CHAPTER-3

PROFITABILITY ANALYSIS

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PROFITABILITY ANALYSIS

3.1 Introduction

The term profit means the income earned by the enterprise in a specified period of time. Profitability refers to the ability of the firm to increase earnings. In profitability analysis absolute figures are less meaningful than earnings measured as a percentage of a number of bases: productive assets, the owners' and creditors' capital, and sales **(Gibson, 2009)[1].** Profit is an absolute term whereas profitability is a relative concept **(Trivedi, 2010)[2]**. Profitability reflects the final result of business operation **(Chandra, 2008)[3]**. Profitability of a firm can be measured by its profitability ratios. Profitability ratios can be determined on the basis of either sales or investments. These ratios consist of (i) income ratios, (ii) expense ratios and (iii) profit margin ratios **(Khan and Jain, 2001)[4]**. General profitability ratios may be calculated in relation to sales or investments such as operating profit ratio, various expenses ratios etc., to determine fall or rise in expenses or cost **(Gupta and Sharma, 2008)[5]**.

In life insurance companies, premium is regarded as revenue. Underwriting income and investment income are taken as operating income. Operating expenses, benefits paid, change in policy liabilities etc. are taken as expenses and profit before tax is taken as profit margin. The ratio of underwriting income to net premium indicates underwriting performance of a life insurance company. The ratio of total income from investment to total investments reflects the investment performance. The ratio of operating expenses to net premium is used as an indicator whether operating expenses are reasonable or not. The ratio of benefits paid to net premium is an indicator of correctness of pricing of life insurance policies. The actuarial efficiency is judged by the ratio of change in policy liabilities to net premium **(Das et.al, 2003)[6]**.

Profit before or after tax to revenue i.e., net premium will be an indicator of profit achievement **(Modi, 2011)[7].** In any business, this is the main objective. In case of life insurance companies, the analysis of these ratios is of great importance in determining profitability performance. Underwriting income is calculated as profit from operation minus investment income (**Chen et al, 2004[8]** and **Darzi, 2011[9]**). In other words, underwriting results ratio means net written premium minus claims, expenses and

increase in policy liabilities divided by net written premium **(Shinde, 2011)**[10]. Insurance liabilities are usually estimated by using actuarial or statistical techniques and if these calculations are wrong, there may be understatement of liabilities distorting the true financial position of the insurers and this may result in both solvency and liquidity problems **(Das et al., 2003)**[6]. Investment performance (invested income to average invested assets) discloses the effectiveness and efficiency of investment decisions. As such investment performance becomes critical to financial performance of an insurer **(Chen et al., 2004**[8]**).** The expenses ratio is very important for analyzing the profitability of a firm. It may be compared over a period of time with the industry average as well as firms of similar type. Operating expense ratio in insurance companies is the portion of premium used to pay all the costs of acquiring, writing and servicing of insurance and reinsurance business **(Darzi, 2011)**[9]. Underwriting risk ratio (ratio of benefits paid to net premium) depends on the risk appetite of the life insurers. Sound underwriting guidelines are important to financial performance of a life insurance company **(Charumati, 2012)**[11]. It is otherwise called loss ratio. This ratio reflects the adequacy or otherwise, of companies' underwriting performance **(Adams and Buckle, 2000)**[12]. Life policy liabilities have been taken in comparison to premium income as an indicator of financial performance besides other indicators **(Neelaveni, 2012)**[13]. So, change in policy liabilities to net premium is an important indicator of actuarial efficiency.

In any kind of business, profitability is generally measured by the ratio of profit divided by net sales. **(Gupta and Sharma, 2007)**[5]. Operating profit ratio is referred to as the ratio of profit before tax to sales **(Khan and Jain, 1993)**[4]. Sales profitability is described as the ratio of profit before tax to net premium written by an insurance company **(Green and Segal, 2004)**[14]. In our study, the ratio of profit before tax to net premium is taken as operating profit ratio.

3.2. Analysis of Profitability

Six ratios, namely, the ratio of underwriting income to net premium, the ratio of total income from investment to total investment, operating expenses to net premium, benefits paid to net premium, change in policy liabilities to net premium and the ratio of profit before tax to net premium have been selected by the researcher from the review of literature and analyzed individually to judge profitability performance of

life insurance companies and the industry under the study for ten years on the basis of descriptive statistics consisting of average and standard deviation presented in the form of tables and diagrams and to test statistically whether the differences in profitability performance of selected life insurance companies are significant or not by applying ANOVA and also to identify the companies for which significant difference has arisen by applying Post Hoc ANOVA:

3.2.1 RATIO OF UNDERWRITING INCOME TO NET PREMIUM (UI/NP)

Underwriting income is calculated as profit from operation minus investment income excluding other income. In the underwriting income ratio, numerator is underwriting income (profit before tax minus investment income excluding other income) and the denominator is net premium. This ratio shows whether underwriting is profitable or not.Net premium includes first premium, renewal premium single premium minus premium on re-insurance ceded.

3.2.1.1 Descriptive Analysis of the Ratio of UI/NP

For the purpose of descriptive analysis of the ratio of UI/NP, the ratios for ten years of thirteen companies have been computed on the basis of IRDA Annual Reports (Concerned Issues) and shown in the table-3.1as follows:

Table-3.1

Descriptive Analysis of the Ratio of Underwriting Income to Net Premium

Name of the Company	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Average	SD	Kolmgorov-Smirnov Z	Sig.
AVIVA	-1.03	-0.45	-0.42	-0.21	-0.20	-0.07	-0.74	-0.20	0.09	-0.28	-0.35	0.31	0.59	0.88
BAJAJ ALLIANZ	-0.20	-0.05	-0.04	-0.07	-0.10	0.29	-0.83	-0.31	0.15	-0.31	-0.15	0.29	0.61	0.85
BIRLA SUNLIFE	-0.18	-0.13	-0.18	-0.20	-0.30	-0.01	-0.82	-0.22	0.09	-0.33	-0.23	0.23	0.77	0.59
HDFC STANDARD	-0.23	-0.19	-0.33	-0.13	-0.17	0.22	-0.87	-0.25	0.00	-0.19	-0.22	0.26	0.80	0.54
ICICI PRUDENTIAL	-0.29	-0.12	-0.39	-0.22	-0.33	0.34	-1.05	-0.31	0.10	-0.37	-0.27	0.34	0.85	0.47
ING VYSYA	-0.87	-0.31	-0.43	-0.36	-0.29	0.08	-0.71	-0.28	-0.08	-0.30	-0.36	0.26	0.62	0.83
KOTAK MAHINDRA	-0.73	-0.09	-0.29	-0.25	-0.21	0.14	-0.35	-0.20	-0.03	-0.30	-0.23	0.22	0.63	0.82
PNB MET LIFE	-0.74	-0.74	-0.46	-0.10	-0.05	0.18	-0.54	-0.24	0.06	-0.33	-0.30	0.31	0.39	1.00
LICI	-0.46	-0.47	-0.43	-0.35	-0.37	-0.27	-0.60	-0.47	-0.41	-0.56	-0.44	0.09	0.50	0.97
SBI LIFE	-0.17	-0.10	-0.16	-0.09	-0.10	0.22	-0.57	-0.21	-0.01	-0.38	-0.16	0.20	0.64	0.80
TATA AIA	-0.29	-0.15	-0.13	-0.18	-0.31	0.05	-0.72	-0.25	0.05	-0.40	-0.23	0.22	0.51	0.95
MAX NEW YORK	-1.18	-0.31	-0.17	-0.11	-0.15	-0.05	-0.43	-0.15	0.00	-0.16	-0.27	0.32	1.01	0.26
RELIANCE	-3.02	-0.62	-0.69	-0.36	-0.22	-0.03	-0.57	-0.26	0.16	-0.33	-0.59	0.85	1.14	0.15
Average	-0.72	-0.29	-0.32	-0.20	-0.22	0.08	-0.68	-0.26	0.01	-0.33	-0.29			

Note: 1) Computed by researcher from data obtained from Annual Report of IRDA (Various issues)

2) Kolmogorov- Smirnov test indicates that the data are normally distributed as the test fails to reject null hypothesis that distributions are normal since the significance level of group distributions exceeds 0.05.

The table-3.1 shows differences in the ratio of underwriting income to net premium in between life insurance companies in India under the study. BAJAJ ALLIANZ has a highest average underwriting income ratio of -0.15 in spite of having incurred huge underwriting losses in the year 2009-10 with the ratio of -0.83. RELIANCE registers a lowest average underwriting income ratio of -0.59 followed by LICI, ING VYSYA and AVIVA in which cases these were -0.44, -0.36 and -0.35 respectively. So far as variations of underwriting income ratio are concerned, it is highest in case of RELIANCE which is 0.85. Variations are also moderately on the higher side in case of ICICI PRUDENTIAL, MAX N Y, AVIVA and PNB MET LIFE where standard deviations are 0.34, 0.32, 0.31 and 0.31 respectively. Ration of underwriting income is less fluctuating throughout the periods under study in respect of LICI with standard deviation of 0.09. This means that LICI's underwriting income ratio is very steady throughout the study periods.

From the analysis, it is found that huge underwriting losses are being incurred by life insurers in our country. The urge to secure more new business makes the companies ignoring the proper risk selection procedure leading to poor risk evaluation.

3.2.1.2 Average Performance of the Ratio of UI/NP of Select Life Insurance Companies Compared to Industry Average

To assess the average performance of select life insurance companies compared to industry average of the ratio of UI/NP, the table no-3.2 and diagram-3.1 have been prepared on the basis of IRDA Annual Reports shown below:

Table-3.2

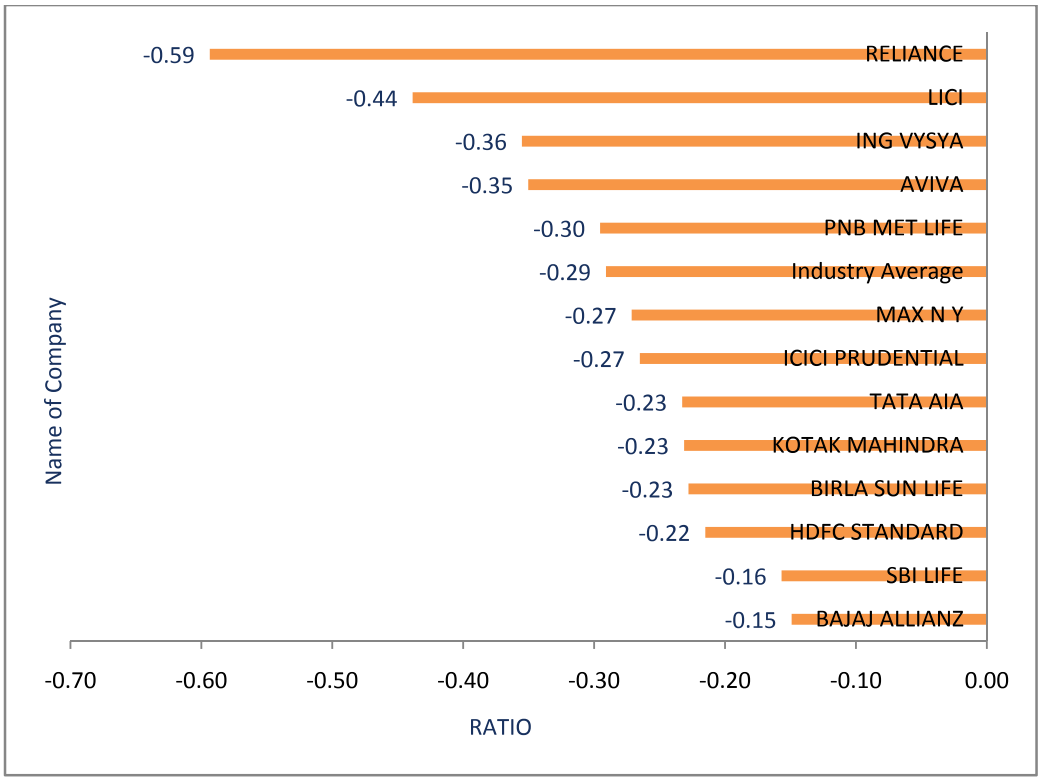
Company-wise Average Ratio of Underwriting Income to Net Premium (2003-04 to 2012-13)

Name of the Company	Average (2003-04 to 2012-13)	Ten Years' Average Rank
BAJAJ ALLIANZ	-0.15	1
SBI LIFE	-0.16	2
HDFC STANDARD	-0.22	3
KOTAK MAHINDRA	-0.23	4
BIRLA SUN LIFE	-0.23	5
TATA AIA	-0.24	6

ICICI PRUDENTIAL	-0.27	7
MAX N Y	-0.27	8
Industry Average	-0.29	
PNB MET LIFE	-0.30	9
AVIVA	-0.35	10
ING VYSYA	-0.36	11
LICI	-0.44	12
RELIANCE	-0.59	13

Diagram-3.1

Company-wise Average Ratio of Underwriting Income to Net Premium (2003-04 to 2012-13)



The table-3.2 and diagram-3.1 show that the underwriting income ratio of RELIANCE is lowest and that of BAJAJ ALLIANZ is highest. The diagram also reveals that the underwriting income performance of BAJAJ ALLIANZ and SBI LIFE is much better compared to all other companies under the study and there are five companies namely, RELIANCE, LICI, ING VYSYA, AVIVA and PNB MET LIFE, ratio of underwriting income are above industry average.

3.2.1.3 Year-wise Average Performance of Life Insurance Industry with respect to UI/NP

To study the performance of life insurance industry as a whole relating to UI/NP, the table-3.3 and diagram-3.2 have been prepared by way of computation from the data obtained from IRDA Annual Reports.

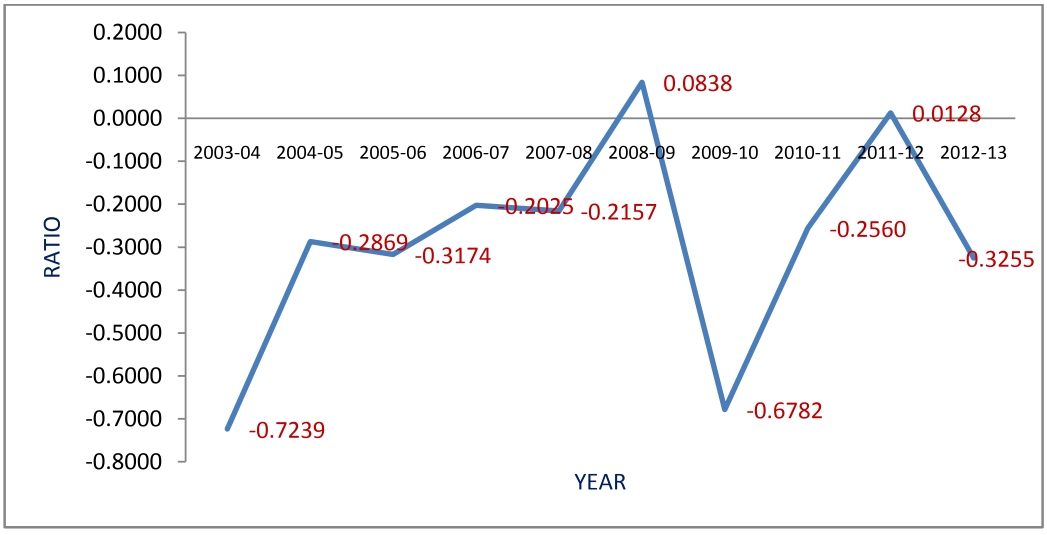
Table-3.3

Year-wise Industry Average Ratio of Underwriting Income to Net Premium (2003-04 to 2012-13)

Year	Industry Average
2003-04	-0.72
2004-05	-0.29
2005-06	-0.32
2006-07	-0.20
2007-08	-0.22
2008-09	0.08
2009-10	-0.68
2010-11	-0.26
2011-12	0.01
2012-13	-0.33

Diagram-3.2

Year-wise Industry Average Ratio of Underwriting Income to Net Premium (2003-04 to 2012-13)



The table-3.3 and diagram-3.2 show that the underwriting income performance has improved for the industry as a whole up to 2008-09 and thereafter deteriorated in the year 2009-10 and again improved in the year 2010-11 and 2011-12 and again deteriorated in the year 2012-13.

3.2.1.4 Analysis of Variance to Test Null Hypothesis $H_0 P_1$

The descriptive analysis indicates that there are differences in the ratio of underwriting income to net premium in select life insurance companies. However, the differences seem to be not significant across the life insurance companies under the study since there are no higher differences in the ratio of underwriting income to net premium which will be evident from the analysis of variance.

In order to test the significant differences in the ratio of underwriting income to net premium or any other ratios in this study across the select life insurance companies of India, one way ANOVA has been employed for which two basic assumptions i.e. normality and homogeneity of variance, have been taken care of. However non-compliance of the assumption of homogeneity of variance may not seriously affect the inference based on "F" distribution provided that the sample from each group is of equal size **(Sachdeva, 2008)**[15] Results show, when group sizes are equal, ANOVA is accurate **(Field, 2005)**[16]. In this study, since the entire group sizes are equal, so ANOVA will be likely to be accurate.

On the basis of data as per IRDA Annual Reports and with the help of SPSS-17, the following ANOVA table has been calculated:

Table-3.4

One Way ANOVA of the Ratio of Underwriting Income to Net Premium

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.769	12	.147	1.12	.35
Within Groups	15.443	117	.132		
Total	17.213	129			

The table-3.4 indicates that the differences in underwriting income to net premium are not significant as significant value of "F" is 0.35. This is the p-value corresponding to

the test. Since the value is more than 0.05, so it is concluded that there is no significant difference in the ratio of underwriting income to net premium across the select life insurance companies under the study at 5% significance level. As a result, the null hypothesis has been accepted.

3.2.2 RATIO OF TOTAL INCOME FROM INVESTMENT TO TOTAL INVESTMEN (TIFI/TI)

The investment performance of a life insurance organization is determined by the ratio of total income from investment to total investment where the numerator is total income from investment and the denominator is total investment. This ratio discloses the efficiency of life insurance companies as asset managers. Greater is the ratio; higher is the efficiency of life insurance organizations. Income from investment includes interest, dividend and rent on investment, profit/loss on sale of investment, gain/loss on revaluation of investments etc. Total investment includes long term and short term policyholders' investments and shareholders' investments.

3.2.2.1 Descriptive Analysis of the Ratio of TIFI/TI

Ratios of TIFI/TI has been given in the table-3.5 shown in the following page. These ratios of thirteen companies for the period of ten years totaling 130 cases have been calculated from the data collected from the concerned Annual Reports of IRDA.

Table No-3.5

Descriptive Analysis of the Ratio of Total Income from Investment to Total Investment

Name of the Company	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Average	SD	Kolmgorov-Smirnov Z	Sig.
AVIVA	0.15	0.18	0.54	0.33	0.49	-0.71	3.27	0.58	-0.09	0.27	0.50	0.99	1.17	0.13
BAJAJ ALLIANZ	0.08	0.04	0.06	0.20	0.28	-1.01	2.00	0.64	0.03	0.26	0.26	0.71	0.92	0.37
BIRLA SUNLIFE	0.14	0.34	0.63	0.56	0.85	-0.66	2.58	0.67	-0.03	0.61	0.57	0.79	0.84	0.48
HDFC STANDARD	0.11	0.05	0.29	0.13	0.21	-0.49	1.16	0.35	0.03	0.23	0.21	0.39	0.83	0.49
ICICI PRUDENTIAL	0.08	0.06	0.85	0.41	0.82	-1.50	3.07	0.69	0.01	0.41	0.49	1.07	0.87	0.44
ING VYSYA	0.20	0.04	0.13	0.10	0.17	-0.28	0.69	0.18	0.04	0.14	0.14	0.225	0.97	0.30
KOTAK MAHINDRA	0.12	0.11	0.37	0.26	0.40	-0.35	0.85	0.42	0.13	0.35	0.27	0.29	0.65	0.79
PNB MET LIFE	0.08	0.06	0.07	0.08	0.14	-0.42	1.26	0.42	-0.06	0.25	0.19	0.41	0.79	0.57
LICI	0.10	0.10	0.09	0.09	0.09	0.07	0.13	0.10	0.08	0.10	0.10	0.02	0.78	0.58
SBI LIFE	0.06	0.05	0.10	0.09	0.12	-0.21	0.53	0.20	0.04	0.19	0.12	0.17	0.73	0.65
TATA AIA	0.06	0.05	0.07	0.12	0.15	-0.29	0.65	0.25	0.01	0.22	0.13	0.223	0.66	0.77
MAX N Y	0.07	0.06	0.10	0.09	0.13	-0.07	0.57	0.22	0.06	0.15	0.14	0.16	0.85	0.47
RELIANCE	0.13	0.10	0.32	0.17	-0.11	-1.29	3.88	1.13	-0.17	0.32	0.45	1.28	1.07	0.21
Average	0.11	0.10	0.28	0.20	0.29	-0.55	1.59	0.45	0.01	0.27	0.27			

Note: 1) Computed by researcher from data obtained from Annual Report of IRDA (Various issues)

2) Kolmogorov- Smirnov test indicates that the data are normally distributed as the test fails to reject null hypothesis that distributions are normal since the significance level of group distributions exceeds 0.05.

The table 3.5 displays that the average ratio of total income from investment to total investment is highest i.e., 0.57 in case of BIRLA SUN LIFE, followed by AVIVA, ICICI PRUDENTIAL and RELIANCE. Lowest average investment income ratio is held by LICI which is 0.10, and the performance of rest of the companies ranges from 0.12 to 0.27. So far as variation of income is concerned, LICI is less fluctuating. Highest variation of investment income ratio is observed in case of RELIANCE and ICICI PRUDENTIAL followed by BAJAJ ALLIANZ, AVIVA, and BIRLA SUN LIFE.

It is found from the above analysis that the investment performance of AVIVA, BIRLA SUN LIFE, ICICI PRUDENTIAL and RELIANCE is much better compared to all other companies under the study period and these companies have been able to efficiently offset the negative underwriting income. In this respect, the investment management of LICI, SBI LIFE, MAX N Y, TATA AIA, PNB MET LIFE and ING VYSYA is discouraging resulting in low bonus and dividend paying capacity to the policyholders and shareholders respectively.

3.2.2.2 Average Performance of Select Life Insurance Companies Compared to Industry Average

To compare the performance of select life insurance companies under the study with the industry average, table-3.6 and diagram-3.3 has been made based on the data as per Annual Reports of IRDA (Various Issues).

Table-3.6

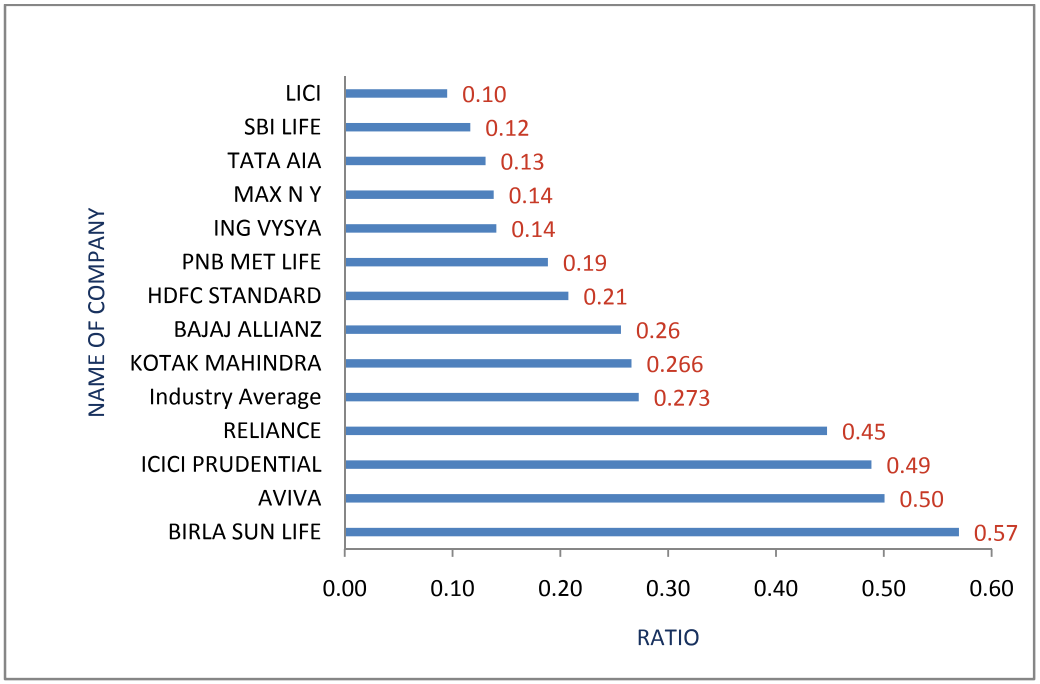
Company-wise Average Ratio of Total Income from Investment to Total Investment (2003-04 to 2012-13)

Name of the Company	Average(2003-04 to 2012-13)	Ten Years' Average Rank
BIRLA SUN LIFE	0.57	1
AVIVA	0.50	2
ICICI PRUDENTIAL	0.49	3
RELIANCE	0.45	4
Industry Average	0.272	
KOTAK MAHINDRA	0.266	5
BAJAJ ALLIANZ	0.26	6
HDFC STANDARD	0.21	7
PNB MET LIFE	0.19	8

ING VYSYA	0.14	9
MAX N Y	0.14	10
TATA AIA	0.13	11
SBI LIFE	0.12	12
LICI	0.10	13

Diagram-3.3

Company-wise Average Ratio of Total Income from Investment to Total Investment (2003-04 to 2012-13)



The table-3.6 and diagram-3.3 depicted above show that AVIVA, BIRLA SUN LIFE, ICICI PRUDENTIAL and RELIANCE have performed far better in the ratio of investment income compared to all other companies under the study and the performance of these companies are above industry average. Moreover, the performances of rest of the companies under the study are below industry average.

3.2.2.3 Year-wise Average Investment Performance of Life Insurance Industry

Year-wise industry average ratios have been calculated by adding all the ratios of TIFI/TI of thirteen companies in a particular year divided by total number of

companies under the study from the data obtained from IRDA Annual Reports as shown in the table-3.7 and on the basis of which diagram-3.4 also has been prepared.

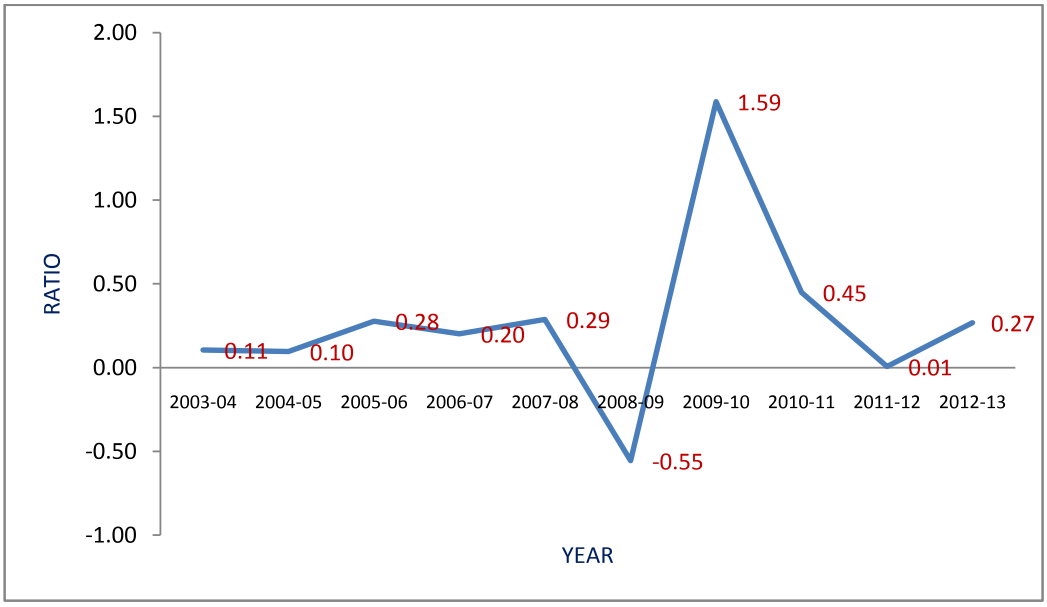
Table-3.7

Year-wise Industry Average Ratio of Total Income from Investment to Total Investment (2003-04 to 2012-13)

Year	Industry Average
2003-04	0.11
2004-05	0.10
2005-06	0.28
2006-07	0.20
2007-08	0.29
2008-09	-0.55
2009-10	1.59
2010-11	0.45
2011-12	0.01
2012-13	0.27

Diagram-3.4

Year-wise Industry Average Ratio of Total Income from Investment to Total Investment (2003-04 to 2012-13)



The table-3.7 and diagram3.4 shown above indicate the fact that investment performance of the industry has an increasing trend up to 2007-08 and has deteriorated in the year 2008-09 and performed very well in the year 2009-10 and has a decreasing trend after 2009-10.

3.2.2.4 Analysis of Variance to test null hypothesis $H_0 P_2$

In order to test null hypothesis H_0P_2, the researcher has calculated table-3.8 on the basis of data as per table-3.5 with the help of SPSS-17.

Table-3.8

One Way ANOVA of the Ratio of Total Income from Investment to Total Investment

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.407	12	.284	.61	.83
Within Groups	54.408	117	.465		
Total	57.815	129			

The ANOVA table-3.8 indicates that the significant value of "F" is 0.83 which is the p-value corresponding to the test. Since the p-value is more than 0.05, so it is concluded that there is no significant difference in the ratio of underwriting income to net premium across the select life insurance companies under the study at 5% significance level and therefore, the null hypothesis has been accepted.

3.2.3 RATIO OF OPERATING EXPENSES TO NET PREMIUM (OE/NP)

In operating expense ratio the numerator consists of operating expenses plus commission and the denominator is taken as net premium. A low ratio indicates the efficiencies of management and high ratio indicates inefficiencies of management in operating life insurance business. Operating expenses consist of employees' remuneration, welfare benefits and other manpower costs, travelling expenses, training expenses, rent, rates and taxes, repairs and maintenances, printing and stationery, communication expenses, legal and professional charges, medical fees, auditors' fees and expenses, advertisement and publicity, interest and bank charges, depreciation, service tax on premium and other expenses. Commission expenses include commission paid on first year premium, renewal premium and single premium to agents.

3.2.3.1 Descriptive Analysis of the Ratio of OE/NP

For the purpose of descriptive analysis of the ratio of OE/NP, the researcher has ascertained all the ratios of thirteen companies for ten years which is presented in the table-3.9 as follows:

Table-3.9

Descriptive Analysis of the Ratio of Operating Expenses to Net Premium

Name of the Company	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Average	SD	Kolmgorov-Smirnov Z	Sig.
AVIVA	1.47	0.76	0.60	0.54	0.48	0.47	0.37	0.29	0.29	0.30	0.55	0.34	0.77	0.59
BAJAJ ALLIANZ	0.83	0.36	0.27	0.38	0.36	0.28	0.25	0.25	0.27	0.30	0.35	0.17	1.07	0.20
BIRLA SUN LIFE	0.42	0.34	0.33	0.33	0.31	0.37	0.34	0.28	0.27	0.29	0.33	0.04	0.63	0.83
HDFC STANDARD	0.47	0.45	0.34	0.28	0.28	0.40	0.29	0.22	0.18	0.18	0.31	0.10	0.54	0.93
ICICI PRUDENTIAL	0.40	0.27	0.24	0.26	0.28	0.23	0.19	0.16	0.19	0.21	0.24	0.06	0.64	0.81
ING VYSYA	1.35	0.56	0.67	0.57	0.45	0.40	0.36	0.37	0.37	0.34	0.54	0.29	0.84	0.48
KOTAK MAHINDRA	0.75	0.33	0.33	0.34	0.35	0.36	0.26	0.24	0.23	0.26	0.34	0.14	1.12	0.16
PNB MET LIFE	1.81	1.38	1.00	0.69	0.61	0.50	0.39	0.26	0.26	0.29	0.72	0.50	0.69	0.72
LICI	0.32	0.25	0.19	0.17	0.15	0.15	0.15	0.17	0.17	0.19	0.19	0.05	0.91	0.38
SBI LIFE	0.30	0.25	0.24	0.18	0.17	0.16	0.13	0.12	0.12	0.17	0.18	0.06	0.75	0.63
TATA AIA	0.63	0.59	0.50	0.41	0.46	0.48	0.38	0.30	0.25	0.26	0.42	0.12	0.41	1.00
MAX N Y	0.96	0.76	0.61	0.50	0.47	0.53	0.40	0.35	0.29	0.28	0.51	0.20	0.56	0.91
RELIANCE	1.92	0.81	0.59	0.53	0.41	0.51	0.34	0.32	0.31	0.40	0.61	0.46	1.00	0.27
Average	0.89	0.55	0.45	0.40	0.37	0.37	0.30	0.26	0.25	0.27	0.41			

Note: 1) Computed by researcher from data obtained from Annual Report of IRDA (Various issues)

2) Kolmogorov- Smirnov test indicates that the data are normally distributed as the test fails to reject null hypothesis that distributions are normal since the significance level of group distributions exceeds 0.05.

The table-3.9 shows that the average ratio of operating expenses to net premium of LICI and SBI LIFE is 0.19 and 0.18 respectively which are much lower compared all other select companies under the study period. This ratio is highest in case of PNB MET LIFE i.e., 0.72 and that is also followed by RELIANCE, AVIVA, ING VYSYA, MAX N Y, and TATA AIA. However, this ratio is around 0.30 in case of rest of the companies. SDs of different companies indicates that the ratio is less fluctuating for LICI and SBI LIFE and highly unsteady for RELIANCE, PNB MET LIFE, ING VYSYA and AVIVA.

3.2.3.2 Average Performance with respect to the Ratio of OE/NP of Select Life Insurance Companies Compared to Industry Average

To compare the performance of the ratio of OE/NP of select life insurance companies with industry average, ten years' average ratio has been calculated (based on Annual Reports of IRDA) for all select companies under the study and at the same time industry average has been arrived at by totaling the averages of 13 select companies and dividing it by 13 which has been depicted in the table-3.10 .On the basis of table-3.10, diagram-3.5 has also been prepared for analysis purpose.

Table-3.10

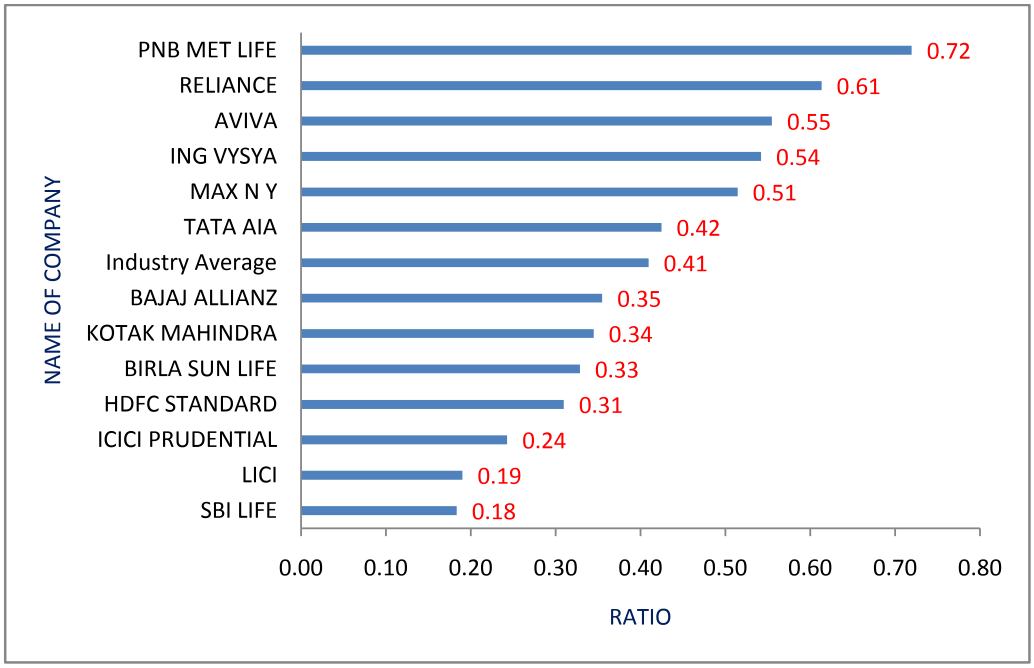
Company-wise Average Ratio of Operating Expenses to Net Premium (2003-04 to 2012-13)

Name of the Company	Average(2003-04 to 2012-13)	Ten Years' Average Rank
PNB MET LIFE	0.72	13
RELIANCE	0.61	12
AVIVA	0.55	11
ING VYSYA	0.54	10
MAX N Y	0.51	9
TATA AIA	0.43	8
Industry Average	0.41	
BAJAJ ALLIANZ	0.36	7
KOTAK MAHINDRA	0.35	6
BIRLA SUN LIFE	0.33	5
HDFC STANDARD	0.31	4
ICICI PRUDENTIAL	0.24	3
LICI	0.19	2
SBI LIFE	0.18	1

Diagram-3.5

Company-wise Average Ratio of Operating Expenses to Net Premium

(2003-04 to 2012-13)



The table-3.10 and diagram-3.5 depicted above show that the average operating expenses of RELIANCE AND PNB MET LIFE are on the much higher side and that of LICI and SBI LIFE on the much lower side compared to all other companies under the study. However, six companies whose performances are below industry average can be named as PNB MET LIFE, RELIANCE, AVIVA, ING VYSYA, MAX N Y and TATA AIA and the performances of rest of the companies under the study are above industry average.

3.2.3.3 Year-wise Average Performance of the Ratio of OE/NP of Life Insurance Industry

To study the performance of life insurance industry in respect of the ratio of OE/NP, the following table and diagram have been calculated (Based on IRDA Annual Reports):

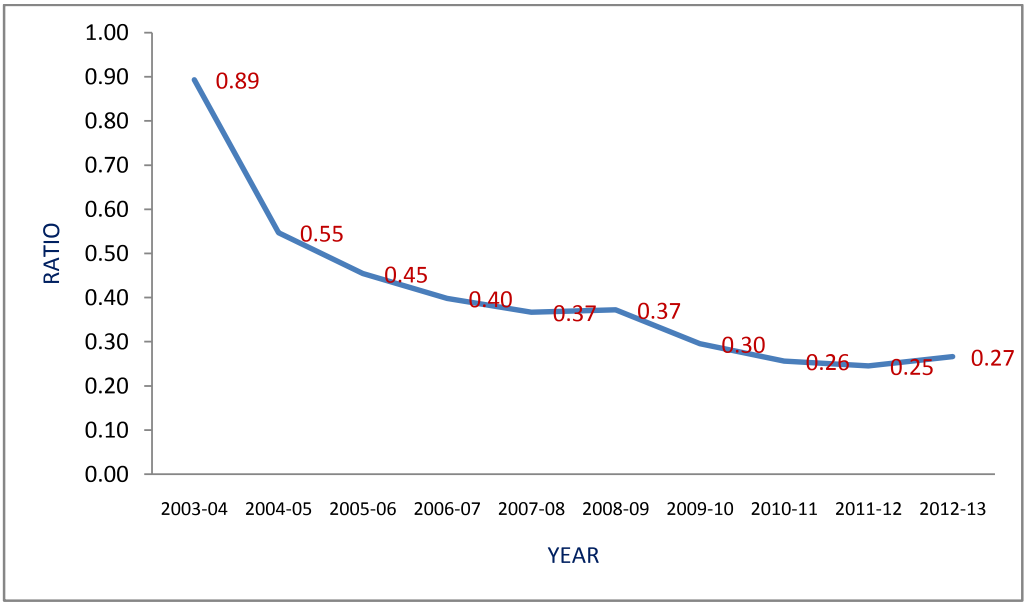
Table-3.11

Year-wise Industry Average Ratio of Operating Expenses to Net Premium (2003-04 to 2012-13)

Year	Industry Average
2003-04	0.89
2004-05	0.55
2005-06	0.45
2006-07	0.40
2007-08	0.37
2008-09	0.37
2009-10	0.30
2010-11	0.26
2011-12	0.25
2012-13	0.27

Diagram-3.6

Year-wise Industry Average Ratio of Operating Expenses to Net Premium (2003-04 to 2012-13)



The table-3.11 and diagram 3.6 relating to operating expenses ratio for the industry as a whole show that this ratio has a decreasing trend which is a good sign for the life insurance industry in India.

3.2.3.4 Analysis of Variance for Testing Null Hypothesis H_0P_3

On the basis of data as per IRDA Annual Reports and with the help of SPSS-17, the following ANOVA table has been calculated:

Table-3.12

One Way ANOVA of the Ratio of Operating Expenses to Net Premium

Sources of Variation	Sum of Squares	d.f	Mean Square	F	P value.
Between Groups	3.382	12	.282	4.222	.000
Within Groups	7.810	117	.067		
Total	11.192	129			

It is clear from the ANOVA table-3.12 that the significant value of "F" is 0.000 which is the p-value corresponding to the test. Since the p-value is less than 0.05, so it can be concluded that there is significant difference in the ratio of operating expenses to net premium across the select life insurance companies under the study at 5% significance level and hence, the null hypothesis has been rejected .

3.2.3.5 Post Hoc Test in Identifying the Life Insurance Companies Responsible for Significant Differences in the Performance of the Ratio of OE/NP

To identify life insurance companies for which differences in performance of the ratio of operating expenses to net premium has arisen, the Post-hoc test has been conducted with the help of SPSS-17 and test result is given in table-3.13.

Table-3.13

Post Hoc Tests-The Ratio of Operating Expenses to Net Premium
Tukey HSD

Name of Co (I)	Name of Co (J)	Mean Difference(I)-(J)	Sig.
PNB MET LIFE	HDFC STDNDARD	.40987*	.031
PNB MET LIFE	ICICI PRUDENTIAL	.47666*	.004
PNB MET LIFE	LICI	.52933*	.001

PNB MET LIFE	SBI LIFE	.53598*	.001
RELIANCE	LICI	.42310*	.022
RELIANCE	SBI LIFE	.42976*	.018

Tukey HSD is another test of significance, but this time the test compares each possible group of means one at a time. Examination of the Tukey HSD post hoc analysis as shown in table-3.13 reveals that there are six mean comparisons that are significantly different. All these differences are statistically significant at 0.05 levels. A close look at the diagrammatic representation of ten years' average ratio indicates that these are 0.72 and 0.61 in case of PNB MET LIFE and RELIANCE respectively which are much on the higher side compared to LICI, SBI LIFE, HDFC STANDARD and ICICI PRUDENTIAL and that is why the differences have arisen.

However, the differences of selected life insurance companies may be reduced to insignificant level if PNB MET LIFE and RELIANCE take some stringent measures to reduce the ratio by increasing premium income or by decreasing operating expenses.

3.2.4 RATIO OF BENEFITS PAID TO NET PREMIUM (BP/NP)

The ratio of benefits paid to net premium or underwriting risk ratio or loss ratio reflects whether life insurance organizations are following sound underwriting rules thus minimizing losses and maximizing profits. Here, numerator consists of benefits paid and the net premium is placed in the denominator. Benefits paid include claims by death, claims by maturity, annuities, pension payment, surrenders etc.

3.2.4.1 Descriptive Analysis of the ratio of BP/NP

The underwriting performance has been assessed by collecting the data for benefits paid and net premium from the respective Published Annual Reports of IRDA and calculating 130 ratios being arranged in the table -3.14 as follows:

Table-3.14

Descriptive Analysis of the Ratio of Benefits Paid to Net Premium

Name of the Company	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Average	SD	Kolmgorov-Smirnov Z	Sig.
AVIVA	0.01	0.02	0.03	0.06	0.10	0.10	0.27	0.51	0.61	0.95	0.27	0.30	0.93	0.35
BAJAJ ALLIANZ	0.01	0.06	0.21	0.13	0.09	0.07	0.23	0.52	0.74	1.36	0.34	0.40	0.96	0.32
BIRLA SUN LIFE	0.01	0.04	0.06	0.07	0.13	0.15	0.21	0.35	0.47	0.72	0.221	0.22	0.72	0.67
HDFC STANDARD	0.01	0.02	0.03	0.06	0.10	0.12	0.19	0.32	0.29	0.38	0.15	0.13	0.59	0.88
ICICI PRUDENTIAL	0.01	0.01	0.05	0.09	0.15	0.14	0.44	0.59	0.61	0.99	0.31	0.32	0.90	0.40
ING VYSYA	0.01	0.01	0.07	0.07	0.08	0.09	0.15	0.34	0.45	0.69	0.20	0.21	0.89	0.40
KOTAK MAHINDRA	0.03	0.01	0.07	0.18	0.16	0.11	0.17	0.35	0.50	0.66	0.223	0.20	0.87	0.43
PNB MET LIFE	0.02	0.04	0.03	0.04	0.03	0.04	0.07	0.19	0.31	0.59	0.14	0.17	1.05	0.22
LICI	0.38	0.38	0.38	0.43	0.38	0.34	0.43	0.55	0.59	0.65	0.45	0.10	0.88	0.43
SBI LIFE	0.10	0.08	0.08	0.05	0.06	0.06	0.08	0.23	0.37	0.75	0.18	0.21	1.12	0.16
TATA AIA	0.03	0.05	0.05	0.06	0.06	0.05	0.09	0.18	0.28	0.72	0.16	0.20	1.01	0.26
MAX N Y	0.05	0.03	0.05	0.06	0.05	0.06	0.12	0.22	0.27	0.39	0.13	0.12	1.03	0.24
RELIANCE	0.02	0.07	0.15	0.08	0.05	0.03	0.11	0.31	0.50	1.44	0.28	0.41	0.99	0.28
Average	0.05	0.06	0.10	0.11	0.11	0.10	0.20	0.36	0.46	0.79	0.23			

Note: 1) Computed by researcher from data obtained from Annual Report of IRDA (Various issues)

2) Kolmogorov- Smirnov test indicates that the data are normally distributed as the test fails to reject null hypothesis that distributions are normal since the significance level of group distributions exceeds 0.05.

The table-3.14 shows that the average underwriting risk ratio of LICI is 0.45, which is much higher compared to rest of the companies under the study and is above industry average. It is moderately high in case of ICICI PRUDENTIAL, BAJAJ ALLIANZ, AVIVA and RELIANCE. Highest variations in the ratio are observed in RELIANCE, BAJAJ ALLIANZ, AVIVA and ICICI PRUDENTIAL as the SDs of these companies are higher compared to other companies under the study.

The analysis reveals that LICI, ICICI PRUDENTIAL, BAJAJ ALLIANZ, AVIVA and RELIANCE are engaged in high risk undertaking activities suffering higher underwriting risk losses compared to rest of the companies under the study.

3.2.4.2 Average Performance in the Ratio of BP/NP of Select Life Insurance Companies Compared to Industry Average

Table-3.15 and diagram-3.7 have been prepared on the basis of data collected from IRDA Annual Reports (Respective Issues) which are as follows:-

Table-3.15

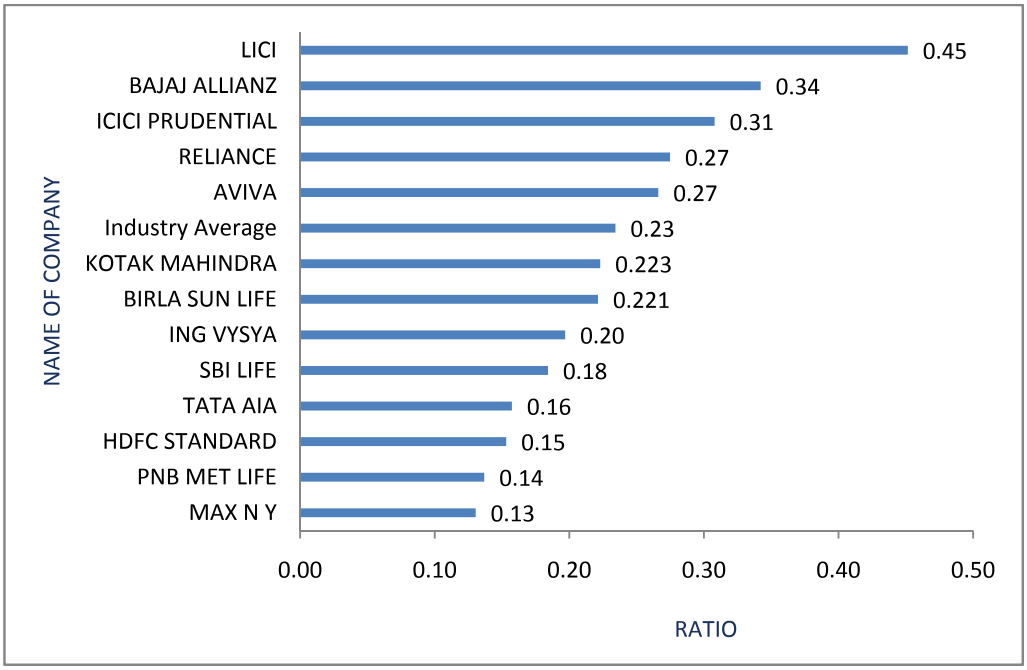
Company-wise Average Ratio of Benefits Paid to Net Premium
(2003-04 to 2012-13)

Name of the Company	Average(2003-04 to 2012-13)	Ten Years' Average Rank
LICI	0.45	13
BAJAJ ALLIANZ	0.34	12
ICICI PRUDENTIAL	0.31	11
RELIANCE	0.28	10
AVIVA	0.27	9
Industry Average	0.23	
KOTAK MAHINDRA	0.223	8
BIRLA SUNLIFE	0.221	7
ING VYSYA	0.20	6
SBI LIFE	0.18	5
TATA AIA	0.16	4
HDFC STANDARD	0.15	3
PNB MET LIFE	0.14	2
MAX N Y	0.13	1

Diagram-3.7

Company-wise Average Ratio of Benefits Paid to Net Premium

(2003-04 to 2012-13)



The table-3.15 and diagram-3.7 concerning the ratio of benefits paid to net premium of ten years' average show that the underwriting risk performance of LICI is not better compared to all other selected companies under the study which will have a negative impact on the generation of profit of the company. However, there are five companies i.e. LICI, BAJAJ ALLIANZ, ICICI PRUDENTIAL, RELIANCE and AVIVA whose performances are below industry average compared to rest of the companies under the study indicating poor performance.

3.2.4.3 Year-wise Average Performance of the Ratio of BP/NP of Life Insurance Industry

To study the performance of life insurance industry as a whole with respect to the ratio of BP/NP, the following table and diagram have been calculated (Based on IRDA Annual Reports):

Table-3.16

Year-wise Industry Average Ratio of Benefits Paid to Net Premium

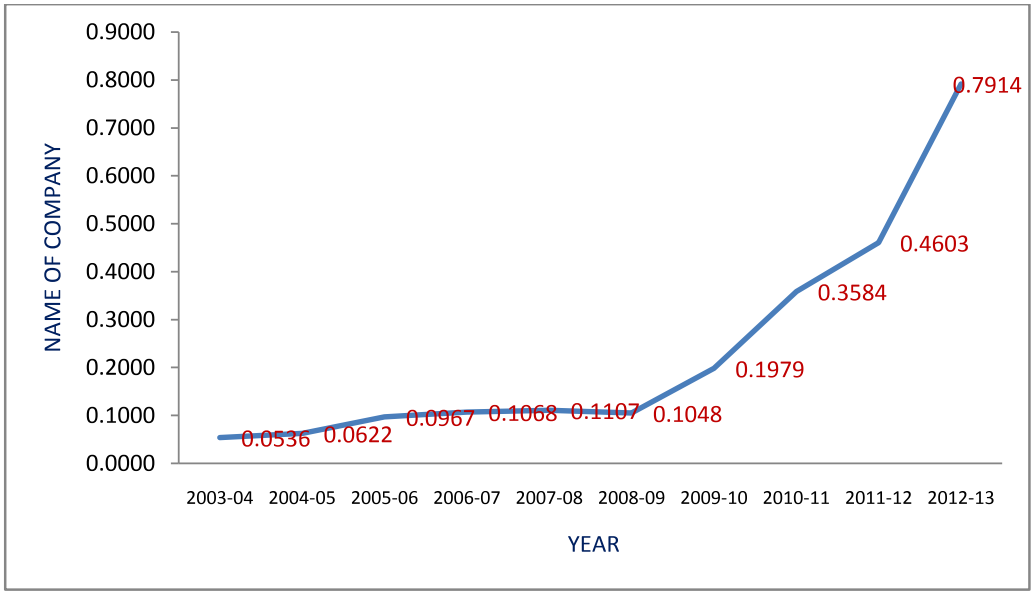
(2003-04 to 2012-13)

Year	Industry Average
2003-04	0.054
2004-05	0.062
2005-06	0.097
2006-07	0.107
2007-08	0.111
2008-09	0.105
2009-10	0.198
2010-11	0.358
2011-12	0.460
2012-13	0.791

Diagram-3.8

Year-wise Industry Average Ratio of Benefits Paid to Net Premium

(2003-04 to 2012-13)



The table-3.16 and diagram-3.8 show that the underwriting risks of the life insurance industry are increasing alarmingly indicating very poor underwriting risk management by chasing new business targets.

3.2.4.4 Analysis of Variance for Testing Null Hypothesis H_0P_4

For testing the significant difference in the ratio of BP/NP across the select life insurance companies, the following ANOVA table (Based on IRDA Annual Reports, Respective Issues) has been calculated with the help of SPSS-17:-

Table-3.17

One Way ANOVA of the Ratio of Benefits Paid to Net Premium

Sources of Variation	Sum of Squares	df	Mean Square	F	P value.
Between Groups	1.039	12	.087	1.242	.263
Within Groups	8.158	117	.070		
Total	9.197	129			

The table-3.17 indicates that the significant value of "F" is 0.263. This is the p-value corresponding to the test. Since the value is more than 0.05, so the researcher concludes that there is no significant difference in the ratio of benefits paid to net premium across the select life insurance companies under the study at 5% significance level and as a result, researcher accepts the null hypothesis.

3.2.5 RATIO OF CHANGE IN POLICY LIABILITIES TO NET PREMIUM (CIPL/NP)

The actuarial efficiency in a life insurance organization is judged by the ratio of change in policy liabilities to net premium. Where previous years' actuarial liability in the liabilities side is deducted from current years' actuarial liability to get the change in policy liability which is placed in the numerator and the denominator consists of net premium. Lower is the ratio; the better is the actuarial performance.

3.2.5.1 Descriptive Analysis of the Ratio of CIPL/NP

For the purpose of descriptive analysis of the ratio of CIPL/NP, the researcher has ascertained all the ratios of thirteen companies for ten years which is presented in the following table-3.18.

Table-3.18

Descriptive Analysis of the Ratio of Change in Policy Liabilities to Net Premium

Name of the Company	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Average	SD	Kolmgorov-Smirnov Z	Sig.
AVIVA	0.54	0.66	0.76	0.60	0.61	0.46	1.09	0.38	0.03	0.05	0.52	0.30	0.43	0.99
BAJAJ ALLIANZ	0.34	0.64	0.56	0.54	0.63	0.36	1.37	0.55	-0.14	-0.34	0.45	0.44	0.76	0.61
BIRLA SUN LIFE	0.75	0.76	0.80	0.80	0.84	0.48	1.25	0.57	0.18	0.36	0.68	0.28	0.62	0.84
HDFC STANDARD	0.71	0.71	0.98	0.80	0.79	0.25	1.37	0.71	0.52	0.61	0.74	0.28	0.72	0.67
ICICI PRUDENTIAL	0.90	0.85	1.10	0.85	0.88	0.28	1.39	0.57	0.12	0.19	0.71	0.39	0.73	0.67
ING VYSYA	0.51	0.74	0.67	0.72	0.75	0.45	1.20	0.57	0.27	0.27	0.62	0.26	0.65	0.79
KOTAK MAHINDRA	0.64	0.80	0.90	0.66	0.67	0.36	0.89	0.60	0.32	0.42	0.63	0.19	0.49	0.97
PNB MET LIFE	0.51	0.47	0.61	0.82	0.84	0.55	1.18	0.78	0.35	0.43	0.66	0.24	0.55	0.92
LICI	0.77	0.85	0.88	0.76	0.84	0.78	1.02	0.75	0.65	0.71	0.80	0.10	0.60	0.86
SBI LIFE	0.78	0.78	0.84	0.86	0.86	0.56	1.36	0.86	0.53	0.46	0.79	0.24	0.90	0.40
TATA AIA	0.62	0.46	0.58	0.67	0.77	0.44	1.27	0.77	0.41	0.44	0.64	0.25	0.67	0.76
MAX N Y	0.44	0.51	0.49	0.55	0.62	0.46	0.87	0.54	0.38	0.43	0.53	0.13	0.73	0.67
RELIANCE	0.55	0.71	0.94	0.76	0.77	0.48	1.11	0.62	0.05	-0.43	0.56	0.42	0.73	0.65
Average	0.62	0.69	0.78	0.72	0.76	0.46	1.18	0.64	0.28	0.28	0.64			

Note: 1) Computed by researcher from data obtained from Annual Report of IRDA (Various issues)

2) Kolmogorov- Smirnov test indicates that the data are normally distributed as the test fails to reject null hypothesis that distributions are normal since the significance level of group distributions exceeds 0.05.

The table-3.18 indicates that on an average during the study period, about 80% of net premium income is taken as a charge against profit as change in policy liabilities by the actuarial experts of LICI and SBI LIFE followed by HDFC STANDARD as 74% and ICICI PRUDENTIAL as 71% respectively which are much on the higher side.

The analysis, therefore, finds that the actuarial efficiencies of SBI LIFE, LICI, HDFC STANDARD and ICICI PRUDNTIAL are less than the rest of the select life insurance companies under the study period. SDs of BAJAJ ALLIANZ, ICICI PRUDENTIAL and RELIANCE show that this ratio is fluctuating in between years.

3.2.5.2 Average Performance in the Ratio of CIPL/NP of Select Life Insurance Companies Compared to Industry Average

Table-3.19 and diagram-3.9 have been prepared on the basis of data collected from IRDA Annual Reports (Respective Issues) which are as follows:

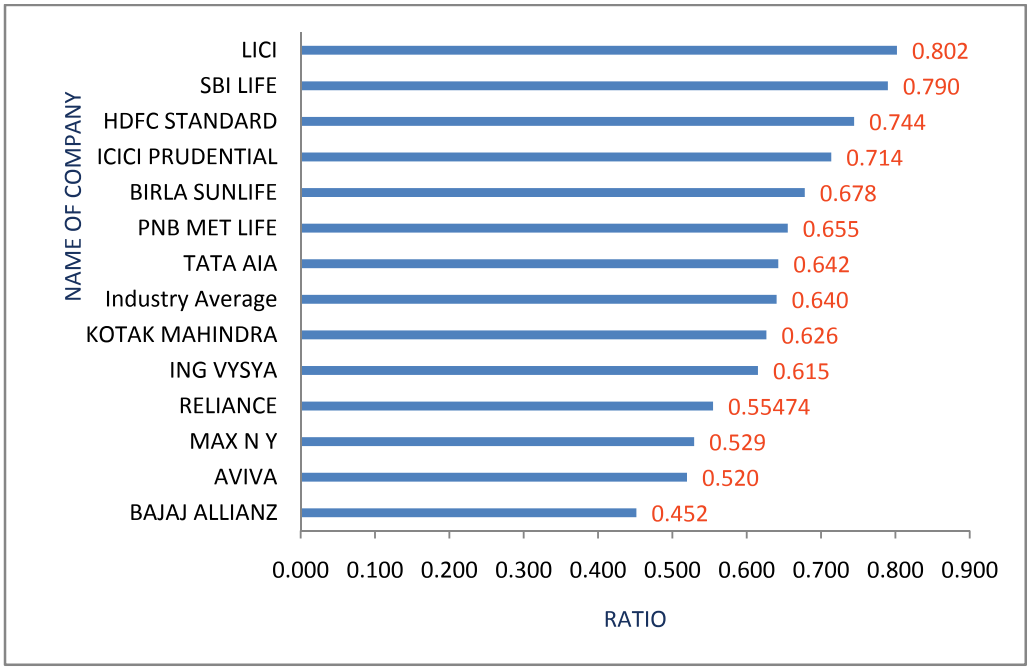
Table-3.19

Company-wise Average Ratio of Change in Life Policy Liabilities to Net Premium (2003-04 to 2012-13)

Name of the Company	Average(2003-04 to 2012-13)	Ten Years' Average Rank
LICI	0.802	13
SBI LIFE	0.790	12
HDFC STANDARD	0.744	11
ICICI PRUDENTIAL	0.714	10
BIRLA SUN LIFE	0.678	9
PNB MET LIFE	0.655	8
TATA AIA	0.642	7
Industry Average	0.640	
KOTAK MAHINDRA	0.626	6
ING VYSYA	0.615	5
RELIANCE	0.555	4
MAX N Y	0.529	3
AVIVA	0.554	2
BAJAJ ALLIANZ	0.452	1

Diagram-3.9

Company-wise Average Ratio of Change in Life Policy Liabilities to Net Premium (2003-04 to 2012-13)



This ratio change in policy liabilities to net premium indicates proper risk evaluation with respect to profitable but competitive pricing of insurance and in this respect not much differences among the companies are noticed from the table-3.19 and diagram-3.9. However, it is found that the ratio of seven companies i.e. LICI, SBI LIFE, HDFC STANDARD, ICICI PRUDENTIAL, BIRLA SUN LIFE, PNB MET LIFE and TATA AIA are above industry average (poor performer) while the performance of rest of the companies under the study are above industry average(better performer).

3.2.5.3 Year-wise Average Performance of the Ratio of CIPL/NP of Life Insurance Industry

To study the performance of life insurance industry in respect of the ratio of CIPL/NP, the following table and diagram have been calculated (Based on IRDA Annual Reports):

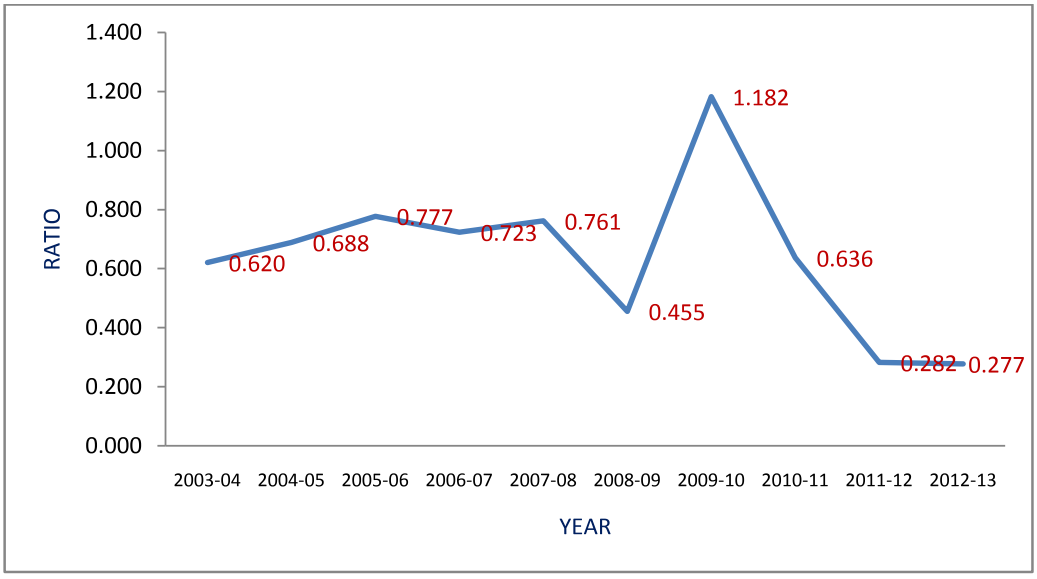
Table-3.20

Year-wise Industry Average Ratio of Change in Life Policy Liabilities to Net Premium (2003-04 to 2012-13)

Year	Industry Average
2003-04	0.620
2004-05	0.688
2005-06	0.777
2006-07	0.723
2007-08	0.761
2008-09	0.455
2009-10	1.182
2010-11	0.636
2011-12	0.282
2012-13	0.277

Diagram-3.10

Year-wise Industry Average Ratio of Change in Policy Liabilities to Net Premium (2003-04 to 2012-13)



The table-3.20 and diagram3.10 show that the actuarial performance of the life insurance industry in India is satisfactory except 2009-10 and in this year almost all the companies' performance under the study has shown unsatisfactory results

probably due to economic slowdown forcing the actuaries to reduce the price of policies to secure more new business.

3.2.5.4 Analysis of Variance for Testing Null Hypothesis H_0P_5

In order to test null hypothesis $H_0 P_5$, the researcher has calculated table-3.21 with the help of SPSS-17 (Based on Data obtained from Annual Reports of IRDA, Various Issues).

Table-3.21

One Way ANOVA of the Ratio of Change in Policy Liabilities to Net Premium

Sources of Variation	Sum of Squares	df	Mean Square	F	P value.
Between Groups	1.371	12	.114	1.238	.266
Within Groups	10.793	117	.092		
Total	12.164	129			

It is clear from the ANOVA table-3.21 that the significant value of "F" is 0.266 which is the p-value corresponding to the test. Since the p-value is more than 0.05, so it is concluded that there is no significant difference in the ratio of change in policy liabilities to net premium of select life insurance companies under the study at 5% significance level and therefore, the null hypothesis has been accepted

3.2.6 RATIO OF PROFIT BEFORE TAX TO NET PREMIUM (PBT/NP)

In the ratio of profit before tax to net premium, the numerator includes profit before tax and the denominator is taken as net premium. This ratio reflects the operating performance of a life insurance organization**.**

3.2.6.1 Descriptive Analysis of the Ratio of PBT/NP

For the purpose of descriptive analysis of the ratio of PBT/NP, the ratios for ten years of thirteen companies have been computed on the basis of IRDA Annual Reports (Concerned Issues) and shown in the table-3.22 as follows:

Table-3.22

Descriptive Analysis of the Ratio of Profit Before Tax to Net Premium

Name of the Company	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Average	SD	Kolmgorov-Smirnov Z	Sig.
AVIVA	-0.79	-0.36	-0.24	-0.12	-0.11	-0.25	-0.15	0.01	0.03	0.02	-0.20	0.23	0.67	0.76
BAJAJ ALLIANZ	-0.12	-0.04	-0.03	-0.01	-0.02	-0.01	0.05	0.11	0.18	0.20	0.03	0.10	0.76	0.60
BIRLA SUNLIFE	-0.15	-0.07	-0.05	-0.08	-0.14	-0.16	-0.08	0.05	0.08	0.11	-0.05	0.09	0.65	0.79
HDFC STANDARD	-0.08	-0.13	-0.08	-0.04	-0.05	-0.09	-0.04	-0.01	0.03	0.04	-0.05	0.05	0.47	0.98
ICICI PRUDENTIAL	-0.23	-0.09	-0.05	-0.09	-0.11	-0.06	0.02	0.05	0.10	0.12	-0.03	0.10	0.47	0.98
ING VYSYA	-0.71	-0.28	-0.29	-0.25	-0.17	-0.14	-0.08	-0.04	-0.02	0.01	-0.20	0.20	0.71	0.70
KOTAK MAHINDRA	-0.63	-0.04	-0.07	-0.12	-0.04	0.01	0.02	0.03	0.07	0.07	-0.07	0.20	0.99	0.28
PNB MET LIFE	-0.43	-0.61	-0.39	-0.02	0.02	0.01	0.01	0.01	0.01	0.02	-0.14	0.23	1.20	0.11
LICI	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.65	0.79
SBI LIFE	-0.07	-0.02	0.00	0.00	0.01	0.00	0.03	0.03	0.04	0.06	0.01	0.03	0.58	0.89
TATA AIA	-0.23	-0.10	-0.06	-0.05	-0.17	-0.21	-0.11	0.01	0.07	0.12	-0.07	0.11	0.42	0.99
MAX N Y	-1.10	-0.24	-0.08	-0.04	-0.06	-0.10	0.00	0.03	0.07	0.07	-0.14	0.33	1.10	0.18
RELIANCE	-2.62	-0.51	-0.44	-0.31	-0.24	-0.22	-0.04	-0.02	0.07	0.09	-0.43	0.76	1.12	0.16
Average	-0.55	-0.19	-0.14	-0.09	-0.08	-0.09	-0.03	0.02	0.06	0.07	-0.10	0.17		

Note: 1) Computed by researcher from data obtained from Annual Report of IRDA (Various issues)

2) Kolmogorov- Smirnov test indicates that the data are normally distributed as the test fails to reject null hypothesis that distributions are normal since the significance level of group distributions exceeds 0.05.

The table-3.22 reveals the fact that three companies i.e., BAJAJ ALLIANZ, SBI LIFE and LICI could maintain a positive figure of o.031, 0.007 and 0.007 respectively with respect to average operating profit ratio during the study period among the companies under the study. Among the three companies mentioned above BAJAJ ALLIANZ has done well. In this respect the performance of RELIANCE is very poor whose average operating profit ratio is -0.43 followed by AVIVA and ING VYSYA as -0.20, MAX N Y -0.14 and PNB MET LIFE -0.14. The performance of remaining companies under the study is moderate. The standard deviations of RELIANCE, MAX N Y, PNB MET LIFE, AVIVA and ING VYSYA are 0.76, 0.33, 0.23 and 0.20 respectively and this implies that the ratios of profit before tax to net premium of these companies are very fluctuating. From the table, it also appears that the ratio of average profit before tax to net premium of LICI registered a decreasing trend (if ratios are calculated up to 5 decimal places) although LICI could maintain positive ratio throughout the study period. However, all thirteen companies have enjoyed the taste of positive operating profit ratio during the year 2012-13 which is good sign to the growth life insurance industry in India if they maintain the pace.

Table-3.22 also reveals that the performance of BAJAJ ALLIANZ and SBI LIFE is encouraging as they have maintained increasing trend of operating profit ratio during the study period. In contrast, LICI's operating profit ratios during the study period registered a decreasing trend (if ratios are calculated up to 5 decimal places). All other companies under the study have sustained negative average ratio of profit before tax to net premium during the study period.

3.2.6.2 Average Performance of Select Life Insurance Companies Relating to the Ratio of PBT/NP Compared to Industry Average

To compare the performance of the ratio of PBT/NP of select life insurance companies with industry average, ten years' average ratio has been calculated (based on Annual Reports of IRDA) for all select companies under the study and at the same time industry average has been arrived at by totaling the averages of 13 select companies and dividing it by 13 which has been depicted in the table-3.23 .On the basis of table-3.23, diagram-3.11 has also been prepared for analysis purpose which are as follows.

Table-3.23

Company-wise Average Ratio of Profit Before Tax to Net Premium

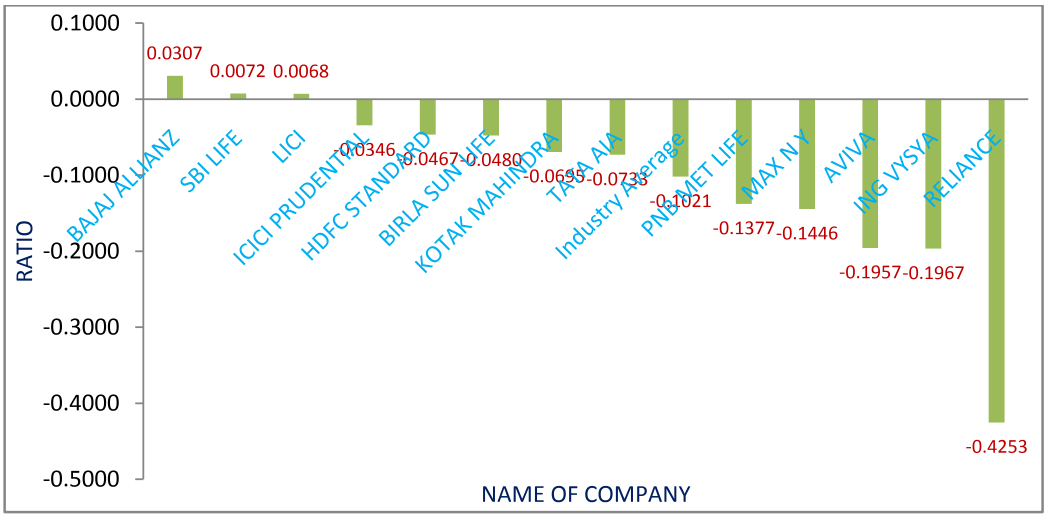
(2003-04 to 2012-13)

Name of the Company	Average(2003-04 to 2012-13)	Ten Years' Average Rank
BAJAJ ALLIANZ	0.0307	1
SBI LIFE	0.0072	2
LICI	0.0068	3
ICICI PRUDENTIAL	-0.0346	4
HDFC STANDARD	-0.0467	5
BIRLA SUN LIFE	-0.048	6
KOTAK MAHINDRA	-0.0695	7
TATA AIA	-0.0733	8
Industry Average	-0.1021	
PNB MET LIFE	-0.1377	9
MAX N Y	-0.1446	10
AVIVA	-0.1957	11
ING VYSYA	-0.1967	12
RELIANCE	-0.4253	13

Diagram-3.11

Company-wise Average Ratio of Profit Before Tax to Net Premium

(2003-04 to 2012-13)



The table-3.23 and diagram-3.11 show that the performance of the RELIANCE is very poor in respect of the profit before tax to net premium compared to all other companies under the study and the performance of five companies, namely, PNB MET LIFE, MAX N Y, AVIVA, ING VYSYA and RELIANCE are below industry average and the performance of rest of the companies under the study are above industry average.

3.2.6.3 Year-wise Average Performance of Life Insurance Industry with respect to the Ratio of PBT/NP

Year-wise industry average ratios have been calculated by adding all the ratios of PBT/NP of thirteen companies in a particular year divided by total number of companies under the study from the data obtained from IRDA Annual Reports as shown in the table-3.24 and on the basis of which diagram-3.12 also has been prepared.

Table-3.24

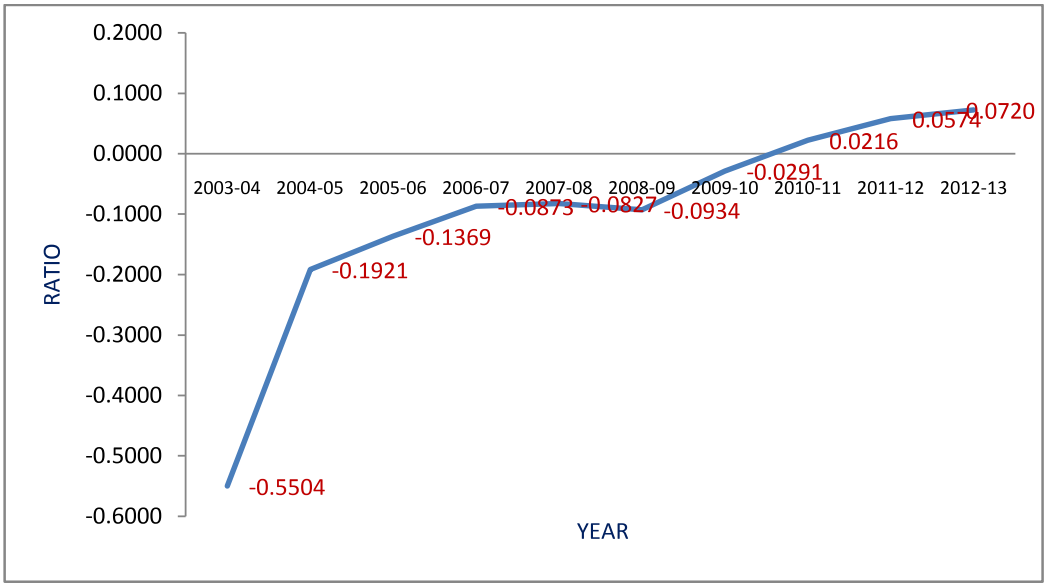
Year-wise Industry Average Ratio of Profit Before Tax to Net Premium (2003-04 to 2012-13)

Year	Industry Average
2003-04	-0.550
2004-05	-0.192
2005-06	-0.137
2006-07	-0.087
2007-08	-0.083
2008-09	-0.093
2009-10	-0.029
2010-11	0.022
2011-12	0.057
2012-13	0.072

Diagram-3.12

Year-wise Industry Average Ratio of Profit Before Tax to Net Premium

(2003-04 to 2012-13)



This is interesting to note from the table-3.24 and diagram3.12 that the life insurance industry is gradually heading towards a profit making industry in India.

3.2.6.4 Analysis of Variance to Test the Null Hypothesis H_0P_6

On the basis of data as per IRDA Annual Reports and with the help of SPSS-17, the following ANOVA table has been calculated:

Table-3.25

One Way ANOVA of the Ratio of Profit before Tax to Net Premium

Sources of Variation	Sum of Squares	d.f.	Mean Square	F	P value.
Between Groups	1.791	12	.149	1.914	.039
Within Groups	9.124	117	.078		
Total	10.916	129			

The table-3.25 indicates that the significant value of "F" is 0.039. This is the p-value corresponding to the test. Since the value is less than 0.05, so it is concluded that there is significant difference in the ratio of profit before tax to net premium across the

select life insurance companies under the study at 5% significance level and hence, the null hypothesis has been rejected.

3.2.6.5 Post Hoc Test in Identifying the Life Insurance Companies Responsible for Significant Differences in the Performance of the Ratio of PBT/NP

To identify life insurance companies for which differences in the performance of the ratio of profit before tax to net premium has arisen; the Post-hoc test has been conducted with the help of SPSS-17.

Table-3.26

Post Hoc Tests-The Ratio of Profit before Tax to Net Premium (Tukey HSD)

Name of Co (I)	Name of Co (J)	Mean Difference(I)-(J)	Sig.
RELIANCE	BAJAJ ALLIANZ	0.45597	0.022
RELIANCE	SBI LIFE	0.43249	0.040
RELIANCE	LICI	0.43205	0.040

As mentioned earlier, Tukey HSD is another test of significance, but this time the test compares each possible group of means one at a time. Examination of the Tukey HSD post hoc analysis in the table-3.26 reveals that there are three mean comparisons that are significantly different. First, we find that there is an average difference of 0.45597 in the ratio net profit before tax to net premium of RELIANCE and BAJAJ ALLIANZ. Second, there is average difference of 0.43249 in the operating profit ratio of RELIANCE and SBI LIFE. Finally, it is determined that there is an average difference of 0.43205 for RELIANCE and LICI. All these differences are statistically significant at 0.05 level.

However, the significant differences have arisen mainly because of the poor performance of RELIANCE in respect of operating expenses which is evident from descriptive statistics and low premium income This is evident from the fact that in the years 2009-10, 2010-11,2011-12 and 2012-2013 the net premium income of RELIANCE have been reduced to 658834, 654786, 547025 and 401532 lakhs of rupees respectively. If the RELIANCE management takes steps for reduction in operating expenses ratio and increase in the income from investment, then the

differences of selected companies may be made insignificant from statistical points of view.

3.3 NET PREMIUM PREDICTION

By using the method of least square fitting a straight line trend of net premium income of life insurance companies under the study, the market share in Net premium may be forecasted **(Shinde, 2011)**[10].The process of calculation for linear trend of AVIVA has been shown in table-3.27 and explanation is given below this table.

Table-3.27

Computations for Linear Trend of AVIVA

Origin	Year(t)	Y	X=(t-5.5)/ o.5	(X) x (Y)	X square	Trend Value (Y_c)
	2003-04	8110	-9	-72990	81	26815
	2004-05	25037	-7	-175259	49	54413
	2005-06	59693	-5	-298465	25	82012
	2006-07	114006	-3	-342018	9	109610
5th year	2007-08	187941	-1	-187941	1	137209
6th year	2008-09	197707	1	197707	1	164807
	2009-10	236150	3	708450	9	192405
	2010-11	232678	5	1163390	25	220004
	2011-12	238969	7	1672783	49	247602
	2012-13	209787	9	1888083	81	275201
	N=10	Sum of Y=1510078	Sum of X=0	Sum of XY=4553740	Sum of X square=330	Sum of Y_c=1510078

Source: Computed from Annual Reports of IRDA, Various Issues.

The equation of straight-line trend is $Y_c = a + b\,X$ where Y_c is used to designate the trend values, a is Y intercept or the computed trend figure of the Y variable when X=0, b represents the slope of the trend line or amount of change in Y variable that is associated with a change of one unit in X variable. The X variable in time series analysis represents time. This is a mathematical method of measuring trend and as such there is no possibility of subjectiveness.

Here,

Sum of Y/N = (a) = 151007.80

Sum of XY/Sum of X square=(b) = 13799.21

The Equation of Straight-line Trend of AVIVA can be expressed as:-

Y = 151007.80 + 13799.21 x X

Thus, Y (2017-18) of AVIVA=151007.80 + 13799.21 x 19 = 413192.8303

In the similar way, Net Premium Income for 2017-18 for other selected companies has been calculated.

After the computation of expected net premium income of selected life insurance companies for the year 2017-18, the concerned market share in net premium has been shown in tavble-3.28 as follows:

Table-3.28

Comparative Statement of Market Share (in premium) for 2012-13 and 2017-18

Name of Company	Net Premium (Rupees in lakhs) (2012-13)	Net Premium (Rupees in lakhs) (2017-18)	Market Share (2012-13)	Market Share (2017-18)	Difference
AVIVA	209787	413193	0.76%	0.91%	0.16%
BAJAJ ALLIANZ	683506	1550053	2.46%	3.43%	0.97%
BIRLA SUN LIFE	505175	964340	1.82%	2.13%	0.32%
HDFC STANDARD	1125863	1768882	4.05%	3.91%	-0.14%
ICICI PRUDENTIAL	1341724	2719110	4.83%	6.02%	1.19%
ING VYSYA	173672	302863	0.63%	0.67%	0.04%
KOTAK MAHINDRA	272399	510680	0.98%	1.13%	0.15%
PNB MET LIFE	237504	468042	0.85%	1.04%	0.18%
LICI	20858972	31618510	75.09%	69.96%	-5.13%
SBI LIFE	1038211	2143734	3.74%	4.74%	1.01%
TATA AIA	274604	601143	0.99%	1.33%	0.34%
MAX N Y	657030	1102445	2.37%	2.44%	0.07%
RELIANCE	401532	1032241	1.45%	2.28%	0.84%
Industry Total	27779979	45195235	100.00%	100.00%	0.00%

Source: Computed from Annual Reports of IRDA, Various Issues.

The table-3.28 shows that the market share in net premium of giant LICI is likely to be reduced by 5.13% in the next five years after 2012-13 which is expected to be shared by rest of the companies under the study in the competitive market provided other things remaining the same.

3.4 COMPREHENSIVE RANKING ANALYSIS

In order to evaluate the overall profitability position of selected companies, comprehensive method of ranking as used by **Singh, 2012**[17] and **Kavitha & Shanmugam, 2015**[18] in ranking overall liquidity has been used. The test combines the ranks of various profitability ratios and companies are finally ranked for the study periods accordingly. In this method, selected ratios are assigned ranks according to their respective degree of profitability i.e. all income ratio are ranked as higher ratio equal to one and next higher as 2 and so on whereas expense ratio are ranked, like lower ratio as one and next lower ratio as 2 and so on. At last, all the ranks as calculated individual ratio-wise are combined in a point score and ultimate ranking has been made on the principle that lower the total scores of individual ranks, more favourable is the company's position and vice versa. The calculations have been made for each study period. Thereafter, Kruskal-Wallis statistical test has been applied to find out whether there are significant differences in the mean ranks of selected life insurance companies under the study. The following null hypothesis H_oP_7 has been tested-:

''There is no significant difference in overall profitability performance across the Life Insurance Companies in India''.

Table-3.29

Rank Scores of Overall Profitability Performance

Name of the Company	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Total Scores	Ranks
AVIVA	43	42	33	42	38	57	49	36	50	40	430	9
BAJAJ ALLIANZ	29	36	41	28	28	33	43	37	32	38	345	1
BIRLA SUNLIFE	30	32	35	39	47	53	48	30	38	31	383	4
HDFC STANDARD	29	43	42	36	38	40	52	45	42	26	393	5
ICICI PRUDENTIAL	38	34	43	45	50	38	49	37	33	35	402	7
ING VYSYA	38	49	44	58	47	42	49	60	54	52	493	12
KOTAK MAHINDRA	46	27	44	46	38	31	26	33	38	33	362	2
PNB MET LIFE	51	55	42	45	23	43	33	43	47	45	427	8
LICI	41	43	57	46	52	32	42	61	52	55	481	11
SBI LIFE	40	39	42	31	43	27	31	39	41	49	382	3
TATA AIA	48	42	35	38	52	44	53	46	38	46	442	10
MAX N Y	57	46	30	34	33	48	39	33	36	39	395	6
RELIANCE	56	58	58	58	57	58	32	46	45	57	525	13

Source: Computed from Annual Reports of IRDA, Various Issues.

The table-3.29 reveals that overall profitability performance ranks achieved by the selected life insurance companies under the study period. . BAJAJ ALLIANZ has done well during the study period and ultimately has gained first position for overall profitability performance in ten years added together. Accordingly, KOTAK MAHINDRA, SBI LIFE, BIRLA SUN LIFE and HDFC STANDARD have secured 2nd, 3rd, 4th and 5th position respectively for overall profitability performance during the study period of ten years taken together. Analysis also shows that LICI, ING VYSYS and RELIANCE have been ranked 11th, 12th and 13th position respectively for ten years' overall profitability performance. The rest of the companies have achieved ranks in between the two groups discussed above for overall profitability performance which is also evident from the table-3.29.

The result of Kruskal-Wallis test to find out whether there is significant difference in overall profitability performance across the selected life insurance companies in India has been given in the following table:

Table-3.30

Kruskal-Wallis Test of Rank Scores of Overall Profitability Performance

Test Statistics	
Chi-Square	**41.549**
df	**12**
Asymp. Sig.	**.000**

SPSS output in the table-3.30 shows the test statistics for the Kruskal –Wallis test (although SPSS labels it chi-square, rather than H). The significant value of this test is .000 and this value is less than .05. So it can be concluded that there is significant difference in mean ranks of overall profitability performance across the life insurance companies in India and hence null hypothesis is rejected.

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