CAUSAL RELATIONSHIP BETWEEN ECONOMIC DEVELOPMENT AND GENERAL INSURANCE IN INDIA

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ABSTRACT

The present study discerns the relationship between GDP and the general insurance premium in India by employing Johansen Co-integration Test, Granger Causality Test and Vector Auto Regression (VAR) for the period 1970-71 to 2008-09. The Impulse Response Functions (IRFs) have also been used to investigate the effect of an impulse shock of one of the innovation on the current and future values of the same or other time series variable. Johansen Co-integration Test results do not provide evidence of a long run causal relationship between GDP and general insurance premium in India. Granger test established unidirectional causality from general insurance premium to GDP confirming the indisputable significance of general insurance in nation's growth. VAR results indicate that growth in GDP cause general insurance premium to increase in short term period. Further, the effect of the increase in general insurance premium can been seen to effect the GDP positively only after a lag of one year. IRF graphs show that there is a transient response immediately or after some lag on the application of a positive shock (impulse) which gradually dies out.

Keywords: *Economic Development, General Insurance Premium, Granger Causality Test, Vector Auto Regression*

INTRODUCTION

The importance of the insurance-growth nexus is growing due to the increasing share of the insurance sector in the aggregate financial sector in almost every developing and developed country. The growing links between the insurance and other financial sectors also emphasis the possible role of insurance companies in economic growth. Insurance companies indemnify the one who suffer a loss and stabilize the financial position of individuals and firms. With possibility of transfer of different kind of risks to insurance companies, risks averse economic unit are more induced to buy goods or services, especially those of higher values. In this way insurance sustains demand or consumption for good or services which encourage production and employment and finally, economic growth. Insurance ensures the stable and smooth functioning of economic development by encouraging loss mitigation. Insurers also acts as the intermediaries by investing the funds into Government and socially oriented sectors and stock market and thus contributing to nation's growth. However, the dependence between economic development

and general insurance sector is not single sided. The development in economy also directly reflects the accelerated development in insurance sector. As the economy grows, the insurance premium also get boosted up with the increase in trade, better standard of living and entrepreneurial activities.

The present research paper discerns the causal relationship between gross Domestic Product (GDP) and the general insurance premium by employing Granger Causality Test for the period 1970-71 to 2008-09. The remainder of this paper is as follows: The review of literature is presented in the next section and the subsequent section describes the research methodology used in the research paper. The next section presents the correlation between economic development indicators and premium underwritten under various general insurance categories from 1991-92 to 2008-09. The succeeding section deals with the empirical assessment of interdependence between GDP and general insurance premium in India and the ending section provides the concluding annotations.

REVIEW OF LITERATURE

A review of related literatures on the subject has been undertaken to determine the relationship between economic development and insurance. Ashley (1981) investigated Granger causality between the CPI inflation and price dispersion in both directions by comparing the out-of-sample forecasting performances of univariate and bivariate time series models. He shows that inflation has predictive power for price dispersion but not vice-versa. Ward and Zurbruegg (2000) apply a co-integration analysis on a unique set of annual data for real GDP and total real premiums issued from 1961 to 1996. The findings show that in the long run there is a bidirectional causal relationship between total insurance premiums and real GDP for Australia, Canada, Italy, and Japan, but a unidirectional causality running from real GDP to real insurance premiums for France. Sharma and Panagiotidis (2005) examined whether exports growth Granger causes GDP growth and whether exports growth Granger causes investment. Analysis fail to find support for the hypothesis that exports Granger cause GDP and same holds for the relationship between exports and investment. Further, Impulse Response Functions (IRF_s) concluded that relatively big shocks in real exports do not generate significant response. Engel and West (2005) conducted bivariate and multivariate Granger causality test to evaluate the present-value model for exchange rates. From the asymptotic tests, they find statistically significant Granger causality from exchange rates to fundamentals. Guryay, Safakli and Tuzel (2007) empirically examined the relationship between financial development and economic growth in Northern Cyprus using Ordinary Least Square method. Granger causality test showed that financial development does not cause economic growth, on the other hand there is evidence of causality from economic growth to the development of financial intermediaries. Rudra (2007) probed the nexus between exports and imports in India. The empirical evidence is based on Vector Auto Regression, Causality Test and Co-integration test. Co-integration test established that both exports and imports are co-integrated with each other, indicating the long term relationship. The Granger Causality test support that there exist bi-directional causality. Arena (2008) examined causal relationship between insurance market activity (life and nonlife insurance) and economic growth using the generalized method of moments (GMM) for dynamic models of panel data for 55 countries between 1976 and 2004. The study finds that both life and nonlife insurance have a positive and significant causal effect on economic growth. Vadlamannati (2008) observed that the contribution of the insurance sector to economic development is positive and exhibits a long-run equilibrium relationship. The study further concludes that reforms exert no strong relationship, but the rate of growth of reforms has a positive influence on economic development. Sümegi and Haiss (2008) opined that the role of insurance companies, though growing in importance in financial intermediation, has hardly been investigated with regard to the direction and causality vis-á-vis GDP growth. Æurak, Lonèar and Poposki (2009) examined the relationship between insurance sector development and growth in the 10 new EU member states during 1992-2007 and concluded that the sector has promoted economic growth in these countries. Kogid, Mulok, Beatrice, and Mansur (2010) investigates the factors that stimulate and maintain economic growth in Malaysia from the year 1970 to 2007. The results show that there exists long-run co-integration and multiple short-run causal relationships between economic growth and the determinant factors. Sook-Ching, Kogid and Furuoka (2010) examined the existence of a causal relation between the life insurance sector and the growth of the Malaysian economy using Johansen co-integration test, and the Granger causality test based on the Vector Error Correction Model (VECM). The results provide sufficient evidence to support a long-run relationship between the life insurance indicator (the total assets of Malaysian life insurance sector) and the real GDP. Azman-Saini and Smith (2011) sheds light on the impact of insurance sector development on output growth, capital accumulation and productivity improvement using data from 51 countries during 1981-2005. The dynamic panel data analysis results demonstrate that insurance sector development affects growth predominantly through productivity improvement in developed countries, while in developing countries it promotes capital accumulation. Lee (2011) uses disaggregated data on real insurance premiums to examine the interrelationship between insurance markets' activities and economic growth for 10 selected OECD countries during 1979-2006 using panel unit-root tests, heterogeneous panel co-integration tests, and panel causality techniques. The study concludes that there is fairly strong evidence favoring the hypothesis of a long-run equilibrium

relationship between real GDP and insurance markets' activities after allowing for the heterogeneous country effect. Samad (2011) investigates the causality relationship between economic growth, exports and imports in Algeria using Co-integration, Error Correction Model, and VEC Granger causality/Wald Exogeniety tests. The study finds that economic growth in Algeria is linked to export industries and import is linked to economic growth.

However, it has been observed that there are contradicting findings by various researchers regarding the causal relationship between economic development and insurance. Therefore, it was felt that there is a need to investigate the relationship between economic development and general insurance in India.

RESEARCH METHODOLOGY

With the growing complexities in the modern economic system, the performance of the insurance sector and economic development is highly interdependent. The causality direction between the two is a highly interesting and debatable topic. There are two theories describing the direction of causality namely demand-following theory and supply-leading theory. Demand- following theory considers the development of the financial sector as the direct and obvious outcome of the economic development. In contrast to this, supply-leading theory believes the development of financial sector, here insurance, as the prerequisite for the economic development.

An attempt is made to empirically analyze dependence between development of insurance sector and the Indian Economy. The study also examines the relationship between general insurance premium and Gross Domestic Product (GDP) for the period 1970-71 to 2008-09. The GDP used for the analysis is at constant price. General insurance premium series is obtained by adjusting the premium at current price with GDP deflator. Both the series represents the annual data. Since there is a significant difference in the range of the two series, all the tests are applied on their natural log transformations. Data for the purpose is complied from Annual Reports of general insurers, IRDA Annual Reports, RBI database, Human Development Index Report, various issues of IRDA Journal and Society of Indian Automobile Manufacturers.

In order to establish the relationship between the country economic development and general insurance industry, Pearson's correlation coefficient has been calculated between fire insurance and industrial production, marine insurance and exports, motor insurance and number of registration of vehicles and, mediclaim insurance premium and human development index. The correlation between the investment by general insurers and the economic growth, as indicated by gross domestic product is also analyzed. In addition, Granger Causality Test, Augmented Dickey-Fuller Test and Jonson Co-integration Test have been applied.

Granger Causality Test, Augmented Dickey-Fuller and Johansen Co-integration test

Granger Causality test is utilized for determining the direction of causality between GDP and general insurance premium. The test uses the linear regression modeling of the stochastic processes.

Mathematically,

$$Y(t) = \sum_{j=1}^{L} A_{21,j} X(t-j) + \sum_{j=1}^{L} A_{22,j} Y(t-j) + E_y(t)$$

$$X(t) = \sum_{j=1}^{L} A_{11,j} X(t-j) + \sum_{j=1}^{L} A_{12,j} Y(t-j) + E_x(t)$$

where, L is the maximum number of lags (order).

Granger test depending on the time series X and Y may give any of the following results:

Case 1: Y causing X. In this case change in X has no effect on Y but change in Y makes X to change. This is indicated by $A_{21} = 0$.

Case 2: X causing Y. In this case change in Y has no effect on X but change in X makes Y to change. This is indicated by $A_{12} = 0$.

Case 3: Bilateral causality. In this case both the time series are interdependent.

Case 4: Independence. This is the case where none of the variable depends on the other. This is indicated by $A_{12} = A_{21} = 0$.

It is in principle to predict a variable in a time series from the past values of another time series in addition to the past values of same series . This essentially means that the two time series needs to be stationary to allow such prediction. However, in case the two are not stationary, they are made so by inserting appropriate level of differencing before applying the test. Augmented Dickey-Fuller (ADF) test is used to establish the order of integration and the degree of differencing to establish the stationarity. The lag is chosen at minimum Akaike Information Criteria (AIC) value. Co-integration means some linear combination of the two series must be stationary. This can be tested by using Johansen Co-integration test. To satisfy this test the probability likelihood value should be lesser than that of critical value. The lag value calculated from ADF test is used for determining co-integration in Johansen test.

Vector Auto Regression and Impulse Response Functions

The mathematical dependence of one time series over another is obtained by unrestricted Vector Auto Regression (VAR) or restricted Vector Error Correction (VEC) model.

This choice of VAR or VEC model depends on the fact whether, the two time series are co-integrated at least, if not stationary. If the two series are not co-integrated restricted VEC model cannot be applied. However, in this case, VAR model is used to mathematically represent the system.

VAR is commonly used for predication of interrelated time series and for analyzing the impact of random disturbances on the system. Mathematically, VAR is represented by:

$$y_t = A_1 y_{t-1} + - - - + A_p y_{t-p} + Bx_t + \varepsilon_t$$

where, y_t is vector of endogenous variables, while x_t is exogenous variable vector. is innovation vector uncorrelated with and lagged values of itself and y_t. A_1---- ---- A_p and B are matrices of coefficient to be estimated.

The Impulse Response Functions (IRF_s) have also been employed to investigate the effect of an impulse (shock) of one of the innovation on the current and future values of the same or other time series variable.

The following are the hypotheses of the present research paper:

1. The null hypothesis in ADF Test is that there exists a unit root.
2. The null hypothesis of Johansen Co-integration Test is that the series are not co-integrated.
3. The null hypotheses examined by the Granger Causality Test are (a) DLGIP does not Granger cause DLGDP and (b) DLGDP does not Granger cause DLGIP. LGIP stands for natural log transformation on real general insurance premium and LGDP stands for natural log transformation on real GDP.

ECONOMIC DEVELOPMENT INDICATORS AND COMPONENT-WISE INSURANCE PREMIUM

This section describes the trend in economic development and growth of general insurance sector in India. The general insurance business is divided into various categories for the purpose of comparative analysis with various economic development indicators. The general insurance premium is classified into fire insurance, marine insurance, motor insurance and mediclaim insurance premium. Similarly, for the economic development, the indicators selected are industrial production, exports, number of registration of vehicles and Human Development Index. The correlation between the investment made by general insurers and the economic development, as indicated by gross domestic product of India is also analyzed.

General insurance industry plays a vital role in the process of industrial development and development of entrepreneurship. During all phases of production, starting from raw material to finished goods, both infrastructure and the product are exposed to several risks. The general insurance industry in additional to providing financial covering for such risks, provide skills and prevention techniques to minimize the losses. In more risk prone areas, the general insurance companies even monitor the measures to minimize the accidents faced by the insured, on the regular basis. With such financial confidence, the entrepreneurs need not fear financial instability or maintain large reserve for any unaccounted, uninsured losses. This encourages the expansion of business by directing funds to more productive uses. Table 1 portrays the figures of industrial production and fire insurance premium in India. High correlation value of 0.968 speaks about the eminent relationship between industrial production and fire insurance premium.

With the rapid growth in the medical technology and increase in medical cost, the health care has turned as highly expensive function and treatment expenses particularly involving hospitalization have become unaffordable to the large part of the population. By the health insurance, such a risk can be pooled among the large set of individuals through indemnification, otherwise cost could be catastrophic. Individual health insurance also reduces the Government burden of public health expenditure. On saving this expenditure, the same fund can be utilized for development elsewhere, thereby improving the standard of living directly or indirectly. For such reason, health insurance is recognized as the class of utmost importance for individual and thus formed the only category in general insurance, where tax benefit is given for its premium. Table 1 gives the figure of the mediclaim insurance premium and Human Development Index (HDI). Most of the contribution in health insurance comes through mediclaim policy, which covers the expense during hospitalization. HDI summarizes the measurers of human development, broadly comprising of life expectancy, literacy and standard of living. Correlation value of 0.989 depicts the firm relationship between mediclaim insurance premium and HDI.

With the increase in purchasing power and amount of demand for all types of automobiles, almost matching with that of supply during the past few years, India has witnessed a rapid growth in registering of motor vehicles. The motor insurance being compulsory in India, for third party, the insurance industry has directly gained from this scenario and has observed an almost similar growth in total motor insurance premium. Table 1 shows that increase in the number of vehicles in India, which signifies the improving standard of living is highly correlated with motor insurance premium, correlation value among the variables stood at 0.976.

Marine insurance is broadly composed of two categories namely Hull and Cargo. Since the losses in case of uninsured marine accidents can be huge, it is always preferred to insure both hull and cargo. This way amount of marine insurance premium directly relates with that of marine transportation. As the major portion of India exports is through sea route, Table 1 shows the high correlation of

Table1: Economic Development Indicators and Different Premium Categories

Year	Fire Premium (Rs. Crores)	Industrial Production (Rs. Crores)	Mediclaim Premium (Rs. Lakhs)	Human Development Index	Motor Premium (Rs. Crores)	Motor Vechiles (Thousand)	Marine Premium (Rs. Crores)	Exports (Rs. Crores)	GDP (Rs. Crores)	General Insurance Investment (Rs. Crores)
1991-92	795	121918	9632	0.381	2136	23380	634	44042	594168	6335
1992-93	932	142566	11200	0.401	2210	25718	771	53688	681517	7640
1993-94	1096	165663	15204	0.447	2498	29922	832	69751	792150	9030
1994-95	1248	202888	17998	0.468	2513	31033	827	82674	925239	10486
1995-96	1501	248450	21030	0.489	2714	33786	961	106353	1083289	12833
1996-97	1719	280247	24568	0.514	2954	37332	991	118817	1260710	14893
1997-98	1916	300389	27489	0.426	3246	41368	1126	130101	1401934	17276
1998-99	2087	332464	31254	0.552	3412	44875	1023	139753	1616082	19739
1999-00	2299	350233	37583	0.571	3521	48857	977	159561	1786526	22659
2000-01	2057	392138	51898	0.577	3811	54991	1054	203571	1925415	24009
2001-02	2667	410667	74204	0.59	4001	58924	1048	209018	2097726	19574
2002-03	2950	463302	99955	0.595	5441	67007	1089	255137	2261415	21859
2003-04	3150	509106	112926	0.602	6457	72718	1134	293367	2538170	24227
2004-05	3331	598674	132117	0.611	7504	81715	1189	375340	2877701	26519
2005-06	3774	676207	163442	0.619	8702	90621	1243	456418	3402316	29803
2006-07	4185	745891	182547	0.678	9146	96808	1268	435896	3941865	32615
2007-08	4937	865924	225879	0.719	14341	106591	1341	476895	4540987	34718
2008-09	5479	938271	256431	0.756	25413	139112	1387	465892	5228650	39510
Correlation	0.968		0.989		0.923		0.954		0.968	

Source: RBI Annual Reports various issues, Annual Reports of general insurers, data from Department of Road Transport and Highways, GOI and Society of Indian Automobile Manufacturers (SIAM), Human Development Index Report, IRDA Annual Reports various issues, IRDA Journal

Note: Mediclaim premium represents the premium of public insurers only.

0.954 among the exports and marine insurance premium.

The insurance companies receive premium for providing the covers and carrying out underwriting business. This way, insurance companies amass huge funds which are to be properly invested. General insurers build up such a large pool of funds that they have been called as economy's 'investment reservoirs'.

For economic developments, investments are necessary. The investment by insurance sector in various sectors such as Central & State Govt. Securities, Infrastructure & Social Sector Development and Stock Market directly signifies the development in economy. The investments by general insurance companies and GDP of India have shown inviolable correlation with each other. Correlation scores among the variable stood at 0.968 as indicted by Table 1 portrays the linear relationship among investments by general insurance companies and GDP.

INTERDEPENDENCE OF ECONOMIC DEVELOPMENT AND GENERAL INSURANCE

Augmented Dickey-Fuller and Johansen Co-integration Test

Satisfying ADF Test for both the series is the first prerequisite for Granger Causality Test. ADF Test null hypothesis has been accepted at level for both the time series at all the lags, as ADF test statistics is greater than critical values at both 1 per cent and 5 per cent significance level, as depicted by Table 2. This signifies that both the time series are non-stationary at level.

However, ADF test statistics value being lower than critical value at 1 per cent and 5 per cent suggests that and LGIP are stationary at first difference. Table 3 discerns that at first difference of, lag 0 and 1 are the only two lags where null hypothesis can be rejected. Since the AIC value is lower at lag 1, 1st difference at lag

1 is selected for. For LGIP at 1st difference time series, the null hypothesis is rejected for all the lags from 0 to 3 (Table 4). But AIC decreases from lag 0 to 1 but goes increasing on moving from 1 to higher values. Thus for LGIP also 1st difference at lag value 1 is selected.

Granger Causality Test

Granger Causality Test investigates the causal relationship between LGDP and LGIP at the lag value of 1 and 2 for both the time series. The value for AIC criteria for 'DLGIP does not Granger cause DLGDP' stood at 68 and 56 at the lag value of 1 and 2 respectively and AIC value being lower at lag 2, hence Granger test has been tested at lag 2. The value for AIC criteria for 'DLGDP does not Granger cause DLGIP' hypothesis stood at 48 and 45 at the lag value of 1 and 2 respectively and AIC value being lower at lag 2, hence Granger test has been tested at the lag value 2.

The null hypothesis 'DLGIP does not Granger cause DLGDP' is rejected at 5% significance value while null hypothesis 'DLGDP does not Granger cause DLGIP' is accepted.

This gives the unidirectional causality from general

Table 2: ADF Test Statistic for Unit Root at Various Differences (Lag 0)

Difference	ADF Test	LGDP	LGIP	Critical Value at 1 %	5 %
Level	Statistics Null Hypothesis	0.420662 Accept	-0.234050 Accept	-3.621023	-2.948404
1st Difference	Statistics Null Hypothesis	-3.647332 Reject	-4.035767 Reject	-3.626784	-2.945842

LGDP: - stand for Natural log Transformation on real GDP.
LGIP: - stand for Natural log Transformation on real General Insurance Premium.

Table 3: ADF Test Statistics for LGDP at 1st Difference (Various Lags)

Lag	ADF Test Statistics	AIC	Critical value		Null Hypothesis
			1 %	5 %	
0	-4.617332	-4.058116	-3.626784	-2.945842	Reject
1	-4.632902	-4.905352	-3.632900	-2.948404	Reject
2	-2.847576	-4.822044	-3.639407	-2.951125	Accept

Table 4: ADF Test Statistics for LGIP at 1st Difference (Various Lags)

Lag	ADF Test Statistics	AIC	Critical value		Null Hypothesis
			1 %	5 %	
0	-4.035767	-3.099706	-3.626784	-2.945842	Reject
1	-3.865475	-3.948873	-3.632900	-2.948404	Reject
2	-3.734260	-3.588852	-3.639407	-2.951125	Reject
3	-3.940820	-3.887887	-3.646342	-2.954021	Reject

Johansen Co-integration test is applied on and LGIP series for testing long-term relationship at the lagged values computed from ADF test.

Table 5: Johansen Co-integration Test

r	Trace Statistics	5% Critical Value	1% Critical Value
0	4.95	15.49	19.93
1	0.11	3.84	6.63

Acceptance of null hypothesis of no co-integration (r=0) and one co-integrating vector (r=1) provides the evidence that and LGIP are the set of non co-integrated time series (Table 5).

insurance premium to GDP. Null hypothesis 'DLGIP does not Granger cause DLGDP' being marginally rejected at 5 % significance value, gives a weak evidence suggesting the causality direction from general insurance premium to GDP.

Vector Auto Regression

Vector Auto Regression illustrates the impact of unitary innovations on the time series. Since ADF test and co-integration test states that the time series are neither stationary nor co-integrated, first difference of time series is used in analyzing VAR. VAR behavior between general insurance premium (LGIP) and GDP (LGDP) is described by the following relationship:

Table 6: Granger Causality Test

Null Hypothesis	F-Statistics	Probability	AIC
At Lag 1			
DLGIP does not Granger Cause DLGDP	0.59	0.4470	68
DLGDP does not Granger Cause DLGIP	3.26	0.0801	48
At Lag 2			
DLGIP does not Granger Cause DLGDP	1.31	0.0455	56
DLGDP does not Granger Cause DLGIP	3.42	0.2849	45

D (LGIP) = 0.009*D {LGDP (Lag 1)} - 0.001*D {LGDP (Lag 2)} + 1.145*D {LGIP(Lag 1)} - 0.379*D {LGIP (Lag 2)} - 1271.704

D (LGDP) = 1.228*D {LGDP (Lag 1)} - 0.281*D {LGDP (Lag 2)} - 6.792*D {LGIP (Lag 1)} +13.725*D {LGIP (Lag 2)} + 33104.601

The result clearly indicates that general insurance premium is dependent on GDP at lag value of 1, but GDP value at lag 2 negatively effects general insurance premium. This depicts that growth in GDP cause premium to increase only in short run. The effect of increase in general insurance premium can been seen to positively effect the GDP at lag value of 2.

VAR also allows further analyzing the system by generating Impulse Response Functions (IRF_s). These graphs essentially shows the effect of an impulse shock of one of the innovation on the current and future values of the same or other time series variable.

All IRF graphs show that there is a transient response immediately after application of a positive shock (impulse) which gradually dies out. Analyzing the effect of impulse of premium on GDP is on the lines of the causal relationship indicated by Granger Causality test.

GDP does not show any effect to impulse of general insurance premium initially and then increases and finally dies out in an oscillatory manner. This is quite intuitive also as the economic development is not affected immediately by the increase in insurance but shows a lagged response. Thus results obtained by the IRF_s is consistent with result shown by co-integration test, both of which indicates that there does not exists long-term relation among the general insurance premium and GDP.

Further, results gathered by VAR equations are also in line with the IRF_s both of which shows that increase in GDP cause GDP to increase only initially and effect of increase dies out afterwards as indicated by Figure 1. Figure 2 shows that increase in premium cause GDP to increase after gap of some time, same is indicated by VAR equation.

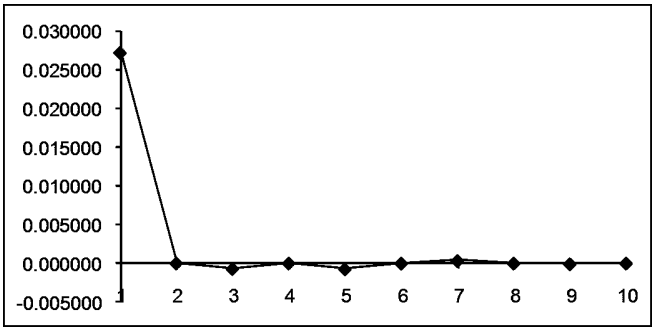

Figure 1: IRF of GDP to GDP

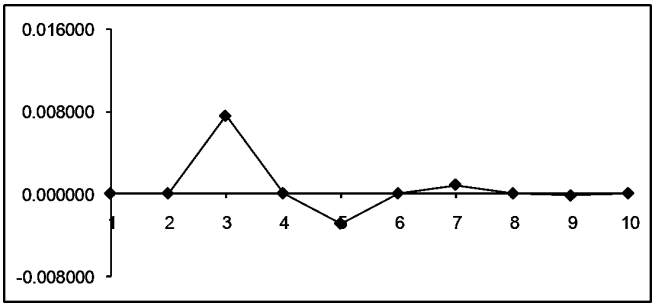

Figure 2: IRF of GDP to General Insurance Premium

Figure 3 highlights that increase in GDP cause premium to increase only initially and same is indicated by VAR. Figure

4 highlights that increase in general insurance premium cause general insurance premium to increase initially but dies out soon.

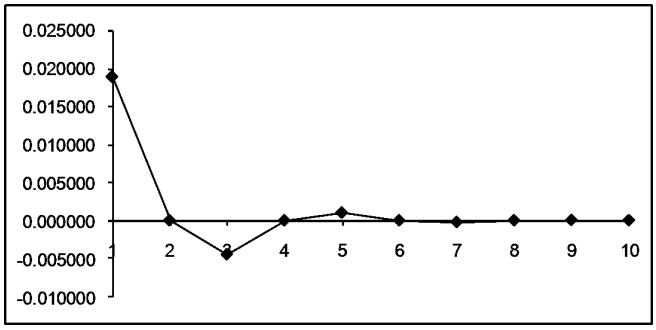

Figure 3: IRF of General Insurance Premium to GDP

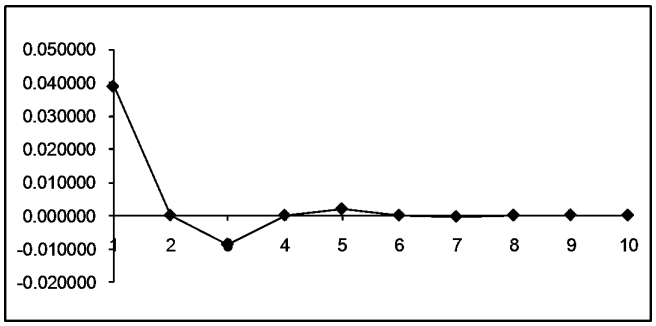

Figure 4: IRF of General Insurance Premium to General Insurance Premium

CONCLUSION

The present paper attempted to trace out the linkage among the economic development and general insurance in India. Analysis unveiled that economic development indicators like industrial production, exports, number of registration of vehicles and human development index are strongly correlated with fire insurance, marine insurance, motor insurance and mediclaim insurance premium respectively. The paper discerns the causal relationship between the general insurance premium and GDP by employing Granger Causality Test. Analysis reveals that there exists only unidirectional causality from general insurance premium to GDP. Johansen Co-integration test applied for testing long term relationship among GDP and general insurance premium divulges that variables are not co-integrated. Further the result obtained by VAR clearly indicates that growth in GDP cause premium to increase only in short run. The effect of increase in premium can be seen to positively affect the GDP only after a year. This is quite intuitive also as the economic development is not affected immediately by the increase in insurance but shows a lagged response. Further, the Impulse Response Functions have been utilized in order to investigate the effect of an impulse shock of one of the innovation on the current and future values of the same or other time series variable. All IRF graphs show that there is a transient response immediately after application of a positive shock (impulse) which gradually dies out. The results obtained by the IRF_s are consistent with result shown by co-integration test, both of which indicates that there does not exists long-term relation among the general insurance premium and GDP.

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