Analysing business scenarios statistics economics and econometrics economics essa...

Economics

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Abstract

Exact amount of role played by a particular discipline in another can be relatively easily identified but it is very difficult to be quantified. In spite of such difficulty, an attempt can be made to highlight and reflect the nature of roles played by a particular discipline in another. Such identification is very important in augmenting the pace of development in interdisciplinary activities. It is also very useful to understand what sort of forward and backward interlinks exist among disciplines which collectively may exert influence on a particular sector like Business sector. Such understanding help formulate effective policies and programs. We principally focus on how various avenues of statistics, economics and econometrics, in isolation or in combination, can be gainfully utilized in analyzing scenarios of Business sector. Such results help formulate more authentic policy options. As an example, we have picked up the Insurance WorldThe principal purpose of this paper is to delineate the key roles of three interwoven disciplines namely, statistics, economics and econometrics in analyzing activities associated with the Insurance world. We demonstrate how forward and backward linkages exist in the world of statistics, economics and econometrics. We highlight how different tools of statistics, principles of economic thought and tools of econometrics can be accommodated in analyzing behavior of Insurance related variables. We have demonstrated using Conjoint Analysis how Insurance Policy makers can gainfully utilize statistical tools in framing policy options for different service packages. We

have also adopted econometric tool namely, Regression Analysis to show how analysis of contribution of Insurance investment to GDP can be made useful. Interesting outcomes have emerged which provoke to gainfully utilize statistical, economic and econometric tools for meaningful and useful policy analysis. For making the analysis we had utilized both Primary and Secondary data.

I. INTRODUCTION

Interdisciplinary interactions and their contributory roles need not be exaggerated. It is true that such interactions differ in magnitude and nature. It is also true that the magnitude of roles played by different disciplines in a particular arena differ from one discipline to another. However, the exact amount of role played by a particular discipline in another can be relatively easily identified but it is very difficult to be quantified. In spite of such difficulty, an attempt can be made to highlight and reflect the nature of roles played by a particular discipline in another. Such identification is very important in augmenting the pace of development in interdisciplinary activities. It is also very useful to understand what sort of forward and backward interlinks exist among disciplines which collectively may exert influence on a particular sector like insurance world. Such understanding help formulate effective policies and programs. This paper is supposed to be a very useful guide for applied researchers in business, economics and many other social science branches. The plan of the paper is as follows. In section II we delineate the roles of statistics, economics and econometrics which can be identified to be useful for analyzing insurance activities. While in section III we discuss forward and backward linkages among three interlinked

disciplines namely statistics, economics and Econometrics, in section IV we provide description of empirical data used for analysis purpose in the framework of Conjoint Analysis and Econometric model. In section V we provide analysis of empirical investigation followed by concluding remarks in section VI.

II. ROLE OF STATISTICS, ECONOMICS AND ECONOMETRICS IN ANALYSING INSURANCE ACTIVITIES

In this section we briefly highlight various tools and concepts which can be gainfully utilized in Insurance World.

A. Role of Statistics in Analyzing Insurance Activities

Statistics is a discipline whose varieties of use in various disciplines have been drawing keen interest and attention of theoretical and applied researchers for a long time. Insurance sector is not an exception in this respect. We attempt to focus on the roles of various elements of statistics in insurance sector under several subheadings as depicted below.

Basic Statistics in Insurance

The use of basic statistical tools such as measures of central tendency, measures of dispersion, index numbers etc., are of day-to-day affairs in insurance sector as in many other fields. For example, average time taken to settle claims, average of relative yearly changes in premiums (geometric mean), and comparing variability of risk data by using standard deviation and coefficient of variation (CV) can be gainfully used in analyzing Insurance Activities. In addition to ascertaining averages and spreads for distribution of

data on different insurance related variables, index number can be effectively used for measuring relative changes in variable values with respect to time and space. Say for example, chain index for volume of sales or claims across time points can be very useful. Percentage change in volume of investment by insurance world at a particular time with reference to a base period or for a particular company with respect to another can be obtained by an appropriate Index Number. Similarly, shape of distribution of values of various insurance related variables help identify mode of concentration. This way, basic statistical tools help form grounding ideas of insurance transactions. For visual comprehension of behavioral pattern of different Insurance related variables graphical representation is of great use. For example, claims versus policies sold, employees by locations etc. can be graphed quick visual ideas. In order to compare dispersion in some variables say, age with respect to claims CV can be of great use. A pleasant way of presenting data is frequency distribution and associated graphs like frequency curve, ogive which can provide ‘ less than’ and ‘ more than’ scenarios for values of some variables. For example, it may be useful to know above which age level more than 50% claimants lie in a particular time period.

Sampling Technique in Insurance

This important part of the discipline of statistics can befittingly be used for analyzing activities in insurance sector. Such work may be exploratory, diagnostic and any other types of research aimed at formulating and implementing insurance policies and assessing insurance activities. In determining representative sample size as well as the appropriate sampling

method, sampling theory of statistics is of paramount importance. In this connection we may cite the example of assessing marketing strategy of Insurance products. For such purpose, samples of sales personnel, customers, insurance officials etc. need to be statistically decided. Thus, sample size representative for a population with designated confidence and precision level need to be determined statistically. Similarly, for assessing knowledge, attitude, choices and preferences of potential customers, samples of households can be statistically determined and surveyed. We have adopted a sampling approach which is presented in section IV. We want to assess people’s perception about usefulness of Insurance. Our purpose is to conduct a survey at household level. Here we present a practical example of sample size determination for national level sample of households. For determining a representative sample size of households we have adopted a strategy delineated below which is different from usual practice. According to statistical year book 2009, there are 25490822 households of which about 24% are Urban and 76% Rural. Averages Household size is 4. 9 of which 26. 4% i. e. about 1. 3 is expected to be in the age group 5-14 years. Who go to school. Thus, our target population of households having young people in age group 5-14 years is almost all the households. Now, according to statistical yearbook (2009) 55. 6% of young children in age group 5-14 years in Rural areas attend schools and such figure for Urban areas is 58. 3%. We plug such figures in the following sound formula for determining representative sample size of households. wheren1 = Sample size of households for urban stratump1= Proportion of dropouts in urban areaq1 = 1-p1p2= Proportion of dropouts in rural areasq2= 1-p2, are respective

population proportionsn1 = Urban sample sizen2= Rural sample sizeAccording to statistical yearbook 2009, n2= 2. 9 n1. Thus, we have at first decided n1 and then rural size n2. Using 95% confidence level at 1. 5% precision level and 10% design effect, we have determined household sample sizeN= 1546 (n2= 1177, n2 = 369)Such an example shows how exploitation of statistical tools can be gainfully used in practice.

Probability Theory in Insurance

Probabilistic assessments and use of probability in estimating expected values of important insurance related variable such as expected demand, expected profit, expected loss, expected risk coverage etc. are of immense use in Insurance world. When there are large numbers of agents say, claimants, law of large number is very useful for deciding long-run policy options. Some common features may crop up repeatedly in Insurance World and these may follow some types of probability distributional pattern. Such probability distribution can be used to estimate expected value, say, expected number of claims for a particular range of payment may be needed sometimes. In order to show the role of probability theory in analyzing Insurance activities we provide an intuitive example below: Issue: An outdoor concert is scheduled on a particular day. Weather forecaster predicts chance of rain to be 25%. If it rains net is only $10, 000. If it does not rain the promoter is certain to net $100, 000. An Insurance company agrees to insure the concert for $100, 000 against a premium of $20, 000.

Should the promoter buy the Insurance?

In such uncertain situation we can use probability theory for meaningful and sensible decision making for the promoter as shown below. Table 1: Pay-off Table

DecisionStateInsureDon't Insurerain90, 00010, 000p= 0. 25No rain80, 000100, 000p= 0. 75

Expected Monetary Value (EMV) is given below: Insure: 0. 25(90000) +0. 75(80, 000) = 82, 500Don’t Insure: 0. 25(10000) +0. 75(100, 000) = 77, 500The above results suggest that the promoter should insure for long-run gain. In Insurance World decision making under uncertainty is a very common phenomenon. Simple example given above clearly shows that probability theory can be of great use in such situation. Using probability and its distributional pattern, decision maker can make probabilistic forecast of deaths, accidents, claims etc.

Estimation and Test of Hypothesis in Insurance

The main focus of using sampling technique in Insurance sector is to gather some representative information for drawing inference about some population characteristics. Confidence interval for prevalence of some quality characteristics in the population may be necessary and deviation from some set standard of some characteristics may need to be assessed in some cases for drawing inference. For example, proportion of not compliance with set rule of premiums may be needed. Similarly, some specific statements regarding population characteristics about Insurance activities may need to be verified. All these aspects associated with insurance

activities can be gainfully worked out in the framework of statistical theory of estimation and test of hypothesis. For example, one may need and construct 95% Confidence Interval for population proportion of claimants who will claim above certain level of money within next 6 months. Similarly, one may test the hypothesis that more than 50% people in the population will prefer a particular service package. For the above purpose one collects representative sample information and performs the tasks.

Application of Statistical Multivariate Tools in Insurance

Multivariate statistical techniques which analyze simultaneous behavior of many variables can be very gainfully utilized in analyzing Insurance activities since such large number of variables operates in Insurance World. This naturally arises due to interdependence among insurance related variables. These techniques primarily deal with empirical analysis of realistic results. These are simply not tools, they help decision making. In order to demonstrate the role of statistics in Insurance World we have adopted a Conjoint Analysis whose results are presented later in section v.

B. Role of Economics in Analyzing Insurance Activities

One of the key considerations in insurance sector is the understanding of economic behavior of insurance agents. One such key issue is the marginality analysis with respect to employment of new field staff, use of insurance materials, cost and volume of production, inventory control and marketing. Analysis of demand and supply behavior is another important lookout of analyzing insurance activities. Economics of product development in insurance sector is a very important issue. Use of utility theory in risk

assessment is also very important. In addition to demand-supply scenario of insurance products, economic concepts of long-run and short-run cost analysis, profit analysis are very important insurance related issue.

Utility Theory versus Risk Neutrality, Risk Seeking Behavior and Risk Aversion

Some factors always operate in the mind of consumers of Insurance Services. We can distinguish among a risk neutral, risk seeker and risk averse person in terms of utility as follows. According to basic economic theory a person derives satisfaction from increasing quantities of a commodity. This often leads to diminishing marginal utility from larger and larger quantities of a commodity. But, in connection with Insurance, we are concerned with uncertainty also in addition to utility (value) of a commodity. People maximize moral satisfaction or utility rather than maximizing mathematical expectation. Let us consider a risk neutral person. Suppose, we equate wealth to utility, say, $1= 2 utiles (measure of utility). Thus, zero wealth implies zero utility and assume maximum wealth is $50 which is equivalent to 100 utiles. People may have different attitudes towards risk and thus, everyone may not respond in the same way. We can reasonably assume that everyone is on the same continuum. Let us look to the following figure. Risk Seeker----------Risk AverseFigure 1In Figure 1 above, we notice that risk averse and risk seekers are at two extreme ends of the continuum. While risk averse people are always interested in insuring (safe action always preferred), risk seekers have predilection for risks and always prefer risky option in uncertainty and are not likely to insure. Vast majority of people lie somewhere in between. A person right at the middle

point would not be influenced by chance of loosing or gaining. He is guided solely by values. Then, we can show the relationship between utility and actual money as shown in the Figure 2 belowUtility100A50Risk neutral(a)O2550MoneyAButility100B BR Risk seeker eekBR((b)50BBBBBBBO253550MoneyUtility100CARisk averse500 102550 MoneyFigure 2(C)The line OA makes 45° angle with x-axis bisecting the origin. A person on this line is absolutely risk neutral having no feeling about risk because of the fact that zero wealth means zero utility, 1 unit of money equals two units of utility (2 utiles) and so on. Such a person is influenced by actual amount of money and not by chance of getting the money. Suppose, there is 0. 5 probability of getting the money, then expected amount $25 and sure amount $25 provides same utility 50 utiles. Risk neutral person will be indifferent between insuring and not insuring. Most people are not risk neutral and are not risk averse. Some people will even settle by much more that $25 as a certainty equivalent to give up game. Some people have predilection for risk and thus they like playing game. A risk seeker has more satisfaction from playing game than from sure amount. He has more satisfaction from expected gain on gambling than having a sure amount equal to expected amount. His certainty equivalent is much higher than expected value. In Figure 2 (a) (b) (c) A is the utility curve for a risk neutral person and B is utility curve for a risk seeker. It is clear from above figure that certainty equivalent of a risk seeker is more than 25 to have same amount of utility (50). Such a person would accept a minimum of $35(70% chance of winning) before he gives up the gamble. His expected satisfaction from taking risk is much higher than satisfaction from a sure amount $25

which is the expected gain. C is the utility curve for a risk averse and risk averse person earns more satisfaction (utility) on C compared to a risk neutral person on A. Here the person is much more concerned with certainty equivalent. He is ready to settle at a lower amount as a certainty equivalent to gamble. Suppose, someone is ready to settle at $10 (20% chance of winning) for same amount of utility. Even then he has higher satisfaction. So 50 utiles is equivalent to $10. The person is equally satisfied with $ 10 as he would be with 50 utiles in playing game where either wins $50 or zero. So, we can depict utility scenario of a risk averse person incorporating certainty equivalent in the game. Against an amount of $25, his utility level is above 50 utiles. Let us, consider an example. Suppose a machine costs $50, 000 and there is a chance of 0. 1 for the machine to be destroyed by mechanical trouble. Suppose an insurance facility is available whose premium is equal to expected value of loss. That is, Expected value of loss = 50, 000(. 1) + 0(. 9) = 5000 premium (say). Now, for a risk neutral person (indifferent to insuring or not insuring) satisfaction from sure loss of paying $5000 through premium is the same as for expected loss of $5000. Expected satisfaction is 100(. 9) +0(. 1) = 90 utiles, it is because total wealth $50000= 100 utiles. Corresponding to 90 utiles wealth is 45. Many people will be ready to pay the premium and even more than expected loss. Utility0Money959035 45 50Figure 3From Figure 3, it is observed that satisfaction (utility) from paying $5000 and reducing wealth to $45000 is the same as expected satisfaction. But, a risk averse person has higher satisfaction from a certain level of wealth of $45, 000 (after premium) than from expected wealth $45000 and for him utility equivalent is more (95 utiles). But, expected satisfaction is

only 90 utiles. Thus, a risk averter prefers to experience a loss of $5000 and consequent reduction of wealth to $45000 instead of undergoing risk of the machine being totally destroyed or not. Corresponding to expected 90 utiles he is ready to pay (more) an amount $ 15000 bringing his wealth to $35000 rather than running the risk. This shows that consumers prefer to pay premium higher than expected loss. In order to be relaxed from uncertainty many would pay premium higher than expected loss. Such type of analysis can be of high use in designing promotional strategies for Insurance services. Insurance is actually a risk transfer mechanism. It does not prevent accident but transfers financial burden resulting from accident to an insurance company. Thus, attitudes and risk awareness determine demand scenario of Insurance policy. Hence, to motivate people through advertising and awareness building increases demand for Insurance goods as it is the case with other commodities.

Demand-Supply nexus applied to Insurance world

Like other sectors, price of Insurance determines volume of demand. Such price is related to inflation and thus, inflation rate in an economy affects demand structure of Insurance. We have attempted an analysis in this regard and results are shown in section v. For keeping Insurance cover the same in real terms, sums insured have to be adjusted in line with inflation using index-linking. Taxation policies affect demand of Insurance. A tax rebate makes insurance cheaper. Thus, elasticity of demand for Insurance with respect to change in price, tax rebate etc need to be analyzed. Just like other goods and services, nature of competition also affects market of Insurance. Thus, in order to study market demand of Insurance, number of

competitors (multinational, domestic, monopoly, and oligopoly) is important to study about. Concepts of monetary, fiscal, exchange rates and income policies aimed at harmonizing economic activities invariably influence Insurance world. It is necessary to keep in mind that Insurance world keeps positive impacts on production process of an economy by providing peace of mind, reconstruction of damaged economic units and thereby generating income facilities for the people and so on. Analysis of roles of Insurance in economic activities like investments, saving, balance of payments etc. necessitates understanding of pure economic concepts and their interpretations. Control over money supply affects interest rates and in turn it affects aggregate demand, employment and equilibrium. If interest rate rises investment gets reduced. If Government spending rises or taxes are reduced, output increases and this is dampened due to rise in interest rate and thus, low investment. Increase in Government spending as an increase in investment has same effect on equilibrium output (increased). This has implication on demand for insurance product. If both Government spending and taxes are increased, aggregate output will still rise may be a little less. This shows that there are lot of scenarios in Insurance World which need to be analyzed using appropriate tools. Rise in interest rate causes decline in Investment resulting in lower income which leads to lower aggregate demand. Thus, demand for Insurance falls. If total demand for goods like houses, cars, machines, furniture etc increase, necessity of Insurance also increases because many people prefer risk transfers. Less purchases cause less demand for insurance. Expansionary monetary and fiscal policies may cause more demand for insurance which Insurance policy makers should

take into account. Exchange rate policies can affect insurance world. Many insurance companies earn considerable income from abroad and, thus this earning will be affected by exchange rates. Corporate tax rate affects taxes paid by insurance companies. Insurance world can affect balance of payments of a country. It occurs through premium received from abroad and claims paid to abroad, claims payment received from abroad, premiums paid to abroad. Government price control bears effect on insurance world. Floor pricing policy brings loss to insurance companies, while ceiling price policy results in low demand for Insurance, a reasonable price policy leads to normal market condition. It is because some sort of restrictions on demand and supply of services and goods come into force due to maximum and minimum pricing. One can attempt to verify whether money supply increases inflation or not: To investigate whether money growth is associated with price. Such results may provide guidelines for business decision making. One can use Pareto distribution of total bank’s assets to identify homogenous groups of banks. Similarly, other enterprises can also be identified in the similar way. Hence some specific studies like cost-effectiveness analysis can be done. Such analysis may indicate factors influencing cost-effectiveness. Such factors may be equity to asset, ratio of nonperforming loans to total loans, liquid asset to total asset etc. Another horizon can be to adopt method like put option framework for calculating requirements of short-term insurers. One can follow Merton (1977). Such results help formulate policy guidelines. Behavioral stereotype of commercial baking activities can be analysed in the framework of CAMEL Model. One can also test Friedman (1977) hypothesis which states that greater inflation uncertainty adversely

affects real economic activity as inflation uncertainty reduces the inflation content of prices, distorts relative prices and thereby lowers economic activity. High inflation is associated with high variable inflation. Such investigation can be made using ARCH /GARCH types of models. We know business services provide essential input to production and trade in both goods and services. Role of business services for competitiveness in downstream industries can be analysed using statistical & econometric tools. Relationships between trade costs in business services and performances in downstream industries can be analyzed. Such performance indicators may be index of marginal intra-industry trade, value of weight ratio of exports. In decision making process an entrepreneur or a business manager may take into account the research outcomes which come out due to welfare maximizing combination of inflation and distortionary taxes since taxes are generally distortionary.

C. Role of Econometrics in Analyzing Insurance Activities

In pointing out the role of econometrics in analyzing insurance activities, it is pertinent to say that econometrics can be considered as a marriage having three partners, namely, economics, mathematics and statistics. Any way, the important task which can be performed by econometric principles in insurance sector is model building for different insurance activities. For example, a forecast model for sale, claims etc. are a very powerful and useful econometric tool which can be befittingly and beneficially used in policy and goal formulation in Insurance world. Factors affecting demand and supply of insurance products can be elegantly analyzed in the framework of econometric models. Another interesting and useful horizon of econometrics

which can be of effective application in the Insurance World is the choice model approach. People's attitude towards Insurance, tastes and preferences for particular types of Insurance services can be very elegantly analyzed in the framework of choice models since such modeling strategies take account of discrete choices, yes/no, like/dislike, prefer/not prefer etc. It is emphasized that simultaneous equations models can be very powerful tools in identifying interactions of various endogenous variables operating in Insurance World. For yearly data on say, premium, claims, GDP, contribution of Insurance on GDP etc. regression analysis can be done to isolate relative importance of factors. Comparison among different insurance companies can also be made in the same framework. In this line we have estimated a regression and results are shown a little later. However, in order to keep the size of the paper within allowable margin, we provide results of only few Multiple Regression Analysis as applied in Insurance World.

III. DELINEATION OF FORWARD AND BACKWARD LINKAGES AMONG STATISTICS, ECONOMICS AND ECONOMETRICS

In the previous section we have attempted to focus on how tools and concepts in statistics, Economics and Econometrics are useful in analyzing insurance activities. Here we try to demonstrate what type of interlinks exist among those disciplines so that their collective usefulness in analyzing insurance activities can be better understood. We start our discussion with a schema given below which portrays interwoven links.

EEconomicsBADCStatistics Insurance worldFEconometricsFigure 4In the above figure we have altogether six arrows A, B, C, D, E and F. We notice

that A, C, and D indicate two-way interlinks and B, E and F indicate one-way links. If we analyze these arrows, our understanding of interlinks among three disciplines as well as their usefulness in insurance world are better understood. Arrow A shows that while statistics provides (forward linkage) various tools to an economist to verify economic theories, economics provides (backward linkages) scopes for a statistician to develop and workout new tools and theories keeping in mind what is needed for economic theory. Arrow C and D can be more easily illustrated. Basically Econometrics is heavily dependent on both statistics and economics. Even then it has its own domain. Econometric criteria are very much necessary to validate economic theory and such criteria have strong footing on statistical theory. While an Econometrician encourages an economist to keep on developing new economic thoughts with an assurance of validating and modifying such thoughts, it motivates a statistician to develop new theoretical frameworks which have scopes for being accommodated in econometric framework. Thus, it is clear that development of economic thought without being able to be accommodated in econometric analysis is of little use. Similarly, development of statistical theory without being further used in econometric framework is incomplete. The above argument indicates backward linkages of econometrics but forward linkages for economics and statistics. A simple example will illustrate the nexus still better. Assuming saving(s) as a function of ratio of expenditure to income (E/I) an economist will put forth a deterministic modelS= f (E/I) = a+b (E/I) in linear form. An econometrician will transform this static model into a stochastic one through incorporating a random error term e in the form S= a+b (E/I) +e. Econometrician in turn

draws on the distributional pattern of e as developed by statistician. Now, economist, statistician and econometrician together help analysis Insurance world via their own domain.

IV. DATA DESCRIPTION

For empirical investigation we have used some data collected from Bangladesh Insurance Academy, Insurance Association and Statistical Year Book of Bangladesh. Time series data on following variables for the period (1988-2008) were collected. Yearly Premiums, yearly Investment by Insurance companies, GNP, GDP and Inflation rates are the variables dealt with in the paper. We have collected data from two sources namely, Primary Source (intercept interview at Insurance Company Premise) and Secondary Source. While primary data were used for Conjoint Analysis secondary data were used for Econometric Model estimation. We have conducted an Intercept sample survey in an Insurance company namely, Progoti Life Insurance. We have visited the office for one week and interviewed randomly chosen 18 policy holders per day. Thus, sample size for exit interview is n= 90. We framed a short questionnaire made of several choice alternatives. We show a sample of few combinations (product profile) only due to page problem. We show it for a single installment premium Life Insurance policy. 19 years planCombination C1: (Age limit 41 years, at the end/ sudden death return is 3 times, Tax rebate, 90% of surrender value as loan after 2 years). Combination C2: (No age limit, at the end/ sudden death return is 4 times, No tax rebate, 90% of surrender value as loan after 4 years). 12-years planC1: (Age limit 48 years, at the end/ sudden death return is 2 times, Tax rebates, 90% of surrender value as loan after 2 years)

V. EMPIRICAL RESULTS AND ANALYSIS

Here we present results of an application statistical Multivariate tool namely, Conjoint Analysis in the Insurance world followed by results of application of Multiple regression.

Conjoint Analysis Results

We have adopted multifactor evaluation approach. We have considered four different factors. First 3 factors have 3 levels each and the last factor has 2 levels. Thus, in all there are 54 total numbers of combinations. Considering it as a large number of product profiles, we have used orthogonal design and selected 18 combinations as main factors assuming higher order interactions to be insignificant. We have obtained utility weights (part-worths) of a respondent using scale 0-10. We have estimated preference values using regression method for which factor levels are treated as predictor variables and preference values as criterion variable. Estimate of preference value for any product profile is obtained by adding utility values of respective levels of factors of that profile. We present the obtained results below. A set of actual and estimated preference values for a respondent. Table 2CombinatiosActualEstimted

Preference ValuePreference Value15. 55. 3526. 16. 2737. 07. 8549. 09. 1158. 58. 4969. 110. 1074. 04. 4185. 55. 8596. 56. 90108. 18. 41117. 57. 72129. 59. 22133. 13. 25144. 14. 75155. 05. 48166. 47. 10177. 16. 77189. 59. 2Above results show that estimated values are quite close to actual values. However, from such results performed for a representative sample, a policy maker can pick up combinations which are the most preferable to

customers. In other words, market segmentation can be done and most desirable features of service can be worked out. Hence, it is clear to us that statistical multivariate tools can be gainfully used for policy making in the Insurance world. Segments of homogeneous customers can be formed and market Priority share predictions can be made using results of Conjoint Analysis.

Regression Results and Analysis

We have formed regressions as presented below. Regression of per capita GNP(y) on Insurance Investment(X) by types. Here, we hypothesis that growth in GNP in an economy is influenced by growth in economic activities in the economy. Economic activities in turn depend on investment. A major investment in the economy is done by Insurance sector. Hence, we formed following regression. We use 3 types of investment. y = β0+β1X1+β2X2+β3X3 + uEstimated regression of per capita GNP(y) on Private General Insurance investment (X1), Private Life Insurance Investment (X2), Public Life Insurance Investment (X3) is

y = 59. 3870+0. 00033X1+0. 00138X2+0. 003469X3

Taking per capita GDP as dependent variable, we have the estimated the regression with above mentioned 3 regressors as

y = 35. 70242+0. 00015055X1+0. 00077105X2+0. 001971602X3

Considering the fact that if Income increases, then Investment also increases, we have estimated the Reverse regression. We take premium(y) as a surrogate for Demand for Insurance and per capita GNP as a regressor

(X) to see how y varies with respect to X. Our estimated regression isLife Premium y = -17273. 3+268. 9242XSimilarly, taking per capita GDP as a regressor, we haveLife Premium y = -18306+475. 4434XResults of both the regressions clearly show positive impact of per capita GNP and GDP as expected on the demand for Insurance product. We have also attempted to see how inflation and per capita income can impact upon demand for insurance. Here also we use premium as a surrogate for demand for insurance. Year to year inflation rate is taken as an independent variable. Our estimated regression of life premium (y) on per capita GNP (X1), Private Life Insurance Investment (X2) is

Life Premium y = -17301. 80 + 262. 37X1 - 114. 33X2

Results of above regression clearly show positive impact (as expected) of per capita GNP(X1) and negative impact of Inflation rate(X2) on life premium. Taking Private General Insurance investment as dependent variable, we have the estimated the regression with above mentioned two regressors as

General Premium y = -619. 72 + 28. 29X1 -41. 93X2

Results of above regression clearly show positive impact of per capita GNP and negative impact (as expected) of the inflation rate on general premium.

VI. CONCLUSION

In this paper we principally have attempted to demonstrate how various tools of interwoven disciplines like statistics, economics and econometrics can be beneficially adopted to analyze insurance related activities. We have demonstrated that multivariate tools like Conjoint Analysis and Regression Analysis can provide outcomes which can be very useful for decision makers

in Insurance world regarding forming service package, incentives etc. It has become clear that using both primary and secondary data in a large scale, better insights of the scenarios in Insurance World can be achieved through using statistical, economic and econometric tools although partially it has been demonstrated in the present paper.