

AN ECONOMETRIC ANALYSIS OF IMPACT OF PUBLIC  
ISSUE ON ECONOMIC DEVELOPMENT IN INDIA  
DURING 1989-2009

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*Abstract*

This study examines the empirical association between public issue and economic development (GDP) during the period 1989-2009. With help of log-lin regression model, we found that public issue had a positive significant impact on India's economic development during this period, which survives almost all diagnostic tests of Classical Linear Regression Model. But, the relationship between public issue and economic development during this period, though had drastically undergone a structural change after 1997 South-east Asian Crisis, evidenced by residuals of recursive least squares, CUSUM test, CUSUMSQ test and Chow's Predictive Failure test, but had remained stable after 2007 Subprime Crisis.

**Key Words:** *Public Issue, Economic Development, Econometric Analysis*

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## 1. Introduction:

In a modern economy, economic growth is dependent upon an efficient and effective instrument that pools domestic savings and mobilizes that pooled savings into productive projects. Absence of such an instrument could leave developmental projects unexploited. Such instrument in the capital market is known as '*Public Issue*'. Public issue connects the monetary sector with real sector and facilitates, thereby, growth in the real sector and economic development.

Public issue channelizes long-term savings into long-term investments by mobilizing house-hold savings into corporate investments. It fulfils the transfer function of current purchasing power in future and thus enables companies to raise funds to finance their investments in real assets. This leads to an increase in productivity within the economy, in turn, leading to more employment, increase in aggregate consumption and thus growth and development. It also provides a relief to the banking system by matching long-term investments with long-term capital and broader ownership of productive assets to the small savers as well. It enables the small investors to benefit from economic growth and wealth distribution and indirectly encouraging thrift culture within them, which is critical for industrialization in an economy like India.

Public issue gives a boost to the social capital formation, such as development of roads, water and sewage systems, housing, energy, telecommunications, public transports, etc. through private capital formation, leading to sustainable growth and development. Since public issue, increases efficiency of capital allocation by confirming projects which deem profitable only, it enhances the competitiveness of domestic industries to stand global competition, leading to a spill over in exports and concomitant economic growth.

The Public-Private-Partnership (PPP) has become today's buzz-word, keeping in view the inducement the private sector receives in taking participation in productive investments, thereby shifting economic development from public to private sector, as resources continue to diminish. This partnership assists the public sector to close the resource gap and complement its endeavour in financing essential socio-economic development through raising long-term project-based capital. The market for public issue also invites foreign portfolio investors who are critical in supplementing the domestic savings level.

## 2. Motivation:

Empirical research, linking development of public issue market and economic growth, suggests that public issue markets enhance economic growth and well developed public issue markets experience higher economic growth than others. Since, India's capital market is one of the highly developed capital markets in the world, we evinced special interest to explore how much impact the amount of public issue had on the economic development in India during the period 1989-2009.

## 3. Literature Review:

There are many studies subscribing to the positive link between stock market development and economic growth & development. Let us mention some of the studies one by one. Levine and Zervos (1998), in their cross-country study found that the development of banks and stock markets had a positive effect on growth. Henry (2000), studied a sample of 11 LDCs and observed that stock market liberalisations led to private investment boom. In another study Levine (2003), argued that although theory provides ambiguous relationship between stock market liquidity and economic growth, the cross-country data for 49 countries over the period 1976-93 suggested a strong and positive relationship (see also Levine, 2001). Recently, Bekaert et. al (2005) analysed data of a large number of countries and observed that the stock market liberalisation 'leads to an approximate 1 % increase in annual real per capita GDP growth'. Surprisingly, Ted Azarmi (2005), examined the empirical association between stock market development and economic growth in India for a period of 1981-2001 and found no support for the linkage between stock market development and economic development. Though during pre-liberalization period, he found support for relevance of stock market to economic growth, but in the post-liberalization period, he found negative correlation between stock market and economic development and suggested Indian stock market to be a casino. No doubt, there are some economists who are skeptical about the contribution of stock market development to economic development. Long time back, Keynes (1936) compared the stock market with casino and commented: '*when the capital development of a country becomes the by-product of the activities of a casino, the job is likely to be ill-done*'. However, P.N. Snowden (2008), categorically suggested that stock market activity and economic development are correlated internationally,

but stock markets can only contribute to growth when firms begin to seek external equity. He examined the IPO prospectus evidence of Indian firms during the most recent period of market strength. The more general development gain of stock markets suggested by the analysis is that equity permits investment finance to be raised on terms seen by firm owners as being more favourable. This was again strengthened by P K Mishra, Uma Sankar Mishra, Biswo Ranjan Mishra and Pallavi Mishra (2010), who examined the impact of capital market efficiency on economic growth in India using the time series data on market capitalization, total market turnover and stock price index over the period spanning from the first quarter of 1991 to the first quarter of 2010 and applied multiple regression model to show that the capital market in India had the potential of contributing to the economic growth of the country. F.T.Kolapo & A O. Adaramola (2012), examined the impact of the Nigerian capital market on its economic growth from the period of 1990-2010 and found the existence of a bi-directional causation between the GDP and the value of transactions (VLT) and a unidirectional causality from Market capitalisation to the GDP and not vice versa.

#### 4. Objective:

To see, whether or not, during the 20-year-period (1989-2009), changes in the value of public issue had significantly explained variation in the value of GDP (at current prices).

#### 5. Methodology:

IPO data has been collected from 'PRIME DATABASE' and GDP data has been collected from 'Economic Survey 2010-11' for 20 years (from the year 1989-90 to 2008-09). GDP, being exponential function, has been transformed into logarithmic series and IPO being linear function has been retained in its raw series. So, here the regression model is simple log-lin model of the form;

$$\ln GDP = \alpha + \beta * PI + u_t$$

Year	Public Issue Amount (Rs. Crore)	GDP (Rs. Crore) <i>at Current Prices</i>
1989-90	2,522	442134
1990-91	1,450	515032

1991-92	1,400	594168
1992-93	5,651	681517
1993-94	10,824	792150
1994-95	12,928	925239
1995-96	8,723	1083289
1996-97	4,372	1260710
1997-98	1,132	1401934
1998-99	504	1616082
1999-00	2,975	1786526
2000-01	2,380	1925017
2001-02	1,082	2097726
2002-03	1,039	2261415
2003-04	17,807	2538170
2004-05	21,432	2971464
2005-06	23,676	3389621
2006-07	24,993	3952241
2007-08	52,219	4581422
2008-09	2,034	5282086

$$LGDP = 13.78846 + 4.37E-05*PI$$

$$SE = (73.96958) \quad (2.707076)$$

$$t = (0.186407) \quad (1.61E-05)$$

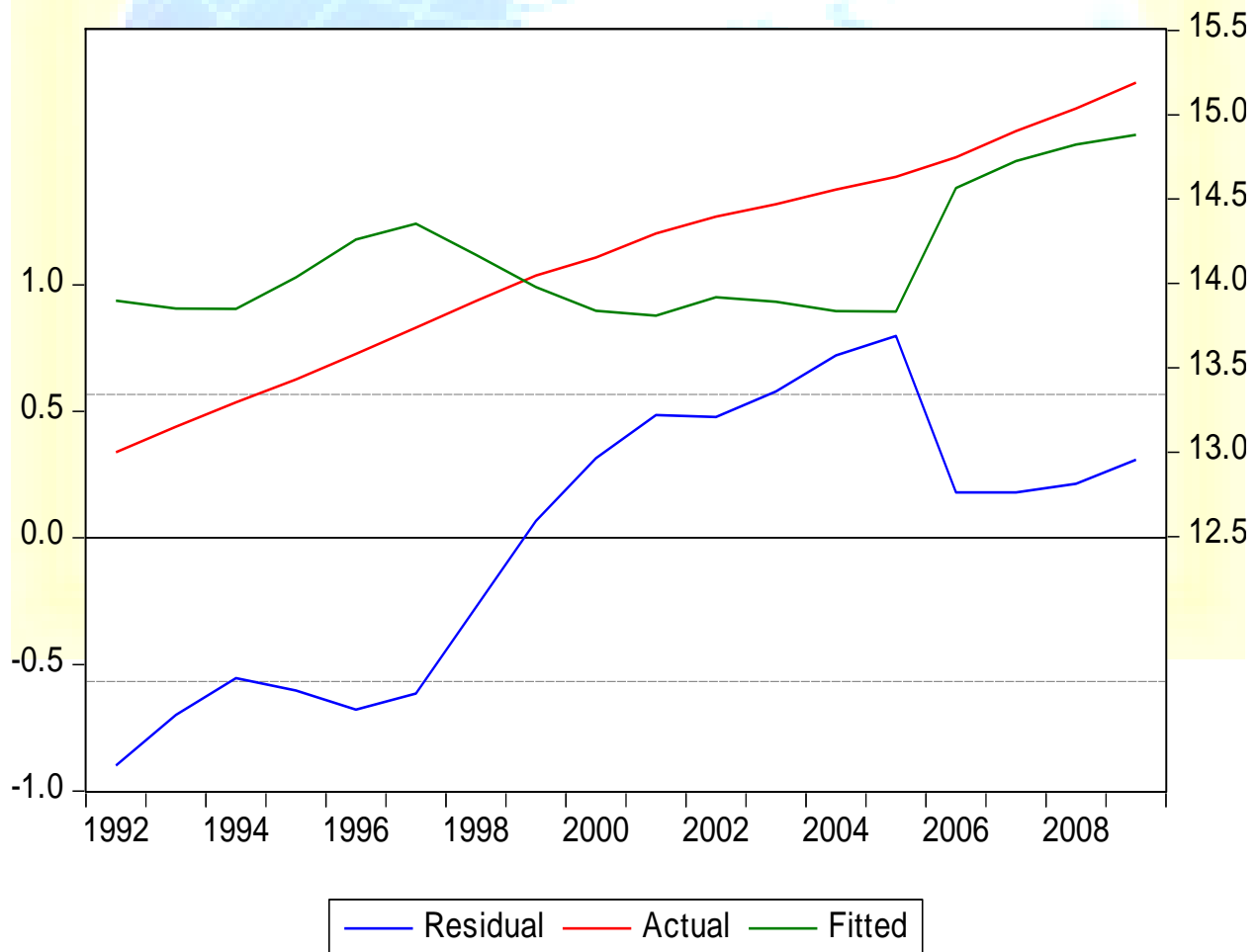
$$p = (0.0000) \quad (0.0155)$$

$$(F\text{-statistic} = 7.328259) \quad (p\text{-value} = 0.015545), \quad R^2 = 0.314137$$

Log GDP has been regressed on raw series of public issue. Since it is level regression, it signifies long-run impact of public issue on GDP. From the above output, we see that the value of public issue coefficient (4.37) is significant, which implies that public issue has a positive impact on GDP. Overall fitness of the model is warranted from the significant value of F-statistic (7.328) and 31.41% of the variation in log(GDP) is explained by public issue, which is warranted by the value of  $R^2$ .

**Heteroskedasticity Test: White**

F-statistic	5.836669	Prob. F(1,16)	0.0280
Obs*R-squared	4.811175	Prob. Chi-Square(1)	0.0283
Scaled explained SS	1.196480	Prob. Chi-Square(1)	0.2740



From the output for ‘White’s general test of heteroscedasticity’, we get three statistics; F-statistic (Wald version) – 5.8366 (p-value significant),  $\chi^2$  Statistic (LM version) – 4.811 (p-value significant) and Scaled explained sum square (normalised version of explained sum of square) – 1.19 (p-value not significant). From the above, the conclusion about residual heteroscedasticity is not clear though ‘Actual-Fitted-Residual’ graph clearly shows the presence of residual heteroscedasticity

**Breusch-Godfrey Serial Correlation LM Test:**

F-statistic	17.57389	Prob. F(2,14)	0.0002
Obs*R-squared	12.87261	Prob. Chi-Square(2)	0.0016

Breusch-Godfrey Serial Correlation test presents two statistics – F version and LM version, both of which are significant here, implying residual autocorrelation. Autocorrelation signifies non-linearity and adding lag in the model cannot even cure this problem. In order to cure the problems of ‘Heteroscedasticity’ and ‘Autocorrelation’, ‘Newey-West HAC’ has been taken recourse to, which takes care of residual heteroscedasticity as well as autocorrelation. Newey-West HAC (Heteroscedasticity-Autocorrelation-Consistent) test has only increased the standard error and thus made the model more conservative, but autocorrelation still exists, as shown below;

$$LGDP = 13.78846 + 4.37E-05*PI$$

$$SE = (0.326924) \quad (1.86E-05)$$

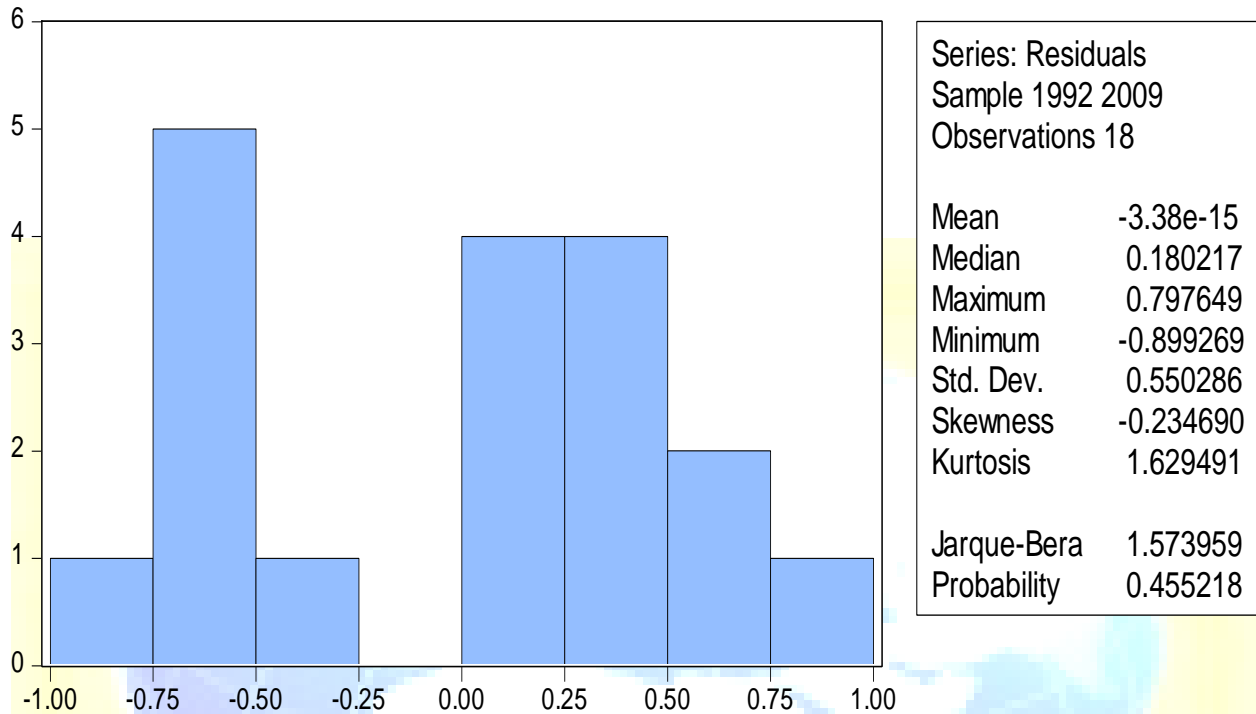
$$t = (42.17633) \quad (2.352661)$$

$$p = (0.0000) \quad (0.0318)$$

$$(F-statistic = 7.328259) \quad (p-value = 0.015545), \quad R^2 = 0.314137$$

Here we see from the Newey-West HAC test with lag-length (2) output that standard error has increased from 1.61 to 1.86 making the model more conservative through reducing the p-value of the coefficient of the regressor. But positive autocorrelation still exists, which is expressed by the value of the D-W test statistic (.1600). However, assuming autocorrelation is an opportunity to build a non-linear model (Autoregressive Conditionally Heteroscedastic Model), one should not be tense regarding the presence of it. But, since the characteristics of OLS estimation are more

known to us as compared to non-linear estimation methods, such as MLE estimation, we prefer to stick to linear estimation method



Jarque-Bera residual normality test has been applied. From the p-value of JB test, we see that the test statistic is not significant and so the normality assumption is not rejected. Therefore, residuals are normally distributed in this case. However, ‘Law of large numbers’ and ‘Central Limit Theorem’ ensure residual normality. However, if residuals are not normally distributed, in the presence of large outliers, dummy variables could have been used to cure the problem.

**Ramsey RESET Test:**

	Value	df	Probability
F-statistic	2.926911	(2, 14)	0.0867
Likelihood ratio	6.288106	2	0.0431

Ramsey’s RESET test signifies whether the model specification is appropriate or not. From the output, we have F-statistic not significant, implying that there is no apparent non-linearity in the regression model. But, the p-value of the Likelihood ratio statistic is significant, implying that



linear regression model could be inappropriate in this case. However, it is to be kept in mind intact that existence of one problem leads to several others and presence of autocorrelation might lead to several other problems though, in actuality, their effect may be benign.

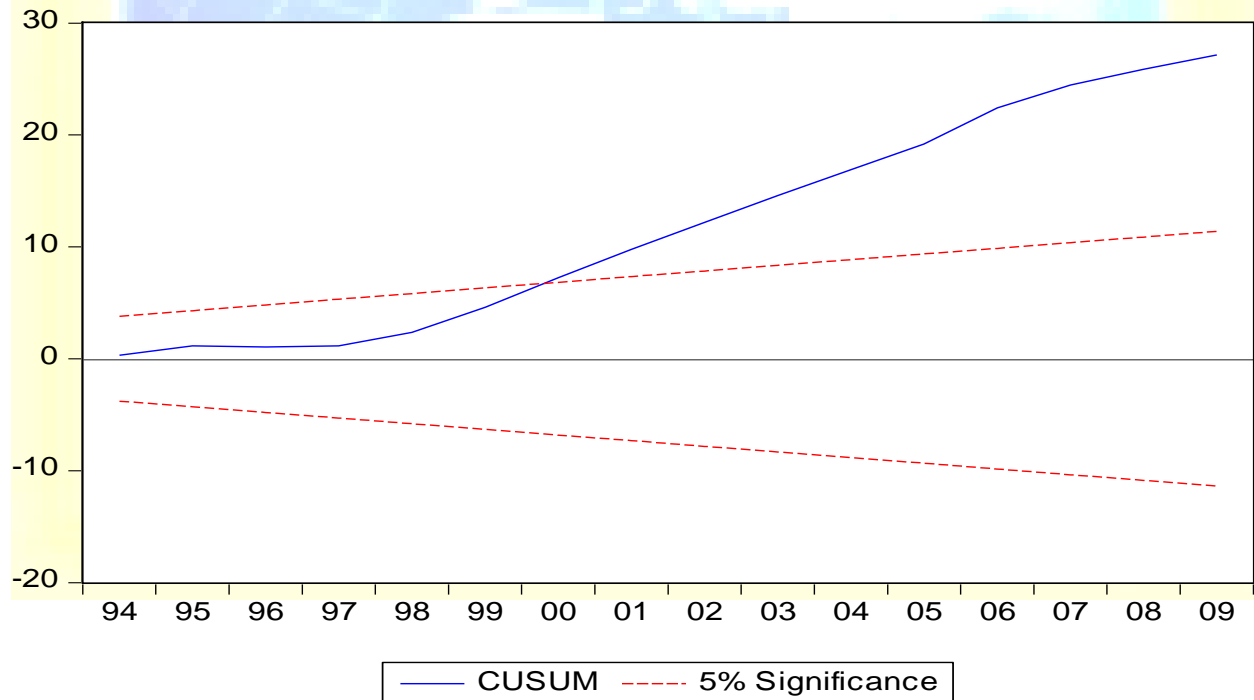
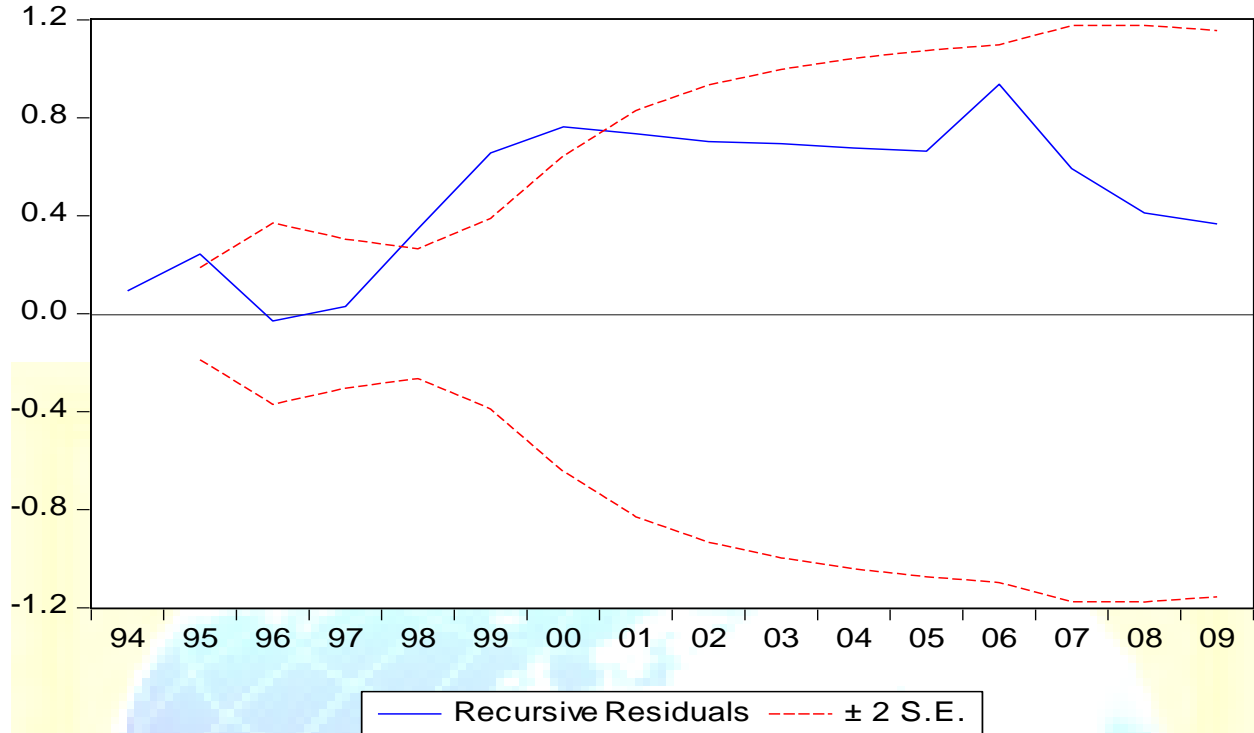
**Chow Breakpoint Test: 1997 ( $H_0$ : No breaks at specified breakpoints)**

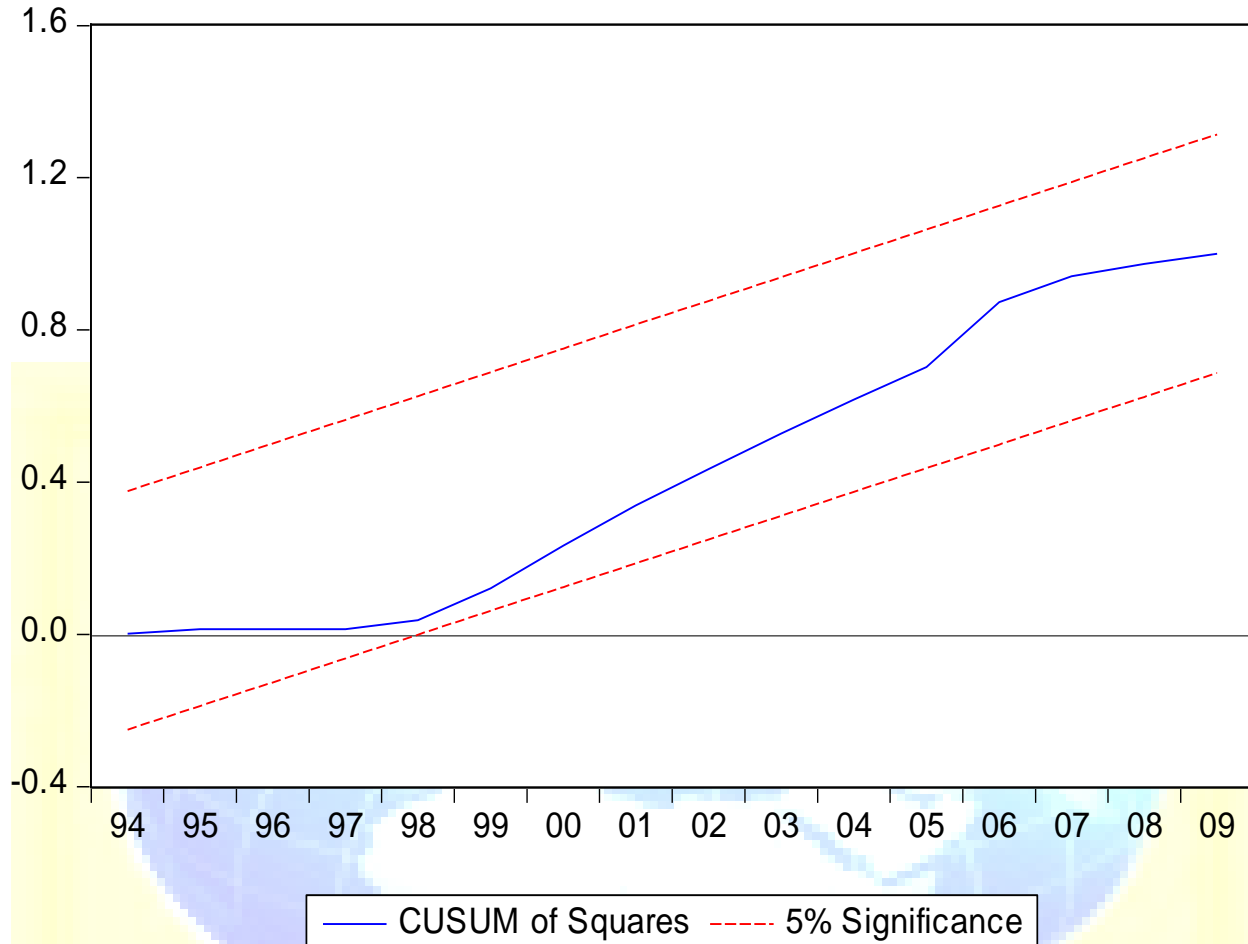
F-statistic	15.70209	Prob. F(2,14)	0.0003
Log likelihood ratio	21.17784	Prob. Chi-Square(2)	0.0000
Wald Statistic	31.40418	Prob. Chi-Square(2)	0.0000

**Chow Breakpoint Test: 2007 ( $H_0$ : No breaks at specified breakpoints)**

F-statistic	1.019369	Prob. F(2,14)	0.3861
Log likelihood ratio	2.447093	Prob. Chi-Square(2)	0.2942
Wald Statistic	2.038739	Prob. Chi-Square(2)	0.3608

Sometimes, economic events (such as South-east Asian Crisis in 1997 and Subprime Crisis in 2007) have impact on the dependent variables, which might cause the variables assume structural change over a period of time. This is known as ‘Structural Break’ or ‘Parameter Instability’. In order to test whether our model, establishing the impact on economic development, suffers from any parameter instability or not, ‘Chow’s Breakpoint Test’ is applied. From the output, we see that though South-east Asian Crisis of 1997 has caused parameter instability, but the Subprime Crisis of 2007 had not, which is vouched by the plots of residuals of Recursive Least-squares, Cumulative sum of residuals, Cumulative sum squares of residuals and ‘Chow’s Predictive Failure Test’ output for prediction of 1997-2009 as shown below.





**Chow Forecast Test: Test predictions for observations from 1997 to 2009**

	Value	df	Probability
F-statistic	16.93645	(13, 3)	0.0196
Likelihood ratio	77.56809	13	0.0000

**Conclusion:**

From the analysis of data of Public Issue and GDP over 1989-2009, we see that Public issue had a positive long-term significant impact on India's economic development during the period. Though the relationship between public issue and economic development during 1989-2009 had drastically undergone structural change after 1997 South-east Asian Crisis, evidenced by residuals of recursive least squares, CUSUM test, CUSUMSQ test and Chow's Predictive Failure test, but had remained stable after 2007 Subprime Crisis.

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