Chapter VI

Determinants of Insurance Demand in India

6.1: INTRODUCTION

Liberalization of the domestic financial market has been a common characteristic of a number of economies since late 60's. This was particularly true in case of industrially advanced countries like Australia, Japan, UK, and France. However, this was not been confined to these industrially developed countries only. In recent years, many LDCs have taken macroeconomic reforms, which involve structural adjustment programme. Main concentration was towards the financial system, especially banking and insurance sectors, which typically either owned or controlled by the state itself. The developing country like India along with other semi-industrialized countries has also opened up their financial sector[1].

The New Economic Policy (NEP) introduced in India in June 1991 by the then newly elected government and the process of liberalization of Indian financial sector is part of that new policy. The main thrust of reforms in the financial sector was the creation of efficient and stable financial institutions and markets. Reforms in the banking and non-banking sectors focused on creating a deregulated environment, strengthening the prudential norms and the supervisory system, changing the ownership pattern, and increasing competition. The main idea is globalization, privatization, deregulation and liberalization[2].

With the paradigm shift in the development strategy, the economy is increasingly opening up and there is a step forward towards market orientation. Consequently, some financial markets such as capital market, for-ex market and banking sector have reformed subject to various degrees of level. The insurance sector yet to receive the reform initiatives to get the benefit out of the global changes that occurred in the recent past. The Uruguay Round of GATT (now WTO) also advocated the removal of restrictions and non-tariff trade barriers to free flow of international services across countries so that domestic market of LDCs improve its efficiency and competitiveness and eventually improve economic growth. It is against this backdrop that many countries have deregulated its insurance sector and countries, which already allowed private insurance

business further deregulated their reinsurance business such as Brazil (1991) and Peru (1991). Table: 6.1 summarizes the year when different countries opened up their insurance industry. The insurance business remains a state monopoly only in Cuba, Myanmar, North Korea and in India[3].

Table: 6.1 **Country specific year of opening of domestic insurance market**

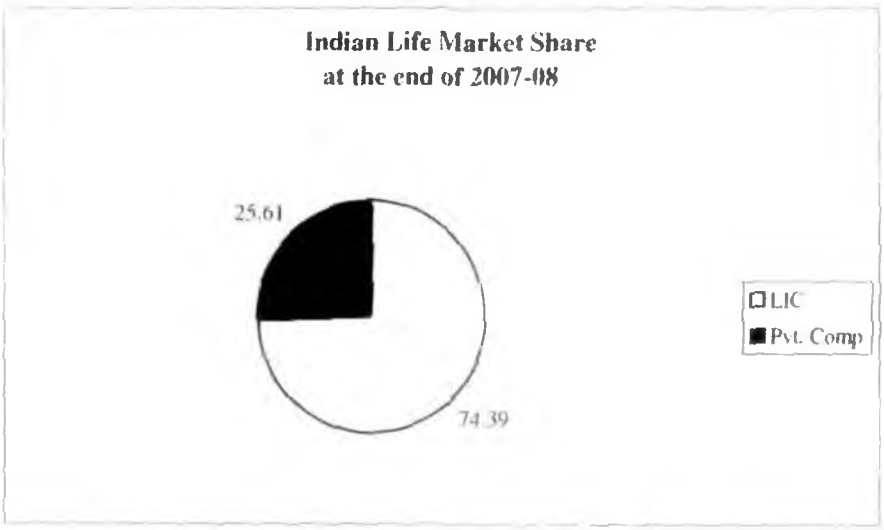
Country	Years
South Korea	1987
Taiwan	1987
Argentina	1990
Pakistan	1990
Czechoslovakia	1992
Philippines	1992
Japan	1996

Source: Compiled from various sources.

In India, the reforms in the insurance sector (Life and General) commenced with the setting up of the **Committee on Reforms on Insurance Sector** under the chairmanship of Dr. R.N.Malhotra, the ex- governor of RBI. by the GOI in April 1993 for examining the structure of insurance industry. The recommendations of the Committee was submitted in 1994 which was accepted in principle by the government and started implementing the recommendations since December 1999, thus heralding an era of liberalization in the country's insurance sector[4]. The setting up of **Insurance Regulatory and Development Authority (IRDA)** and opening up of Insurance Business (life and general) to foreign capital up to 26 per cent were the initial steps in this direction. It is widely acknowledged that the opening up of the insurance sector has been aimed at ushering in greater efficiency in the insurance business by maximising productivity and minimising transaction cost. Competition is believed to bring a wider choice of products at lower prices to the consumers, larger coverage of population, better customer service, superior information technology, higher returns to the policyholders, and so on.

At present there are 21 life insurers are operating in the Indian life insurance market along with the state own life insurer Life Insurance Corporation of India (LICI) and at the end of the financial year 2007-08, The total volume of premium reached to Rs. 201,351 crore in 2007-2008 from Rs. 24,630 crore in the year 1999-2000 which is more than 700% increase by 19 numbers of insurers (including LICI) in India. In India, private life insurers are slowly gaining the momentum to penetrate the market with their new products, services and the global knowledge of expertise in doing life business. This can be witnessed from their market share statistics which shows (Fig: 6.1) nearly 26 percent of the Market are in their hands at the end of 2007-08 financial year. Most important aspect is that their acceptability is on the rise though it is an urban phenomenon. The prominent private players operating actively are, ICICI Prudential Life, Bajaj Allianz Life, Max New York Life, TATA AIG Life, HDFC Standard Life, Birla Sun Life, Met Life, SBI Life, Aviva Life, Kotak Mahindra Life and Reliance Life Insurance Company[5].

Fig: 6.1



Source: IRDA annual report, 2007-2008.

The role of financial development and economic growth has been well established by the researchers and economic analysts in their empirical studies [Levine and Zervos[6] (1998), Levine[7] (1997), King and Levine (1993 (a)[8] and (b)[9], Levine et. al[10]. (2000), and Beck et. al[11] (2000)]. These studies established the role of financial institutions and

financial intermediaries in fostering the economic growth by improving the efficiency of capital accumulation, encouraging savings and ultimately improving the productivity of the economy. Now the research has shifted from established link between financial development and economic growth to understand factors that affects the overall financial services, thereby the underlying factors that lead to improve the financial development. Insurance is one of the important financial services that can trigger the growth in an economy by channelising the long-term savings for the productive purpose and providing a shield before the risk associated with any activity related to productivity, assets or life. Recent studies show that the insurance industry can improve the economic growth through financial intermediation, risk aversion and generating employment. For example, we can highlight the studies of Outreville[12] (1990 b), Catalan et. al.[13], (2000), and Ward and Zurbruegg[14] (2000).

By identifying, the factors that promote the demand for life insurance it would be possible to find out the factors actually work as a catalyst in promoting financial development and, thereby, economic growth. The recent empirical work on insurance market by Browne and Kim[15] (1993), Browne et al[16]. (2000), Ward and Zurbruegg[17] (2002), Beck and Webb[18] (2003) and Esho et. al.[19] (2004) has shown that the level of insurance demand can be influenced by the economic, demographic and legal factors. Despite the findings of several influencing factors affecting the life insurance demand and the promotion of life insurance development, there is meek guidance for the policy makers to focus on specific factor/s to foster the life insurance development and thereby financial development which improves the economic development. The objective of this study is to determine the factors which affect the demand for life insurance in the post reform period and in doing so, provide guidance for the policymakers on how to promote life insurance development in India. In the previous section we have investigated the relationship between life insurance reforms and demand for life insurance in India and found that the reforms do affects the life insurance business positively in India and need more reforms in this sector to boost the life insurance sector. In this section we will focus on the factors (macro level), *other than life insurance sector reforms*, which govern the life insurance demand in India.

6.2: LITERATURE REVIEW

Yaari[20] (1965) and Hakanson[21] (1969) were the first to develop a theoretical framework to explain the life insurance demand. Bequest motives and risk aversion, due to the pre mature death of the wage earner, were the main factors, which influence the purchasing behaviour of the consumers. According to Yaari, demand for life insurance is based on the consumer's lifetime allocation process. The consumer maximizes lifetime utility subject to a vector of interest rates and a vector of prices including life insurance premium rates. In contrast to the pioneer works of Yaari (1965) and Hakanson (1969) who stressed on bequest motives and risk aversion as the determinants of insurance demand, Lewis[22] (1989) has underscored the preference pattern of beneficiaries for its explanation based on the following model, which builds the theoretical starting points for many empirical works.

$$(1-lp)F=\max\left[\left(\frac{1-lp}{l(1-p)}\right)^{1/\delta} TC-W, 0\right] \qquad (6.1)$$

Where,

F = face value of life insurance written on the primary wag e earner's life;

l = policy loading factor (the ratio of the cost of the insurance to its actuarial value);

p = probability of primary wage earner's death;

δ = a measure of beneficiaries' relative risk aversion;

TC = value of consumption of each off spring from the current period until he/she leaves the household and of the spouse over his/her remaining life span.

W = *household's net worth.*

This model states that life insurance demand increases with the amount of beneficiaries' consumption and degree of risk aversion along with the probability of primary wage earner's death. This model recognizes that a number of variables may explain international differences in insurance demand. Based on these ideas of the Lewis (1989) model subsequent scholars have tried different sets of arguments to explain the insurance demand behaviour. Let us review those *'arguments'* concisely to examine their relevance in Indian context. Some studies are based on cross-section data of different

countries whereas others are country specific. No such study has yet been published so far, at least at the time of taking this research work, on Indian life insurance market after the implementation of reforms in this sector in 1999. The only published literature available on Indian life insurance industry is the study of Sadhak[23] (2006) who has shown certain naive statistical relationship among lead factors. But literature on many other economy/economies is available and the studies found that there are many factors operating simultaneously to influence the demand for life insurance products such as macro-economic factors, social factors and legal/political factors. All the factors are categorized under *economic* and *non-economic* heads for the simplicity of the above discussions.

6.2.1: Economic Factors

Income: Yaari (1965), Hakansson (1969), Fortune[24] (1973), Fischer[25] (1973), Campbell[26] (1980) and Lewis (1989) have shown the demand for life insurance is positively correlated with income. An individual's consumption increases with the increase with his/her income, which makes life insurance more affordable. As the income increases the need for life insurance also increases to protect the principal wage earner for the income flow in future and also to protect the dependants against the loss of premature death and to meet the expected consumption of his/her dependants. These results are also confirmed by the more recent cross country based works on life insurance of Benstock et. al[27], (1986), Truett and Truett[28] (1990), Browne and Kim[29] (1993), Outreville[30] (1996), Ward and Zurbruegg[31] (2002) and Beck and Webb[32] (2003).

Ward and Zurbruegg (2002) extended these findings by modern OECD economies with the emerging economies in Asia. They found, interestingly, that life insurance consumption becomes less sensitive to income growth in the countries with higher per capita income. This result was in line with the S-curve hypothesis by Enz[33] (2000) which states that at higher levels of income per capita, the demand for life insurance or insurance consumption becomes less sensitive as insurance product saturation reached. The main reason behind this low demand for life insurance is that at

higher level of income, consumers become so wealthy that they can afford to retain risk with their current financial portfolios. Enz's (2000) study also shows that, on average, Asians spends more on life insurance than in the developed countries of the world. This is in line with the findings of Ward and Zurbruegg (2002) that the consumption of life insurance products in OECD countries is three times less sensitive to changes in income that it is in Asia.

Previous studies of life insurance consumption have used gross national product (GNP) and gross domestic product (GDP) to proxy income. However, both GDP and GNP less accurately reflect the amount of disposable personal income.

Inflation: inflation has a significant negative impact on demand for life insurance product. A rising inflation rate leads to a devaluation of future benefits from purchasing life insurance. A country that is experiencing high inflation rate, life insurance may not be able to serve the interest of individuals and families as a savings product or as a product, which will benefit in future eventualities. Inflation erodes the value of life insurance.

Green[34] (1954), Fortune[35] (1973), Babbel[36] (1981) have shown that inflationary expectation have a significant negative impact on life insurance consumption. Moreover, Babble[37] (1979) and (1981) highlighted that anticipated inflation rate with the governmental regulations could surge the cost of life insurance even when policies are index linked by using empirical data from Brazil. The study of Browne and Kim[38] (1993) and Outreville[39] (1996) reveal the same impact on life insurance. However, the findings of Cargill and Troxel[40] (1979), Rubayah and Zaidi[41] (2000) are not in the line with the results of Browne and Kim (1993). Rubayah and Zaidi (2000) showed an insignificant positive relationship between inflation rate and life insurance consumption. Ward and Zurbruegg[42] (2002) pointed out that the impact of inflation and economic uncertainty on insurance demand is not same everywhere in the world. Inflation is around two and half times more important in Asian economies than in general OECD countries.

In India, inflation plays a vital role in day-to-day life of every citizen as it affects the household directly. Generally inflation pressure on food prices are more vulnerable than in any other segment of the economy as India is having three hundred million middle class populations along with 26% of population, which lives below poverty line[43]. As the inflation, hits the household directly in India, the inflationary pressure tend to reduce the savings behaviour of common people. This may have an effect on the demand for life insurance in India. We are not certain about the out come effect of inflationary *pressure on the consumption or the demand for life insurance in India though we expect a* negative relationship with the increasing inflation. Browne and Kim (1993) used an average inflation rate of the last eight years, Outreville (1996) used a weighted average of realized price changes over the last five years, Cargill and Troxel (1979) used percentage change in consumer price index (CPI) over a period of fourteen months and Rubayah and Zaidi (2000) used CPI as a basis for anticipated rate of inflation in their studies.

Interest rates: The findings on the relationship between the interest rates and the demand for life insurance are inconclusive. Cargill and Troxel[44] (1979) examined two *kinds of interest rates, the computing yield on other savings products and the return* earned by life insurance products. The findings on computing yields tend to negatively related to life insurance and inconsistent too. On the other hand, findings on return earned by the insurers are mixed. In another study, Outreville[45] (1996) has shown that the interest rates are not the determining factor affecting the life insurance demand. Outreville used the real interest rates (current bank discount rate minus anticipated inflation) and the lending rate to study the impact of those interest rates on demand for life insurance. On the other hand, Rubayah and Zaidi[46] (2000) used three types of interest rates in their study. First, the personal savings rate; second, the short-term interest rates; and third the current interest rates. The personal savings rate and the short-term interest rates are negatively associated and significant, while the current savings rate does not have any significant effect on life insurance demand.

The rate of interest are going to play an important role on demand for life insurance only when people are tend to take life insurance products as savings

instrument. A higher interest rate on alternative investment or savings product tends to make insurance product less attractive to the savers as a saving instrument. In India, as the evidence shows, the business or the spread of life insurance is yet to develop fully, the role of interest rates in determining the demand for life insurance product would be meager. It is only after 1999 when insurance market was opened, few new and big players have started to operate in India with their different array of products, which give Indians a choice of different products to invest. This is a new phenomenon in Indian insurance market. In India, life insurance considered as savings instrument only after it met the basic objective of life insurance, that is, future benefits arising out of premature death of the principal wage earner.

Financial Development: Outreville[47] (1996) finds a significant and positive relationship between financial development and life insurance development in developing countries. Whether financial development promote the development in life insurance or life insurance development promote financial development is a different issue and to know the causality relationship, we need different set of data and model that we are not intended to find out. In developing the model, Outreville (1996) assumed that, there exists a positive relationship between financial development and the individual's ability to buy insurance product.

Measuring financial development is very controversial as countries differ in their institutional structure and the level of development of each country's financial sector. In his study, Outreville (1990b, 1996) used two proxies to measure the financial development of developing countries. First, is the ratio of quasi money to broad money and the second, is the ratio between broader definitions of money to GDP. Broad money (M3) often taken as an adequate measure of the size of financial sector development in developing countries because of the predominance of the banking sector. Another reason to use this proxy to measure the development of financial sector is the lack of available data set on financial assets through out the different developing countries. This perhaps, one of the reasons behind using the banking sector development indicator as one of the

dependant variable in Beck and Webb[48] (2003) study, where they found that banking sector development is positively correlated with life insurance consumption.

Well functioning banking system may increase the confidence level of consumers have in other financial institutions; for example life insurance companies. Again, because of the well functioning banks life insurers and policyholders get an efficient payment system that helps to improve the consumption of insurance. This led us to use banking sector development measure as one of the variable in our study to proxy the financial development. We choose household access to banking system[49] in India to proxy the financial development as most of the reforms were initiated and introduced in banking system since the liberalization process begun in 1991 and India's financial system is dominated by the size and spread of banks.

Price of insurance: it is always true that the price of any product will always be the determining factor (not for exceptions) for the demand of that particular product and life insurance policies are not the exception. However, it is said that consumers face difficulty in comparing the price of insurance products because the price of life insurance policies depend on types of product, the design of the product, payment period, mode and provisions of the product and importantly on the age of the policy holder. Despite these reasons, studies such as Babbel[50] (1985), Beenstock et. al[51]. (1986), Browne and Kim[52] (1993), Outreville[53] (1996), Ward and Zurbruegg[54] (2002), and Lim and Haberman[55] (2005) suggest that the price affects the consumption of life insurance policies.

Measuring the impact of price on life insurance is difficult due to the problem of actuarially determining the price. To overcome this problem several studies [Beenstock et al. (1986), Outreville (1996), and Ward and Zurbruegg (2002)] used life expectancy at birth as it reflects the actuarially fair price for life insurance. This was based on the assumption that the longer the people are going to live, the more will be the payments of premiums. On the other hand, Browne and Kim (1993) used the policy loading charge as the price measure that is the ratio of life insurance premiums to the amounts of life insurance in force.

6.2.2: Non-Economic Factors

Life expectancy (at birth): Generally, it is assumed that the longer the people are going to live the greater will be the demand for life insurance. Outreville[56] (1996) and Ward and Zurbruegg[57] (2002) find a positive and significant relationship between the life expectancy and the life insurance demand. The positive relationship between this two variable implies that the population that have longer life will buy more life insurance because they would expect lower cost of insurance and greater capital accumulation as the cost of insurance spread over a longer period. Browne and Kim[58] (1993) used life expectancy to measure the probability of death in a country and found insignificant to affect the demand for life insurance products.

On the other hand, if we examine the life expectancy in its social context, it would be difficult to use this variable because life expectancy is highly related with nation's wealth, national income or per capita income. Therefore, it would be difficult to say whether life expectancy or the greater wealth or income is driving the demand for life insurance upward.

Social Security Expenditure: There is no unanimous conclusion regarding the effect of social security expenditure in a country on the premium expenditure on life insurance. The impact of social welfare provisions on life insurance demand has been tested by Babbel[59] (1985), Beenstock et. al[60]. (1986), Lewis[61] (1989), Browne and Kim[62] (1993), Outreville[63] (1996), Ward and Zurbruegg[64] (2002), Beck and Webb[65] (2003). They indicate that the needs for individuals to make private provisions for early death are reduced when government spending on social security increases. Browne and Kim (1993) also find that social security has positive, though insignificant, impacts in this regard. On the other hand, Ward and Zurbruegg (2002) highlighted that the impact of average social welfare expenditure on life insurance demand is insignificant in Asia. From this point of view, we just cannot agree that the low provisions of government expenditure in social welfare are driving the demand for life insurance. It should be emphasized here that the

effect of social security on the demand for life insurance varies from country to country due to the differences in social security system. In India, government spends on social welfare under the heads of education, medical and health, family welfare, housing, urban development and other social services and the provisions under these heads are not enough to meet all the social requirements of the huge masses especially those who live below poverty line (BPL). With the present level of spending on social security by the government is not going to reduce the demand for the life insurance products either. So the effect of social security investments on demand of life insurance products would be very negligible in case of India.

Education: Education lengthens the period of dependency and therefore increases the demand for life insurance. At the same time, however, a higher level of education leads to the perception of greater risk aversion among people. However, the literature suggests that education is not particularly significant as a promoter of life insurance demand [Beenstock et. al[66]. (1986), Beck and Webb[67] (2003)]. Browne and Kim[68] (1993), *in their study find education is inconsistent in their model and could not draw any* conclusion.

In measuring education Beck and Webb (2003) used average years of schooling in the population over 25 years and gross secondary enrollment rate whereas Outreville (1996) used average years of schooling of the labour force in his study. In India, where literacy is not as high as in the developed countries, a step increase or spread of education might lead to an increase in the demand for life insurance products as the education improves the level of perceived risk aversion and awareness among the people. To spread education among the all section of masses, GOI made elementary education mandatory for all children below 14 years and taken the Sarva Siksha Mission (SSM) programme to eradicate illiteracy.

Urbanization: The Beck and Webb[69] (2003) have studied the effect of urbanization on life insurance consumption and found it insignificant though it was expected a higher share of urban population to have higher level of life insurance

consumption. Outreville[70] (1996), using ratio of agriculture population to total employed population suggests that the life insurance development may be related to the status of country's social structure. The decline of agriculture population is likely to increase the urban population. In India, since the inception of life insurance business, life insurance is an urban phenomenon. Mostly its business is concentrated in the urban areas of India. In one hand, due to the decrease in the numbers of joint family[(1)] system in modern urban life, the reliance on formal life insurance product has increased in India in recent times. On the other hand, concentration of consumers in a geographical area makes the life insurance cheaper as the cost related to distribution of life policies; underwriting, premium collection, claim settlements and marketing are reduced. We expect a higher ratio of urban area is going to foster the growth of life insurance consumption in India. In India, life insurance is also treated as a luxury product, which is affordable to the higher income groups, mostly in the urban areas. In this study, urbanization ratio has been used as one of the measure of social structure of India. A summary of life insurance consumption studies is provided in the annexure 6.(A).

6.3: Measurement of Dependent Variables

Measuring Life Insurance: There are few variables, which are used to measure the life insurance consumption or demand in an economy by different researchers, such as life insurance *Penetration*, life insurance *Density*, life insurance *in force*, life insurance *premium volume*, life *insurance in savings* etc.

Life Insurance Penetration is the ratio of the direct gross premium volume to GDP in an economy. This is a relative measure of life insurance sector's contribution to the total economy. Many researchers have used life insurance penetration as a measure of insurance consumption (demand), e.g., Outreville (1996), Beck and Web (2003), Hwang

(1) Why joint families require less life insurance products to avert risk can be explained by simple mathematical calculation. Let us assume a joint family has n numbers of earning members who generates income with random variables y1, y2, and y3 ... y^n. If we calculate, the per capita income of this family stands at $\{(y^1+y^2+y^3+\ldots\ldots+y^n)/n\}$ which is more stable than any individual's income (y). The break up of such joint family into n numbers of families, increases the risk and consequently, require more life insurance product to negate the risk.

and Greenford[71] (2005), Zhang and Zhu[72] (2005). Since the penetration is the product of price and quantity, it sometimes mislead in understanding the demand or consumption pattern due to higher premium rates, competitiveness of insurance market (due to lack of players), high cost of writing of insurance policies due to governmental regulations and differences in the price of different policies sold by different insurers.

Life Insurance Density is the ratio of direct gross premium volume to the population in a country. It is average spending of people in life insurance in a country or per capita spending on life insurance. This particular variable to measure the life insurance is being used often by the researchers to represent the consumption of life insurance in an economy. For instance, Truett and Truett (1990), Browne and Kim (1993), Outreville (1996), Zhuo[73] (1999), Beck and Web (2003), Hwang and Gao[74] (2003), Hwang and Greenford (2005), Zhang and Zhu (2005).

Total Premium Volume represents the total life insurance premium written in a year in a given country. This variable has been used as dependent variable by different researchers in their study to analyze the consumption or demand pattern of life insurance; such as Babbel (1985), Goldsmith[75] (1983), Ferber and Lee[76] (1980), Beenstock et. al. (1986), Schwebler[77] (1984), Diacon[78] (1980), Browne and Kim (1993), Ward and Zurbruegg (2002), Lim and Haberman (2004).

Life Insurance in Force is equals the sum total of the face amounts of life policies plus dividends. Life insurance in force measures the mortality risk along with savings. Thus, life insurance in force measures the cash value of policies along with risk. This measure has been used as a dependent variable by Beck and Webb (2002), Browne and Kim (1993) in their studies

Life insurance penetration and density is the internationally accepted measure of life insurance development and all the financial institutions (life insurance companies, research firms, banks etc.) and international organizations such as IMF, World Bank, UNCTAD etc., report life insurance development with help of these two measures of life

insurance. In this study, both penetration and density will be used as dependent variables to determine the factors influencing the demand for life insurance in India. Density measures life insurance consumption with out adjusting income and we, therefore, expect density to be more elastic than penetration which measures the relative importance of life insurance business in an economy. We expect life insurance in force (the sum total of the face amounts of life policies plus dividends) will measure *insurance consumption in a better way. However, this measure also did not highlight the demand (quantity) of life insurance in an economy.* To do so, we have introduces a new measure to quantify the demand, the number of ***new policies*** issued by the insurance industry in every year to measure the overall demand for life insurance products in India.

6.4: Measurement of Independent Variables:

For the purpose of this study, the following definitions have been used to examine the independent variables.

Income (RDPI): *Previous studies of life insurance consumption have used gross* national product (GNP) and gross domestic product (GDP) to proxy income. However, both GDP and GNP less accurately reflect the amount of disposable personal income. To measure the effect of income on life insurance consumption we use per capita real personal disposable income in our study.

Inflation (WPI): Rate of change in the yearly wholesale price index (WPI) [2] is *used here as a measure of inflation as it reflects the real effects on households all over* India.

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[2] The variation in the price level in India can be measured in terms of the Wholesale Price Index (WPI), or the Implicit National Income Deflator (NID) or the Consumer Price Index (CPI). The WPI is the main measure of the rate of inflation often used in India justifiable on grounds of convenience as well as analytical reasoning. Firstly, the commodity coverage in WPI is wider than that in CPI, *and secondly, WPI is computed on all-India basis whereas CPI is just constructed for specific centre and then aggregated to get* the all-India index. Because of this feature majority of public, *more easily understands* WPI.

Interest rates (INTS): As the life insurance products are long-term in nature, we will use the commercial bank's savings rate for five and more years to assess the impact of interest rates on life insurance demand.

Financial development (FD): We use the percentage of people with deposit accounts in banking system to proxy financial development in our study. Household access to banking system is one of the new measures that has introduced by the World Bank very recently in their Financial Sector Development Indicators (FSDI).

Price of insurance (LEXP): We are going to use the life expectancy at birth as a proxy measure of price of life insurance in our study as the fair price of life insurance is not available and difficult to compute due to the reasons stated earlier in this study.

Education (EDUN): It is very difficult to use any measure of education to evaluate the impact of education on the demand for life insurance. Here we have used the adults literacy rates (ALR) prepared by the UNDP to present the overall educational status of India.

Urbanisation (URBN): We used the percentage of people in urban area in total population to study its impact on life insurance demand.

Based on the above propositions, the demand for life insurance is hypothesized to have following relationships with the economic and non-economic variables.

DEMAND = f [INCOME (+), FINANCIAL DEVELOPMENT (+), INFLATION (-), INTEREST RATES (-), LIFE EXPECTANCY (+), EDUCATION (+), URBANISATION (+)]

6.5: Sample Size

The financial sector reforms was started in India with the implementation of new economic policy in 1991 by the then finance minister Dr. Man Mohan Singh who is the

present Prime Minister of India. Insurance sector reforms are the part of the total financial sector reforms initiative. The first step towards insurance sector reforms was the setting up of the Malhotra Committee in 1992-93 and consequently the opening of the life insurance sector in 1999 and setting up of an independent regulatory body IRDA. This study focuses on to find out the relationship between economic and non-economic factors and the consumption of life insurance in India in the post reform period which consists of the annual data series from 1991 to 2008.

6.6: Data Source

All the data series are annual aggregate data for the period starting from 1991 to 2008 and secondary in nature. All the annual data are collected from, annual reports of LICI and IRDA, Handbook of Statistics on Indian Economy, RBI; Human Development Reports of UNDP, World Development Indicators of the World Bank, IFS data base from IMF, CIA fact book on India, UNCTAD reports, various issues and reports from Swiss Re. life insurance penetration, density and new policy issue data are collected from sigma issues, annual reports of LICI and annual reports of IRDA. All the economic variables are collected from RBI and IMF whereas the non-economic data are collected from UNDP and the World Bank.

6.7: Research Methodology

The analysis of the above mentioned study has been carried out in the following manner (Gujrati, 2007)[79], (Lim and Haberman, 2005)[80],

Transformation of Variables: For any time series data, transformations of variables are dependent on the model/s to be tested and on its values. A transformation is made on the variables at level value; however, variables of rate values are not transformed because they are already in a preferred form as they are a measure of change. Accordingly, the variables of rate value form, i.e., life insurance penetration (Pen), density (Den), inflation (WPI), financial development (FD), interest rates (Intrs),

Education (Edun), Life Expectancy (Lexp) and Urbanisation (Urbn) are not transformed as they are in the required form. But the variables of the level value form are subject to transformation by taking natural logarithm of their level values. In this case, total new policy issued (NP), and income (GDPI) has been transformed and transformed variables are used in the analysis.

Testing for Unit Root & Co-integration: All time series variables, whether transformed or not transformed, are subject to a statistical test to investigate their univariate properties. Formally, Augmented Dickey Fuller (ADF) unit root test[81] is used to check the stationary properties of the variables whether the variables are stationary or non-stationary because using non stationary time series variable in the regression might give spurious results[82]. Non stationary variables may be used in our model provided the series are co integrated. Therefore, Engle and Granger[83] (1987) co-integration study also been done to verify this property.

Initial Estimation Equation: Most of the previous studies have adopted the OLS (Ordinenary Least Square) technique to determine the factors affecting the life insurance demand. There are, however, variations in the underlying relationship of the demand functions. Few researchers have used the log-linear equations while others have used semi log-linear equations in their studies. The initial model consists of three-regression equation as the demand for life insurance is alternatively defined by life insurance *penetration* (PEN), *density* (DEN) and *new policies* (NP). To test our hypothesis, ordinary least squares is used to estimate the following equations,

$$(PEN) = \alpha_1 + \beta_{1i} \ln(RPDI) + \beta_{1i}(FD) + \beta_{1i}(WPI) + \beta_{1i}(INTS) + \beta_{1i}(LEXP) + \beta_{1i}(EDUN) + \beta_{1i}(URBN) + e_{1i} \quad (6.2)$$

$$(DEN) = \alpha_2 + \beta_{2i} \ln(RPDI) + \beta_{2i}(FD) + \beta_{2i}(WPI) + \beta_{2i}(INTS) + \beta_{2i}(LEXP) + \beta_{2i}(EDUN) + \beta_{2i}(URBN) + e_{2i} \quad (6.3)$$

$$(NP) = \alpha_3 + \beta_{3i} \ln(RPDI) + \beta_{3i}(FD) + \beta_{3i}(WPI) + \beta_{3i}(INTS) + \beta_{3i}(LEXP) + \beta_{3i}(EDUN) + \beta_{3i}(URBN) + e_{3i} \quad (6.4)$$

Where, *ln* = natural log (i.e., log to the base e), *RPDI* = real personal disposable income, *FD* = financial development, *WPI* = wholesale price index, *INTS* = interest rate, *LEXP* = life expectancy at birth, *EDUN* = education index, *URBN* = urbanization rate, α_i = the intercept, ($\beta_1 \ldots \beta_7$) = slope coefficients, and e_i = error term.

The above-mentioned three initial estimation equations are subject to subsequent simplification by removing the most insignificant variable from the equation. This process is repeated until further deletion of any insignificant variables from the equation causes autocorrelation in the residuals. Every equation will be tested for the presence of residual serial correlation before and after the simplification process. If the serial correlation is not present in the residuals then most insignificant variable form the equation is removed. If the residual serial correlation (we have used the Durbin-Watson statistics) is detected as a consequence of removing the most insignificant variable from the estimation equation, indicates that the variable should not be removed from the equation at that stage and the initial estimation equations need to be respecified to get the final regression equation.

6.8: EMPIRICAL FINDINGS

The first step is to transform the total new policy issued (NP) and income (GDPI) by taking natural logarithm of their level values. In the second step, the Augmented Dickey Fuller (ADF) unit root test is conducted to investigate stationarity properties of the variables. Using non stationary time series variable in the regression might give spurious results. Non stationary variables may be used in our model provided the series are co-integrated. Therefore, after conducting ADF unit root test, if the variables are found to non-stationary, a co-integration study using ADF also been done to corroborate that the variables are co-integrated before running the regression.

The results of the Augmented Dickey Fuller (ADF) unit root test indicate that the variables (dependant and independent) have unit root at their level values at 10%, 5% and

1% significance level. That is, the series are non-stationary and integrated of order (*1*). The results of the ADF unit root tests are summarised in the table: 6.2 as follows;

Table: 6.2

ADF UNIT ROOT TEST

Lag Length: (Automatic based on Modified AIC, Maximum Lag =3)

Variables	Null Hypothesis	ADF test Stat.	Prob*	DW stat	Critical Values 1%	5%	10%
Den	Den has a unit root (intercept)	8.8807	1.000	2.095	-3.8867	-3.0521	-2.6665
Pen	Pen has a unit root (intercept & trend)	1.7508	0.999	1.760	-4.8000	-3.7911	-3.3422
NP	NP has a unit root (intercept & trend)	-1.4144	0.818	2.031	-4.6162	-3.7104	-3.2977
RPDI	RPDI has a unit root (none)	3.1437	0.998	2.095	-2.7175	-1.9644	-1.6056
FD	FD has a unit root (intercept & trend)	-0.0765	0.989	2.216	-4.6678	-3.7732	-3.3103
EDUN	RPDI has a unit root (intercept)	2.3564	0.999	2.341	-4.0044	-3.0988	-2.6904
WPI	WPI has a unit root (intercept & trend)	-3.1805	0.122	2.117	-4.6678	-3.7732	-3.3103
LEXP	LEXP has a unit root (intercept & trend)	-1.9526	0.581	1.989	-4.6678	-3.7732	-3.3103
INTRS	INTRS has a unit root (intercept)	-1.9103	0.319	1.821	-3.9203	-3.0655	-2.6734
URBN	INTRS has a unit root (none)	2.0522	0.986	1.974	-2.7080	-1.9628	-1.6061

* Mac Kinnon (1996) one-sided p-values.

From the above table, it is observed that the computed ADF test statistics for all the data series are greater than the critical values (i.e., ADF test statistics lies to the right of the critical values). Since the computed ADF test-statistics is greater than the critical

values (at different level of significance), we cannot conclude to reject null hypothesis i.e., Ho. That means all the series has a unit root problem and the series is a non-stationary series.

Since the series under study is a non-stationary in nature we can't run a regression unless the variables of the series are co-integrated. Therefore, a co-integration test is conducted using ADF test. The basic purpose of the co-integration test is to determine whether a group of non- stationary variables are co-integrated or not. Engel and Granger (1987) points out that the two non-stationary variables can be used in regression if the linear combination of the two non-stationary variables are stationary. An equilibrium theory which involves non-stationary variables requires that the combination of the variables should be stationary.

We can rewrite the equation-(6.2) as follows,

$$e_{1t} = PEN - \alpha_1 + \beta_{1t}\ln(RPDI) + \beta_{1t}(FD) + \beta_{1t}(WPI) + \beta_{1t}(INTS) + \beta_{1t}(LEXP) + \beta_{1t}(EDUN) + \beta_{1t}(URBN) \quad (6.5)$$

Since, e_{1t} must be stationary, this means that the linear combination of the non-stationary (integrated) variables given in the right hand side must also be stationary. Stationarity of the error term (e_{1t}) has been checked by both the ADF unit root test and Philip-Perron[84] unit root test and the results of the test are summurised below in Table: 6.3(a) & 6.3(b).

Table: 6.3(a)

ADF UNIT ROOT TEST

Lag Length: 0 (Automatic based on Modified AIC, Maximum Lag =4)

Variables	Null Hypothesis	ADF test Stat.	Prob*	DW stat	Critical Values 1%	5%	10%
(e_{1t})	(e_{1t}) has a unit root (none)	-4.902	0.0001	1.967	-2.7175	-1.9644	-1.6056

* Mac Kinnon (1996) one-sided p-values.

Table: 6.3(b)

PHILIPS-PERRON UNIT ROOT TEST

Bandwidth: 2 (Newey-West using Bartlett Kernel)

Variables	Null Hypothesis	PP test Stat.	Prob*	DW stat	Critical Values 1%	5%	10%
(e_t)	(e_t) has a unit root (none)	-7.133	0.0000	1.967	-2.7175	-1.9644	-1.6056

- Mac Kinnon (1996) one-sided p-values.

From the above tables, it is observed that the computed ADF/PP unit root test statistics for all the data series are smaller than the critical values (i.e., ADF/PP test statistics lies to the left of the critical values). Since the computed ADF/PP test-statistics is smaller than the critical values (at 1% level of significance), we can conclude to reject null hypothesis i.e., Ho. It means that the residual series (e_t) doesn't has a unit root problem and the (e_t) series is a stationary series at 1% significant level. The Durbin-Watson statistics is 1.96 that means, the (e_t) series does not have any autocorrelation problem. Now, we can use these non- stationary variables in equation-(6.2) as they are co-integrated. The results of the initial Ordinary Least Square (OLS) estimation of equation (6.2) are furnished in Table: 6.4.

The initial estimation of equation-(6.2) shows that the income (RPDI), financial development (FD), inflation (WPI), interest rates (INTRS), life expectancy (LEXP) and education (EDUN) are the important variables associated with the demand for life insurance in India. Both income and financial development are positively related with the demand for life insurance in India, whereas rate of interest is negatively related and significant. A close observation shows that the life expectancy, inflation and education variables are not consistent in spite of significantly related with the demand for life insurance. Since the above result includes an insignificant variable urbanization (URBN), the estimation is subject to further simplification and the insignificant variable (URBN), has been deleted from the initial estimation equation after confirming that there is no evidence of residual serial correlation. The result of the re-estimated equation is given in

Table: 6.4

The OLS estimation of initial equation (6.2) for the regression of demand (PEN) for life insurance on economic and non-economic variables

Dependent Variable: PEN

Method: Least Squares

Sample (adjusted):17 (1992-2008)

Variables	Coefficient	Std. Error	t-Statistic	Prob.
RPDI	9.335621	3.350641	2.786219	0.0212
FD	0.212573	0.081927	2.594670	0.0290
WPI	0.075874	0.027557	2.753347	0.0224
INTRS	-0.100754	0.039140	-2.574208	0.0300
URBN	-0.148660	0.180134	-0.825275	**0.4305**
LEXP	0.296608	0.107514	2.758783	0.0222
EDUN	-0.416556	0.129027	-3.228435	0.0103
C	-89.10912	27.09999	-3.288161	0.0094
R-squared	0.982114	Akaike info criterion(AIC)		-0.429573
Adjusted R-squared	**0.968203**	Schwarz criterion		-0.037473
S.E. of regression	0.167576	F-statistic		70.59937
Durbin-Watson stat.	**2.426732**	Prob(F-statistic)		0.000000

the table: 6.5, which shows that, at this stage, all the variables become significant and there is no evidence of residual serial correlation in the estimation as the commuted DW statistics is significant at 1% level. Hence, the final regression model is obtained as under,

$$PEN = 7.1132^* RPDI + 0.1584^*FD + 0.0663^*WPI - 0.1108^*INTRS + 0.2335^*LEXP - 0.3294^*EDUN - 69.9805 \quad (6.6)$$

The result of the final estimation shows that RPDI, FD, WPI and LEXP have a significant positive relationship with the demand for life insurance in India and EDUN along with INTRS have significant negative relationship. The findings of RPDI, being positively related with the life insurance demand, is in line with the previous studies such

as, Lewis (1989), Truett and Truett (1990), Browne and Kim (1993), Outreville (1996), Ward and Zurbruegg (2002),Beck and Webb (2003), Rubayah and Zaidi (2000) and Hwang and Greenford (2005). FD is also found to be positively associated with the demand for life insurance in India and in line with the findings of Beck and Webb (2003), Outreville (1996) and Li et. al[85]. (2007). But the WPI is positively associated with the demand for life insurance in India which is contrary to the hypothesized proposition that inflation (WPI) is negatively related since the rising inflation rate leads to devaluation of future benefits from purchasing life policies. This finding is not in line with the findings of Green (1954), Fortune (1973), Browne and Kim (1993), Beck and Webb (2003) and Li et al (2007) where WPI found to impacted negatively. In case of LEXP, it is found to be significant and positively associated with the demand for life insurance in India and in line with the findings of Outreville (1996).

Table: 6.5

The OLS estimation for the final Test Equation of demand (PEN) for life insurance on economic and non-economic variable

Dependent Variable: PEN

Method: Least Squares

Sample (adjusted): 17 (1992-2008)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RPDI	7.113240	1.961714	3.626033	0.0046
FD	0.158478	0.048357	3.277224	0.0083
WPI	0.066335	0.024614	2.695048	0.0225
INTRS	-0.110858	0.036578	-3.030744	0.0127
LEXP	0.233503	0.074365	3.139959	0.0105
EDUN	-0.329485	0.073080	-4.508575	0.0011
C	-69.98056	13.81603	-5.065173	0.0005

R-squared	**0.980761**	Akaike info criterion (AIC)	-0.474272
Adjusted R-squared	**0.969217**	Schwarz criterion	-0.131184
S.E. of regression	0.164882	**F-statistic**	**84.96204**
Durbin-Watson stat.	**2.057721**	**Prob(F-statistic)**	**0.000000**

In this study, LEXP has been used as actuarially fair price to proxy the price of average life insurance based on the argument that the longer people are going to live, there will be more payments in the form of life premiums to the life insurance industry and not in the form of social context. Most significantly, this study finds that there is a negative relationship between educational development (EDUN) and life insurance consumptions. This is in contrast to the findings of Truett and Truett (1990), Browne and Kim (1993), Outreville (1996), Ward and Zurbruegg (2002), Beck and Webb (2003) and Li et al (2007) who found that education has appositive impact on the life insurance demand. This is probably due to the low level of literary in India and the lack of awareness among the people about the importance of life insurance products in their lives. It is possible that taking other alternative measures in education might give expected results but adult literacy rate has been considered in this study because it is the adults who take the decision of purchasing life insurance being an earning member.

The interest rates on alternative investments/savings instruments found to be significant and negative relationship with the development of life insurance demand in India which is in line with the findings of Cargill and Troxel (1979), Outreville (1996), Rubayah and Zaidi (2000) and Li et. al. (2007). High interest rates offered by the other alternative investment often preferred by the investors because of liquidity elements and sometimes the investments are short term in nature, i.e., mutual funds, bank deposits etc. From the results of Table: 6.5, it is clear that the above mentioned variables (RPDI, FD, WPI, INTRS, LEXP, and EDUN) collectively explain about 97% of the variance in the demand for life insurance in India being, adjusted $\mathbf{R^2 = 0.9692}$ and **P-value = 0.0000**. Only 3% of the variance is note explained by the regression model we have used in this study. The test for normality (JB Statistic =0.765185, P-value =0.682091) indicates that the residuals are normally distributed.

Similarly, we can rewrite the equation- (6.3) and (6.4) as follows to check the co-integration properties.

$$(e_{2t}) = (DEN) - \alpha_2 + \beta_{21}\ln(RPDI) + \beta_{22}(FD) + \beta_{23}(WPI) + \beta_{24}(INTS) + \beta_{25}(LEXP) + \beta_{26}(EDUN) + \beta_{27}(URBN) + e_{2t} \quad (6.7)$$

$$(e_{3t}) = (NP) - \alpha_3 + \beta_{31}\ln(RPDI) + \beta_{32}(FD) + \beta_{33}(WPI) + \beta_{34}(INTS) + \beta_{35}(LEXP) + \beta_{36}(EDUN) + \beta_{37}(URBN) \quad (6.8)$$

Stationarity of the both the error terms {(e_{2t}) & (e_{3t})} has been checked by ADF unit root test and Philip-Perron unit root test and the results of both the tests are summurised below in Table: 6.6 (a, b) & Table: 6.7(a, b).

Table: 6.6(a)

ADF UNIT ROOT TEST

Lag Length: 0 (Automatic based on Modified AIC, Maximum Lag =4)

Variables	Null Hypothesis	ADF test Stat.	Prob*	DW stat	Critical Values 1%	5%	10%
(e_{2t})	(e_{2t}) has a unit root (none)	**-5.008**	**0.0002**	**2.049**	-2.7175	-1.9644	-1.6056

** Mac Kinnon (1996) one-sided p-values*

Table: 6.6(b)

PHILIPS-PERRON UNIT ROOT TEST

Bandwidth: 2 (Newey-West using Bartlett Kernel)

Variables	Null Hypothesis	PP test Stat.	Prob*	DW stat	Critical Values 1%	5%	10%
(e_{2t})	(e_{2t}) has a unit root (none)	**-5.1610**	**0.0000**	**2.049**	-2.7175	-1.9644	-1.6056

- Mac Kinnon (1996) one-sided p-values.

Table: 6.7(a)

ADF UNIT ROOT TEST

Lag Length: 0 (Automatic based on Modified AIC, Maximum Lag =4)

Variables	Null Hypothesis	ADF test Stat.	Prob*	DW stat	Critical Values 1%	5%	10%
(e_{3t})	(e_{3t}) has a unit root (none)	**-4.7485**	**0.0001**	**2.005**	-2.7175	-1.9644	-1.6056

* Mac Kinnon (1996) one-sided p-values.

Table: 6.7(b)

PHILIPS-PERRON UNIT ROOT TEST

Bandwidth: 2 (Newey-West using Bartlett Kernel)

Variables	Null Hypothesis	PP test Stat.	Prob*	DW stat	Critical Values 1%	5%	10%
(e_{3t})	(e_{3t}) has a unit root (none)	**-4.7925**	**0.0001**	**2.005**	-2.7175	-1.9644	-1.6056

* Mac Kinnon (1996) one-sided p-values.

Since the computed ADF/PP test-statistics is smaller than the critical values (at 1% level of significance), the null hypothesis can be rejected and we can conclude that the residual series (e_{2t}) and (e_{3t}) doesn't have any unit root problem and both the series are stationary series at 1% significance level. The Durbin-Watson statistics are 2.049 and 2.005 respectively, which means, both the series does not have any autocorrelation problem. Now, we can use these non- stationary variables in equation-(6.3) and (6.4) to estimate the life insurance demand function, as they are co-integrated. The initial estimation equations are subject to simplification and the variables which are not significant are omitted from the initial equations after confirming that there is no evidence of residual serial correlation. In case of dependent variable DEN, variables such as, INTRS, URBN and LEXP are removed sequentially from the estimation equation through the simplification process. Again, when dependent variable NP is used in the initial regression equation-(6.4), variables such as URBN and LEXP has been deleted

successively from the initial estimation equation after validating that there is no evidence of residual serial correlation. However, in the third round of simplification, the insignificant variable WPI cannot be removed from the estimation equation because residual serial correlation is detected while trying to delete WPI from the equation and further deletion of the variable WPI causes the autocorrelation problem in the residual. Therefore, simplification process [results of the simplification processes has been provided in the Annexure: 6. (B) and 6. (C)] had to stop at second stage of simplification and the final regression model has been obtained.

The results of Ordinary Least Square (OLS) estimation for the final test equation for dependent variable DEN and NP are furnished respectively in Table: (6.8) and (6.9).

Table: 6.8

The OLS estimation for the final Test Equation of demand (DEN) for life insurance *on economic and non-economic variable*

Dependent Variable: **DEN**

Method: Least Squares

Sample (adjusted): 17 (1992-2008)

Variable	Coefficient	Std. Error	t-Statistic	Prob
RPDI	4144.925	630.8237	6.570654	0.0000
FD	*132.0328*	*17.31888*	*7.623630*	*0.0000*
WPI	17.35242	8.873514	1.955530	0.0742
EDUN	-107.4477	29.57408	-3.633170	0.0034
C	-39775.27	4674.746	-8.508541	0.0000
R-squared	**0.985413**	Akaike info criterion		11.54037
Adjusted R-squared	**0.980551**	Schwarz criterion		11.78544
S.E. of regression	68.80551	**F-statistic**		**202.6628**
Durbin-Watson stat	**1.996635**	**Prob(F-statistic)**		**0.000000**

Table: 6.9

The OLS estimation for the final Test Equation of demand (NP) for life insurance on economic and non-economic variable

Dependent Variable: **NP**

Method: Least Squares

Sample (adjusted): 17 (1992-20080

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RPDI	4.242079	0.528576	8.025488	0.0000
FD	0.032416	0.014930	2.171275	0.0527
WPI	0.006725	0.007473	0.899944	**0.3874**
INTRS	-0.034808	0.008299	-4.194223	0.0015
EDUN	-0.101468	0.025238	-4.020498	0.0020
C	-31.72155	3.911868	-8.109054	0.0000
R-squared	**0.992396**	Akaike info criterion		-2.601115
Adjusted R-squared	**0.988940**	Schwarz criterion		-2.307039
S.E. of regression	0.057569	**F-statistic**		**287.1365**
Durbin-Watson stat	**2.349831**	**Prob(F-statistic)**		**0.000000**

From the final results of the re-estimated equations, given in the Table: 6.8 & 6.9, the final regression representation is obtained for both the dependent variable DEN and NP as under,

DEN = 4144.9247*RPDI + 132.0327*FD + 17.3524*WPI - 107.4476*EDUN - 39775.2657 ---------- (6.9),

&

NP = 4.2420*RPDI + 0.0324*FD - 0.0348*INTRS - 0.1014*EDUN + 0.0067*WPI - 31.7215 ---------- (6.10).

From the results of Table: 6.8, it is clear that the above mentioned variables (RPDI, FD, WPI and EDUN) collectively explain about 98% of the variance in the demand for life insurance in India being, adjusted $\mathbf{R^2 = 0.9805}$ and **P-value = 0.0000.**

Only 2% of the variance is note explained by the regression model that has been used in this study. The computed DW test statistics (1.996) is more than the table value of 1.710 at 5% significance level which means that there is no evidence of positive first order serial correlation problem in the residuals. The test for normality (JB Statistic =2.2515, P-value =0.3244) indicates (Kurtosis =3.290) that the residuals are normally distributed.

The results of the Table: 6.9, shows that the RPDI, FD, WPI, INTRS and EDUN variables jointly explains 98% of the variance with only 2% is unexplained. The residual examination finds that the residuals are normally distributed with Kurtosis =4.290 and computed DW test stat (2.349) is above the tabulated value of 1.847 at 1% significance level.

For life insurance, we find RPDI, FD and WPI are the only variables which have significant influence on all the three dependent variables. Surprisingly, the study could not find urbanization (URBN) to be an important variable which influence the life insurance demand in either directions on all the dependent variables though urban people are more likely to be aware of their risk perception and life insurance business are mostly driven by the urban population in India. This may be due to the low rate of urbanization in India. Since 70% population represents the rural sector in India, the importance of the urbanization is found almost insignificant in this study. Another non-economic variable, life expectancy at birth (LEXP) is found to be positively affecting the life insurance demand with only one dependent variable (PEN) in this study. Since LEXP has been used to proxy the price of average life insurance, it is very inconclusive. But it is expected that with the longer life expectancy people need more life insurance products (especially pension funds offered by the life insurers) for future eventualities.

The variable RPDI is positively associated with demand for life insurance in India. This result is in line with the previous findings of Browne and Kim (1993), Outreville (1996), Zhuo (1999), Ward and Zurbruegg (2002), Beck and Webb (2003), Rubayah and Zaidi (2000), Hwang and Greenford (2005) and Li et al (2007). This proves the fact that the increase in per-capita income (real disposable income in particular) is the

fundamental factor for the development of life insurance demand in India. We, also, find the financial development (FD) affects the growth of life insurance demand positively in India which means that the development in the financial sector or in the banking sector (as we have used the percentage of people with deposit accounts in banking system to proxy financial development in our study) would lead the growth of life insurance in positive direction in India. An overall sustained economic growth is a key to the life insurance consumption in India.

The most surprising finding of this study is that the variable education (EDUN) is found to be negatively allied with the life insurance demand in India with all three dependent variable and in contrast with the findings of previous studied such as Truett and Truett (1990), Browne and Kim (1993), Outreville (1996), Ward and Zurbruegg (2002), Beck and Webb (2003) and Li et al (2007) who found that education has a positive impact on the life insurance demand. Education actually helps people to understand the importance of life insurance in their life. This unanticipated outcome of education (EDUN), most likely, due to the fact that the level of education in total masses is very poor in India, especially rural people who represents around 70% of the population. Another explanation for this negative result is perhaps educated people try to evaluate the other alternative investments options and eventually ended up in investing other than life insurance products. In some cases it is found that illiterate persons may ended up investing in the life insurance products due to the huge network of the life insurance agents who performs all the required work (filling the forms, health certificate, choice of products, mode of payment etc.) on behalf of the investors where as formal financial institutions does not provide such advantages before the illiterate who always try to pass over the paper works. There is a gap in the literature about the behavioural pattern related to financial decisions of non-educated people in India and further research should be carried out to study behavioural pattern of life insurance investments made by the non-educated (formal) people in India.

The interest rates (INTRS) on alternative saving found to be negatively related with the life insurance demand in India with life insurance penetration (PEN) and number

of new policies (NP) issued. This means that the higher rates on other alternative savings instrument would affect the demand for life insurance adversely but any reduction in the alternative investment rates would certainly increase the savings (consumption) through life insurance in India. In India, life insurance industry faces challenge from the banking industry with their offerings of higher fixed deposits rates as the common Indians still find the bank deposits are more safe and liquid than life insurance products. This finding is consistent with conclusions of earlier works of Cargill and Troxel (1979), Outreville (1996), Rubayah and Zaidi (2000) and Li et al (2007).

We find inflation (WPI) is significant and positive with life insurance penetration and density. This finding does not lend support to the findings of Green (1954), Fortune (1973), Browne and Kim (1993), Beck and Webb (2003) and Li et al (2007) where WPI found to be negatively linked with the life insurance demand. On the contrary, this finding is in line with the Cargill and Troxel (1979), Rubayah and Zaidi (2000) and Lim and Haberman (2004). Even Nuemann[86] (1969), in his study, found that there was no significant effect of inflation on savings through life insurance in America. The result says that the higher rate if inflation in the economy increases the demand for life insurance in India. This behaviour is probably due to the existence of Money illusion[87] *(refers to the tendency of people to think of currency in nominal, rather than real terms)* which can also influence people's perceptions of outcomes and influences economic behaviour. There are several reasons why the money illusion is likely to be exists for many people in India. For example, a general lack of financial education and the price stickiness *(nominal prices are slow to change even where inflation has caused real prices or costs to rise)* in many goods and services.

In India, life insurance companies (especially by the state life insurance company) typically offer some life insurance policies with guaranteed returns. Some times people invest into such life insurance policies to negate the effect of depreciated value of money and to gain out of the depreciated money in the future with higher return in expectation that the present higher inflation rate is short term in nature and may vanish in the near future. This behaviour of investors in life insurance industry leads to conclude that the

effect of the inflation on the life insurance consumption is inconclusive though the results are significant.

Out of the seven determinants, this study (over a period of 1991-2008 in India) indicates income, financial development, education, inflation and interest rates on alternative investments are significant in explaining life insurance penetration, density and new policies. The major findings of this exercise are as follows:

(1) Income (Real Personal Disposable Income) and Financial Development (FD) are the most significant and positive factors in driving the life insurance demand upward in India.

(2) Education (EDUN) found to be most important factor among the non-economic factors which is significant but negatively associated with the life insurance demand.

(3) Inflation (WPI) is significant and positively related with the life insurance demand in India.

(4) Interest rate (INTRS) of alternative products is significant and negatively related with the demand for life insurance in India.

References:

(1) Rao, D. T, (2000). "Privatisation and Foreign Participation in (Life) Insurance Sector", *Economic and political Weekly*, March 25, pp. 1107-1120.

(2) Bhole, L.M., (1999), *"Financial Institutions and Markets: Structure, Growth and Innovations" (Third Edition)*, Tata McGraw-Hill Publishing Company Limited, New Delhi, India.

(3) Palande, P.S, Shah, R.S and Lunawat, M.L, (2003), *"Insurance in India: Changing Policies and Emerging Opportunities"*, Response Books, Sage Publications, New Delhi, India, p.62.

(4) Government of India, (1994), *"Report of the Committee on Reforms in the Insurance Sector"*, Ministry of Finance, New Delhi, India.

(5) Annual Report of IRDA, (2000-2001) and (2007-2008), IRDA, Hyderabad, India; (www.irdaindia.gov.in).

(6) Levine, R. and S. Zervos, (1998), "Stock Markets, Banks and Economic Growth", *American Economic Review*, Vol. 88, No.3, pp. 537-558.

(7) Levine, R., (1997), "Financial Development and Economic Growth: Views and Agenda", *Journal of Economic Literature*, June, Vol. 35, No. 2, pp 688-726.

(8) King, R. G., and R. Levine., (1993a), "Finance and Growth: Schumpeter Might be Right", *Quarterly Journal of Economics*, Vol. 108, No.3, pp. 717-737.

(9) King, R. G. and Levine, R., (1993b), "Finance, Entrepreneurship and Growth: Theory and Evidence", *Journal of Monetary Economics*, Vol. 32, pp. 513-542.

(10) Levine, R., N. Loayza, and T. Beck, (2000), "Financial Intermediation and Growth: Causality and Causes", *Journal of Monetary Economics*, Vol. 46, No.1, pp. 31-77.

(11) Beck, T., Levine, R. and Loayza, N., (2000), "Finance and the Sources of Growth", *Journal of Financial Economics*, Vol. 58, No.1-2, pp. 261-300.

(12) Outreville, J. F., (1990b), "The Economic Significance of Insurance Markets in Developing Countries", *Journal of Risk and Insurance*, Vol.18, No.3, pp. 487-498.

(13) Catalan, M., Impavido, G and Musalem, A.R., (August, 2000), "Contractual Savings or Stock Markets: Which leads?" *Financial Sector Development Department*, the World Bank.

(14) Ward, D., and R. Zurbruegg., (2000), "Does Insurance Promote Economic Growth? Evidence from OECD Countries", *Journal of Risk and Insurance*, Vol. 67, No.4, pp. 489-507.

(15) Browne, M. J. and Kim, K., (1993), "An International Analysis of Life Insurance Demand", *Journal of Risk and Insurance*, Vol. 60, No. 4, pp. 616-634.

(16) Browne, M.J., Chung J., and Frees E. W. (2000) International Property-Liability Insurance Consumption *Journal of Risk and Insurance*, Vol.67, No.1, pp. 73-90.

(17) Ward, D., and R. Zurbruegg., (2002), "Law, Politics and Life Insurance Consumption in Asia" *The Geneva Papers on Risk and Insurance*, Vol. 27, pp. 395-412.

(18) Beck, T. and Webb, I., (October 2002), "Economic, Demographic and Institutional Determinants of Life Insurance Consumption across Countries", *Working Paper: World Bank and International Insurance Foundation*.

(19) Esho, N., Kirievsky, A., Ward, D. and Zurbruegg, R., (2004), "Law and the Determinants of Property Casualty Insurance", *'Journal of Risk and Insurance'*, Vol. 71, No.2, pp. 265-283.

(20) Yaari, M. E., (1965), "Uncertain Lifetime, Life Insurance and the Theory of the Consumer", *Review of Economic Studies*, Vol. 32, pp.137-150.

(21) Hakansson, N. H. (1969), "Optimal Investment and Consumption Strategies under Risk and under Uncertain Lifetime and Insurance", *International Economic Review*, Vol. 10, No. 3, pp. 443-466.

(22) Lewis, F. D., (1989), "Dependants and the Demand for Life Insurance", *American EconomicReview*, Vol.79, No. 3, pp. 452-467.

(23) Sadhak, H., (2006), "Life Insurance and the Macro Economy", *Economic and Political Weekly*, Vol. 41, No. 11, pp. 1108-1112.

(24) Fortune, P., (1973), "A Theory of Optimal Life Insurance: Development and Tests", *Journal of Finance*, Vol. 28: pp. 587-600.

(25) Fischer, S., (1973), "A Life Cycle Model of Life Insurance Purchases", *International Economic Review*, Vol.14, No.1, pp. 132-152.

(26) Campbell, R. A., (1980), "The Demand for Life Insurance: An Application of the Economics of Uncertainty", *Journal of Finance*, Vol. 35, pp. 1155-1172.

(27) Beenstock, M., G. Dickinson and S. Khajuria., (1988), "The Relationship between Propert-Liablity Insurance Premiums and Income: An International Analysis", The Journal of Risk and Insurance, Vol. 55, No. 2, pp. 259-272.

(28) Truett, D. B. and Truett, L. J., (1990), "The Demand for Life Insurance in Mexico and the United States: A comparative Study", *Journal of Risk and Insurance*, Vol. 57, No. 2, pp. 321-328.

(29) Browne, M. J. and Kim, K., (1993), op. cit.

(30) Outreville, J. F., (1996), "Life Insurance Markets in Developing Countries", *Journal of Risk and Insurance*, Vol. 63, No.2, pp. 263-278.

(31) Ward, D., and R. Zurbruegg., (2002), op. cit.

(32) Beck, T. and Webb, I., (October 2002), op. cit.

(33) Enz, R., (2000), "The S-curve Relation between Per Capita Income and Insurance Penetration", *The Geneva Papers on Risk and Insurance: Issues and Practice*, Vol. 25, No. 3, pp. 396-406.

(34) Greene, M. R., (1954), "Life Insurance Buying in Inflation", *Journal of the American Association of University Teachers of Insurance*, Vol. 21, pp. 99-113.

(35) Fortune, P., (1973), op. cit.

(36) Babbel, D. F. (1981), "Inflation, Indexation and Life Insurance Sales in Brazil", Journal *of Risk and Insurance*, Vol. 48, pp. 115-135.

(37) Babbel, D. F. (1979b), "Measuring Inflation's Impact on Life Insurance Costs", *Journal of Risk and Insurance*, Vol. 46, No. 3, pp.425.

(38) Browne, M. J. and Kim, K., (1993), op. cit.

(39) Outreville, J. F., (1996), op. cit.

(40) Cargill, T. F. and Troxel, T. E., (1979), "Modeling Life Insurance Savings: Some Methodological Issues", The *Journal of Risk and Insurance*, Vol. 46, No. 2, pp. 391-410.

(41) Rubayah, Y. and Zaidi, I., (2000), "Prospek Industri Insurans Hayat Abad Ke-21", *Utara Management Review*, vol. 1, no. 2, pp. 69-79.

(42) Ward, D., and R. Zurbruegg., (2002), op. cit.

(43) Government of India, (2007), *"Economic Survey, 2006-07"*, Ministry of Finance, New Delhi, India.

(44) Cargill, T. F. and Troxel, T. E., (1979), op.cit.

(45) Outreville, J. F., (1996), op. cit.

(46) Rubayah, Y. and Zaidi, I., (2000), op. cit.

(47) Outreville, J. F., (1996), op. cit.

(48) Beck, T. and Webb, I., (October 2002), op. cit.

(49) Financial Sector Development Indicators: "*Comprehensive assessment through enhanced information capacity*, (2006)", Financial Sector Operations and Policy, World Bank, *FSDI@worldbank.org*.

(50) Babbel, D. F., (1985), "The Price Elasticity of Demand for Whole Life Insurance", *The Journal of Finance*, Vol. 40, No. 1, pp. 225-239.

(51) Beenstock, M., G. Dickinson and S. Khajuria., (1988), op. cit.

(52) Browne, M. J. and Kim, K., (1993), op. cit.

(53) Outreville, J. F., (1996), op. cit.

(54) Ward, D., and R. Zurbruegg., (2002), op. cit.

(55) Lim, C. C. and S. Haberman, (2004), "Modeling Life Insurance Demand from a Macroeconomic Perspective: The Malaysian Case", Paper presented at *The 8th International Congress on Insurance: Mathematics & Economics, Rome, 2004*, http://www.ime2004rome.com/fullpapers/Chee%20PAPE.pdf.

(56) Outreville, J. F., (1996), op. cit.

(57) Ward, D., and R. Zurbruegg., (2002), op. cit.

(58) Browne, M. J. and Kim, K., (1993), op. cit.

(59) Babbel, D. F., (1985), op. cit.

(60) Beenstock, M., G. Dickinson and S. Khajuria., (1988), op. cit.

(61) Lewis, F. D., (1989), op. cit.

(62) Browne, M. J. and Kim, K., (1993), op. cit.

(63) Outreville, J. F., (1996), op. cit.

(64) Ward, D., and R. Zurbruegg., (2002), op. cit.

(65) Beck, T. and Webb, I., (October 2002), op. cit.

(66) Beenstock, M., G. Dickinson and S. Khajuria., (1988), op. cit.

(67) Beck, T. and Webb, I., (October 2002), op. cit.

(68) Browne, M. J. and Kim, K., (1993), op. cit.

(69) Beck, T. and Webb, I., (October 2002), op. cit.

(70) Outreville, J. F., (1996), op. cit.

(71) Hwang, T. and B. Greenford., (2005), "A Cross-Section Analysis of the Determinants of Life Insurance Consumption in Mainland China, Hong Kong, and Taiwan", *Risk Management and Insurance Review*, Vol. 8, No. 1, pp. 103-125.

(72) Zhang, C and N. Zhu, (2005), "Determinants of the Development of Insurance in China under the Globalization". www.cerdi.org/colloque/CHINE2005/papier/Zhang_31.pd.

(73) Zhuo, H., (1999), "Demand for Life Insurance: An Empirical Analysis on China", *Zeitschrift fur Versicherungwesen*, No. 6-7.

(74) Hwang, T. and S. Gao, (2003), "The Determinants of Demand for Life Insurance in an Emerging Economy- the Case of China", *Managerial Finance*, Vol. 29, No.5/6, pp.82-96.

(75) Goldsmith, A., (1983), "Household Life Cycle Protection: Human Capital Verses Life Insurance", *Journal of Risk and Insurance*, Vol. 50, pp. 33-44.

(76) Ferber, R and L. C. Lee., (1980), "Acquisition and Accumulation of Life Insurance in Early Married Life", *Journal of Risk and Insurance*, Vol. 47, pp 713-734.

(77) Schwebler, R., (1984), "Identification and Quantification of the Overall Impact of the National Economy on Life Assurance in the Federal Republic of Germany", *The Geneva Papers on Risk and Insurance*, No. 32, pp. 280-298.

(78) Diacon, S. R., (1980), "The Demand for U. K. Ordinary Life Insurance: 1946-1968", *Geneva Papers on Risk and Insurance*, June.

(79) Gujarati, D.N and Sangeetha., (2007), "*Basic Econometrics" (Fourth Edition)*, Tata McGraw-Hill Publishing Company Limited, New Delhi, pp. 821-825.

(80) Lim, C. C. and S. Haberman, (2004), op. cit.

(81) Dickey, D. A. and Fuller, W.A., (1979), "Distribution of the Estimators for Autoregressive Time Series with a Unit Root." *Journal of the American Statistical Association*, Vol. 74, pp. 427-431.

(82) Granger, C.W.J. and Newbold, P., (1974), "Spurious Regression in Econometrics." *Journal of Econometrics*, Vol. 2, pp. 111-120.

(83) Engle, R and Granger, C. W. J., (1987), "Co-integration and Error correction: Representation, Estimation and Testing", *Econometrica*, vol. 55, pp.251-276.

(84) Phillips, P. C. B. and Perron, P., (1987), "Testing for a Unit Root in Time Series Regression." *Biometrica*, Vol. 75, No. 2, pp. 335-346.

(85) Li, D., F. Moshirian, P. Nguyen and T. Wee, (2007), "The Demand for Life Insurance in OECD Countries", *Journal of Risk and Insurance*, September.

(86) Neumann, S., (1969), "Inflation and Savings through Life Insurance", *The Journal of Risk and Insurance*, Vol. 36, No. 5, pp. 567-582.

(87) Fehr, E. and Tyran, J. R. (2001), "Does Money Illusion Matter?", *American Economic Review*, Vol. 91, pp. 1239-1262.