

# **Chapter 2: Survey of Literature**

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## Chapter 2

### LITERATURE REVIEW

#### 2.1 BACKGROUND

This chapter reviews different literatures which were available in respect of life insurance. Review of literature is an important part of any research work, which helps us to enhance our understanding of the research contents of different literatures, to identify the research gap and to decide the direction of our research work. For better presentation, the entire review has been divided into four sections: (a) review of articles (b) review of books (c) review of reports and (d) review of Ph.D. thesis. Finally the research gap has been identified.

#### 2.2 REVIEW OF ARTICLES

The initial research papers on the efficiency of US Life Insurance, mostly focused on scale economies (e.g., **Grace and Time, 1992**, **Yuengert, 1993** and **Gardner and Grace, 1993**). These studies intend to find evidence of significant scale economies in the industry, although larger firms generally are found to exhibit decreasing returns to scale.

During the 1980s and 1990s, the US Life Insurance industry has experienced an unprecedented wave of mergers and acquisitions. Traditionally, the industry has been known for its high-cost distribution system and lack of price competition, but insurers increasingly faced with more intensive competition from non-traditional sources such as Banks, mutual funds and investment advisory firms. These non-traditional competitors have captured a major share of the market for asset accumulation products such as annuities and cash value life insurance. The increased competition has narrowed profit margins and motivated insurers to seek ways to reduce costs. The more stringent solvency standards implemented under the risk-based capital system adopted in 1993 had put pressure on insurers to strengthen their financial statements. Technological advances in sales, pricing, underwriting and policyholder services have forced insurers to become more innovative; and relatively high fixed costs of the new systems may have affected the minimum efficient scale in the industry.

**Abidin and Cabanda (2011):** The primary objective of the study was to determine the efficiency level of non-life insurers in Indonesia during the period 2005-07. Though the total number of companies was 88, the sample size for the research was only 23 comprising of 13 large and 10 medium-sized firms. They applied the output-oriented VRS model of DEA for arriving at efficiency results. Further, they used the Tobit regression model to determine the linkage between efficiency scores and financial performance, which included return on total assets (ROA), return on equity (ROE) and return on net premium (RNP). The data analysis showed that the average efficiency score remained in the range of 0.55 to 0.60. More specifically, in 2005, 2006 and 2007, the scores were 0.587, 0.599 and 0.579 respectively. At the end of 2005 and 2007, 7 and 5 firms respectively achieved 100% efficiency. An in-depth analysis showed that captive market, listed companies and government ownership did not affect efficiency results. The results of second part of the analysis pointed that ROE and RNP had positive association with the efficiency result, whereas the ROA was negatively related. Of the three independent variables, only RNP was found to be significant, that too at 10% level of significance.

**Afza and Jam-e-Kausar (2010):** This study focused on the non-life insurance companies of Pakistan. They applied DEA to estimate the technical efficiency of 27 companies (including one state-owned) during the period 2003- 2007. The results revealed an average technical efficiency of 82.4%, pure technical efficiency of 91.4% and scale efficiency was 89.9%. Over the period of study, the average efficiency increased from 80% in 2004 to 86% in 2007. However, Pak General Insurance Company showed only 52.4% efficiency. To arrive at more specific results, the technical efficiency was decomposed into two components viz. pure technical efficiency and scale efficiency. The results of decomposition of technical efficiency showed that reason behind the inefficiency shifted from scale inefficiency to pure technical inefficiency. The study also tried to investigate the relationship between technical efficiency and size of the firm. The average technical efficiency for the large sized firms was found to be the highest (0.954) and the lowest was for the smaller sized firms (0.682). The dominating reason behind inefficiency in the case of large-sized, medium-sized and small-sized firms was scale inefficiency, purely technical inefficiency and scale inefficiency respectively. In addition, the analysis of scale economies in different size of non- life insurers suggested that most of the cases of increasing returns to scale were found in smaller non-life insurers.

**Al-Jarrah (2007):** The author used input-oriented DEA to measure the cost efficiency of the banking sector considering a sample size of 82 banks in four Arabian countries comprising of Jordan, Egypt, Saudi Arabia and Bahrain covering data for the period 1992-2000. The author divided the efficiencies into as many components as possible. First, he considered the relationship between cost efficiency, technical efficiency and allocative efficiency. Second, the researcher divided the technical efficiency into pure technical efficiency and scale efficiency and revealed that cost efficiency averaged 50% and 70% under CRS and VRS respectively. The author also reviewed the deviation in the efficiency scores on the basis of size and location. It was conferred that in terms of the former parameter, the largest banks were the most cost efficient, whereas with regard to the latter, therefore the Saudi banks and the Jordanian banks scored the maximum and the minimum respectively. The break-up of the cost efficiency scores reflected that on one hand, overall technical efficiency score showed no significant difference among the banks, whereas on the other, there was a significant difference in the allocative efficiency score based on size and geographical location. Comparing on the basis of the countries, the highest and lowest technical score was attained by the Bahraini and Jordanian banks. However, in terms of allocative efficiency, on the basis on location, the maximum and minimum score was attained by the Saudi Arabian and Egyptian banks. On the other hand in terms of size, the larger banks scored better. The scale efficiency result showed an insignificant difference across the different type of banks.

**Akimov, A. and Dollery. B.,** (2009), conducted a study on financial development policies of Uzbekistan analyzing its achievements and failures. This study provides a detailed analysis of

Uzbekistan's performance in liberalizing its financial system. Two major areas were considered in the paper. They reviewed financial development reform in Uzbekistan from independence until 2006, including the banking sectors, non-bank financial institutions and securities markets. The study also examined the policy achievements and failures of the Uzbekistan and sequence of reforms in each of these areas. The period covered was from 1991 to 2006. Three major phases in financial sector reform was distinguished, first stage of reform of the period 1991-1997, second stage which extended over the period 1998-2001 (little progress was achieved) and final stage which started in 2002 (reform had progressed but at an extremely slow pace and in an unsystematic manner. They studied the reforms in the Banking sectors, Non-banking financial institutions, Securities markets (Debt instruments, Equity markets) and compared the outcomes of financial reforms. Based on the identified problems a number of reformist policy measures were suggested in the study to overcome the situation.

**Akula, R. and Kanchu, T.,** (2011), conducted a study on Growth of ULIP Policies in Life Insurance Sector by Comparing Traditional and ULIP Policies. The study stressed on the importance of Insurance Industry in the economy. The objective of the study was –to study the evolution of ULIPs in India, the growth of ULIPs over Traditional Policies, risk factors involved in ULIPs over Traditional Policies, to suggest various measures to develop and stabilize the growth of ULIPs. The period from 2007 to 2009 has been considered for the study. The Primary Data was collected from the Insurance Companies at Warangal, Andhra Pradesh, India and the Policy Holders. The Secondary Data was collected from the IRDA Annual Reports, Insurance Companies Annual and Monthly Reports, Internet, Newspapers, Magazines, Journals and Books. A Comparative Study using Tables, taking the absolute figures and percentage changes was adopted in the study. The study found that the concept of ULIP was introduced in 1960. In 1971, Unit Trust of India (UTI) offered the Unit Linked Insurance Plan. ULIP investors have the option of investing across various schemes. Fundwise growth of Investments of ULIP over Traditional Policies – Growth Percentages of underlying assets of the Life Insurance Policies were found and individual business achieved by selected Life Insurance Companies in terms of sum assured were probed. It was found that there was remarkable growth in ULIP Policies compared to Traditional Policies as the new private entrants targeted ULIPs for market presentation. It was seen that in 2007, increase was about 159% more than the previous year, 95.48% in 2008 and 29.82% in 2009, which is much more than the Traditional Policies (Life Fund + Pension & General Annuity and Group Fund). The study considered 5 companies to compare Growth Percentages in assets under management of Life Insurers. The 5 companies selected were LIC, HDFC Standard Life, ICICI Prudential Life, SBI Life and Bazaz Allianz Life. The study revealed that growth in Pension and Group Fund was remarkable for SBI Life whereas, Bazaz Allianz did the best for ULIPs, all the companies reflected higher Growth

Rate for ULIPs except SBI Life. The study compared the number of Traditional Policies and ULIP Policies of the companies in Warangal District, Andhra Pradesh, India. ULIP Policies were more exposed to risk but they provide double benefit of covering risk and investing in Stock Markets. The basic charges for taking a ULIP Policy was also analyzed, which were-Premium Allocation Charges, Mortality Charges, Fund Management Charges, Policy Administration Charges, Surrender Charges, Fund Switching Charges. The study suggested a number of factors to be considered while taking ULIP Policies, were identified and suggested in the study, such as, to stay invested for long run, to be clear with the charges, to invest as per the risk profile. The study concluded with suggestion for procuring the ULIP Policies for its high achievement in short span of time and lucrative futures because of which policy holders preferred ULIP Policies for long-term returns, a number of suggestions for the Regulatory Authority (i.e. IRDA), the Life Insurance Companies and the Investors.

**Bala and Kumar (2011):** The researchers analyzed the efficiency of public sector banks (PSBs) in India. The results with respect to technical efficiency (TE) under CCR model showed an average of 0.87 for the 27 PSBs. Of the total sample, only one-third attained a score of one. The range for TE scores for the remaining banks is in the range of 0.553 to 0.999. Since, several banks attained a score of one, the super-efficiency model was run. The ultimate ranking showed that the top three banks in terms of efficiency were IDBI Bank, Corporation Bank and Indian Bank. Leading banks like the SBI, PNB and Canara Bank secured ranks of 10, 8 and 22 respectively.

**Barros, Barroso and Borges (2005):** The authors projected the change in total productivity of 27 insurance companies considering data for the period 1995-2001. They covered almost 100% of the Portuguese market. They used the Malmquist Index to capture the results. For better results, the total productivity change was again divided into two components: (a) due to technical efficiency change (broken further into pure efficient change and scale efficient change) and (b) due to technological efficiency change. Results revealed that almost 75% of the total sample experienced total productivity gains during period of the study. The mean score was 1.113. The results of technical efficiency change pointed that almost 50% attained a score of more than 1. Further break-up of the technical efficiency change showed that it was a case of mixed results. The performance was found to be highly encouraging from the viewpoint of technological efficiency change measurement because except one, all other insurers secured a score greater than 1. In the last part, the researchers identified the determinants of insurance efficiency. The analysis using the Tobit regression model showed that the efficiency scores were positively related with variables like foreign insurer, size factor, EU (denoting entry after 1994) on the one hand, whereas it was negatively related with the life insurance form of business.

**Barros, Barroso and Borges (2006):** The researchers in this study made an efficiency analysis of 14 life insurance companies by covering a period from 1995 to 2003. They tried to estimate Stochastic Frontier using the Cobb- Douglas cost function on the basis of observations and exogenous variables. The average technical efficiency scores for the Portuguese life insurers showed that the top three performers were Global Vida, Ocidental Vida and Fidelidade-Mundial respectively. The worst three were Victoria Seguros de Vida, BPI Vida and Barclays Viday Pensioners. Though the overall mean was 0.915 during the period, still one insurer positioned itself on “best-practice” frontier with a score of one. Their effort to identify the reasons behind efficiency differences revealed that foreign-owned insurers and those using bancassurance as an intermediary attained better scores than those who were not.

**Barros and Obijiaku (2007):** The authors investigated into the technical efficiency scores of 10 Nigerian insurance companies by analysing data for the period 2001 to 2005. The different methods applied for the analysis were DEA-CCR, DEA-BCC, Cross-Efficiency DEA and Super-Efficiency DEA. The relevant findings using the first two methods were that 80% of the insurers positioned themselves on the efficient frontier, all the insurers operated at a high pure technical efficiency level, scale inefficiency was the main factor in the overall inefficiency and all insurers positioned at the constant returns to scale except two insurers which operated under decreasing returns to scale. The overall mean of technical efficiency was 0.946. On applying the third method, it was found that the top three insurers were Prestige Assurance, Lasaco Assurance and Guinea Insurance. However, there was a slight change in the ranking using the last method and the top three insurers in descending order were as follows: Lasaco Assurance, Prestige Assurance and Law Union and Rock. In the last part of their study, they tested a few hypotheses, the results of which were that the larger-sized insurers were more efficient, bank-networked insurers attained higher efficiency scores and those with higher market share were found to more efficient.

**Bawa and Kaur (2011):** The authors studied efficiency of the Indian non-life insurance companies during the period 2002-03 to 2009-10 using DEA. The sample consisted of ten companies which consisted of four public sector insurers and the rest of all private insurers. The major aspects included examination of the three forms of efficiency, namely TE, PTE and SE along with the insurers’ operating returns to scale. Among the public sector players, it was noticed that none showed a definite trend in terms of returns to scale, which was quite similar to the trend in the private sector. Tata General Insurance and ICICI Lombard Insurance did not reveal CRS in any of the years. Bajaj General Insurance and ICICI General Insurance showed DRS during the recent years. However, the others reflected either CRS or IRS during the later part of the study period. In the sample, National Insurance Company was found to be the most efficient one, having operated

at the CRS during majority of the years. The other two leading players were Oriental Insurance and United General Insurance Company. Among the private insurers, the leading one were Reliance General Insurance followed by IFFCO Tokyo Insurance, Bajaj General Insurance and Royal General Insurance. The last part of the study revealed the sector-wise analysis in respect to all forms of efficiency. However, a fluctuating trend was noticed.

**Bawa and Ruchita (2011):** The authors studied the technical efficiency of general insurers engaged in health insurance business in India by applying DEA. They examined data of eight years from 2002-03 to 2009-10 for ten general insurers including four public sector insurers. The results were presented as company wise, year wise, sector wise and all insurers considered together. The findings of the study covered aspects like technical efficiency, pure technical efficiency, scale efficiency and returns to scale. Some of the key results were firstly, New India Assurance Company Limited and National Insurance Company Limited were the two fully efficient insurance companies, during the later years they showed an efficiency level of less than 1. Secondly, in most of the years, at least one or even two public sector players lay on the efficient frontier. During the later years of the study period, it was revealed that none of the public sector player achieved 100% relative efficiency which could be attributed to decreasing returns to scale because of the entry of private players. In the third part of analysis, results revealed that the mean technical efficiency of the private players was on the rise (from 0.062 in 2002-03 to 0.776 in 2009-10) in contrast to the falling trend observed in the case of the public sector players (from 0.878 in 2002-03 to 0.661 in 2009-10). The downfall may be attributed to falling pure technical efficiency (PTE) and scale efficiency (SE). At the end of their analysis, it was observed that the overall mean technical efficiency of all insurers increased from 0.389 in 2002-03 to 0.730 in 2009-10. In terms of returns to scale (RTS), decreasing returns to scale was observed for the public sector.

**Bedi and Singh (2011):** The authors studied the life insurance industry during the pre and post-deregulation period. They mentioned that though the sector has been growing at a rapid pace after the opening up, there still exists several opportunities to the entrants due to low insurance penetration and the increasing per capita income in the country. They specifically made a study on the LIC and came to a conclusion that the public sector player in particular was also growing fast but with a declining market share. The application of ANOVA technique showed that there was a significant difference in the performance of LIC and the private players during the period 2001-02 to 2007-08. They also studied the difference in the investment strategy of LIC during the last three decades which several earlier studies did not do. The application of the ANOVA technique and the t-test showed that there was a significant change in the investment strategy of the public

sector life insurer during the period 1980 to 2009. They also observed that ICICI Prudential Life Insurance posed severe challenge to LIC.

**Bhattacharya and Rane (2003):** The researchers elaborately discussed the historical development of the life and non-life insurance sector in India. A brief about the business during the pre-independence period and the early years of the post-independence period was depicted by the authors. They highlighted the circumstances that lead to the nationalization of life insurance business in 1956. Moreover, they made a detailed discussion about the performance of Indian life offices prior to 1956 and that of LIC during the period 1957-75. In order to assess the performance, the parameters that were considered included level of premium rate, lapse ratio, expense ratio, rate of interest and nature of investment policy.

**Bikker and Leuvensteijn (2008):** The authors examined the efficiency and competitive nature of the Dutch insurance industry. They studied some measures of competition (both direct and indirect) such as efficiency - scale efficiency (related to output volumes) and X-efficiency (related to managerial capability), average profit margins and Boone indicator. In the first part of their study, they used a translog cost function which is often considered to empirically determine efficiency, whereas for determining the X-efficiency, a stochastic cost frontier model was used. The data analysis showed that though on an average cost X-efficiency of the insurers was about 72% but the fluctuation was quite less. On further analysis it was revealed that efficiency on the basis of size showed that the efficiency for medium-sized firms was low but for both smaller and larger sized firms were high.

**Boonyasai, Grace and Skipper (2002):** The authors studied the impact of liberalization and deregulation in four life insurance markets viz. Korea, Philippines, Taiwan and Thailand. The objectives were to determine whether liberalization and deregulation was associated with: (1) increase in total efficiency of the life insurers (e.g., technical efficiency, pure technical efficiency, and scale efficiency), (2) growth in productivity changes (total factor productivity, technological change, technical efficiency change, purely technical efficiency change, and scale efficiency change) and (3) realizing a change in productivity. For the purpose, they studied different efficiencies using data of twenty years from 1978-1997 using the DEA technique. They also applied the Malmquist Index to understand productivity changes after deregulation and liberalization. Results reflected that productivity of Korea and Phillipines was better than Taiwan and Thailand. However, an increasing trend was visible for the insurers in general.

**Boyd, B.K., (1991):** conducted a study on strategic planning and financial performance of US companies using Meta-Analysis by taking 29 samples amongst 2496 organizations. 21 studies were

selected for study which used various performance measures such as change in sales over earnings, growth in revenue etc. and analyzed by statistical tools like *T-Test* and *Anova* published in different reputed journals between the years 1970 to 1988. The effect size were calculated using 'r' and cumulated for following nine performance measures (Earnings Growth, Deposit Growth, Earning per Share Growth, Sales Growth, Price-Earning Ratio, Profitability, Return on Assets, Return on Equity, Return on Investment). The magnitude and consistency of the effect size were estimated. The early studies recognized the benefit of Strategic Planning but later analysis was not conforming so. But the study failed to assure that there is no financial rewards of Strategic Planning due to the inherent limitations of the study. The study paved way for further research in this area.

**Bris, A., Koskinen, Y., Pons, V., (2004) :** They conducted a study on corporate financial policies and performance around currency crisis based on data from 17 countries to understand firm level leverage and performance measures before and after a currency crisis and 3 countries where currency crisis had minor or no effect. They obtained information about currency crisis that have occurred in the period 1985-2000. The data stream provides a Global Market Index which includes a varying number of firms per country. The accounting information regarding available firms for 5 years around the years of currency crisis. They judged exchange rate exposure, firm leverage through debt-to-value ratio, profitability (earnings before interest and taxes over total revenues and return on capital employed), financial fragility (current ratio, interest coverage ratio), investments (net investment as the ratio of changes in total assets). The study found that the firms in countries that suffered dramatic exchange rate depreciation in the last decade follow a similar pattern of financial policies prior to a currency crisis; there were significant differences across regions following currency depreciation. The results from the cross-section regression were – 1) For the total sample, profitability and size have negative and positive coefficients, respectively. 2) The market-to-book value ratio was never significant. 3) Consistently negative relationship between a firm's exposure to exchange rate movements and book leverage for the firms in crisis sample. The opposite held for the firms in control sample. 4) Some corporate governance variables explain leverage though not significant.

**Cagil and Karabay (2010):** The authors used CCR-based DEA to evaluate the efficiency of 25 non-life Turkish firms on the basis of input and output data. They covered a period from 2003 to 2008. On the basis of analysis, they concluded that the number of insurers having perfect efficiency varied from year to year. In 2003, it was 20, which reduced drastically to 14 in 2004, increased to 19 in 2005 and finally settled at 15 in the last three years of the study period. The average efficiency scores for the different years were as follows: 2003 – 0.97, 2004 – 0.93, 2005 – 0.98, 2006

– 0.97, 2007 and 2008 – 0.94. In terms of individual insurers, Birlik attained the best and Liberty attained the worst scores with an average score of 0.989 and 0.354 respectively.

**Carson and Ingves (2000):** This article comprises of seven chapters, where the researchers discussed in detail about the developments taking place across the globe through the initiatives of the IMF, World Bank and other national and international bodies. They recommended the need for macro-prudential surveillance and identification of macro-prudential indicators. The authors also pointed the importance of both micro and macro-prudential indicators for better financial sector surveillance. For better guidance in policy-making, they presented a summary of macro-prudential indicators which have been bifurcated into aggregated micro- prudential indicators and macro-economic indicators. In the later part of their research work, they highlighted certain issues relating to the information on the basis of which macro- prudential surveillance is carried out which include accuracy, timeliness and comparability of macro-prudential indicators across the countries.

**Chansorn (2008):** The author examined the relative efficiency level of 13 Commercial Banks in Thailand, including three that were included only in 2006, for the period 2003-06, using DEA. The analysis was made by categorizing banks on the basis of size (i.e. large, medium and small) and the nature of diversification in the business. They applied both the operating approach and intermediation approach to arrive at the results. On the basis of the operating approach, average efficiency score was in the range of 0.9106 and 0.9720. Amongst all the institutions, Kosikorn Bank, Siam Commercial Bank, Thanachart Bank and Standard Chartered Bank attained a score of 1.00 in all the years. The number of banks which scored 100% efficiency in various years was as follows: 2003 – four, 2004 – six, 2005 – seven and in 2006 – seven. The average efficiency score in various years was: 2003 – 0.9106, 2004 – 0.9561, 2005 – 0.9720 and in 2006 – 0.9354. The study revealed that on the basis of size and nature of business diversification all the DMUs attained 100% efficiency level. The results of the second approach showed that the average efficiency score had a higher range; from 0.3452 to 1.00. The average in different years reflected a declining trend from almost 0.87 in 2003 to 0.71 in 2006. Surprisingly, none of the banks attained 100% efficiency in all the years. In terms of individual banks, ACL Bank was found to be the most efficient followed by Siam City Bank and Bangkok Bank. The study on the basis of the different sized banks revealed that the smaller ones were the most efficient. In contrast to the result in the former approach, the new entrants scored lower than the incumbents who focused only on the banking business. However in all the approaches the average efficiency score was quite high in the industry.

**Chen, Chiu and Huang (2010):** The researchers conducted a study on efficiency analysis of 37 Taiwanese banks during the period 2004 to 2006. This study applied the DEA approach followed by Tobit regression. The study determined relative efficiency score of the banks using DEA and

identified those factors which affected efficiency results using Tobit Regression. They applied four different models of DEA, namely Super-BCC Model, Super-Threshold Model, the Modified Super-model and Super-SBM Model to check whether they gave similar results. They concluded that the ranking of banks changed with a change in the method. The following conclusions were drawn by them: (a) the third model gave higher estimates of maximum value compared to the others, (b) the fourth model gave lower estimates of the minimum value compared to the others, (c) in terms of average efficiency results, the fourth model assigned minimum score, whereas, the third method revealed maximum value and efficiency variance. From the nature of results, they interpreted that the fourth and third models were most preferable.

**Chen, Powers and Qiu (2007):** The researchers studied the Chinese life insurance industry and aimed to point out the effect of regulatory changes and entry of foreign insurers on the efficiency of the insurance players. They used the Banker et. al (1984) version of the DEA to determine the relative efficiency scores and the Malmquist Index to discriminate between changes in efficiency and technical progress. The examination of results revealed the fact that the average technical efficiency score tumbled down from 0.65 in 2001 to 0.505 in 2005. The study revealed that the overall market had more scope for improvement but the domestic players ranked high in terms of efficiency scores. They revealed that the foreign insurers scored low because of the non-performance of the new joint ventures that they entered into. A deeper look into the scores of the foreign insurers showed that the pure technical efficiency scores were better than that of scale efficiency. In terms of the operating returns, the researchers found that 72% of the life insurers exhibited increasing returns to scale (IRS) and 22% constant returns to scale (CRS) with only 6% operating at the decreasing returns to scale (DRS). Of the foreign insurers, around 12-20% of the players only operated at the CRS and the remaining at the IRS with no player operating at the DRS. In the aspect of Malmquist Index, they found that the overall trend was positive for the industry. The break-up of the results into the component factors showed that technical progress was an important factor in driving productivity of insurers. The study revealed that due to the changing environment of the insurance industry the market was getting restructured and that is the major factor in driving productivity of insurers.

**Chen, Powers and Qiu (2009):** The researchers analyzed the structural changes which the Chinese insurance market was going through. They considered the developments that were taking place in the country regarding increasing demand for insurance and increase in the number of foreign insurers participation in the industry. The study revealed that the entry of foreign insurers into the market did not bring any improvement in efficiency levels of the industry which was dominated

by the domestic insurers. However the authors concluded that there was an overall sign of technical progress and potential improvement.

**Cummins, Tennyson and Weiss, (1998):** They examined the relationship between mergers and acquisitions efficiency and scale economies in the US Life Insurance industry. They estimated cost and revenue efficiency over the period 1988-1995 using DEA.

**Cummins and Zi, (1998):** They presented a comparative analysis of frontier cost-efficiency methodologies by applying a wide range of econometric and mathematical programming techniques to a dataset consisting of 445 Life Insurers over the period 1988-1992. The alternative methodologies gave significantly different estimates of efficiency for the insurers included in the sample. The efficiency rankings were quite well-preserved among the econometric methodologies; but the rank correlations were found to be lower between the econometric and mathematical programming categories and between alternative mathematical programming methodologies. Thus the choice of methodology had a significant effect on the results. Most of the Insurers in the sample display either increasing or decreasing returns to scale, and stock and mutual insurers were found to be equally efficient after controlling for firm size. The *Malmquist Methodology* is used to measure changes in efficiency over time. They found that acquired firms achieve greater efficiency gains than firms that have not been involved in mergers or acquisitions. Firms operating with non-decreasing returns to scale and financially vulnerable firms were found to be acquisition targets. Overall, mergers and acquisitions in the Life Insurance Industry was found to have a beneficial effect on efficiency.

**Cummins, Tennyson and Weiss (1999):** The researchers investigated the efficiency improvement of life insurers in U.S as a result of mergers and acquisitions. They considered several types of efficiency in the U.S. life insurance industry over the period 1988-1995 using Data Envelopment Analysis (DEA). Malmquist Indices were computed to measure changes in efficiency and productivity over time. They also compared the efficiency of targets of mergers and acquisitions with firms that have not been targets of consolidation activity. They revealed the results relating to relationship between mergers and acquisitions and efficiency in the life insurance industry. Regression analysis was done to test for changes in efficiency while calculating for the characteristics of the target and non-merged firms. The analysis of the results showed that the proportion of target firms operating with Non-decreasing returns to scale was 73.3% which was significantly higher than for non-merged firms (60.3%) and targets on average showed significantly higher scale efficiencies than non-targets (93% versus 89%). Target firms also showed significantly higher technical, pure technical, and scale efficiency than non-merged firms. The Malmquist Indices showed that target firms experienced significantly larger gains in technical efficiency and in total factor productivity over the sample period than the non-merged

firms, thereby concluding that acquisitions lead to efficiency gains. The regression analysis revealed that the Malmquist indices of technical change and total factor productivity change were significantly larger for target firms than for non M&A firms. They revealed that target firms experienced significantly larger gains in both cost and revenue efficiency than did non-M&A firms, with the cost efficiency gains attributed primarily to gains in technical rather than allocative efficiency. The control variables in the regressions revealed that larger firms experienced significantly lower efficiency changes than smaller firms.

**Das (2012):** The author looked into status of life insurance industry in North- Eastern India. The researcher revealed that though the private players were growing at a fast pace, the years ahead would not be easy for them; the success in the coming days will depend on how they adopt strategies with respect to customer retention strategy, operational efficiency / effectiveness, regulatory developments and innovations. He cited the comments of Rastogi and Sarkar (2007) to justify the privatisation of the sector. According to the two authors whose comments have been mentioned in the article, the government of our country had applied different models before to ensure its development. The models already tested before were those of privatisation with negligible regulations (which was before 1956) followed by the nationalisation of the industry leading to the formation of LIC in 1956. This scenario existed for 44 years before another set of reforms were brought about in 2000. He mentioned that the opening up of the sector opened the scope of offering large number of products to the huge untapped population. The author also concluded that the industry grew at a fast pace of 22.49% CAGR in terms of insurance premium between 2001 and 2010. LIC grew at the rate of 18% in comparison to 156% growth reflected by the private sector. Some of factors that supported the growth were the burgeoning middle class segment, rising disposable income, increasing insurance awareness, huge investments and infrastructure spending. The author further observed that though there were a number of improvements in the industry with respect to products and spread of insurance, the insurance business did not grow uniformly; instead they centred around a few selected areas. With this revelation in the background, the main focus area of the article was to analyze the performance of LIC and to assess the market share in that region. Also, the author revealed the challenges that the public sector insurer is facing and the marketing strategies it is adopting to combat the same. The author mentioned that after the liberalization, privatization and globalization (LPG) process in India, the North-Eastern region has been receiving increasing interest from both LIC and the private sector. It was worthy to note that LIC which had only two to four divisional offices to cater to the entire region has been expanding its marketing base after the private players entered the industry. The researcher also observed that the trend in respect of individual new business policies in the region was better

than that of the country. The researcher further opined that the insurance sector reform in 1999 benefitted the entire region. From 2006-07 to 2009-10, Assam has been contributing maximum business to both the sectors in the life insurance business.

**Delhausse, Fetcher, Perelman and Pestieau (1995):** The authors made a comparison of the non-life insurers of two European countries, Belgium and France in terms of technical and scale efficiency. The non-parametric DEA and stochastic frontier methods (parametric maximum likelihood procedure) were used to analyze the data for the period 1984-88. In the latter case, a translog functional form was adopted to estimate efficiencies of the individual insurers. The total number of insurers analyzed was 434 (191 from Belgium and 243 from France). The firm-specific results showed that the efficiency level in both the countries was quite low and there existed enough scope for improvement. In the cross-country comparison, it was clear that France was better placed than Belgium in terms of efficiency and non-profit companies were better placed compared to the profit-making companies. Furthermore, in the later part, a multiple regression analysis was run keeping efficiency score as the dependent variable and the institutional form, distribution ratio, reinsurance ratio, claims ratio, car ratio, scale and country concerned as the independent variables. The analysis showed that efficiency was related to the variables in the following way: positively related with size, claims ratio and reinsurance ratio (except in the case of France) and negatively related with higher specialization in car insurance but both-way related to distribution ratio. In the last part, the authors examined the relationship between firm size and elasticity of scale which gave a positive result. An inter-country comparison revealed that the average scale elasticity in France (0.935) was more than that of Belgium (0.917).

**Diacon, Starkey and O' Brien (2002):** The authors analysed the relative performance of 454 life insurers covering 15 European countries for the period 1996-99. The nations covered in the study were Austria, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, Switzerland and UK. The efficiencies that were analysed were pure technical efficiency, scale efficiency and mix efficiency. The empirical study looked into the country-wide difference in the efficiency and also the variables that impacted the efficiency levels. The overall score showed that the average PTE fell for the entire period in contrast to the other two where it increased till 1998 but drastically fell in 1999. In terms of disparity among countries, UK, Spain, Sweden and Denmark showed the highest level of TE. However, UK insurers displayed low levels of both SE and ME. Moreover, mutual companies scored higher average TE than the stock insurers but a lower ME. In the tobit regression analysis, the independent variables used were size, gearing ratio, liquidity, profitability, reliance on re-insurance and solvency. Some of the observations from their study were: (a) PTE and SE were strongly related with size (b)

ME was linearly related with size (c) large companies scored well in both PTE and ME, but had low scores in ME (d) solvency was positively related with TE (e) Liquidity had no effect on efficiency (f) profitability had a positive influence on scale, but a negative influence on ME (g) increase amount of re-insurance done was associated with lower ME.

**Diboky and Ubl (2007):** The authors analyzed 73 mutual insurers, 263 stock insurers and 20 public insurers to demarcate between different ownership forms during the period 2002-05. In terms of the corporate structure of the respective holding companies, the 263 stock firms were split into 156 stock insurers owned by a stock holding company ("pure" stock insurers), 82 stock insurers owned by a mutual holding ("mutual" stock insurers) and 25 stock insurers owned by a public holding ("public" stock insurers). In this study, they investigated not only the efficiency of different ownership forms at the firm level but also the influence of corporate structure of holding companies on their life insurance subsidiaries. They assumed constant returns to scale while applying the DEA technique as well as the bootstrapping method to arrive at technical, cost and allocative efficiency scores. Their analysis showed that there was no significant difference in the result obtained under public and private ownership structure. However, results under stock ownership were found to be superior to the mutual and public structure with smaller stock insurers being more dominant. A further analysis was made to understand the effect of organizational form of a holding company on the efficiency of its subsidiaries which showed that a uniform structure was dominant over the hybrid form structure.

**Eckles and Saardchom (2007):** The researchers analyzed the technical and scale efficiency results in the Thai Non-Life insurance industry. The analysis of data for the period 1997 to 2003 showed that technical efficiency ranged from 0.691 to 0.791. A noticeable point was that those insurers which attained a score of one were not necessarily the largest firms in the industry. With regard to the returns to scale, they pointed out that 41.7% of the firms operated under CRS, 25.1% under DRS and the remaining under IRS.

**Eling and Luhn (2008):** The researchers thoroughly reviewed large number of studies to understand the different methods applied to measure efficiency. They also compared efficiency of 3555 insurers from 34 countries. Different methodologies, organizational forms, countries, lines of business and company sizes were compared. The analysis reflected technical and cost efficiency growth in international markets from 2002 to 2006, but with marked difference between the countries. The average technical efficiency in life and non-life insurance was found to be 0.86 and 0.72 respectively. In terms of position, Denmark and Japan held the highest rank whereas Philippines occupied the lowest rank with an average technical efficiency of 0.52 in non-life insurance. The average score of the developed countries in Asia and Europe was found to be more

than those of the emerging economies. However, the largest economies occupied the middle position. It was observed that there existed a statistical difference between the scores of not only stocks and mutuals but also between different lines of business. Technical efficiency scores also showed that diversifying into varied businesses was not always the best strategy for businesses. It was also found that the average efficiency decreased with lower size of organizations. On the other hand, in terms of cost efficiency they found that the score was on an average lower than technical efficiency. The cost efficiency results were very similar to the technical efficiency results. The highest and lowest values were obtained by Denmark and Philippines respectively. Furthermore, they observed the following (a) mutuals were more cost efficient than stock companies (b) companies operating in one line were not too different from multi-line firms in terms of performance and (c) large companies were more efficient than small ones, especially in life insurance. In the later part of their study, technical efficiency and cost efficiency scores were calculated using Stochastic Frontier Approach (SFA). The extent of variation across different frontier efficiency methodologies scores was found to be minimal. With regard to position of countries, Denmark and Japan were among the most efficient ones in terms of cost-efficiency. Portugal and Singapore were, however, found to be most efficient in life and non-life business respectively.

**Eling and Luhn** (2009): The researcher compared the efficiency of 6462 insurers comprising of life and non-life from 36 countries. This study considered five main aspects: methodologies, countries, organizational forms, lines of business and company size. The application of DEA for analysis showed that the average score of technical efficiency in life and non-life insurance was 0.71 and 0.50 respectively. Thus the scores indicated relative poor efficiency score for the non-life sector. In the life insurance business, the top three countries were Denmark, Luxembourg and Norway, whereas, in the non-life space, the highest scorers were Japan, Denmark and Switzerland. It was revealed that the average efficiency scores for Asian and European countries were more than those of the emerging countries. It was also seen that there existed a steady technical and cost efficiency growth in international insurance markets from 2002 to 2006 with remarkable differences among countries. The second area of focus was to test the Expense Preference Hypothesis and Managerial Discretion Hypothesis. Their results showed that the average technical efficiency values of stock companies (0.49 in non-life and 0.70 in life) were lower than those of mutual insurers (0.55 in non-life and 0.80 in life) which therefore goes against the expense preference hypothesis. In fact, the Wilcoxon test was used to test the difference between the two scores which showed that they were statistically significant at 1% for both life and non-life insurance. In life insurance, multi-line firms were more efficient than specialized firms. The test of efficiency based on company size showed that the efficiency of large-sized life insurers was higher than those of the small-sized

companies. Average efficiency score was 0.77 for large-sized companies, 0.72 for medium-sized companies, and 0.65 for small-sized companies. In non-life business, the efficiency for small (0.49) and medium (0.49) insurers was less than those of large-sized insurers (0.54). An additional analysis on returns to scale showed that many small insurers exhibited increasing returns to scale, whereas most large insurers operated under decreasing returns to scale. Results also showed that in life insurance, 65.60% of the small insurers operated under increasing returns to scale and 7.09% under decreasing returns to scale. Only 0.05% of the large firms operated under increasing returns to scale and 68.18% under decreasing returns to scale. On the other hand, the study of cost efficiency showed that the cost efficiency score was on an average lower than technical efficiency, with a value of 0.38 in non-life and 0.59 in life insurance. The cost efficiency results were very similar to the technical efficiency results. In life insurance, large companies (0.70) were more efficient than small ones (0.51). Further analysis showed that the increase in cost efficiency was more than that of technical efficiency thereby pointing that insurers had increased allocative efficiencies during the period 2002-06. In order to get a better view about the factors affecting efficiency the Conditional Mean Analysis was applied, the results of which confirmed the efficiency differences found under DEA and SFA. Further results showed that there was a positive relationship between capitalization and efficiency. Legal systems were not found to be the main drivers of efficiency in the insurance industry.

**Eling and Huang (2011):** The researchers used the multi-stage DEA model to estimate technical efficiency score of non-life insurers in the BRIC countries by using data from 2000 to 2008. In order to determine the inefficiency due to managerial incompetence and exogenous factors, they used a model that incorporated both controllable and uncontrollable variables in the four countries, namely Brazil, Russia, India and China. The frontier methodology was applied to arrive at the efficiency scores. Two basic steps were applied to arrive at their objectives: Firstly, by using DEA, the efficiency scores were obtained after which, in the second step, the slack variables were regressed against uncontrollable variables. On the basis of the basic model, Brazil was found to exhibit maximum efficiency. When the input slacks were regressed on certain environmental factors, mixed results were obtained. Some factors like change in GDP, per capita GDP, consumer price index, deposit interest rate, shareholders' equity to assets ratio had a negative influence on firms, whereas vehicles per thousand and insurance density had a favorable influence on input slacks. In the final stage, when the model was modified to incorporate the effect of environmental variables, the result showed that the country-wise efficiency was in the following descending order: Brazil, Russia, China and India. Furthermore, the Malmquist Productivity Index results showed that there was a progress in terms of both technological change and technical efficiency

change. Finally, in order to detect the factors that influenced efficiency, they employed the regression analysis using certain firm-specific variables like size, profitability, steadiness, and solvency. The tobit regression results showed that: (a) size did not affect efficiency, (b) return on equity had a positive relationship with efficiency scores but (c) steadiness and solvency were negatively related.

**Frimpong (2010):** The author investigated into the relative efficiency of the Ghanaian Banks in 2007 by applying the input-oriented model. The sample used for the study included 3 state-owned sector banks, 8 private domestic banks and 11 foreign banks. Hence, the efficiency analysis has been done on a total of 22 banks. The researcher calculated the technical efficiency score for the industry which showed that only 18% of the insurers attained a score of one with the overall average being 74%. In the later part of the study, the relationship between technical efficiency scores and profitability (denoted by return on equity) was studied by plotting the ROE against the efficiency scores on a two-dimensional space.

**Gowland, D., and Aiken, M., (2005):** They studied the changes to Financial Management Performance Measures, Accountability Factors and Accounting Information Systems of Privatized Companies in Australia. They examined use of performance measurement and accountability factors and the related changes to accounting systems after organizations were privatized in Australia. The outcome had been determined by prior literature review and by undertaking a survey of organizations privatized in Australia between 1990 and 1998. A *Test of Validity and Reliability* of the survey instrument was performed on a smaller sample of organizations in order to modify to the survey instrument after the preliminary results were discussed with colleagues and representatives from industry. The *sample size* consisted of all organizations privatized in Australia between 1990 and 1998, which were 45 in number. But, a number of those organizations (7 Nos.) were unsuitable for acceptance of the information due to four factors - i) Four organizations absorbed into existing private sector firms. Therefore, the management structures and culture was already in ii) One company indicated that staff turnover had occurred to such an extent that there were no officers remaining who could answer the survey questions; iii) One company had changed ownership more than once and it was difficult for executives to complete the questionnaire; iv) One company had been privatized but were not operating the assets. So, 38 companies were in a position to complete the survey. The response rate of the selected companies was 28, i.e. 62% of the total sample of 45. Two specific industry groups (aviation and electricity) were identified within the total of the companies that completed the survey. A split of the returns enabled the analysis to be divided into specific industry groups (Electricity-10 returns, Aviation-05 returns, Other Industries-13 returns). The responses of the company's senior executives were gathered with the tested questionnaire which consisted of thirteen questions relating to performance measurement, seventeen questions relating to

accountability factors and seven questions relating to information systems. Unless a response to a question indicates 'no change', then, they acknowledged that some change had occurred. However to determine whether those changes had been major, an average of 3 in the *Likert Scale* (where, the range was 0 to 5) was considered to be a medium change and an average of 4 or above, a significant change. Tests were produced for the responses to the questions and for the summed total of the five parts of the questionnaire. This was done at the 95% confidence level. The returned questionnaire for each respondent has been analyzed to determine whether any specific bias was evident. All respondents gave a range of ratings for questions asked in each of the five parts of the questionnaire and, therefore, it is not evident that a specific bias occurred in any of the answers. The outcome of the survey had indicated that with respect to privatized organizations there is evidence to suggest that there has only been a low level of change to Financial Management Performance Measurement, Accountability, Executive Information System Development. The study thereby concluded that there have been changes in performance measurement and accountability and that this has required some adjustment to accounting information systems, but not to the extent expected.

**Gulati (2011):** The researcher studied the different efficiency aspects of 51 Indian banks using DEA. Both CCR and BCC models were used for finding efficiency scores. The analysis of results showed that only 9 banks were technically efficient. Moreover, of these nine, five were private banks which were established after 1996. The technical efficiency results showed that the average score was 0.792 with a deviation of 15.5%. In terms of frequency distribution, around 50% of the banks had a score of less than 0.8. The second aspect relating to pure technical efficiency showed the average to be 0.834 with a deviation of 15.5%. Of the total sample, 14 banks attained perfect efficiency under VRS assumption. Moreover, of these 14, there were 9 banks which were also efficient under CRS assumption, thereby denoting 100% scale efficiency. The overall scale efficiency result showed an average score of 0.951 with a standard deviation of 0.066. The results, therefore, showed that scale inefficiency had a low contribution in the overall inefficiency. Since, there were several banks with the same technical efficiency score the researchers applied the super-efficiency model, which showed that the top three banks were ICICI Bank, Yes Bank and HDFC Bank. In the later part of the study, four tests were applied to determine whether there was any significant difference in the efficiency levels between the private and public sector banks. It was found that in all the cases, there was an insignificant difference in the mean levels of TE, PTE and SE between the two sectors. Furthermore, the tobit regression model showed that the return on assets and off- balance sheet activities were the most important factors affecting efficiency.

**Hardwick, P., and Guirguis, M., (2004):** They studied the structure and performance of UK insurance industry using data envelopment analysis by taking a sample of 50 life and 50 general UK

insurance companies over the period 1990-2003. The study suggested that UK life insurers produced their chosen outputs with an average only 57% efficiency while general insurer produced their chosen output with only 66% efficiency.

**Hsiao (2006):** The study was made to look into the performance measurement of investment for 25 life insurers of Taiwan during the period 1998-2002. The entire sample was divided into domestic and foreign insurers in order to understand the difference in their performance. With the application of efficiency analysis using DEA, it was found that only two insurers, viz. Nan Shan and Hontai Life were both 100% overall and scale efficient. In terms of PTE, other than the above two players, only Cathay, American and Manulife were 100% efficient. The overall range for the three forms of efficiency were as follows: for overall efficiency – 0.177 to 1.00, for PTE – 0.194 to 1.00 and SE – 0.354 to 1.00. The result in terms of returns to scale showed that the majority operated under DRS. In the later part of this study, the Malmquist Index was applied which revealed the average score of the five components: efficiency change – 1.344, technical efficiency change – 0.842, pure technical efficiency change – 1.123, scale efficiency change – 1.193 and total factor productivity change – 1.108. The author also applied certain statistical tests for testing a few hypotheses. The Mann-Whitney test revealed that there was no significant difference in the rank of overall efficiency and pure technical efficiency between foreign and domestic players. However, there was a significant difference in the rank of overall efficiency during 1998-99, 2000-01 and 2001-02. In the last part of the study, it was found that deposits and loans contributed the maximum to the investment return rate.

**Hopkins, Willie, E. and Shirley, A., (1997):** They studied the impact of strategic planning intensity on financial performance. The study proposed that the intensity with which managers engage in strategic planning depends on managerial, environmental and organizational factor, The study used LISREL caused modeling to analyze the mediating effects of strategic planning intensity between certain factors (i.e. managerial, environmental, organizational ) and banks financial performance. The study explained the nature of the planning performance relationship in banks. They used an integrative model of relationships among managerial, environmental, and organizational factors, strategic planning intensity and financial performance and applied the model on data from 112 banks. Test-retest reliability was quite high in the study. Three measures were used for the financial performance *Latent Variables* –

- i) Profits for Income, ii) Return on Equity (net income divided by shareholder's Equity),
- iii) Deposit Growth (percentage change in consumer demand deposits for each bank), LISREL was designed as linear structural equation model for latent variables. The two components of LISREL

are measured – Latent Variables and Structural (Test of causality and hypothesis). LISREL-8 computer program was used to solve the structural equations and generalized least square method was used to derive parameter estimator for the initial and modifies models. The study suggested that the intensity with which banks engage in the strategic planning process has direct, positive effect on banks' financial performance and mediates the effects of managerial and organizational factors on bank performance and a reciprocal relationship between strategic planning intensity and performance. Therefore, the study stated that strategic planning intensity causes better performance, and vice versa. Thus, the study paved the way for similar implications for other financial services institutions subject to similar conditions regarding operations of the institutions.

**Hsiao, Pai, Shi and Su (2011):** They studied the cost efficiency in the Taiwanese life insurance industry during the period 1997 to 2007. The inferences from the study were as follows: (a) the translog cost function reflected that the interpretability was 93% with labour costs and claim costs having a severe impact on costs; (b) the economy-of-scale analysis showed the mean value to be 1.1928. Of the total sample chosen for the study, almost 72% reflected values exceeding 1. Moreover, the results showed that with variation in the “scales” and “patterns”, the value changed; (c) the cost efficiency analysis pointed that the value remained in the range of 55-80%, with an average score of 67%; (d) the efficiency varied with change in scale, and (d) the tobit truncated regression analysis conferred that operating profit percentage, total assets turnover, fixed assets turnover and liquidity ratio were positively related with cost efficiency, whereas benefits payment as a ratio of net premium was negatively related.

**Hwang and Kao (2006):** The researchers utilized the two-stage DEA technique to study twenty four non-life insurance companies of Taiwan. The first stage measured the marketability aspect whereas the second stage measured the profitability aspect. An interesting finding was that the companies that had efficiency in the traditional one stage could never achieve efficiency in both the stages. There was no significant difference between the efficiency level of domestic and foreign insurers and also on the basis of different sizes.

**Huang (2007):** The researcher predicted the profit and cost efficiency in the Chinese insurance industry applying Stochastic Frontier Approach (SFA). Sample for the study included those insurance firms which represented over 90% of commercial insurance firms assets. The data period was 1999-2004. The results showed that in cost efficiency, the non-state owned companies and the foreign companies were better placed than the state owned and domestic companies. But in the case of profit efficiency reverse results were retrieved.

**Ibiwoye (2010):** They identified the reason behind increasing popularity of the frontier methods in performance assessment of decision-making units (DMUs). The authors mentioned that ratio analysis and index numbers failed in the case of multiple input-multiple output case, but there were no problem with the application of frontier methods. The author explained the advantages of the frontier methods over the other two methods. They used data of ten Nigerian insurance companies to show how efficiency analysis could be done by making computations of technical and scale efficiency scores. The results reflected that high level of technical efficiency existed under both constant returns to scale and variable returns to scale. However, in both the cases there exist scale inefficiency, thereby concluding that size made a difference and may lead to decreasing returns to scale.

**Jose and Georgiou (year not found from the website):** The researchers highlighted the financial turmoil which took place in the late 1990s that gave rise to the increasing importance of macro-prudential analysis. They mentioned about responsiveness of the international financial institution like the IMF in working closely with national bodies across the world to develop financial soundness indicators. The paper covered important areas relating to the development of the FSI methodology, results of the compilation exercise taken by the IMF together with the other countries, a study of data requirement for FSI development and implementation of the FSI model in all the IMF member countries

**Jain and Goyal (2012):** The authors made a study to determine whether there is any relationship between policyholders' rights and duties with the demographic factors. The results of the analysis revealed that there was a significant impact of age, income, and gender on policyholders' rights. Another interesting observation was that both the insured and the uninsured were aware of the rights. With regard to duties, it was found that age as a factor partially affected the duties. However, on the one hand, income fully affected the duties of the policyholder, whereas on the other hand, there was no significant relationship between gender and duty awareness. However, there was a significant relationship of insured on duty awareness of policyholders.

**Kasman and Turgutlu (2007):** The authors investigated the technical efficiency of 28 life insurance firms of Turkey by studying data that covered a period from 1999- 2005. They estimated the efficiency results of firms by applying econometric and mathematical approaches. The paper was different in the sense that it applied three different techniques viz. Data Envelopment Analysis (DEA), Chance- Constrained DEA (CCDEA) and the Stochastic Frontier Approach (SFA) to understand the efficiency level of the Turkish life insurers. They examined the relationship in the efficiency level by comparing (a) domestic and foreign insurers and (b) insurers on the basis of their size. It also examined the consistency in the results obtained under the three approaches.

Finally, the authors tested whether the mean efficiency scores from the three approaches were significantly different. The results showed that there existed a high level of inefficiency in the industry. Moreover, their efficiency results showed that domestic firms were relatively more efficient than foreign insurers and larger-sized firms were better performing than the smaller firms. The pair-wise Spearman's rank correlation results showed that not only the rank-order correlation between parametric and non-parametric tests was found to be highly consistent but also the two non-parametric tests showed high consistency. However, the Mann-Whitney-Wilcoxon test showed that difference in the mean efficiency scores of parametric and non-parametric tests showed significant difference.

**Kumar (1996):** The researcher studied on the development of the life insurance industry in India. The researcher highlighted the regulatory developments that took place from time to time. Moreover, the researcher mentioned about the circumstances that lead to the nationalization of life insurance sector in India. While elaborating on the economic reforms that generated in the country since 1991, the author cited certain issues like product development, technological progress, skill development in the insurance sector and discussed the role of insurance industry in a country's development. The author also highlighted the prospect of industry growth and the removal of inefficiencies was elaborated by the author.

**Kulkarni and Sagar (2011):** The researchers focused on the position of LIC in terms of its market share. Moreover, they discussed the marketing strategies being adopted by the public giant to improve its competitive strength and dominance in the market. The authors pointed out the market share of the individual players as at the end of 2008-09; LIC had a share of 70.92% whereas the private insurers taken together had a share of 29.08% dominated by ICICI Prudential Life, Bajaj Allianz Life and SBI Life Insurance.. They mentioned that there was a 800% increase in the premium volume in the industry in 2008-09 with respect to 1999-2000. In the later part of their article, they elaborated the strategies adopted by LIC to fight the increasing competition which included innovative product development, launch of health insurance related products, widening the distribution network, inclusion of micro-insurance agents for the micro-insurance business, bancassurance and opening up of foreign branches.

**Lee and Kim (2008):** The researchers pointed towards the changes in the Korean life insurance industry in terms of changing market structure, distribution channels and increasing competition. They measured, analyzed and decomposed the relative efficiency of the Korean life insurers.

The data covered 22 registered insurers for the year 2006 only. They employed DEA (both BCC and CCR methods), Slack-based measure and the Super-efficiency models to analyze the data by applying the input-oriented model on the DEA-SOLVER software to arrive at their results. They found that the average BCC, CCR and SBM efficiency scores were 0.988, 0.961 and 0.892 respectively, thereby, pointing towards high efficiency level. The reason behind such high average score was that of the total insurers, 81%, 54% and 54% were found to be perfectly efficient under BCC, CCR and SBM approach respectively. In terms of returns to scale, the number of companies under increasing, decreasing and constant returns to scale was three, seven and twelve respectively. On further analysis of the efficiency results showed that 12 efficient insurers were both technically and scale efficient. The super-efficiency model was further applied because there were many companies having the same score of 1.

**Lin, Lee and Shih (2010):** The researchers used DEA technique to analyze the business efficiency of the life insurers in Taiwan based on the data for the period 2005-09. The average technical efficiency level was found to be 0.65. A further break-up of technical efficiency into pure technical and scale efficiency showed that the scores were 0.774 and 0.847 respectively. The Malmquist Index results showed that the average growth of productivity of the life insurers was 4.1%. On further analysis it was revealed that the growth in technical efficiency changes and technological changes were 3.3% and 1.7% respectively.

**Mahesh, H. P. and Bhide, S. (2008):** The researchers studied the effect of India's financial sector reforms, introduced in 1992, on the efficiency level of Indian commercial banks. The period of the study covered some pre-reform and post-reform years i.e. from 1985 to 2004. They used three different measures of efficiency - *Cost Efficiency*, *Profit Efficiency* and *Loan Advance Efficiency*. They have adopted *Battese and Coelli (1995) Approach* for estimation. The panel dataset of 94 banks for 20 years was obtained from the Performance Highlights of Banks, Annual Accounts of Scheduled Commercial Banks, and balance sheet and expenditure statements of respective banks. *Stochastic Frontier Analysis* was employed to study the impact of reforms and it gave unambiguous results by showing that financial reforms had a significant impact on the all three types of efficiency measures. The study found that the loan advance efficiency had declined marginally for the entire industry in the period under consideration, cost efficiency had improved and profit efficiency reflected a varying trend. The study contradicted with the wide held perception that public sector banks are inefficient. By analyzing they found that public sector banks ranked first in two out of the three efficiency measures, thus indicating that those banks did not lag their private counterparts in terms of efficiency. It also revealed that competition had a significant impact on the efficiency levels of commercial banks across all the three measures. Therefore, this study categorically suggests that the financial

sector reforms brought changes in the banking sector and these changes influenced the efficiency level of the services provided by the banking sector. The study is very relevant at the present juncture when a decade or almost two have passed by and also contributes in guiding the finance related policy makers as it suggested that the rapid changes in the financial sector that are underway will keep influencing the performance of the banking sector.

**Mansor and Radam (2000):** This study focused on the analysis of productivity growth in the life insurance industry in Malaysia for the period 1975 to 1997. In the initial part, they discussed about the Malaysian insurance market and its growth pattern. In the empirical part of the study, they applied the Malmquist Productivity Index to understand not only the growth, but also the contribution of technical and technological change. In order to understand the average efficiency in the industry, they computed the mean technical efficiency of each of the firms. The results reflected that the top three most efficient insurers were Malaysia National Insurance Company, Malaysia Co-operative Insurance Society and Overseas Assurance Corporation Ltd. with the overall industry mean to be reasonably good at 72%. In terms of growth in productivity, the insurers which showed maximum technical efficiency growth included Asia Life (156%) and Great Eastern (128%). For the technical change, the maximum progress were observed in the case of United Malaysian Insurance Company (240%) and Malaysian Assurance Alliance (193%). In terms of overall growth, denoted by the Malmquist Index, most of the insurers performed well and showed overall growth. The best performance was seen in the case of MAA and UMI with scores of 387% and 229% respectively. Only three insurers namely, MCIS, Safety and AIA revealed an overall negative growth during the time period. But overall productivity growth results showed wide disparity between insurers. On an average, the technical change technical efficiency, and productivity growth were 30%, 46%, and 48% respectively.

**Martinez and Estrada (2009):** The author enquired mainly into the developments in the Colombian insurance market in terms of improvement in cost efficiency and total factor productivity growth by studying all the life and non-life insurers during the period 1998-2007. In order to compute efficiency levels, they applied the input-oriented measure. They revealed that the insurers recovered a lot towards the end of the sample period and projected rapid improvements.

**Owusu-Ansah, Dontwi, Seidu, Abudulai and Sebil (2010):** The researchers used DEA approach under the constant returns to scale assumption to determine the efficiency levels of Ghanaian general insurers. The insurers operated at an average overall efficiency of 68%, technical efficiency of 87% and scale efficiency of 78%. The Mann-Whitney U-test revealed that larger insurance companies as those with higher market share attained greater efficiency levels.

**Parera (2001):** The researcher highlighted the main reasons for deregulation of the insurance sector which included less insurance spread in the country, to increase competitiveness within the industry, to have better supervision on the industry etc. They mentioned that lacunae in terms of low insurance penetration and density, and lack of social security could be removed by proper insurance sector reforms. It was pointed out that immense opportunity existed in the sector in terms of low share that the country has in the global insurance market. The researchers also highlighted some areas like health insurance, pension policies, insurance awareness building etc. which required a major boost. The article also pointed about the dearth of trained agents and brokers as major challenges to the industry.

**Paul, Joseph and Barnabas (2010):** The researchers carried out a survey to understand the level of awareness among the respondents and the reasons behind it. The study collected responses from more than 1600 respondents from Trichy who revealed that the overall awareness level was low. This study also revealed that the growth in insurance business would take place only when consumers realize its necessity and not just think insurance as another investment for saving tax. They also applied the chi-square test to find out the relationship between different variables like knowledge about policy and purpose of policy with income, education, occupation etc. Some of the major findings were:(a) there existed a strong relationship between educational qualification and knowledge of various Policies and schemes, (b) there was a strong relationship between age and knowledge of various Policies and Schemes, (d) there also existed a strong relationship between purpose of policy taken and knowledge of various Policies and Schemes. Moreover, by applying the binary logistic regression, they found the existence of a strong relationship between the two independent variables - educational qualification and age and the dependent variable - knowledge of various policies and schemes, (e) a strong relationship existed between occupation and the purpose of policy, (f) there was a strong relationship between monthly income and the purpose behind purchasing a policy, (g) there also existed a strong relationship between educational qualification and type of policy taken by respondents.

**Qiu and Chen (2006):** The researchers applied the DEA approach to determine the efficiency level of the Chinese life insurers. The data period considered for the study was from 2000 to 2003. They computed scores relating to technical efficiency (TE), pure technical efficiency (PTE) and scale efficiency (SE). The mean scores of all Chinese insurers in all these efficiencies showed a continuous decline. It ranged from 0.49 to 0.64. By comparing the results of the Chinese and international insurers, they inferred that the latter showed very poor performance in terms of technical efficiency. The cause behind inefficiency of the Chinese insurers was both PTE and SE, but for the international insurers PTE did not play a severe down-

pulling effect. The authors also analyzed the scale economies of the insurers to find out their scale size of production. The Malmquist index was also calculated to find out the reason behind productivity growth.

**Rao (1999):** The researcher looked into the performance of the Life Insurance Corporation of India. The main thrust area was to understand the growth pattern of insurance business in India. The other areas that were covered in the study included parameters like new business, business in force, financial inflow and cash flow. The author also related the performance parameters with the different macro-economic variables.

**Rajendran and Natarajan (2009):** The researcher studied the process of insurance sector reforms in India. Specifically the study was on LIC's business in India and outside. The preliminary part of the study mentioned about the rapid growth pace of the industry after the sector was liberalized in the year 2000. One of the main reasons cited by the authors was that due to competitive pressure on the players, both LIC and the private players resorted to advertisement campaigns which led to an increase in the general awareness level. The authors fitted a trend equation using the linear equation to project the business in India, outside India and the total business for the year 2012. Furthermore, they also highlighted the challenges that LIC was facing in the changed business scenario which included factors like low literacy levels, low savings rate and per capita income along with less number of employment opportunities.

**Ranade and Ahuja (1999):** The researchers made a study on the development of life insurance industry in India. They highlighted the importance of this sector in terms of economic growth of the country. They also mentioned that the contribution of life insurance to the total financial assets was showing an increase; in 1980-81 it was 10% which increased to 14% in 1995-96. According to them, with a huge corpus of funds, large employee strength and a widespread network of branches, LIC played a positive role in the country's growth. The concluding part of their article touched upon the emerging areas in the sector which included faster product development, pension reforms, wider spread of the distribution network and role of IT in the sector among others.

**Rahman (2012):** The researcher computed the relative efficiency scores of 42 Commercial Banks of Bangladesh as at the end of 2008. He used two-stage DEA method. The break-up of the samples included 4 Nationalized Commercial Banks, 30 Private Commercial Banks and 4 Foreign Commercial Banks. The results after the first and second stage showed that the number of firms obtaining 100% relative efficiency score were 6 and 7 respectively, with only one foreign bank scoring 100% in both the stages. In the first stage under the intermediation method, the nationalised banks outperformed the other two categories of banks. The composite score for

efficiency pointed that the overall average was maximum for FCBs (0.616) which is followed by PCBs (0.423) and NCBs (0.363). Further analysis showed a negative correlation between the scores of the first and second stage. Another interesting finding of the study was that in the first stage, with increase in asset size, the intermediation efficiency improved which was, however, not the case with regard to technical efficiency. The researcher revealed that the foreign banks had overall best performance.

**Rastogi and Sarkar (2007):** The authors studied the development of the life insurance industry in India. They studied in detail the evolution of the industry followed by the reforms in 2000. The main stress of the paper was to understand the emerging scenario in the life insurance sector and the trends that were developing. They pointed out the market-driven factors and the regulatory factors that contributed to the vibrant insurance sector in the post-reform period. They also mentioned about the basic intentions of the government when the sector was opened up to the private players. The main objectives as cited by them were: encourage competition and improve insurance penetration, product innovation, improve service standards, efficient allocation of resources and changing the customer outlook. They provided data to show how the players were doing with respect to meeting rural and social obligations as mandated by the IRDA. They used certain ratios and applied them to only five insurers considering data of only 2000-01 and 2004-05.

**Saad and Idris (2011):** This research paper made a comparative analysis of efficiency of life insurance companies of Malaysia and Brunei by evaluating the data set consisting of 11 companies – 9 from Malaysia and 2 from Brunei. The authors used DEA to identify the contribution of technical and efficiency change to the productivity growth by applying the Malmquist Index for the period 2002-05. This study utilized a two-input two-output case. The two inputs considered were commission and management expenses whereas the outputs were premium and net investment income. The results of efficiency were arrived at using both variable returns to scale (VRS) and constant returns to scale (CRS) assumptions. There were only three insurers who obtained a score of one in both the cases. In terms of the industry average, it found that efficiency performance in the life insurance industry was relatively higher based on VRS than CRS. The trend in movement of the efficiency average differed under the two assumptions. In the former case, there was an increase from 2000 to 2002 which then declined during 2003-04 but the trend again reversed. On the other hand, in the case of VRS, there was no definite trend between 2000 and 2003 after which it showed an increase. The results revealed that the total factor productivity was due to both efficiency and technical changes, where scale efficiency and not pure efficiency played a dominant

role. During the entire period of study, there was an improvement in relative efficiency with a slight deterioration at a negative 12.3 percent in the period 2002-2003.

**Saeidy and Kazemipour (2011):** The authors investigated into the relative efficiency scores of public and private life insurers of Iran. They studied data for the period 1983 to 1987. A non-parametric method like the input-oriented DEA with VRS technology was applied. Moreover, they studied whether there was any significant difference in the efficiency score of the public and private sector. The analysis of the input and output variables revealed that the performance of the public sector companies was significantly much better than their private counterparts.

**Saad (2012):** The author in the initial part analyzed the efficiency of 28 insurance companies of Malaysia, covering the period 2007 to 2009, using DEA. The results revealed that Hong Leong Tokio Marine Takaful Bhd, Progressive and Prudential were consistent under both CRS and VRS. Kurnia was consistently efficient under VRS, whereas Prudential BSN Takaful Bhd was the worst performer in both the cases. Commerce, MAA and Pan Global were the insurers showing consistent improvement of performance under both CRS and VRS. The efficiency of insurers was far better compared to those of the Takaful companies. However, the trend was different in the case of VRS assumption; the geometric mean of the efficiency scores of the industry showed an increase from 0.728 in 2007 to 0.787 in 2008, but reduced to 0.756 in 2009. In the second part of the study, the Malmquist Index was calculated which showed that Pan Global, Commerce and MAA showed the highest growth during the period. In terms of the industry, the total factor productivity did not show growth. Of the entire sample, only ING, Pan Global, Progressive and Prudential experienced technical progress while others faced both progress and regress.

**Simpson, J. L.,(2009):** The author studied the warning signals in the period prior to the 2008 Global Financial Crisis. The study commenced with the specification of a basic liner market model. Based on Granger (1988) findings that financial and economic time series may contain unit roots and in the development of the theory of non-stationary time series analysis, the unlagged regression model was re-specified into a model to implement VAR based tests for both co-integration and causality in optionally lagged data. Daily time series banking price index data were collected for each country /region as well as a world banking price index from Data Stream covering the period 31 December, 1999 to 20 September, 2004. Level and first difference data were analyzed using the **Eviews-4** statistical package. Preliminary analysis of the various time series was undertaken in the study. *Jarque-Bera Test* statistics indicated that there were problems with *skewness* and *kurtosis*, with each of the level and first differenced series for each country region. In a nutshell, regression, correlation,

co-integration, causality and variance decomposition analysis was applied to daily bank price index data indicating that bank systems had achieved a high level of global integration, exemplifying the global involvement in the US sub-prime mortgage market. The Study suggested refocusing by banks on a culture of portfolio diversification of investments and borrowings, greater involvement by a global banking regulatory authority, like BIS, monitor undiversified systematic interdependence which may be inevitable.

**Sinha (2005):** The researcher studied the evolutionary phases in the growth of the insurance industry in the country. The preliminary part of the study discussed about insurance practice in the colonial era. This study also highlighted the different Acts and Regulations that were passed from time to time to ensure a healthier development and growth of the industry. The later part of the discussion focused on the evolution of insurance during the nationalized period, i.e. from 1956-2000. The article highlighted the circumstances that lead to the nationalization of life insurance business in the country. The researcher also cited data to throw light on the progress of business after 1956. The extent of rural business was also discussed in detail. The author further discussed the growth of the general insurance business in the country and specifically stressed on the investment regime before and after nationalization of the life and non-life business. The relationship between national savings and life insurance premium was also cited by the researcher in the form of a graph which clearly showed the existence of a non-linear relationship between the two variables. In the last part of the article, a brief discussion was made on the key features of the Insurance Regulatory and Development Act, 1999, developments in the industry after its deregulation and future scenario of the industry.

**Sinha and Chatterjee (2007):** The authors in the initial part of their article highlighted the growth of the Indian insurance industry. In the later part of the study, they analyzed the cost efficiencies of the life insurers which included LIC and the private players. The analysis of data for the period 2002-03 to 2006-07 suggested an inconsistency in the trend of cost efficiency. In the initial four years, there was an upward trend after which it reversed.

**Sinha (2007):** The author highlighted the poor level of penetration of general insurance in our country. In the analytical part of the study, the article discussed the efficiency level of the different non-life insurers by applying a three input-three output DEA model using data for the years 2003-04 and 2004-05. The results showed that in the case of constant returns to scale, the public sector players dominated in terms of mean technical efficiency but it changed when variable returns to scale was assumed.

**Sinha and Chatterjee,(2009):** The researchers estimated cost-efficiency of the Life Insurance companies operating in India for the period 2002-03 to 2006-07 making use of the new cost efficiency approach advanced by Tone (2002). The results suggest an upward trend in cost- efficiency of the observed life insurance between 2002-03 and 2004-05. However, the trend has been reversed for the next two years i.e., 2005-06 and 2006-07. This has been so because of the fact that during the initial years of observation, mean cost efficiency of the private life insurers was rising.

**Sundaraian, et. al. (2002):** The researchers made an in-depth study on financial soundness indicators and mentioned the need to have flexibility in indicators that will be considered for macro analysis of a country's sector. Their work not only pointed to the areas where significant progress had been made, but at the same time, the study also included scope for further research. It had been clearly shown that the macro-prudential indicators play a vital role, not only in the analysis at the macro-level, but also at the firm level.

**Sinha (2011):** The author studied in detail the challenges that the life insurance is facing and those factors that will determine the future success of the industry in our country. The researcher pointed out some interesting aspects relating to the distributions channels in terms of their productivity and persistency ratios. Furthermore, the author mentioned some serious lapses in the industry in terms of policy lapses (or renewals). The other issues pointed in the article relate to the aspect of mis-selling as a result of which the general public is losing its confidence on the industry. The other important challenges relate to earning profits after fulfilling mandatory regulations, maintaining the high growth rate, developing innovative distribution channels, popularizing the concept of micro-insurance, agent's attrition rate etc.

**Tiwary, R. S. (2008):** The researcher explored the importance and use of probability and statistics within a business. She stressed on “*Key Performance Indicators (KPIs)*” which allowed the business to evaluate their performance and identify any potential problem areas. According to her, the most important KPI is Billable Hour Efficiency. Mean or Expected Outcome can be determined from the past performance, even Variance can be calculated to have an idea about the risk and then economic modeling can be used to predict the future. For data collection and analysis, both qualitative and quantitative data can be used and can be represented and studied using Tables, Charts and Graphs, Histograms, Box Plots, Stem-and-leaf Plots, Scatter Plot Distributions are widely used. The outliers in the data set need to be identified in order to remove the inaccuracies in the data. Probability can be used for business decision making as such decisions are uncertain. Venn Diagrams and Probability Tree Diagrams are widely used for this purpose. Statistical Modeling is used concurrently with regression, which represents the relationship between independent and dependent variables to allow businesses to examine cause-and-effect relationships between various factors and output. If a sample

set of data is normally distributed, z-scores can be calculated to determine the probability that a value will be greater than or less than a particular value, or fall in between two specified values. She suggested that these methods help in maintaining quality of products as well. So, we find application of probability and statistics as an important tool for decision making and better prediction of the future which is uncertain.

**Tiwari and Yadav (2012):** The authors studied the Indian Life Insurance industry by using ten years' data from 2001 to 2010. Main focus of the study was to understand the impact of liberalization on this sector. They mentioned that the insurance sector in our country was one of the booming sectors of the economy, growing at the rate of 35-40% annually with a total insurable population of less than forty percent. During this period, LIC faced tremendous pressure and its market share went down by almost one-third till 2009-10 compared to that in 1999-2000. According to the authors, some of the positive developments as a result of opening up of the sector were in terms of product development, insurance awareness, insurance penetration and contribution to the country's GDP. The authors analyzed the growth aspect by studying variables like the total premium income, total income, market share and number of policies. The total premium income criterion showed that the private sector grew at a very fast pace especially during the initial years, mainly due to the low base in the earlier years. In contrast, LIC grew at a pace which ranged between 5-42% during the period 2001-2009. Performance analysis on the basis of growth in the number of policies showed that LIC reflected lower growth rate and even de-growth in some years whereas, the private sector grew at a fast pace in the range of 13-104% (excepting in 2009-10 when it showed a negative growth). The trend was the same even while considering total income as the criterion. The authors mentioned that though the competitive pressure eroded the market share of LIC, the brand still dominated the mind of the Indian consumers and it continued to remain the most trusted brand even in the post-liberalized period.

**Tone and Sahoo (2005):** The researchers applied DEA to analyze the cost efficiency and returns to scale of the Life Insurance Corporation of India (LICI) using time series data. The data set covered a period of 19 years from 1982-83 to 2000-2001. The results showed that there existed heterogeneity in the cost efficiency over the period of study. There was a decreasing performance after 1994-95 mainly due to allocative inefficiency arising from the modernization measures by LIC. However, it was encouraging to see that the efficiency level increased significantly in 2000-01.

**Venugopalan, K. V.(2011):** conducted a study on global financial crisis and Life Insurance Sector in India by undertaking a comparative study of LIC with Private Sector. The study emphasized on insurance sector as it has undergone a tremendous change after liberalization and enactment of IRDA in 1999. India had a huge untapped market for the companies. So, by 2010-11, 22 private players

entered the gamut along with LICI (Life Insurance Corporation of India), thus grasping 30% of the market share from the later. Due to globalization, the Global Financial Crisis hit Indian Insurance Sector during 2007-08 and 2008-09 reflected a large influence made by the sub-price crisis. 2009-10 reflected some signs of recovery. The impact of the Global Financial Crisis of 2007 to the Indian Life Insurance Sector is measured by using the following variables – Insurance Presentation, Insurance Density, Number of Insurance Policies issued, Number of Insurance Premiums collected, Total Premium collected, Profit obtained. Secondary Data were used for measuring the performance the performance collected from Insurance Regulatory and Development Authority (IRDA), Annual Reports, LICI (Life Insurance Corporation of India), Journals etc. For data analysis percentages and averages were used. The period covered in the study was from 2004-05 to 2010-11. Comparing on the basis of the first year premium the study found that the Sectorial Growth was 15.55% in 2010-11, 2008-09 reflected a negative growth of – 6.47% which was recovered in 2009-10, 2006-07 reflected a tremendous growth in the Sector, amongst which a large extent was contributed by the Private Sectors. On the basis of the first year premium underwritten by the leading Insurance Companies in the Public Sector (LICI) and other Private Sectors reveals a positive growth during the financial year 2010-11, as compared to the previous year except Bazaz Allianz Life, Reliance Life and Birla Sun Life. They found that ICICI Prudential and SBI Life are the First and Second positioned Life Insurance Companies in the Private Sectors during the year 2010-2011. The number of Insurance Policies issued by the LICI and Private Sector Companies also revealed that during 2007-08 and 2008-09, it was negative for the LICI and low for Private Sector Companies. However, the situation was not found to improve much in 2009-10 and 2010-11, may be because of the stringent rules regulating ULIP (Uni-Linked Insurance Policies by IRDA). Considering Total Premium collected by LICI and Private Sector Companies, it was revealed that the share of LICI was declined from 90.67% during 2004-05 to 69.80% in 2009-10. The share of Private Sector Life Insurance Companies reflected a decline in 2009-10 compared to the earlier years. The Total Premium (first-year and renewal) collected by the LICI and Private Sector Companies, showed a positive growth throughout the period of the study. ULIP Policies did show a decreasing trend in 2008-09 due to the Stock Market Recession, but, 2009-10 had shown signs of recovery. The study suggested that Insurance Sector was considered as an emerging and untapped sector in our country with good growth potentials. A mixture of traditional and ULIP Policies was also suggested in the study.

**Viradi et. al. (2009):** The authors investigated into the efficiency of 93 commercial banks which included 27 public, 30 private and 36 foreign banks in India operating in the country during the period 1999-2000 to 2002-03. The following four indicators, namely productivity, profitability, financial management and asset quality were used to arrive at the results. Different

criteria were used for each of the indicators. The results of the analysis were as follows: (a) the overall mean of productivity lay in the range of 38%-45% (b) the overall mean of profitability remained in the range of 60-79% (c) the overall average of financial management efficiency remained in the range of 77%-85%, (d) the overall mean of asset quality efficiency score remained in the range of 43%-51%. In all the above four cases, the PSBs outperformed the other two sectors.

**Worthington and Hurley (2002):** The authors measured cost-efficiency in the Australian general insurance industry. For the purpose, a two-stage analysis was applied. In the first case, they calculated measures of pure technical efficiency (PTE), scale efficiency (SE), allocative efficiency (AE) and cost efficiency (CE) using non-parametric methods. In the second stage, they developed a link between insurer size, product line diversification and organizational form with efficiency. Results showed that out of 46 insurers examined, 28 were purely technically efficient while 19 were scale efficient. The result for pure technical efficiency showed that the efficiency level was only 76.2% of the 'best practice' firm, whereas the average score for scale efficiency was around 72.9%. The main reason behind a medium efficiency score was the poor result of the inefficient insurers who showed an average score of 0.391 for pure technical efficiency, 0.538 for scale efficiency, 0.116 for allocative efficiency and only 0.10 for cost efficiency. The results generally indicated that a large portion of the cost efficiency was due to the effects of allocative rather than technical (including scale) efficiency. Furthermore, the authors identified the outliers using the ratio of total costs to total assets as the criterion after which fresh calculations for relative efficiency scores was done. However, the results of the sensitivity analysis indicated that the results were moderately robust with respect to the presence of outliers, with no dramatic changes in the average level of pure technical, scale, allocative and cost efficiency. They found that when the outliers were excluded, the mean scores of PTE, SE, AE and CE was found to be 0.764, 0.769, 0.311 and 0.291 respectively. The paper also applied the Mann-Whitney and Kolmogorov-Smirnov tests to deduce statistical inferences. The Mann-Whitney test indicated that there were significant differences between the largest asset group and the next to largest group across all four measures of efficiency. Also, the Kolmogorov-Smirnov test provided broadly comparable statistically significant differences in the efficiency distributions. For instance, only the largest and smallest twenty percent of insurers had different distributions of allocative and cost efficiency, whereas only the largest twenty percent had a statistically different distribution of scale efficiency. Overall, the results suggested that there were statistically significant differences in cost efficiency across Australian general insurers; more specifically, the largest twenty percent of insurers by asset size were considerably more cost efficient than the remaining. The authors also applied Tobit regression model to find out the relationship between the four efficiencies and the

independent variables used by the authors. The regression model using pure technical efficiency as the dependent variable indicated that total assets and total assets squared were significant at 5% level and the dummy variable representing stock listing was significant at 1% level. The estimated coefficients for asset size, namely asset and asset size squared showed a negative and positive relationship respectively, indicating a non-linear relationship between firm size and efficiency. The regression results using scale efficiency as the dependent variable indicated that all the estimated coefficients were insignificant. In cases where allocative efficiency and cost efficiency were specified as dependent variables, tests of the null hypothesis that all slope coefficients were zero was rejected at the 1% level using the log likelihood ratio procedure. However, in the regression equation where allocative efficiency and cost efficiency were specified as the dependent variable, the estimated coefficients of the firm size proxies were found to be significant at 1% level. The results suggested that larger and smaller sized general insurers were associated with higher levels of pure technical, allocative and cost efficiency while medium-sized insurers were generally less efficient. The effect of product line specification on efficiency score was also tested which showed that in no way it affected the efficiency results.

## 2.3 REVIEW OF BOOKS

**Ali, Mohammad and Ahmad (2007):** The authors covered different aspects of the Indian Insurance sector. The book covered the basics of insurance, the definition of the term and the different types of insurance that are available. They touched upon important aspects like the liberalization era of the Indian insurance market – both life and non-life. They also covered the different phases of economic liberalization. The book also discussed in detail the insurance sector reforms in India and also provided information about the business of LIC. Some of the other areas included in the book were the investment pattern followed by LIC and its progress since the nationalization of the life insurance sector, progress of the general insurance business and the performance of public sector non-life insurance companies. Moreover, the book discussed a chapter exclusively on the risk of insurance business which covered points relating to its types, classification, risk mapping, risk management and measurement, and risk assessment. Furthermore, the authors discussed the trends that the insurance market in India is going through since the opening up of the sector which included points relating to competitive character in the industry, financial structure, insurance products, and distribution channels among others. The last chapter of the book covered the performance of the overall insurance sector – both life and general, in the post-liberalization period. The book covered information on the share of the public and private sectors in the total business, their market share, changing investment pattern between 1998 and 2003 and the like.

**Bawa (2007):** The author covered majority of the contents in discussing the performance aspect of LIC. Out of eight chapters that the book has, only the first one contained basics covering issues like the concept of insurance, reforms in the life insurance business in India, the role of IRDA and its regulations. The second chapter mentioned the literature review section where reference has been made to the areas already covered by different researchers. The third one highlighted the parameters that the researcher used for assessing the performance of LIC. The remaining chapters focused on the performance of LIC till the middle of the last decade. Some of the other relevant aspects covered by the author included business generation, rural business, number of agents, average sum assured per policy, claims settlement record, productivity of branches and agents etc. The sixth chapter of the book highlighted the investment policy and portfolio of LIC together with its changing trend over the years. The second last chapter discussed about the impact of privatization on the business of the life insurer. It touched upon aspects like total premium income, market share of the players, new policies sold and the growth rates of the performance indicators.

**Becham, H. L., (2009):** The author suggested Financial Ratios as an important yardstick for measuring how the firm stacks up against its competition. She suggested internal comparisons using historical *Financial Ratios* as excellent tools for understanding the Company's performance i.e. improving or declining which are very simple to calculate. The ratios fall into five distinct categories and twenty ratios are commonly used as Financial Ratios.

The categories are –

- i) Profitability (Net Profit Ratio, Return on Sales)
- ii) Activity or Efficiency (Asset Turnover, Days of Inventory, Inventory Turnover, Days Receivable, Avg. Collection Period, Days Payable, Working Capital Turnover)
- iii) Liquidity (Current Ratio, Quick Ratio)
- iv) Leverage (Debt Ratio, Debt to Equity Ratio, Times Interest Earned or Coverage Ratio)
- V) Market Value Ratios (Price Earnings Ratio, Dividend Yield Ratio, Dividend Payout Ratio).

Becham further suggested using *Du Pont Model* and Common Size Statement for comparison. She emphasized on proper understanding of the company's accounting practices as a prerequisite for implementing ratio analysis. To quote her - *Financial ratios are most valuable when used as part multifaceted approach to analyzing a business*".

**Das, Davies and Podpiera (2003):** The book was divided into six sections. The authors gave an overview of the industry and its role in an economy. In the introductory part, they discussed

about the three forms of risks that an insurance business is exposed to viz. technical risk, investment risk and other risks. According to them, the riskiness of an insurance business increased after the financial deregulation which changed the focus of activities of insurance companies. That change increased the vulnerability of insurance companies and resulted in their failures, some examples of which were cited by the researchers. Hence, they realized the need to apply qualitative as well as quantitative indicators that would indicate the safety of companies and the financial system as a whole. For better understanding of the soundness status, they proposed two sets of indicators which could be used for both individual insurers' and sectoral surveillance. They further mentioned that financial soundness indicators helped to monitor and assess the financial condition of not only the institutions individually but the market as a whole. The sum total of the indicators gave an idea about the trends and its vulnerability or chances of failure.

**Das, U.S., Davies, N. and Podpiera, R. (2005):** The authors in the first two chapters of the book mentioned about the basics of financial sector assessment and the aspect of macro-prudential surveillance. In the second chapter specifically, they defined the indicators of financial structure, aspects relating to system wise indicators, indicators of the key attributes of the sector and measures of outreach of financial services. The relevant part for our study relates to financial soundness indicators that are defined for the insurance sector particularly for the life insurance sector which have been categorized in terms of core and encouraged ones. The chapter also discussed about the FSIs relating to banking, securities market etc.

**Harold, Lovell and Schmidt (1993):** Their book "the measurement of productive efficiency- Techniques and Application" is divided into two sections. The first section mentions the techniques of measuring efficiency. Chapter one explains the production frontier and Productive efficiency. Chapter two discusses the econometric approach to Efficiency Analysis. Chapter three elaborates on the mathematical programming approach to efficiency analysis. Chapter four deals with efficiency and productivity. The second section is on application of these techniques. However this book mainly emphasizes on application of econometric methods.

**Mishra and Mishra (2008):** The contents of the book are divided into seven parts. Part one introduced the topic of insurance and discussed the evolution, role and importance of insurance. The second part of the book discussed about the different features in an insurance contract. The authors also included a section on classification of policies. Some of the other topics covered were the factors affecting risk, sources of risk information, mortality table, premium calculation procedure, reserve, various issues related to investment of funds, valuation and surplus. The last chapter in this part covered in detail about the progress of LIC. The third and fourth part of the book

covered the topic of marine insurance and fire insurance respectively. The fifth part of the book covered the other types of insurance policies that are available in the market. The next part covered the topics relating to prospects of insurance companies and the circumstances that lead to the opening up of the insurance industry. The last part discussed about the progress of insurance business after the sectoral reform in 2000, bancassurance and India's position in the world.

**Palande, Shah and Lunawat (2003):** The authors divided the content into nine chapters. Chapter 1 discussed the growth and development of the Indian insurance industry. It touched upon important issues like reasons behind nationalization of the life insurance industry in 1956 and the progress of the sector since then. A discussion is also made about the world insurance market and changes the industry is going through. Chapter 2 gave a detailed discussion about the debate regarding opening up of the industry. They mentioned that some of the main reasons behind the deregulation included dismantling restrictive barriers, inculcating positive effects of competition, need for infrastructural development, increasing the spread of insurance coverage, making more product choices available to customers, following the footsteps of developments in other sectors among others. Chapter 3 of the book referred to the upcoming challenges for the insurance sector after its opening up. It discussed the changes that are expected at the industry level some of which include changing the mindset of the insurers, infusing capital, recruiting of quality staff, practicing skill development in the entire industry, increasing focus towards marketing, increasing consciousness about cost, bringing about a structural change within the organizations and upgrading technology. Chapter 4 discussed about the proactive and focused strategies in the industry. The chapter started with the potential that is remaining in the sector and opportunity it provides to the companies. In fact, the market is backed by a huge potential demand which is a result of many factors like demographic changes, economic environmental changes, growth of the overall global economy, increase in the awareness levels, changing government policies etc. Some of the other pertinent factors pointed by the authors include the increasing literacy rate in the country, changes in the social factors, growing middle class, a general shift towards the urban areas etc. Chapter 5 discussed the changes that are taking place in different sectors of the environment and tried to connect those developments with the products that would be in demand in the coming days. In the last part of the chapter, the authors touched upon the response of the public sector players to the environmental needs. Chapter 6 discussed about the growing importance of marketing as a function in the insurance industry in the light of the reforms that took place in 1999. The authors mentioned that the need of the hour is to change the thinking style and do something new and adopt new strategies. They also mentioned the need for free market pricing in the general insurance business which was eventually done in 2005. They also laid stress on the importance of

pricing, customer satisfaction, technology in distribution, technology-driven marketing, claims settlement, surveyors and distribution channels. The authors made a specific discussion about the distribution strategies in the insurance industry and the weaknesses that are existing therein. Chapter 7 of the book discussed about the investment of funds in the insurance business. They pointed towards the concerns in investment management for an insurance business. In other words, since claim settlement is one of the main objectives of any insurance business, the asset-liability management aspect was considered to be very important by the authors. Moreover, a brief discussion regarding the changing investment regulations was done. The next chapter discussed various issues relating to the regulatory aspect in the insurance industry. The developmental role of the regulator was also touched upon by the authors. Chapter 9 discussed about the government's role as a change facilitator in the insurance industry. In the last chapter of the book, the authors briefly identified the changes that would take place in the insurance business. They mentioned about more product choice, better customized product, stricter regulation, organizational restructuring etc. to be the immediate results of change brought about in the sector.

**Ramanathan(2003):** This book is on Data Envelopment Analysis as a tool of performance measurement. It is divided into seven chapters. The first chapter introduces to the concept of decision making units, The second chapter deals with the mathematical programming aspect of DEA. The third chapter elaborates on economies of scale. The fourth chapter mentions the various DEA models including Time Series Analysis using DEA used in the study. The fifth chapter emphasizes on the computational aspect of DEA. The last two chapters reflect application of DEA technique in details. This book is very useful for understanding DEA and its application as it also helps for using data in various softwares.

**Sadhak (2009):** The author discussed about the life insurance sector in India. The book covered areas relating to liberalization, privatization and globalization of the Indian economy and deregulation of the insurance sector. The book covering seven chapters discussed about the changes taking place in the insurance sector in the context of the rapidly changing financial services sector in the country. Chapter one dealt with the financial economy in the era of globalization and liberalization. It also touched upon the aspect of financial globalization and its benefits. Further the chapter discussed in detail about the extent of globalization in the country and its effect on the gross domestic product (GDP) and trade. In the later part of the chapter, a discussion about the effect of liberalization on the institutional investment is made. The initial chapter of the book also covered the emerging trends in the global and domestic insurance market. The second chapter covered the emerging economic and financial environment in the country. It cited data relating to the trend in GDP growth rates in the country, the financial assets of banks,

gross domestic savings (GDS), changing investment pattern of the household sector and the emerging scenario in the country's insurance market. The third chapter discussed about the life insurance sector of the country. It touched upon the historical development of the industry and the cycle of reforms that it has been going through. Moreover, the chapter highlighted the growth story of the insurance sector and different aspects of LIC. It also discussed the changing scenario after the deregulation of the sector. Data about the insurance market in different countries were also cited by the author. Chapter four of the book described the changing nature in product development and the distribution pattern as effects of the financial liberalization process. The authors also elaborated on ULIPs and its regulations, microinsurance and the distribution channels being used for marketing of insurance services. The fifth chapter discussed about the investment regulation passed by IRDA and the changing investment policies of companies. Investment-related data of life insurers during the initial years of the 21st century were also given. In the later part of the chapter, a brief discussion was made about the types of risks and macro-economic indicators that could be used to determine investment strategy. The sixth chapter discussed about the corporate governance aspect of the insurance industry, whereas the last one highlighted the different strategies which would help to meet the challenges in the industry.

**Sinha (2004):** The author made a study on the Indian insurance industry focusing mainly on the challenges and prospects. The basic areas covered included overview of the insurance market, understanding India's position with respect to the world and regulatory regime existing in the country. They provided data relating to the years 1957, 1963, 1972-73, 1992-93 and 2001-02 to depict how the industry grew over the years. In order to understand the change in the investment portfolio of LIC over the years, suitable data were cited in the article. The growth of general insurance business was also covered in the article. The major part in the article studied the opportunities and the challenges that the sector is confronted with.

**Tripathy and Pal (2005):** The authors included not just the theoretical chapters but also certain research-based studies which used primary survey to collect data and arrive at results. The book is divided into two parts. The first part covered an overview of insurance industries, whereas the latter discussed about areas like rural insurance, social insurance and health insurance. In the former section, many important areas have been discussed. To be specific, it covered chapters on financial convergence in India and development of the Indian insurance industry, performance aspect of LIC, various types of insurance policies, study on factors affecting purchase of insurance products, issues and challenges for the general insurance industry, bancassurance, brand positioning of private sector players etc. The second part of the book covered chapters on rural insurance,

social insurance, social security system in India and microinsurance. Some of the other practical studies included in the book covered areas like health insurance and diabetes.

## **2.4 REVIEW OF REPORTS**

**Ernst & Young (2010):** The report is divided into three sections which are as follows: Section I is on industry overview, Section II on industry at the cross-roads of development and Section III on critical factors for market development. The study titled, “Indian insurance sector: Stepping into the next decade of Growth” made an in-depth analysis of the insurance sector of India. The report mentioned about the role played by the liberalization policy in making the sector more vibrant. The report highlighted the role played by the overall financial services sector (including insurance services) in contributing to the country’s gross domestic product (GDP). It also mentioned about the sectoral contribution in the long-term infrastructural development of India and employment generation within the country. The report also discussed about the rapid pace at which the sector has been growing during the last decade and also mentioned about the factors that are facilitating the accelerative growth rate. Some of the prominent factors which were mentioned in the report included India’s growing consumer class, increase in the domestic savings, rising awareness about insurance, improved investments scenario etc. The report has divided the post-liberalization phase into three parts. The first one pertained to the period where there was an unprecedented rise in the sale of insurance products. The period used the capital infusion strategy to give more focus towards growth rather than profitability. The second phase was the period of innovative product development and spread of the distribution network to generate the first-mover advantage. The last stage focused on “stable profitable growth”. This was the phase where focus changed from reducing the growth rate to increasing the channel retention and channel productivity. The next part of the report discussed the role of IRDA. It highlighted the regulatory measures to ensure the protection of policyholders’ interest on the one hand and growth of industry on the other. In the last part of the report it discussed about the role and challenges being faced by the distribution channels in the insurance industry. The report also highlighted the term ‘financial inclusion’, its importance in the Indian context and the measures that are being adopted to spread the message of financial inclusion. It also discussed the changing customer preferences towards products like ULIPs which gained immense popularity in the last decade.

## **2.5 REVIEW OF PH.D. THESIS**

**Dalal (2006):** In his thesis on “*A Study on Life Insurance Sector in India: Structural Adjustment and Its Consequences on Companies’ Performance and Schemes’ Profitability*”, the researcher focused his study on the structural adjustment and its impact on the performance of the insurance companies which included LIC and the private life insurers. The overall research not only covered certain basic aspects relating to the growth and developments in the insurance sector but also studied specifically about the different aspects of LIC. In order to capture an idea about the adjustment as a result of reforms, some of the areas studied included individual and group business, sum assured, premium income, percentage of rural business, growth of life insurance fund, claims record, investment pattern etc. For the purpose of analyzing the profitability of schemes, the researcher made a comparative study of different policies of LIC and those of the private insurers. The study showed that in terms of structural adjustment, there has been a changing trend in terms of the growth pattern. Furthermore, the comparative analysis of the long-term schemes of LIC like the Endowment policy, Money Back Policy, Retirement policy and the Children’s policy with those of the private insurers showed that the public insurer performed better.

**Sen (2011):** In his Ph.D. thesis “*Evaluation of Profitability and Growth of Life Insurance Business in India- A Comparative Study between Public Sector Unit and the Private Sector Units*”, Dr. Sen has taken 17 private sector companies and one public sector company for the study. Period covered is 2000-01 to 2007-08 for the private sector companies and 1995-96 to 2007-08 for the LIC. Tools used for the study are- Ratios analysis, Co-relation Co-efficient and Test of Hypothesis. Comparative study has been made regarding performance of both the sectors. The researcher found that public sector insurer was a far better performer than the private sector insurers.

**Ghosh (2011):** In his Ph.D thesis “*Impact on reforms on Life Insurance in India*”. The study revealed that Income, education, inflation and Interest Rate are the major determinant factors of Life Insurance demand in India.

**Sinha(2012) :** In his Ph.D thesis “*Financial Performance Analysis of Insurers in India*” used CARAMELS Model and basic DEA Models to rank the life insurance companies operating in India. The study covered a period from 2001-02 to 2009-10. The growth and financial stability of the companies were also studied. The study inferred that the only Public sector life insurance company viz. Life Insurance Corporation of India is still much ahead of the private life insurance companies.

## 2.6 RESEARCH GAP

On the basis of literature survey, we found that the extent of study made on insurance in India is not a huge one. There are a number of general theoretical papers that are written on the Indian life insurance industry which covered mainly the areas like historical development of the industry, insurance sector reforms, objective of the reforms, survival strategies to uphold competitive advantage, bancassurance, performance analysis of LIC etc. In respect of articles using statistical tools, we found three papers on the Indian life insurance industry. The first one (by Sinha and Chatterjee, 2007) made a study of cost efficiency on a small sample comprising of LIC and private insurers using the non-parametric method. Another by Bedi and Singh (2011) in their paper exclusively dealt with a study on the Indian public and private life insurers which showed a significant difference in the performance of the two sectors. Furthermore, another paper by Tone and Sahoo (2005) analyzed the cost efficiency and returns to scale of LIC covering a period of 19 years from 1982-83 to 2000-2001. In his Ph.D. thesis Dr. Sen (2011) made an empirical study on 17 private sector insurance companies and one public sector insurer for which they used Ratios analysis, Co-relation Co-efficient and Testing of Hypothesis. Apart from these three papers and two Ph.D. thesis on life insurance, we did not come across any Indian or foreign empirical study that statistically evaluated the life insurance sector of our country.

It was understood and found that though research on the insurance sector has not yet got popularized in India, it is encouraging to see that immense number of research papers have been published on the insurance sector in foreign countries. The non-life sector has, however, received more attention from the researchers. Most of them have evaluated the insurance sector using different parametric and non-parametric measures and determined the relative technical or cost efficiency scores. There are a few papers which made a cross-country comparison of the efficiency results. Therefore, one of the easily identifiable research gaps in the area of life-insurance is the lack of any analytical approach to determine the performance level of life insurers in India after rapid entry of private players following the deregulation of the sector. Another gap identified is that the literatures we came across highlighted the importance of CAMELS model in evaluating the performance of an insurance industry and insurers. But uses of such models are not so obvious (which is corollary to the CAMELS model applied to the banking sector). The life insurance studies in recent past barely used non-parametric techniques which help to understand the efficiency in a better way. The use of dynamic panel approach was also not seen in any of the earlier literature.

Thus, this study may be among the unique studies in India that has evaluated the life insurance sector and the players in so much detail for so many years with the help of financial tools like-ratios under CAMELS model and studied the efficiency of the companies using non-parametric method-Data Envelopment Analysis.