96
2014-15	98.84	99.43	99.11	99.00	99.32	99.90
2015-16	98.89	99.18	98.83	99.00	98.99	99.92
2016-17	99.00	99.12	99.05	99.00	99.23	99.90
2017-18	99.19	99.18	99.14	99.00	98.99	99.88
2018-19	99.40	99.10	98.90	98.92	99.70	99.91
2019-20	99.20	98.52	98.30	98.73	99.24	99.91
2020-21	99.20	98.80	97.90	98.53	99.03	99.89
2021-22	99.10	98.70	97.00	98.02	99.44	99.86

(Source: Calculated from Annual Reports of companies from 2011-12 to 2021-22)

Table 15 reveals that during the initial period of study all the sample companies are retaining the majority of the risk at their own destiny, but in the later period of study HDFC Life, ICICI Prudential and Max Life have slightly diverted their risk on reinsurers, LIC has maintained retention ratio of more than 99.86 throughout the study period, it means LIC, SBI Life and Bajaj Allianz Life Insurance companies are more financially strong companies and they can bear more risk and are less dependent on reinsurance. SBI Life Insurance Company is a less risk-bearing company as compared to other sample companies and Life Insurance Corporation of India is a greater risk-bearing company followed by Bajaj Allianz Life Insurance Company Ltd.

Table 16 Calculation of ANOVA Test of Retention Ratio

Source of Variation	Sum of Square	Degree of Freedom	Mean Sum of Square	F-Ratio
Between the Period	9.54	5	1.91	0.00033
Between the Companies	-92691.26	10	-9269.13	-1.6
Standard Error	92702.71	16	5793.92	
Total	20.99	31		

(Source: Excel)

ANOVA analysis depicts that sum of square of Retention ratio between the periods of study is 9.54 and between the selected life insurance companies with respect to Retention Ratio is -92691.26, whereas sum of square of residual/error is 92702.71. Mean sum of square between the periods of study is 1.91 and between the selected life insurance companies with respect to Retention Ratio is -9269.13, the degree of freedom between the columns and rows is 5 and 10 respectively i.e. V_1 is 5 and V_2 is 10, residual/error in degree of freedom is 16 and calculated value of F-Ratio between the period of study is 0.00033 and the table value is 3.69, $F < F_{01}$, the calculated value of F is greater than table value, H_0 is accepted and H_1 is rejected, therefore it is concluded that there is no significant difference in the Retention Ratio within the period of study, secondly calculated value of F within the Life Insurance Companies with respect to Retention Ratio is -1.16 which is less than the table value of 4.20, $F < F_{01}$. Therefore, H_0 is accepted and H_1 is rejected, so it is concluded that there is no significance difference between the Retention Ratio maintained by the selected Life Insurance Companies, all the companies are ready to accept the risk at their own destiny.

3.7.2. Survival Ratio

The survival ratio indicates the adequacy of technical reserves to the average net premium of last three years; it indicates the long term business taking capacity of the company or shifts in business composition. The higher the ratio will reflect better the technical reserves.

Table 17 Survival Ratio of Selected Life Insurance Companies

Year/ Company	Bajaj Allianz Life	HDFC Life	ICICI Prudential life	Max Life	SBI Life	LIC
2011-12	36.02	2.17	21.55	3.24	9.31	21.64
2012-13	59.08	1.96	24.18	2.98	13.88	26.28
2013-14	85.61	1.96	26.89	3.03	20.28	19.90
2014-15	106.66	4.71	28.16	1.87	26.38	19.74
2015-16	127.84	8.13	25.14	1.29	28.46	19.05
2016-17	139.51	10.99	26.49	6.34	27.28	18.68
2017-18	139.71	13.96	22.79	7.27	26.23	17.87
2018-19	134.75	15.25	20.20	6.74	24.56	0.88
2019-20	120.56	16.97	18.45	4.59	23.61	0.99
2020-21	112.42	20.00	23.42	6.65	22.18	1.80
2021-22	88.29	34.66	21.37	6.76	21.04	1.22

(Source: Annual Reports 2011-12 to 2021-22)

From the above table, it is observed that Bajaj Allianz is having higher survival ratio as compared with other private and public companies and LIC is very poor ratio of survival during the last four financial years. Max Life is also having lower survival ratio. All other companies are having satisfactory survival ratio for the long term.

Table 18 ANOVA Calculation of Survival Ratio

Source of Variation	Sum of Square	Degree of Freedom	Mean Sum of Square	F-Ratio
Between the Period	76049.07	5	15209.81	12.06
Between the Companies	-6093.86	10	-609.39	-0.48
Standard Error	20175.98	16	1261.00	
Total	90131.18	31		

(Source: Excel)

ANOVA analysis depicts that sum of square of Survival ratio between the periods of study is 76049.07 and between the selected life insurance companies with respect to Survival Ratio is -6093.86, whereas sum of square of residual/error is 20175.98. Mean sum of square between the periods of study is 15209.81 and between the selected life insurance

companies with respect to Retention Ratio is -609.39, the degree of freedom between the columns and rows is 5 and 10 respectively i.e. V_1 is 5 and V_2 is 10, residual/error in degree of freedom is 16 and calculated value of F-Ratio between the period of study is 12.06 and the table value is 3.69, $F > F_{01}$, the calculated value of F is greater than table value, H_0 is rejected and H_1 is accepted, therefore, it is concluded that there is significant difference in the Survival Ratio within the period of study, secondly calculated value of F within the Life Insurance Companies with respect to Survival Ratio -0.48, which is less than the table value of 4.20, $F < F_{01}$. Therefore, H_0 is accepted and H_1 is rejected, so it is concluded that there is no significance difference between the Survival Ratio maintained by the selected Life Insurance Companies.

3.8. Earning and Profitability

These ratios are used to assess a business's ability to generate earnings relative to its revenues, these ratios are used to measure the efficiency of the business organisation, that is how efficiently, the company is using its' assets to generate income. The higher value of profitability ratios is considered as most efficient, these ratios give best results, when used inter-industry and intra-industry.

3.8.1. Operating Expense Ratio

Table 19 Operating Expense Ratio of Selected Life Insurance Companies

Year/ Company	Bajaj Allianz Life	HDFC Life	ICICI Prudential life	Max Life	SBI Life	LIC
2011-12	18.918	11.5	17.83	21.50	7.83	6.341
2012-13	23.413	10.8	17.31	19.40	10.28	8.010
2013-14	14.480	10.7	16.28	17.54	9.15	10.036
2014-15	20.532	10.2	12.92	15.32	9.20	9.350
2015-16	20.675	11.6	11.79	13.67	9.30	8.524
2016-17	18.798	12.6	12.55	14.90	7.90	9.642
2017-18	17.614	13.5	9.69	12.90	6.59	9.483
2018-19	22.290	13.10	7.57	13.20	6.34	8.655
2019-20	21.419	13.19	10.65	14.48	5.94	9.119
2020-21	16.500	12.00	7.69	14.20	4.80	8.686
2021-22	17.834	12.30	10.13	13.5	5.06	9.099

(Source: Annual Reports of the concerned company from 2011-12 to 2021-22)

The Operating Expenses can be defined as all recurring business expense of life insurer incurred in normal business operations but does not include commission paid to advisors, the operating expenses means all expenses incurred by an insurer under generally accepted accounting principle (GAAP), that in any way related to the operation of the insurance company or company business, it includes employee remuneration and welfare, travel, conveyance, vehicle running, training of employees, rent, rates, taxes, repair, printing, stationery, communication, legal charges, professional charges, medical fees, auditor fees, advertisement and publicity of insurance products etc. All these expenses are recurring in nature and some are direct expenses whereas others are indirect, which are linked to sourcing of new business and other indirect expenses which are incurred as fixed expense irrespective of new customer acquisition. The Insurance Regulatory and Development Authority of India issued guidelines regulating the Operating Expenses, these guidelines are known as expense regulation 2016 vide which actual expense to allowable expense is up to 120 percent till 2017-18 and further brought down to 100 percent in 2018-19. These guidelines have demarcated expense ratio on the bases the product mix and also the type of premium. According to these guidelines an insurer is allowed to incur up to 80 percent of the first year premium and 15 percent of renewal premium in a policy of ten years vintage.

The above table revealed that all the selected companies are having operating expenses ratio more than the industry except SBI life and HDFC life insurance companies, when SBI life data compared with LIC it is found that SBI is more efficiently working in terms of expense ratio, it is having lower expense ratio to industry as well as public sector company Life Insurance Corporation. The worst affected in this terms is Bajaj Allianz during the initial period of study, but they are continuously making efforts to improve their expense ratio. On analysis of the annual reports of these companies it is found that in the early years of the start of the operation and establishment of offices and distribution

channels they have incurred more expenses, therefore, the operating expenses ratio is higher for these companies. ICICI Prudential Life Insurance Company has improved during the late period of the study i.e. 2018-19, 2020-21 and 2021-22, their operating expense ratio is lower than the industry. Max life is having more operating expenses as compared to industry. So it is concluded that SBI Life Insurance Company is performing well in maintaining their operating expenses, even better than the old giant LIC.

Table 20 ANOVA Calculation of Operating Expense Ratio

Source of Variation	Sum of Square	Degree of Freedom	Mean Sum of Square	F-Ratio
Between the Period	1040.26	5	208.05	1.91
Between the Companies	-1411.48	10	-141.15	-1.29
Standard Error	1746.37	16	109.15	
Total	1375.15	31		

(Source: Excel)

ANOVA analysis depict that sum of square of Operating Expense ratio between the periods of study is 1040.26 and between the selected life insurance companies with respect to Asset Operating Expense Ratio is -1411.48, whereas sum of square of residual/error is 1746.37. Mean sum of square between the periods of study is 208.05 and between the selected life insurance companies with respect to Operating Expense Ratio is -141.15, the degree of freedom between the columns and rows is 5 and 10 respectively i.e. V_1 is 5 and V_2 is 10, residual/error in degree of freedom is 16 and calculated value of F-Ratio between the period of study is 1.91 and the table value is 3.69, $F < F_{01}$, the calculated value of F is less than table value, H_0 is accepted and H_1 is rejected, therefore it is concluded that there is no significant difference in the OER within the period of study, secondly calculated value of F within the Life Insurance Companies with respect to OER is -1.29 which is less than the table value of 4.20, $F < F_{01}$. Therefore, H_0 is accepted and H_1 is rejected, so it is concluded that there is no significance difference between the OER maintained by the selected Life Insurance Companies.

3.8.2. Return on Equity

It is the capacity of the company to earn profit on shareholders equity; the ratio can rise due to higher net income being generated by using the vast range of assets available with the company. The ratio can be further raised by using the debt base for financing the assets or operation of the company. Less equity and more profit will raise the ROE ratio.

Table 21 Return on Equity of the Selected Life Insurance Companies

Year/ Company	Bajaj Allianz Life	HDFC Life	ICICI Prudential life	Max Life	SBI Life	LIC
2011-12	36.42	12.26	27.95	20.86	25.80	0.07155
2012-13	27.43	20.48	29.17	19.88	23.04	42.00416
2013-14	17.45	32.77	31.45	20.29	22.14	30.75930
2014-15	12.98	30.31	31.02	20.16	20.30	11.20801
2015-16	11.52	25.91	31.00	21.70	18.11	43.19202
2016-17	9.87	23.24	26.25	26.30	17.19	36.79991
2017-18	7.77	23.35	23.52	19.55	17.61	65.75828
2018-19	5.20	22.58	16.16	20.15	17.51	70.53644
2019-20	4.62	19.05	14.78	20.96	16.26	61.35266
2020-21	5.41	15.75	10.48	17.39	13.99	47.92614
2021-22	2.97	7.80	8.29	12.11	12.96	38.93459

(Source: Annual Report of Companies from 2011-12 to 2021-22)

On analysis of table 21, it is observed that ROE of Bajaj Allianz, HDFC Life, ICICI Prudential, Max Life and SBI Life has decreased during the period of study from 36.42 percent to 2.97 percent of Bajaj, 12.26 to 7.8 percent in case of HDFC Life, 27.96 to 8.29 in case of ICICI Prudential life, 20.86 to 12.11 percent in case of SBI Life and 25.80 to 12.96 in case of Max Life; however, ROE of Life Insurance Corporation of India did not change significantly.

Table 22 ANOVA Calculation of Return on Equity

Source of Variation	Sum of Square	Degree of Freedom	Mean Sum of Square	F-Ratio
Between the Period	4945.94	5	989.19	1.39
Between the Companies	-4043.06	10	-404.31	-0.57
Standard Error	11357.75	16	709.86	
Total	12260.63	31		

(Source: Excel)

ANOVA analysis depicts that sum of square of Return on Equity ratio between the periods of study is 4945.94 and between the selected life insurance companies with respect to Return on Equity Ratio is -4043.94, whereas sum of square of residual/error is 11357.75. Mean sum of square between the periods of study is 989.19 and between the selected life insurance companies with respect to Return on Equity Ratio is -404.31, the degree of freedom between the columns and rows is 5 and 10 respectively i.e. V_1 is 5 and V_2 is 10, residual/error in degree of freedom is 16 and calculated value of F-Ratio between the period of study is 1.39 and the table value is 3.69, $F < F_{01}$, the calculated value of F is less than table value, H_0 is accepted and H_1 is rejected, therefore it is concluded that there is no significant difference in the Return on Equity Ratio within the period of study, secondly calculated value of F within the Life Insurance Companies with respect to Return on Equity Ratio is -057, which is less than the table value of 4.20, $F < F_{01}$. Therefore, H_0 is accepted and H_1 is rejected, so it is concluded that there is no significance difference between the Return on Equity Ratio maintained by the selected Life Insurance Companies.

3.8.3. Return on Assets

This ratio depicts that how a company is using its' assets to generate profit, it applies that the more assets the insurance company has amassed, more policy sales and potential profits the company may generate. The economies of scale help lower down the costs and improve the margins, returns may grow faster rate than assets; it will ultimately result to increasing Return on Asset.

Table 23 Return on Asset of Selected Life Insurance Companies

Year/ Company	Bajaj Allianz Life	HDFC Life	ICICI Prudential Life	Max Life	SBI Life	LIC
2011-12	3.324	0.81	1.9271	2.6595	1.1525	0.275
2012-13	3.353	1.09	2.0114	2.0620	1.8395	0.092
2013-14	2.609	1.42	1.9556	1.7535	1.2208	0.094
2014-15	2.009	1.17	1.6498	1.3206	1.1068	0.310
2015-16	1.981	1.11	1.6092	1.2202	1.1068	0.114
2016-17	1.693	0.98	1.3799	1.4752	1.0666	0.087
2017-18	1.373	1.05	1.1701	0.9922	0.9624	0.086
2018-19	0.867	1.02	0.7144	0.8751	0.9280	0.086
2019-20	0.788	1.02	0.6987	0.7734	0.8748	0.085
2020-21	0.780	0.79	0.4478	0.5733	0.6539	0.076
2021-22	0.378	0.59	0.3174	0.3572	0.5612	0.096

(Source: Compiled from Annual Reports from 2011-12 to 2021-22)

Table 23 reveals that return on asset in case of both public and private life insurance companies have decreased during the period of study. All the companies earned higher rate of return during the initial period of study particularly Bajaj Allianz Life which earned higher than other, but it started decreasing after 2013-14 in case of all companies, this is an indicative of the slowdown in the life insurance sector, this fact is in correlation with insurance penetration and density, which has decreased after 2013-14.

Table 24 ANOVA Calculation of Selected Companies

Source of Variation	Sum of Square	Degree of Freedom	Mean Sum of Square	F-Ratio
Between the Period	15.67	5	3.13	2.38
Between the Companies	-0.26	10	-0.03	-0.02
Standard Error	21.09	16	1.32	
Total	36.50	31		

(Source: Excel)

ANOVA analysis depicts that sum of square of Return on Assets ratio between the periods of study is 15.67 and between the selected life insurance companies with respect to Return on Asset Ratio is -0.26, whereas sum of square of residual/error is 21.09. Mean sum of square between the periods of study is 3.13 and between the selected life insurance companies with respect to Return on Asset Ratio is -0.03, the degree of freedom between the columns and rows is 5 and 10 respectively i.e. V_1 is 5 and V_2 is 10, residual/error in degree of freedom is 16 and calculated value of F-Ratio between the period of study is 2.38 and the table value is 3.69, $F > F_{01}$, the calculated value of F is less than table value, H_0 is accepted and H_1 rejected, therefore it is concluded that there is no significant difference in the Return on Asset Ratio within the period of study, secondly calculated value of F within the Life Insurance Companies with respect to Return on Asset Ratio is -0.02 which is less than the table value of 4.20, $F < F_{01}$. Therefore, H_0 is accepted and H_1 is rejected, so it is concluded that there is no significance difference between the Return on Asset Ratio maintained by the selected Life Insurance Companies.

3.9. Liquidity Ratio

Liquidity is very critical part of the business. It is required for a business to meet its short term obligations. A higher liquidity ratio represents that the company is highly rich in cash. Higher liquidity ratios determine how quickly a company can convert the assets and use them for meeting the dues that have arisen. The higher the ratio, the easier is the ability to clear the debts and avoid defaulting on payments. This is a very important criterion that creditors check before offering short term loans to the business and also the prospective customers of life insurance should check before buying an insurance policy. An organisation which is unable to clear dues results in creating impact on the creditworthiness and also affects credit rating of the company.

3.9.1. Liquid Assets to Liquid Liability

The LA: LL ratio represent the extent to which a business is enable to pay its' short-term obligation with its most liquid assets. In other words it is a measure of the capability of business's current liability that can be met out of cash and liquid assets. It is also known as acid test ratio. Any business having negative ratio narrate that its' financial strength is not good and the said business is likely to struggle financial crisis, whereas one with positive value means likely to survive. It also means that the company has ability to raise cash quickly when needed. It is a useful indicator of a company's resilience. Further creditors and investors use the quick ratio to determine whether a particular company is a suitable option for funding or for investment. It enables investors and creditors in understanding the readiness of a company to face any financial unexpected crisis. If cash flow becomes a concern, it is a crucial indicator of the company's capacity to meet short term obligations.

From Table 25, it concluded that SBI Life is showing sound liquid health during the study period, LIC is not stable in this connection, there are cash crunch in it. Bajaj Allianz is maintaining this ratio. ICICI Prudential have lower quick ratio. Max Life is satisfactory in this connection. If this ratio is more than 1, it is considered as very strong, it means company is able to pay off its all liabilities even out of liquid assets in a very short span of time without touching long term investment or assets.

Table 25 LA to LL Ratio of Selected Life Insurance Companies

Year/ Company	Bajaj Allianz Life	HDFC Life	ICICI Prudential life	Max Life	SBI Life	LIC
2011-12	0.81065	0.8527	0.53522	0.6233	2.415	1.561803590
2012-13	1.03695	0.7644	0.64844	1.0585	2.550	0.249969147
2013-14	1.10684	0.9655	0.58726	0.8965	2.503	1.491090783
2014-15	0.86441	0.8860	0.69069	0.9778	2.361	0.985954572
2015-16	0.93199	0.7360	0.67025	0.9497	2.004	1.610150709
2016-17	1.12300	0.7769	1.00912	1.0405	2.059	0.762341458
2017-18	1.13855	0.7572	0.78722	1.3143	2.004	0.173038167
2018-19	1.54477	0.7887	0.91043	1.1186	2.059	0.242623574
2019-20	1.25036	0.8654	1.15253	1.3102	1.778	1.585065380
2020-21	1.06000	0.7635	1.04495	1.0217	1.687	1.464665625
2021-22	0.85653	0.8402	0.93436	0.9724	1.484	0.180667190

(Source: Compiled from Annual Report from 2011-12 to 2021-22)

Table 26 ANOVA Calculation of Liquid Asset to Liquid Liability

Source of Variation	Sum of Square	Degree of Freedom	Mean Sum of Square	F-Ratio
Between the Period	12.71	5	2.54	2.30
Between the Companies	-11.21	10	-1.12	-1.014
Standard Error	17.69	16	1.11	
Total	19.18	31		

(Source: Excel)

ANOVA analysis depicts that sum of square of Liquid Asset to Liquid Liability ratio between the periods of study is 12.71 and between the selected life insurance companies with respect to Liquid Asset to Liquid Liability Ratio is -11.21, whereas sum of square of residual/error is 17.69. Mean sum of square between the periods of study is 2.54 and between the selected life insurance companies with respect to Liquid Asset to Liquid Liability is -1.12, the degree of freedom between the columns and rows is 5 and 10 respectively i.e. V_1 is 5 and V_2 is 10, residual/error in degree of freedom is 16 and calculated value of F-Ratio between the period of study is 2.30 and the table value is 3.69, $F < F_{01}$, the calculated value of F is less than table value, H_0 accepted and H_1 is rejected, therefore it is concluded that there is no significant difference in the Liquid Asset to Liquid Liability Ratio within the period of study, secondly calculated value of F within the Life Insurance Companies with respect to Return on Asset Ratio is -1.04 which is less than the table value of 4.20, $F < F_{01}$. Therefore, H_0 is accepted and H_1 is rejected, so it is concluded that there is no significance difference between the Liquid Asset to Liquid Liability Ratio maintained by the selected Life Insurance Companies.

3.9.2. Current Assets to Total Assets

All the companies are having positive ratio, this implies that all the insurance companies are able to make payment of their short term obligations out of current assets. However, the insurance companies have not determined and standard ratio in this connection but in general accounting the ideal ratio in this connection is 1:1. LIC has poor LA: LL ratio as compared to other private sector companies.

Table 27 Liquid Asset to Liquid Liability to Selected Companies

Year/ Company	Bajaj Allianz Life	HDFC Life	ICICI Prudential life	Max Life	SBI Life	LIC
2011-12	0.024708	0.03838	0.013177	0.04795	0.06815	0.02973
2012-13	0.042885	0.02914	0.017584	0.06495	0.06542	0.00206
2013-14	0.046457	0.02842	0.014451	0.04769	0.06873	0.01900
2014-15	0.038133	0.02722	0.015024	0.04252	0.06143	0.00025
2015-16	0.034939	0.02538	0.014384	0.04342	0.06213	0.00095
2016-17	0.051589	0.03251	0.023478	0.04006	0.05737	0.00075
2017-18	0.053140	0.03324	0.019614	0.04409	0.05519	0.00032
2018-19	0.053558	0.03232	0.020925	0.04013	0.04644	0.00030
2019-20	0.046708	0.03386	0.025136	0.03809	0.03581	0.00016
2020-21	0.028845	0.02868	0.018249	0.03231	0.03212	0.00013
2021-22	0.028854	0.02563	0.020518	0.03340	0.02839	0.02072

(Source: Compiled from Annual Report from 2011-12 to 2021-22)

Table 28 ANOVA Calculation of Liquid Asset to Total Asset

Source of Variation	Sum of Square	Degree of Freedom	Mean Sum of Square	F-Ratio
Between the Period	0.02	5	0.003	3.63
Between the Companies	-0.01	10	-0.001	-0.97
Standard Error	0.01	16	0.001	
Total	0.02	31		

(Source: Excel)

ANOVA analysis depicts that sum of square of Liquid Asset to Total Asset ratio between the periods of study is 0.02 and between the selected life insurance companies with respect to Liquid Asset to Total Asset Ratio is -0.01, whereas sum of square of residual/error is 0.01. Mean sum of square between the periods of study is 0.003 and between the selected life insurance companies with respect to Liquid Asset to Total Asset is -0.001, the degree of freedom between the columns and rows is 5 and 10 respectively i.e. V_1 is 5 and V_2 is 10, residual/error in degree of freedom is 16 and calculated value of F-Ratio between the period of study is 3.63 and the table value is 3.69, $F < F_{01}$, the calculated value of F is less than table value, H_0 is accepted and H_1 is rejected, therefore it is concluded that there is no significant difference in the Liquid Asset to Total Asset Ratio within the period of study, secondly calculated value of F within the Life Insurance Companies with respect to Return on Asset Ratio is -0.97 which is less than the table value of 4.20, $F < F_{01}$. Therefore, H_0 is accepted and H_1 is rejected, so it is concluded that there is no significance difference between the Liquid Asset to Total Asset Ratio maintained by the selected Life Insurance Companies.

3.9.3. Liquid Liability to Total Liability

This ratio reflects the short term liability in comparison to long term liability, lower the ratio beneficial for the life insurer is, on the contrary higher ratio reflect higher pay outs in short term.

Analysis of the above table revealed that Bajaj Allianz and HDFC Life have higher ratio, it means these two companies are having greater short term liability in comparison to other companies. Max Life has lower ratio, it means company is not required to pay more funds in the short run. The Ratio of all other companies is satisfactory.

Table 29 Liquid Liability to Total Liability Ratio of Selected Life Insurers

Year/ Company	Bajaj Allianz Life	HDFC Life	ICICI Prudential life	Max Life	SBI Life	LIC
2011-12	0.03048	0.0450	0.0246	0.000077	0.0501	0.01904
2012-13	0.04136	0.0381	0.0271	0.000061	0.0538	0.00826
2013-14	0.04197	0.0294	0.0246	0.000053	0.0275	0.01275
2014-15	0.04411	0.0307	0.0218	0.000043	0.0260	0.00026
2015-16	0.03749	0.0345	0.0215	0.000046	0.0335	0.00059
2016-17	0.04594	0.0418	0.0233	0.000039	0.0304	0.00100
2017-18	0.04667	0.0439	0.0249	0.000034	0.0301	0.00184
2018-19	0.03467	0.0410	0.0230	0.000036	0.0261	0.00124
2019-20	0.03736	0.0391	0.0218	0.000029	0.0186	0.00010
2020-21	0.02721	0.0376	0.0175	0.000032	0.0171	0.02214
2021-22	0.03369	0.0305	0.0220	0.000034	0.0170	0.01675

(Source: Annual Reports 2011-12 to 2021-22)

Table 30 ANOVA Calculation of Liquid Liability to Total Liability

Source of Variation	Sum of Square	Degree of Freedom	Mean Sum of Square	F-Ratio
Between the Period	137.82	5	27.56	6.00
Between the Companies	-43.63	10	-4.36	-0.95
Standard Error	73.46	16	4.59	
Total	167.65	31		

(Source: Excel)

ANOVA analysis depicts that sum of square of Liquid Asset to Total Asset ratio between the periods of study is 137.82 and between the selected life insurance companies with respect to Liquid Liability to Total Liability Ratio is -43.63, whereas sum of square of residual/error is 73.46. Mean sum of square between the periods of study is 27.56 and between the selected life insurance companies with respect to Liquid Liability to Total Liability is -4.36, the degree of freedom between the columns and rows is 5 and 10 respectively i.e. V_1 is 5 and V_2 is 10, residual/error in degree of freedom is 16 and calculated value of F-Ratio between the period of study is 6 and the table value is 3.69, $F > F_{0.1}$, the calculated value of F is greater than table value, H_0 is rejected and H_1 is accepted, therefore it is concluded that there is significant difference in the Liquid Liability to Total Liability Ratio within the period of study, secondly calculated value of F within the Life Insurance Companies with respect to Liquid Liability to Total Liability Ratio is -0.95 which is less than the table value of 4.20, $F < F_{0.1}$. Therefore, H_0 is accepted and H_1 is rejected, so it is concluded that there is no significance difference between the Liquid Asset to Total Asset Ratio maintained by the selected Life Insurance Companies.

4. Findings

- Since the life insurance penetration ratio as well as density of insurance is increasing after 2019-20, the economy is showing growth during 2021-22, domestic savings have been increased from 7.9 percent to 11.5 percent, all the life insurance companies are showing growth in their gross premium written, and the demand for insurance products has been increased, all these factors clearly indicate that there is scope for further growth of life insurance business in India.
- While making the analysis of the Capital Adequacy of the selected companies, it is found that LIC and HDFC are having their solvency ratio just above the statutory limit, whereas Bajaj Allianz Life and ICICI Prudential Life

are maintaining excellent and very good respectively, all other are maintaining good solvency ratio. It means all the companies are financially sound companies, but private companies are more financially sound as compared to public company. During ANOVA testing it is found that there is significant difference in solvency ratio during the study periods in the companies, whereas there is no significant difference between the selected life insurance companies with respect to solvency ratio as all companies are maintaining more than the statutory limit; Capital to Assets ratio of all the companies are decreasing except Bajaj Allianz Life, HDFC Life during the study period that LIC during the year 2021-22 only, it means companies are increasing their asset base during 2011-12 to 2021-22. On the other hand there is no significance difference during the period of study as well as between the companies with respect to capital to total asset ratio; while analysing Capital to Reserves ratio it is found that Bajaj Allianz is having good reserves, while Max Life is having less reserves as compared to capital, whereas HDFC Life, ICICI Prudential Life and SBI Life are improving it significantly, LIC is satisfactory except year 2021-22; it is further found that there is significant difference in the value of Capital to Reserves during 2011-12 to 2021-22 in all the companies but there is no significant difference between the companies with respect to this ratio. Bajaj Allianz Life, HDFC Life and ICICI Prudential are more financially sound companies as compared to other private and public companies.

- While analysing the Asset Quality Ratio, it is found that all private life insurance companies are good in maintaining AQR as compared to LIC; further, it is found that there is significant difference in the value of AQR between the periods from 2011-12 to 2021-22 in all the selected companies but there is no significant difference between all the companies, further it is found that SBI life, ICICI Prudential, Max Life and HDFC life are having good quality assets.
- Management Soundness is depicted in terms of new business as well as operational efficiency of life insurers; in terms of first year premium on new business, the share of LIC is decreasing throughout the study period, while on an average basis share of selected private players have increased up to the year 2014-15 and thereafter start decreasing but increasing as compared to LIC, it is the year 2019-20 when the share of private companies show increasing trend again; further it is found in the ANOVA test that there is no significant difference in the first year premium between the 2011-12 to 2021-22 and between the companies with respect to this ratio. In terms of measuring operational efficiency SBI Life and LIC are found more efficient companies as compared to all other private companies. These two companies are efficient than the life insurance industry. It is further found that there is no significant difference in the performance of all the companies during the period from 2011-12 to 2021-22 and between the selected companies with respect to operational efficiency.
- Re-insurance and Actuarial issues are assessed with the help of Retention Ratio, in the present analysis it is found that all the companies are maintaining more than 99 percent, it means they have less expenses on reinsurance and have capacity to bear the risk in their own destiny, it further found that there is no significant difference between the study period as well as between the companies. While analysing the survival ratio it is found that Bajaj Allianz Life is having very good survival chance followed by HDFC Life, ICICI Prudential, SBI Life and Max Life, whereas survival ratio of LIC is less than all the other private companies. It is further found that there is no significant difference between the periods of study as well as between the companies when compared.
- Earning and Profitability of insurance company is determined by the analysis of operating expenses, return on equity and return on assets, operating expenses of the LIC and SBI are found lower to insurance Industry as these two companies are well managing their operating expenses as compared to all other selected private companies, it is further found that there is no significant difference during the period of study as well as between the selected life insurance companies with respect to operating expense, return on equity and return on assets ratios.
- During Liquidity Analysis, it is found that there is no significant difference during the period of study as well as between the selected life insurance companies with respect to liquid asset to liquid liability ratio and liquid asset to total asset ratio, this implies that all the companies are capable to pay off their short term obligations out of their current assets; further, it is found that there is significant difference between the study period with respect to current liability to total liability and there is no significant difference between the companies with respect to this ratio. The lower ratio depicts that there are less short term obligations of the company.

Limitations

The study is based on historical data from the annual reports of IRDAI, the selected companies, books and Journals, therefore, the study is suffering from limitations of secondary data. The study did not recommend investor to buy policy from any particular company, but it recommended that before taking decision to buy life insurance policy, they should use CAMEL analysis of the said company.

5. Conclusion

There is sufficient scope for life insurance companies to grow in India. All the selected life insurance companies are maintaining solvency ratio more than the prescribed limit of 150 percent as fixed by IRDAI, with respect to capital to total asset ratio all the companies are found having lower capital to asset ratio, hence all the selected companies have poor borrowing capacity, but all the companies have invested more than 100 billion Capital in the respective company, it means all the companies doing business more than their capital. Private Life Insurance companies are maintaining this ratio less than one said to be satisfactory, where more than one indicative that non-performing asset are increasing. Private companies like Bajaj Allianz, HDFC Standard Life, ICICI and Max life have higher percentage of operating expense on gross premium, whereas SBI Life and LIC are having lower percentage of operating expense on gross premium underwritten. The reason behind this may be the large network of branches and large volume of business in case of LIC and carrying on business through bank branches in case of SBI Life. The regulator has fixed the limit of 100 percent of first year premium in case of operating expenses, however this is the further scope of research in this area to know whether life insurance companies are complying with the stipulated rules pertaining to OPEX or not? On reinsurance and actuarial issues all the companies both public and private are bearing the risk at their own destiny, they are all having less expenditure on reinsurance. It is observed that ROE of private companies like Bajaj Allianz, HDFC Life, ICICI Prudential, Max Life and SBI Life has decreased during the period of study, however out of these Bajaj Allianz is badly affected company; ROE of Life Insurance Corporation of India did not change significantly during the period. All the selected companies both public sector and private sector have showed declining trend of earning and profitability during the period of study. In terms of liquidity of the selected life insurance companies Bajaj Allianz and SBI Life are having sufficient cash that these two companies can make payment in very short span, whereas others insurers are also solvent to make payment of their short term liabilities.

Compliance with ethical standards

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Disclosure of conflict of interest

I declare that I have no conflict of interest.

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