

Composition of Premium in Life and Non-life Insurance Segments

R K Sinha¹, Ishtiaque Alam² and Triloki Nath^{3*}

¹ Deputy Director in the R&D Department of IRDA, Hyderabad, India

² Research Assistant in the R&D Department of IRDA, Hyderabad, India

³ Research Assistant in the F&A Department of IRDA, Hyderabad, India

Abstract. MANY studies have shown that the insurance business plays an important role in an economy and its growth depends on the level of economic activities in the economy. Insurance penetration is one important measure, which measures the volume of insurance business, in terms of premium underwritten, as a percentage of Gross Domestic Product (GDP). The insurance penetration is normally positively correlated with the per capita GDP. The relationship is generally found to be linear in the developing countries, which is the beginning part of the global curve (the S-curve). However, the life and non-life insurance penetration do not increase with the same rate and are different from the growth rate of the total insurance penetration. The paper examines the variability of the composition of life and non-life insurance premium in the total premium at a given level of insurance penetration. The study reveals that the share of life insurance premium to the total insurance premium increases with the increase of insurance penetration. This supports the basic nature of life and non-life insurance products where the non-life products are largely need-based and cannot be postponed once need arises. In contrast, the life insurance products are mostly savings instruments, which could be purchased increasingly in a growing economy. The paper demonstrates the same with the data of 86 countries, which reveals very interesting results. The paper carries out a simple linear regression analysis to estimate the ratio of life insurance premium to the total insurance premium at a given level of insurance penetration.

Keywords: Gross Domestic Product, Insurance penetration, S-curve

1. Introduction

The Insurance sector is an important service sector in any economy, which provides a market for transfer of risk from the insured to the insurance company in return for an amount 'premium'. The company invests the premium amount in various investment instruments, which helps in developing infrastructure of the economy. From insured's point of view, it could be similar to a savings instrument, in addition to its coverage for various risks. This is more applicable to the life insurance products, which are largely purchased as savings. In contrast, the non-life products are largely need-based and are mandatory in many of the occasions. Further, the potential insured cannot postpone the purchase of the non-life insurance, when it becomes a need and is due. For example, the insurance of a motorcar becomes due as soon as it is purchased by someone, as the purchaser cannot drive on the road without insurance. The purchase of life insurance products can be postponed by virtue of its nature. Both the volumes of life and non-life insurance business increase as the economy becomes more productive, in terms of its Gross Domestic Product (GDP).

Various studies [Carter and Dickinson (1992), Enz (2000), Zheng et al (2008) etc.] have attempted to examine the nature of inter-relationship between the insurance penetration and per capita GDP. Majority of these studies have revealed that a positive relationship holds between the insurance penetration and per capita GDP. Thus, the insurance penetration normally increases with the increase of per capita GDP. A simple linear relationship will mean that the income elasticity of demand for insurance is a constant. This constant could be less than one, more than one or equal to one, depending upon the slope of the line of

* Corresponding author. Tel.: + (040-23381165); fax: + (040-66823334).
E-mail address: (trilokinath@irda.gov.in).

relationship. In case, the relationship is non-linear, the elasticity does not remain constant, which changes with the level of per capita GDP. The studies of Carter and Dackinson (1992) and Enz (2000) described that the relationship can be explained with an S-curve, as the insurance penetration cannot go on increasing forever with income. Enz (2000) proposed a logistic curve, which tracks an S-curve appropriately. The study of Enz (2000) plotted the insurance penetration with the per capita GDP for select countries both for the life and non-life segments separately. It revealed that there exists a level of per capita GDP at which the income elasticity of demand for insurance reaches to maximum for both the segments (life and non-life) of insurance. The levels were found to be USD 15,000 and USD 10,000 for the life and non-life respectively. The study also attempted to identify the countries, which are consistently above or below the S-curve, and indicated the deviations to be on account of other factors affecting the insurance business of these specific countries.

Given the above findings, we attempted to identify whether there is any relationship of the life and non-life insurance with the level of insurance penetration. It may be noted that just like the total premium can be broken down into life and non-life premium, the total insurance penetration can also be broken down into life and non-life penetration. We study the ratio of the life insurance penetration to the total insurance penetration in the following section, which is indeed the same as the ratio of the life insurance premium to the total insurance premium.

2. Data and Methodology

2.1. Data

We use data from the Swiss Re Sigma Report 2010 consisting of 86 countries. We take the ratio of the life insurance penetration to the total insurance penetration and plot it versus the total insurance penetration. Figure 1 exhibits the scatter plot of the same.

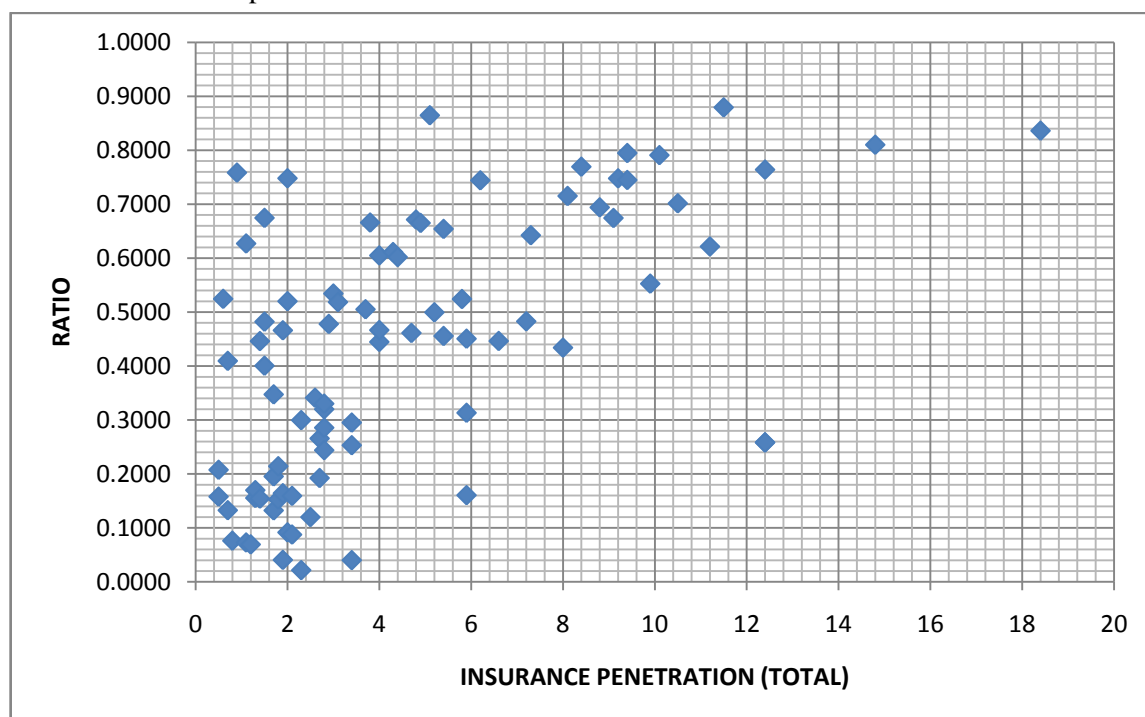


Fig. 1: Scatter plot of Ratio of life penetration to total penetration across countries

From the figure, one can see that the ratio generally increases with the increase of total insurance penetration. The interpretation of this is that suppose an economy has total insurance premium as 5 billion USD and GDP as 100 billion. The insurance premium consists of 3 billion USD in life and 2 billion USD in non-life. So, the ratio is 0.60 and insurance penetration is 5 per cent. Let an economy has a total premium of 20 billion USD and GDP as 200 billion USD, resulting in insurance penetration of 10 per cent. Then for this economy, one can expect the ratio of life to total premium not to be something around 0.60 per cent, but rather more than that.

The authors believe that the life insurance products constitute for higher relative share in the economies, which have high level of income penetration. In view of the nature of scatter plot (Figure 1), authors propose a linear relationship and carry out a simple linear regression analysis as below:

2.2. Methodology

A simple linear regression model is proposed as below:

$$R = a + (b * IP) + \text{error term}$$

Where, the variables R and IP are the dependent and the independent variables respectively.

R is the Ratio of life penetration to the total penetration (or equivalently, the ratio of life premium to the total premium) and IP is the total insurance penetration. Table 1 provides the regression coefficients.

Table 1: Estimates of co-efficient

Variable	Co-efficient	Standard Error	t-ratios	Probabilities
Constant	+ 0.2604	+ 0.035	+ 7.709	0.0001
IP	+ 0.0378	+ 0.006	+ 6.634	0.0001
$R^2 = 0.344$				

From the above, it is observed that the insurance penetration has a significant impact on the ratio and is positively associated. It is interesting to note that the estimated equation has an $R^2 = 0.344$ (or 34.4 per cent), which is reasonable and in line with the expectations from the scatter plot (Figure 1). Figure 2 exhibits the plot of observed and expected (predicted value derived from the regression equation with sorting by expected values from smallest to largest).

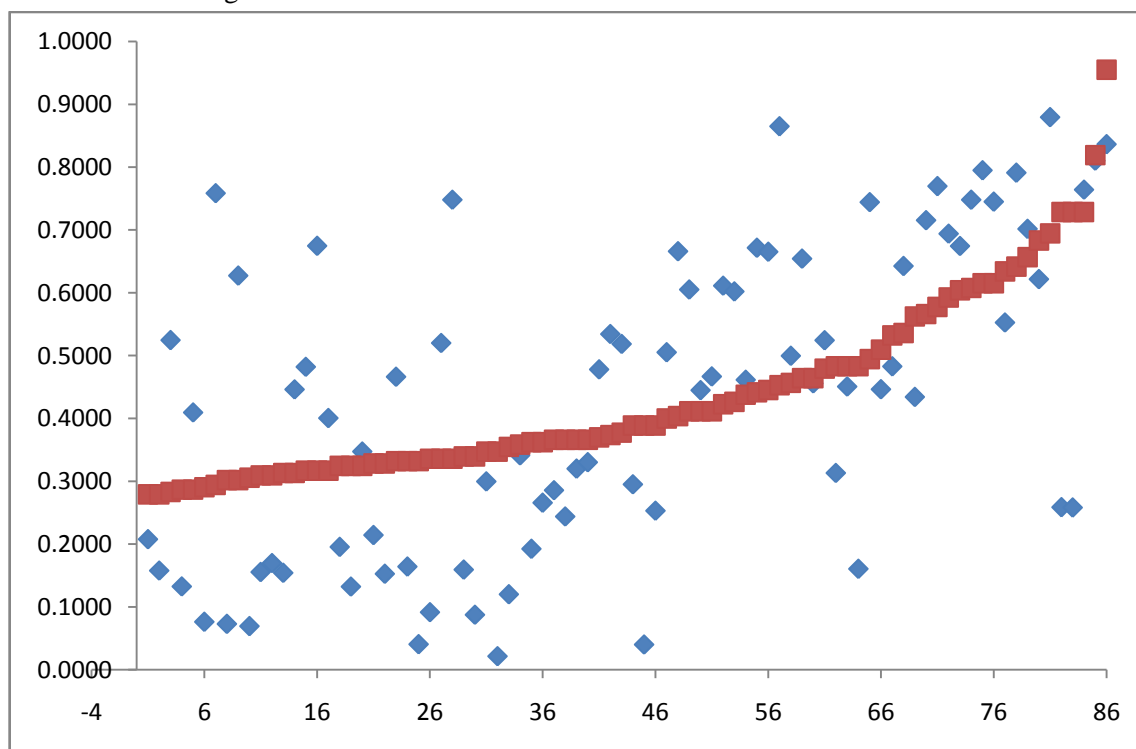


Fig. 2: Expected and Observed Values of Ratio

The figure clearly depicts large deviations of observed values of the Ratio from the model values for select countries. Figure 3 identifies and groups the countries, which have large negative deviations, low (absolute) deviations and large positive deviations. These are represented in Figure 3A, Figure 3B and Figure 3C respectively. Here, we define the large negative deviations, as the deviations, for which the value of Z is less than -0.50. Similarly, the large positive deviations are those for which Z is more than +0.50. The small deviations are the deviations falling in the range [-0.50, +0.50].

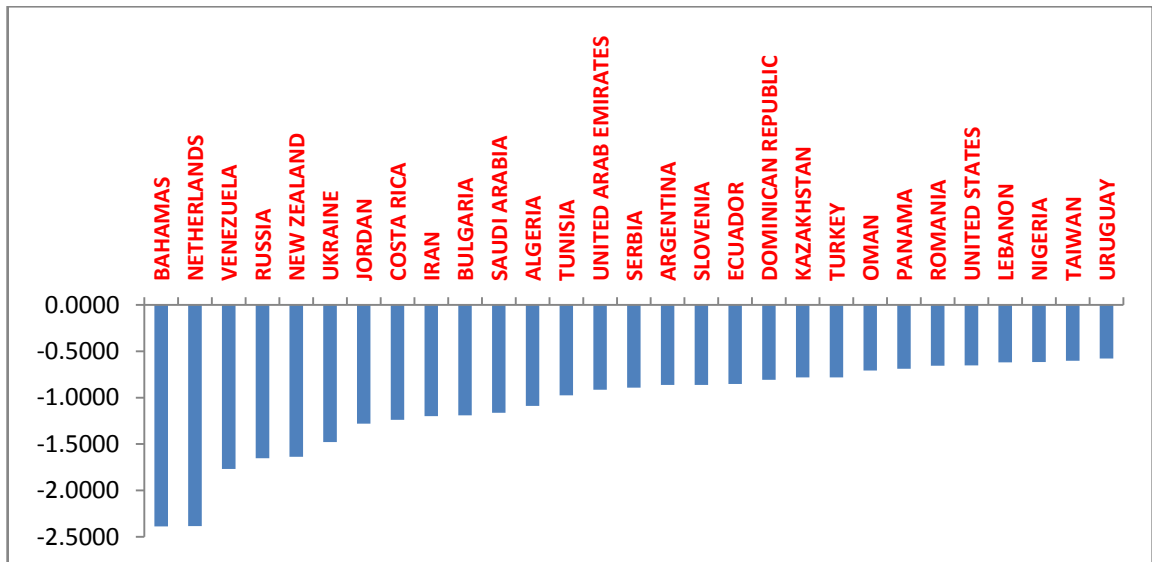


Fig. 3A: Countries with large negative deviations ($Z < -0.50$)

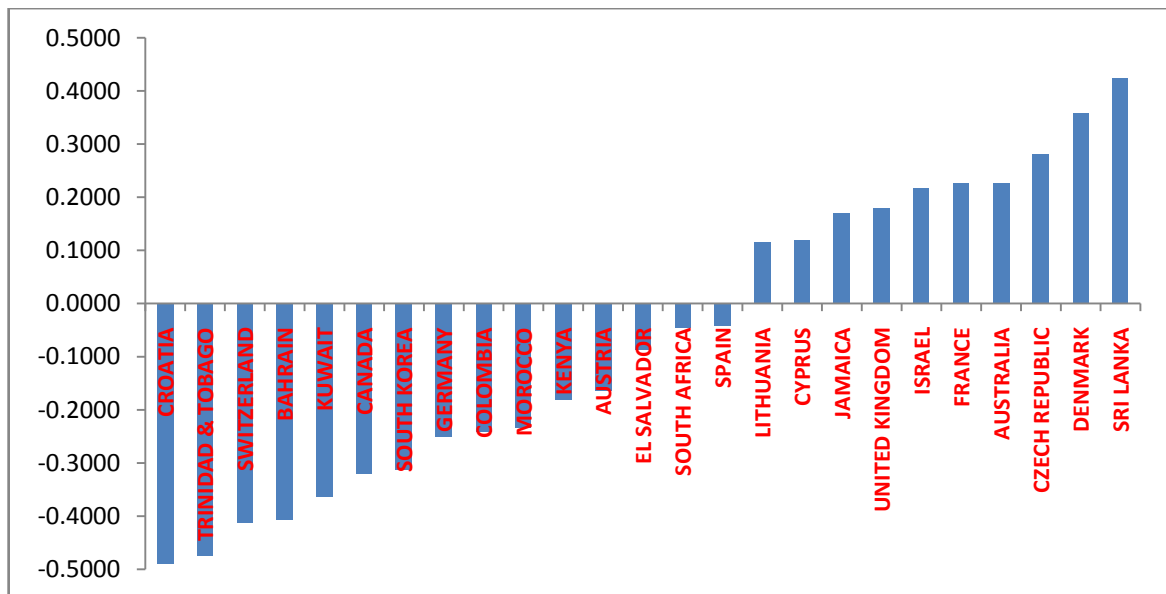


Fig. 3B: Countries with small deviations ($-0.50 \leq Z \leq +0.50$)

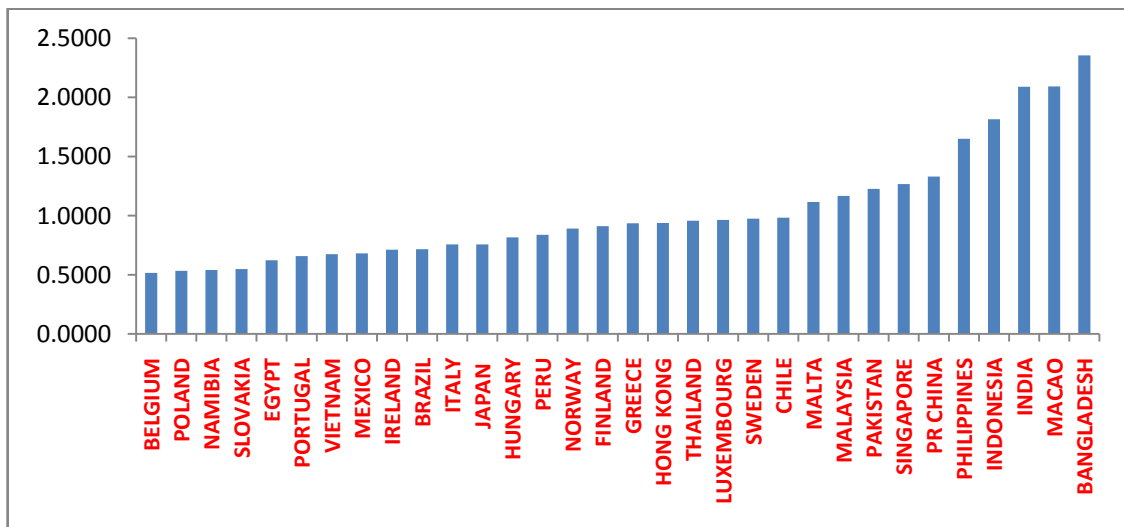


Fig. 3C: Countries with large positive deviations ($Z > +0.50$)

The above figures, which identify and group various economies of the world, could be useful in knowing the level and extent of the relationship, as depicted in the regression equation, they follow. Further, the countries, which have fallen at extreme end of deviations, are likely to be influenced by other general and/or country-specific factors. The ratio of life to total premium of the world (with these 86 countries) is computed as 0.58. Nine countries, viz. Taiwan, South Africa, United Kingdom, Bahamas, Netherland, Hong Kong, South Korea, France and Japan have insurance penetration of above 10 per cent. Fourteen countries viz. Columbia, Morocco, Kenya, Austria, el Salvador, south Africa, Spain, Lithuania, Cyprus, Jamaica, United Kingdom, Israel and Australia have shown strong agreement with the linear model with their Z-values within the [-0.25, +0.25] range.

In the regression analysis, five countries have deviations outside the range [-2, +2] and shows strong disagreement with the model. These are Bahamas, Netherland, India, Macao and Bangladesh. The regression model used in this paper is a single factor model. Accordingly, it neglects all other factors, which influence the relative preference for purchase of the life and non-life insurance products at a given resources allocated for purchasing insurance products. It may be interesting to identify these factors and their level of influence in preferring / not preferring for life insurance versus non-life insurance if the people of the economy have allocated a particular amount of money to buy insurance. There could be many socio, economic and demographic factors playing role in deciding whether to purchase insurance or not and if yes, whether to purchase life products or non-life products. In fact, factors could be cultural too [Chui (2007)].

3. Conclusions

The relationship between Insurance penetration and level of economic activities (measured as the per capita GDP) has been established by many researchers, which happen to be more-or-less linear in the emerging economies and follows an S-curve for the whole set of economies. The paper reveals that the components of insurance penetration by life and non-life insurance business do not grow with equal rate as the insurance penetration surges. In fact, the life insurance business accelerates at faster rate compared to that of the non-life with the rise of insurance penetration. Because of the basic nature of the life (which can be postponed) and non-life insurance (which is need-based and cannot be postponed), the former will have greater share, in case larger portion of insurance is purchased per capita of GDP. The emergence of non-traditional life insurance products, such as unit linked insurance products (ULIPs), which are largely purchased for savings and investment purposes, are likely to be high, in case, larger insurance per capita GDP is purchased by the people of an economy.

4. Acknowledgements

The Authors acknowledge their employer “Insurance Regulatory and Development Authority (IRDA)” for its support and encouragement in preparing the paper.

The view expressed in the paper are of the authors and do not necessarily represent the organization they belong(ed) to.

5. References

- [1] A Chui, C. Kwok. National Culture and Life Insurance Consumption. *Journal of International Business Studies*, 39, 88-101.
- [2] R. L. Carter, G. M. Dickinson. Obstacles to the liberalization of trade in insurance, *London: Harvester Wheatsheaf*.
- [3] R. Enz. The S-curve relation between per-capita income and insurance penetration, *Geneva Papers on Risk and Insurance*, 25 (3): 396-406.
- [4] W. Zheng W, Y. Liu, D Yiting. New Paradigm for International Insurance Comparison: with an application to comparison of seven insurance markets.
- [5] The World Insurance Report 2010, Swiss Re.