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### Assessing the Impact of Inflation on Insurance Sector Performance in India: An Empirical Analysis

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#### Abstract

Insurance sector in India witnessing significant growth since the establishment of Insurance regulatory and development authority of India (IRDAI) and inclusion of private players, Though the development of this sector has been influenced by various macro-economic indicators, this study aims to analyze the relationship between inflation rate and growth of Insurance sector in India. Insurance penetration rate has been taken for the measurement of growth in Insurance sector. The data for the variables are considered from the time period 2001-22 and collected from RBI and IRDAI publication, Auto regressive distributive lag model has been used to analyze the impact of inflation on insurance

penetration rate. The result suggests a significant and positive relationship between moderate inflation rate and insurance penetration rate in India, it shows that a moderate inflation rate can drive the demand for insurance products as during inflationary condition consumer seek protection against economic uncertainty. Diagnostic tests has been applied to check the applicability of the model, the results shows no issues of autocorrelation, heteroskedasticity, or instability over time. Thus, from the finding we can conclude that a controlled moderate level of inflation positively influences the growth of the insurance sector in India.

**Keywords:** Insurance Sector in India, Inflation Rate, Insurance Penetration Rate, IRDAI, ARDL

#### Introduction

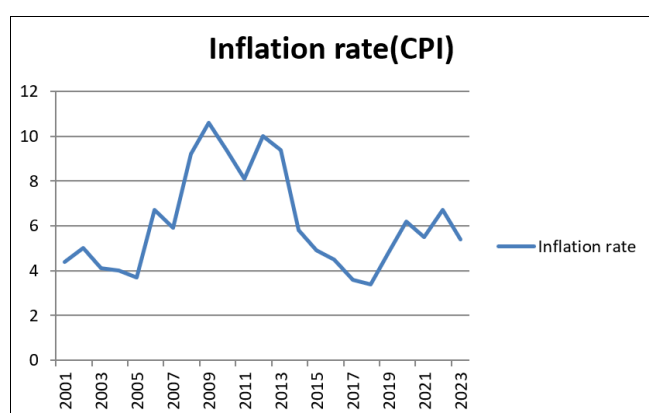
Insurance sector is one of the most vital part of financial services industry in emerging countries like India, functioning as a shield to protect financial interests of people. Insurance sector consists companies and institutions that provide risk management services by offering various type of insurance products, the major products are life insurance, health insurance and other general insurance products. Contribution of Insurance sector's activities in development of any country's economy is defined by United Nations Conference on Trade and Development (UNCTAD) as "A sound national insurance and reinsurance market is an essential characteristic of economic growth" (UNCTAD, 1964). Insurance sector significantly contributes to the development of the other financial sector institutions as well, a good performance of insurance sector can stimulate spillover effect. These institutions also helps to channelizing the funds to support the business activities in the economy, Therefore measuring the performance of insurance companies has significant importance in development of an effective financial system. Functioning of insurance sector highly corelated with the performance of macro economic variables in the economy. Among these macro-economic variables, inflation is the most volatile one and has the influencing power over consumer demand. High Inflation rate has many adverse consequences in an economy, it bring uncertainty, reduces investment and negatively impacts the purchasing power, therefore high inflation rate is not considered good for the development of the economy though zero inflation is equally harmful, a moderate level of inflation is considered beneficial for the growth and good performance of an economy.

Insurance Industry transfers the risk in the form of premium from consumer to institution. There are already many studies has been conducted to understand the impact of macro-economic variable on the functioning of financial system. The aim of this research work is to analyze the impact of inflation on the insurance sector to assess potential risks and vulnerabilities given the uncertainty of inflation rate. Though inflation causes multifaceted influence on insurance sector's regular operations to the economics environment in which they insurance companies operates. Understanding the dynamic relationship of inflation and

insurance sector operation is crucial for insurers to perform effectively and manage risks, adjust strategies and continue providing value to policyholders in an inflationary environment. Therefore there is a requirement of quantitative framework which could help the insurance institutions and regulators to assess the performance of insurance sector under different adverse inflationary scenarios.

### Inflation Trend in India:

Inflation is measurement of the rate at which the general level of prices for goods and services in an economy rises over a period of time. Inflation trend refers to the direction in which inflation rate moves over a certain period of time, it shows whether prices are consistently rising, falling or remaining stable, rising rate indicates inflationary condition whereas falling rate shows sign of deflation. Consumer price index(CPI) data of inflation is considered for the study based on 2011 prices.

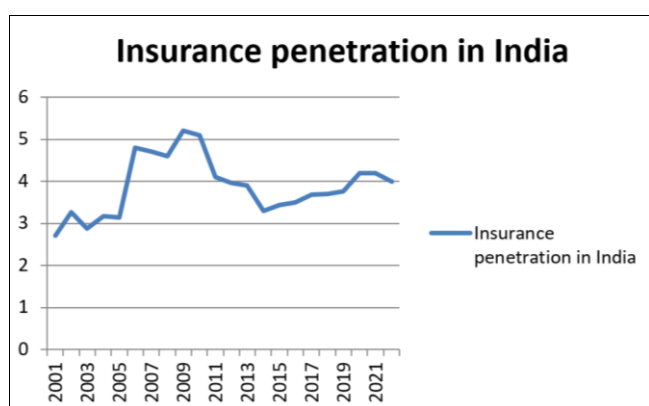


Source: RBI

### Insurance Penetration:

Insurance penetration is an indicator which is used to measure the development of insurance sector in an economy. It is calculated as a percentage of total premium collected to the country's Gross Domestic Product (GDP).

$$\text{Insurance Penetration} = \frac{\text{Total Insurance Premiums}}{\text{GDP}} \times 100$$



Source: IRDAI

**Objectives:** The main objective of this research is:

- To analyze the impact of inflation on performance of Insurance industry in India.

### Literature Review

Inflation generally referred as increase in price level of goods and services, and significantly influences various economic sectors and economic activities including insurance industry. Inflation impacts functioning of insurance industry in multifaceted way but there are limited research work has been done to explore the relation between Inflation and insurance industry activities.

Theoretical framework- Quantity theory of Money suggest that increase in money supply is one of the root cause of inflation, when there is an increase in money supply relative to the level of economic output (Fisher, 1930), it leads to the higher prices in the market and cost associated with providing insurances also increases.

Also the cost push inflation theory indicates that inflation is an outcome of increased production costs, (Blanchard, 2000) In context of insurance industry it can rise costs of claims, administrative expenses which can drive up premium. In addition Demand Pull Inflation theory argues that inflation is caused by increased demand of goods and services, this might take to higher demand for coverage during inflationary periods and will potentially influences premium rate.

Susana Yamoah (2023) examine the role of Inflation and Interest rate on Life Insurance Companies in Ghana in post-covid period. The study's result disclosed that although inflation had a negative impact and interest rate positively affected investment income, both were insignificant. However, the impact of both inflation and interest rate on profit was highly significant. The analysis on the relationship between inflation and profitability in the US and Canadian P&C insurance industry during time period of 1951 to 2008, Swiss Re (2010) found that inflation driving up insurer's combined ratio and lowering their return on equity.

It is evident that inflation erodes household's real income resulting in lower purchase power, has a negative effect on demand. Li *et al* (2007) in his work provide empirical evidence for the negative impact of inflation on the demand side and sale for life insurance products. They concluded that inflation significantly decreases the demand for life insurance.

Browne, Carson, and Hoyt (2001) investigated the impact of inflation on life insurance. In their study they find out that inflation negatively impacting the real value of life insurance benefits, leading to changes in premium rates. This highlights the necessity for insurer to regularly review and adjust premiums in order to tackle with inflation trends.

### Research Methodology

To analyze the impact of inflation on insurance sector performance, time series dataset are considered from the period of 2001 to 2023. The data series taken for study is in form of time series, obtained from secondary sources. Unit root test-Augmented Dickey-Fuller test is used in this analysis to determine whether the series is stationary or non-stationary, Obtained results indicates that inflation rate is stationary at first difference whereas insurance penetration rate is stationary at level. Autoregressive Distributed Lag (ARDL) model is used to analyze the relationship between Inflation rate and Insurance penetration in India, ARDL model is suitable for analyzing the long-run and

short-run relationship between the variables. Further, Diagnostic tests applied to verify the accuracy of the model for which Ramsey RESET test, Heteroscedasticity test, serial correlation test and JB normality test is used in this study.

#### ARDL Model:

$$\text{Insurance\_penetration\_rate} = C(1)*\text{Insurance penetration rate}(-1) + C(2)*\text{Insurance penetration rate}(-2) + C(3)*\text{Inflation\_rate} + C(4)*\text{Inflation\_rate}(-1) + C(5)$$

#### Result and Discussions

Descriptive Statistics of Dependent and Independent Variable:

|                    | Insurance penetration | Inflation rate |
|--------------------|-----------------------|----------------|
| Mean               | 3.877273              | 6.177273       |
| Standard Error     | 0.147946              | 0.486703       |
| Median             | 3.83                  | 5.65           |
| Mode               | 4.2                   | 6.7            |
| Standard Deviation | 0.693927              | 2.282841       |
| Sample Variance    | 0.481535              | 5.211364       |
| Kurtosis           | -0.61417              | -0.8716        |
| Skewness           | 0.317151              | 0.679172       |
| Range              | 2.49                  | 7.2            |
| Minimum            | 2.71                  | 3.4            |
| Maximum            | 5.2                   | 10.6           |
| Sum                | 85.3                  | 135.9          |
| Count              | 22                    | 22             |

#### Stationarity Test:

| Variables Name                      | At level (p value) | Order of Integration |
|-------------------------------------|--------------------|----------------------|
| Inflation rate                      | 0                  | I(0)                 |
| Insurance penetration rate in India | 0.0041             | I(0)                 |

#### ARDL model:

$$\begin{aligned} \text{INSURANCE\_PENETRATION\_RATE} &= \\ C(1)*\text{INSURANCE\_PENETRATION\_RATE}(-1) &+ \\ C(2)*\text{INSURANCE\_PENETRATION\_RATE}(-2) &+ \\ C(3)*\text{INFLATION\_RATE} &+ \\ C(4)*\text{INFLATION\_RATE}(-1) + C(5) & \end{aligned}$$

#### ARDL Results:

The results obtained from the application of ARDL model shows that the lagged value of insurance penetration rate i.e. has positive and significant impact on current insurance penetration rate. The coefficient of insurance penetration rate at one lag is 0.73 which means that increment of 1% in previous insurance penetration rate causes 0.73% increase in current period. Whereas, coefficient value of insurance penetration rate at two lag is -0.44 and it is marginally significant (0.49), value indicates that 1% increment in insurance penetration rate two period ago is causing negative impact on current period. Current Inflation rate has a positive and significant effect on dependent variable i.e. insurance penetration rate in this study, the coefficient value is 0.28% means 1% increment in inflation rate leads to

0.28% increase in dependent variable. Whereas, value of inflation rate at one lag also has a positive and significant impact on dependent variable, 1% increment in inflation rate in previous period causes 0.15% increase in dependent variable. The coefficient value of constant shows that even if the impact of inflation rate and previous periods insurance rate would be zero then also current value of insurance penetration rate will be around 2.

| variable                       | coefficient | std. error | t-Statistic | Prob.  |
|--------------------------------|-------------|------------|-------------|--------|
| Insurance penetration Rate(-1) | 0.730183    | 0.192315   | 3.796802    | 0.0018 |
| Insurance penetration Rate(-2) | -0.449124   | 0.210068   | -2.138      | 0.0494 |
| Inflation_rate                 | 0.281631    | 0.0686421  | 4.116526    | 0.0009 |
| Inflation_rate(-1)             | 0.153534    | 0.057152   | -2.68642    | 0.0169 |
| C                              | 2.005358    | 0.59543    | 3.367917    | 0.0042 |

#### Short Run Results, Error Correction:

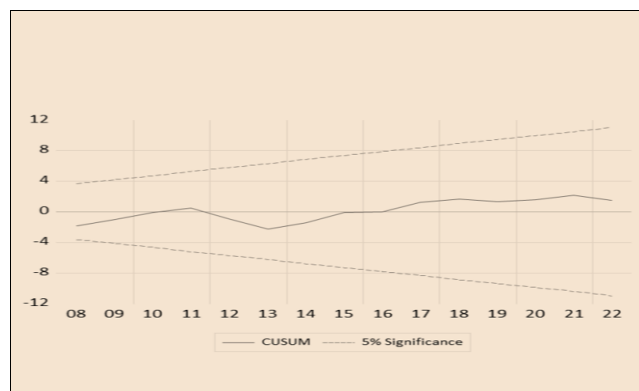
The error correction term shows the speed of adjustment at which the values return to equilibrium after short-run shock. The negative and significant value of ECM term have coefficient value of -0.718941 which means that approximately 71.89% deviation from previous period is adjusted in the next period, bringing the values back toward long run equilibrium.

| Variables                     | Coefficient | Std. Error | t-statistic | Prob.  |
|-------------------------------|-------------|------------|-------------|--------|
| D(insurance penetration rate) | 0.449124    | 0.181054   | 2.480606    | 0.0255 |
| D(inflation rate)             | 0.281631    | 0.0545     | 5.167564    | 0.0001 |
| ECM term                      | -0.718941   | 0.199877   | -3.59692    | 0.0026 |

#### Diagnostic Tests:

To test the reliability of ARDL model several test has been conducted, Ramsey test is used to check the functional form of the model, the test gives insignificant value (0.5819) that indicates model does not have any functional form problem and we cannot reject null hypothesis. To check the problem of heteroskedasticity, is used and on the basis of result null hypothesis cannot be rejected which shows problem of heteroskedasticity does not exist in the model. To check the stability of the model over time CUSUM test has been applied the result shows that plot remains within the critical bounds hence model is stable. The serial correlation test has been applied to check whether the problem of autocorrelation exists or not in the residuals of the model. The p-value indicates that obtained value is greater than 0.05 hence we cannot reject the null hypothesis means model does not have the problem of serial correlation.

| Test Name               | P-value  | Null hypothesis                  | Decision                      |
|-------------------------|----------|----------------------------------|-------------------------------|
| Ramsey Test             | 0.5819   | No problem of functional form    | Do not reject null hypothesis |
| Heteroskedasticity test | 0.1919   | No problem of heteroskedasticity | Do not reject null hypothesis |
| Serial Correlation test | 0.4094   | No problem of serial correlation | Do not reject null hypothesis |
| Normality JB test       | 0.193480 | Data is normally distributed     | Do not reject null hypothesis |



**Fig 1: CUSUM Test**

## Conclusion

The primary objective of this study was to investigate the impact of inflation on the performance of insurance sector in India, the findings suggest that inflation has a significant impact over insurance sector's performance. Infact, a moderate rate of inflation have positive influence on increasing the insurance penetration rate in India. In short run, results suggest that inflation can drive the demand of products from insurance sector, as insurance provide protection against economic uncertainty. As Error correction term shows the adjustment toward long run equilibrium, it reflects adjustments in consumer behavior, purchasing power and maintenance of insurance policies. Overall, the study shows that inflation, as a macroeconomic variable has a significant influence over insurance sector and a tolerable rate of inflation can drive more demand for insurance products in the economy.

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