Structural Stability in Money Mobilization through Public Issues in the Indian Primary Capital Market: Evidence from the Global Economic Meltdown

Professor (Dr.) Siddhartha Sankar Saha

Professor of Commerce, Former Head, Post Graduate Department of Commerce,
Former Dean, Faculty Council for Post Graduate Studies in Commerce,
Social Welfare and Business Management, Former Director, CUCSE-CEFM ,
Former Audit and Finance Officer (Acting), Former Director, IQAC,
University of Calcutta, Kolkata, West Bengal, India.
Email: drsiddharthasxc@gmail.com / ssscom@caluniv.ac.in

Abstract

This study examines the structural stability of money mobilisation through public issues in the Indian primary capital market in the context of the global financial crisis. The analysis uses secondary data covering the financial years 2000–01 to 2017–18 and divides the sample around the crisis into a pre-recession period (2000–01 to 2006–07) and a post-recession period (2007–08 to 2017–18). The growth rate of capital raised through public issues is represented by the log first difference of the series, multiplied by 100 (dlnPI). Descriptive statistics, Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) unit-root tests, and Chow breakpoint tests are used. The ADF and PP results reject the unit-root null for dlnPI under specifications without a constant or trend, with a constant, and with both a constant and trend. The Chow breakpoint test reports an F-statistic of 0.102921 ($p = 0.9029$) for 2008 and 0.341646 ($p = 0.7164$) for 2009. Neither result is statistically significant at the 5% level. Accordingly, the analysis fails to reject the null hypothesis of parameter stability at these specified breakpoints. This finding should be interpreted narrowly: it does not establish that the crisis had no effect on the primary market, but indicates that the specified Chow tests do not detect a statistically significant break in the model estimated. The results provide a starting point for examining the resilience of public-issue mobilisation in India, while highlighting the importance of transparent model specification and further robustness checks.

Keywords: *Indian Primary Capital Market; Public Issues; Resource Mobilisation; Global Financial Crisis; Structural Stability; Chow Breakpoint Test; Unit-Root Test*

Introduction

The primary capital market enables companies and other eligible issuers to raise funds by offering securities to investors. By channeling savings towards investment, it can support business expansion, capital formation and wider economic development. The scale and continuity of resource mobilization through public issues may, however, be affected by changes in investor confidence, domestic financing conditions and international capital flows. Starting from a simple out bursting of US housing bubble, 2008's financial crisis had transformed to one of the worst global financial recessions. While the initial impact of this crisis had found on US economy, the effects on developing and less-developed nations were not insignificant. In case of India and other emerging countries, the primary impact of this crisis was viewed through the reversal of Portfolio Capita Investment for the withdrawal of stock positions by FII, which had led to the crash in stock market, depreciating domestic currencies against US dollar. Following an encouraging trend in economic growth after liberalization, India had experienced a very disappointing result during this global economic downturn. This economic instability had created various uncertainties in domestic, financial and external sectors of that country. The availability of global funds had gradually decreased resulting huge losses in financial sector, which is considered as one of the driving forces of economic growth.

The primary impact was a huge rise in interest rate as well as the less accessibility of foreign funds. Financial market's uncertainty had forced the investors to rethink before investing in domestic risky assets that had ultimately created the possibility of capital outflow generating the situation of liquidity crunch. So, before 2007-08 and after 2007-08, world economy had witnessed an abrupt change. Describing this backdrop, in our study we have tried to capture the impact of this financial crisis on the money mobilization in the Indian primary capital market and hence, we have divided our total time periods into two separate intervals, pre-recession (2000-01 to 2006-07) and post-recession (2007-08 to 2017-18) period. Against this backdrop, an attempt has been made to study the structural stability in money mobilization in the Indian primary capital market in the context of global economic meltdown using chow test.

Past Studies

The literature cited in the source manuscript addresses the development, institutional structure and functioning of capital markets, merchant banking and resource mobilisation. The studies provide background for understanding the role of primary markets, although the available

material contains limited direct empirical evidence on structural breaks in Indian public-issue mobilisation around the global financial crisis.

Merchant banking and the institutional development of capital markets

Stanley (1984) surveys the origins of merchant banking and discusses political influences on merchant-banking activities at national and international levels. Verma (1990) examines financial markets in India and the contribution of financial institutions to industry, trade and commerce, drawing comparisons with merchant-banking developments in Europe and North America. Abadhani (1994) presents an overview of merchant-banking management in India, including its functions, contribution, contemporary trends and future prospects. Machiraju (1999) highlights the social responsibility of merchant bankers in supporting a financially viable industrial structure and the adoption of modern technology.

These works offer institutional and historical context for the role of intermediaries in securities issuance and capital formation. However, based on the descriptions available in the source manuscript, they do not directly test whether the global financial crisis changed the statistical behaviour of funds mobilised through public issues.

Public issues and primary-market operations

Burch and Foerster (2004) focus on the United States initial public offering market. Chakraborti and De (2010) assess operational efficiency in the Indian primary market. Saha (2016) discusses securities issuance through different routes in the Indian primary capital market, including public-issue pricing, allotment and the green-shoe option in the context of SEBI (ICDR) Regulations, 2009. Jenica (2017) examines the role of the Indian primary market in resource mobilisation during 2014–2016 and discusses routes such as offers for sale, private placements, qualified institutional placements and rights issues.

Together, these studies provide context on issuance mechanisms, market operations and the routes through which issuers mobilise funds. The descriptions in the source material do not, however, establish whether public-issue mobilisation remained structurally stable through the 2007–09 crisis.

Capital markets and economic development

Rubani (2017) discusses the structure and functions of the Indian financial market. Agu, Nwankwo and Onwuka (2017) examine the contribution of the capital market to domestic resource mobilisation and economic development in Nigeria over 2000–2015. The source manuscript reports that their cointegration-based analysis found a negative and statistically

significant long-run effect of the Nigerian capital market on economic development. This result concerns a different country and research question, but illustrates the wider interest in the relationship between capital markets and resource mobilization.

Research Gap

The studies summarized above address merchant banking, primary-market operations, issuance routes and the developmental role of capital markets. According to the literature reviewed in the source manuscript, the specific question of structural stability in money mobilization through public issues in India around the global financial crisis has received limited attention. The present study addresses this stated gap by applying Chow breakpoint tests to the period 2000–01 to 2017–18, with breakpoints specified at 2008 and 2009.

Objectives and Hypotheses

The objective of the study is to examine structural stability in money mobilization through public issues in the Indian primary capital market in the context of the global financial crisis, using the Chow breakpoint test. The hypotheses for each specified breakpoint are:

H_0: The regression parameters are stable across the specified breakpoint; there is no structural break.

H_1: The regression parameters differ across the specified breakpoint; a structural break is present.

Data and Methodology

Data

Secondary data for the period 2000-01 to 2017-18 related to money mobilization through public issues in the Indian primary capital market have been taken into consideration for the study.

Methodology

Unit-Root Tests

The Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) tests are applied to dlnPI under three deterministic specifications: (i) no intercept and no trend, (ii) intercept, and (iii) intercept and linear trend. For each test, the null hypothesis is that the series contains a unit root. Rejection of the null supports stationarity under the selected specification.

The source manuscript also uses a correlogram to inspect the transformed series and states that its pattern is consistent with an ARMA(1,1) representation. A correlogram alone does not establish a unique ARMA order; formal model selection and residual diagnostics would be needed to substantiate that claim.

Chow Breakpoint Test

Structural breaks can occur in time series data or cross sectional data, when there is a sudden change in the relationship being examined. For instances, there may be sudden policy changes such as a change in government or sudden move in asset prices or there is serious international disaster such as a civil war or there may be economic crisis. In this backdrop, there is a need to decide whether two separate regression lines are more efficient than a single regression. In view of this, there is a need to split the data set into two sub-samples by considering the break point and it is required to estimate by Ordinary Least Square (OLS). In the first case, there may be a single regression line to fit the data points, it can be expressed as:

$$y_t = \alpha_0 + \alpha_1 x_t + u_t$$

In the second case, where there is a structural break (at time t), there may be two separate models expressed as:

$$y_t = \beta_1 + \beta_2 x_t + u_{1t}$$
$$y_t = \delta_1 + \delta_2 x_t + u_{2t}$$

This suggests that model 1 applies before the break at time t, and then model 2 applies after the structural break. If the parameters in the above models are the same, i.e. $\beta_1 = \delta_1 \; and \; \beta_2 = \delta_2$, then model- 1 and 2 can be expressed as a single model as in first case, where there is a single regression line.

Therefore, a time series data may often have a structural break due to a change in policy or sudden shock to the economy, which is examined with the help of Chow test. Chow test offers a classical possibility for testing structural change. Different variants are often reported: sample-split, break-point, and forecast tests. The Chow test is a statistical and econometric test which determines whether the coefficients in two linear regressions on different datasets are equal. The model in effect uses an F-test to determine whether a single regression is more efficient than two separate regressions involving splitting the data into two sub-samples. The

Chow test basically tests whether the single regression line or the two separate regression lines fit the data best.

With a view to conducting the Chow test, the null hypothesis is: $H_0 : \beta_1 = \delta_1 \ and \ \beta_2 = \delta_2$ *(H_0: structural stability versus H_1 : structural break).* The null hypothesis is the structural stability in this case and the null hypothesis implies that there is no structural break at time t. If the null hypothesis is rejected, there may have a structural break in the data set. In time series analysis, it is used to test for structural breaks. The test statistic is given as

$$F^* = \frac{[RSS_c - (RSS_1 + RSS_2)]/k}{(RSS_1 + RSS_2)/(n_1 + n_2 - 2k)}$$

Where,

- *RSS_c is the residual sum squares from the combined data,*
- *RSS_1 is the residual sum squares from the first group(before the structural break),*
- *RSS_2 is the sum of squared residuals from the second group (after the structural break),*
- *N_1 and N_2 are the number of observations in each group and k is the total number of parameters.*

However, the Chow test can be conducted with the following steps:

(i) Step-1: The regressions can be run using all the data set, before and after the structural break (let, break at t), and compute the value of residual sum squares (RSS_c) from the regression.

(ii) Step-2: Two separate regressions can be run on the data set before and after the structural break, and compute the RSS in both cases, giving RSS_1 and RSS_2.

(iii) Step-3: Using these three RSS values, the test statistic (F-statistic) can be calculated from the following formula:

$$F^* = \frac{[RSS_c - (RSS_1 + RSS_2)]/k}{(RSS_1 + RSS_2)/(n_1 + n_2 - 2k)}$$

(iv) Step-4: The decision rule can be followed: if F^*>F at chosen level of significant and the df={k, (n_1+n_2-2k)}, the null hypothesis can be rejected ($H_0 : \beta_1 = \delta_1 \ and \ \beta_2 = \delta_2$), and two regression are not the same. In other words, there is no structural stability in the data structure. The null hypothesis in this case is structural stability, if the null hypothesis is rejected, there may have a structural break in the data set. [alternatively it can be said that if the p-value of F-statistic is significant at 5% level or 10% level of

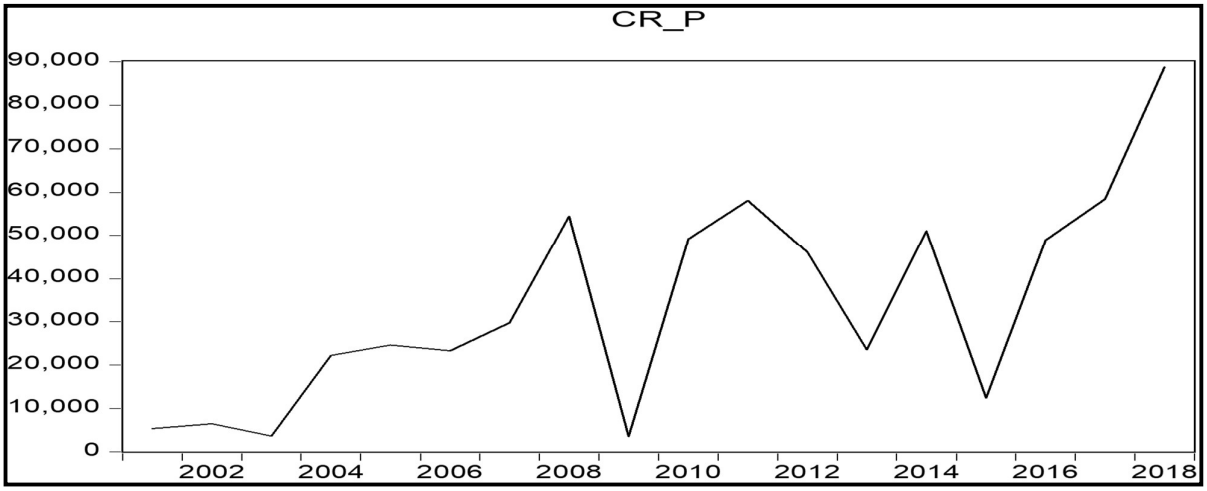
significance (i.e. the p-value of F-statistic < 0.05 or 0.10), the null hypothesis can be rejected ($H_0 : \beta_1 = \delta_1 \; and \; \beta_2 = \delta_2$), and two regression are not the same. If the null hypothesis is rejected, there may have a structural break in the data set.]

Empirical Results and Analysis

Plotting Time Series Data

As part of the diagnostics, a visual inspection of the time plot of capital raised through public issues (CR_P) for the period (2000-01 to 2017-18) under review is presented in Figure –1. A time plot shows the data against the time. From the above plot (Figure –1), a time series data with a linearly upward trend is displayed. We know from our previous analysis that capital raised through Public Issue (PI) in its level is non-stationary. Therefore, there is a need to transform it into log first difference in order to make it stationary. Now taking log first difference of PI and multiplying by 100, we get new variable is dlnPI which is also called as growth rate of capital generation through Public Issue.

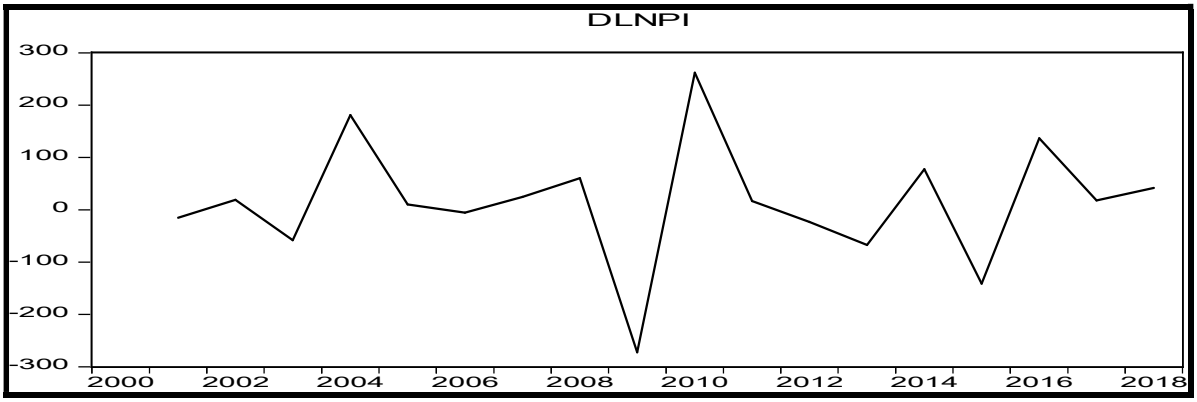
Figure-1: Graphical Plots of CR_P (at level)



(Source: Author's calculation based on data from SEBI)

A visual inspection of the time plot of log first difference of PI (dlnPI) for the period (2000-01 to 2017-18) under review is presented in Figure –2.

Figure–2: Time plot of log first difference of PI (dlnPI)



(Source: Author's calculation based on data from SEBI)

From the Figure–2, it is clear that the series are fluctuating around the mean line. Thus, it looks like a stationary series.

Descriptive Statistics

To specify the distributional properties of the data (dlnPI) during the study period, various descriptive statistics are calculated and reported in Table–1.

Table–1. Descriptive statistic of dlnPI

Descriptive Statistic	dlnPI
Mean	14.733
Median	17.158
Minimum	-272.248
Maximum	262.070
Range	534.318
Standard Deviation	116.850
Skewness	-0.271
Kurtosis	1.874
Jarque-Bera	1.053
Probability	0.591
Sum	265.201
Sum sq. Dev.	232117.1
Observation	18

(Source: Author's calculation based on data from SEBI)

It is seen that the dlnPI during the study period, varies from -272 to 262 and a wide range of fluctuation in data series can be observed. The mean during the study period is 14.73. The skewness statistics for data is -0.271. Thus, it lies between -0.5 and 0.5, the distribution is approximately symmetric. Furthermore, the kurtosis is 1.874, which suggests that the underlying distribution was platykurtic distribution. It can also be observed that the JB statistics is insignificant at 5% level of significance. It means that the null hypothesis of normality accepts the normality assumption.

Stationarity Test: Unit Root Test Analysis

To confirm stationarity, we begin with a correlogram plot, which is followed by application of ADF and PP test to examine the presence of unit root (non-stationary) in the dlnPI series. We obtain the correlogram of the series dlnPI, which is shown in Figure – 3.

(i) Stationarity Test using Correlogram

In this segment, an attempt has been made to test stationarity using correlogram, to examine the presence of unit root (non-stationary) in the dlnPI series. The correlogram of the series dlnPI is shown in Figure – 3.

Figure – 3: Correlogram plot of dlnPI

Sample: 2000 2018
Included observations: 18

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.548	-0.548	6.3492	0.012
		2	0.078	-0.316	6.4873	0.039
		3	-0.048	-0.262	6.5427	0.088
		4	0.160	0.030	7.2010	0.126
		5	-0.493	-0.604	13.930	0.016
		6	0.597	-0.015	24.638	0.000
		7	-0.255	0.011	26.766	0.000
		8	0.052	0.042	26.864	0.001
		9	-0.094	-0.025	27.217	0.001
		10	0.068	-0.387	27.424	0.002
		11	-0.130	0.065	28.287	0.003
		12	0.146	-0.216	29.561	0.003

(Source: Author's calculation using Eviews-8 based on data from SEBI)

From this plot it is observed that dlnPI follow an ARMA (1, 1) model. So, it is stationary series. In the following Table–2 and Table–3, we reported the result of ADF and PP unit root test.

(ii) Stationarity Test using ADF Test

To avoid the spurious regression, we check the stationarity of the data set. In our study, we applied Augmented Dickey-Fuller (ADF) test and Philips-Peron (PP) test to check the existence of unit root or not. Table–2 and Table–3, depict the ADF and PP test statistic of dlnPI with three variations as without trend and intercept, Intercept, and trend & intercept.

Table–2: ADF unit root test result of dlnPI

Unit root test – ADF test of dlnPI					
Model	**t-stat.**	**Prob.**	**C.V (5%)**	**Null hypothesis (H_0): dlnPI has unit root (Decision Rule: if $\|\tau_{Obs}\| > \|\tau_{Tab}\|, H_0$ is rejected)**	**Remarks (non-stationary series=I(1)/ stationary series =I(0))**
No Intercept No Trend	-7.1509	0.0000	-1.9628	H_0 rejected	I(0)
Intercept	-7.1834	0.0000	-3.0521	H_0 rejected	I(0)
Intercept & Trend	-6.9422	0.0002	-3.7105	H_0 rejected	I(0)

(Source: Author's calculation using Eviews-8 based on data from SEBI)

It is observed that the t-statistic of three cases is greater than critical value at 5% significance level. The null hypothesis of unit root in all three variations is rejected at 5% significant level. Hence, our data set (dlnPI) has no unit root indicating stationary series. This can also be verified by the PP test, which is presented in Table–3.

(iii) Stationarity Test using PP Test

From the Table–3.31, it is observed that the t-statistic value of three cases is greater than critical value at 5% significance level.

Table–3: PP unit root test result of dlnPI

Unit root test – PP test of dlnPI					
Model	**t-stat.**	**Prob.**	**C.V (5%)**	**Null hypothesis (H_0): dlnPI has unit root (Decision Rule: if $\|\tau_{Obs}\| > \|\tau_{Tab}\|, H_0$ is rejected)**	**Remarks (non-stationary series=I(1)/ stationary series =I(0))**
No Intercept No Trend	-8.6298	0.0000	-1.9628	H_0 rejected	I(0)
Intercept	-18.311	0.0000	-3.0521	H_0 rejected	I(0)
Intercept & Trend	-18.009	0.0001	-3.7104	H_0 rejected	I(0)

(Source: Author's calculation using Eviews-8 based on data from SEBI)

So, we can say that the null hypothesis i.e., data has unit root should be rejected. This means that dlnPI is a stationary series. Thus ADF and PP test confirm that dlnPI is a stationary variable.

Chow test for Structural Stability

The study considers overall period during 2000-01 to 2017-18, which has been segregated into two phases keeping in mind global economic recession started since 2007. Those two phases are: Pre-recession phase (2000-01 to 2006-07) and the post-recession phase (2007-08 to 2017-18). In view of this, two break points during post-recession phase have been considered in order to examine whether the linear model is stable or not using Chow test. The result of Chow break test is reported in the following Table–4.

Table–4: Chow test for Structural Stability

Chow Breakpoint Test: 2008			
Null Hypothesis: *No breaks at specified breakpoints*			
Equation Sample: 2001 2018			
F-statistic	0.102921	Prob. F(2,14)	0.9029
Log likelihood ratio	0.262727	Prob. Chi-Square(2)	0.8769

Wald Statistic	0.205842	Prob. Chi-Square(2)	0.9022
Chow Breakpoint Test: 2009			
Null Hypothesis: *No breaks at specified breakpoints*			
Equation Sample: 2001 2018			
F-statistic	0.341646	Prob. F(2,14)	0.7164
Log likelihood	0.857753	Prob. Chi-Square(2)	0.6512
Wald Statistic	0.683293	Prob. Chi-Square(2)	0.7106

(Source: Author's calculation using Eviews-8 based on data from SEBI)

Considering the break point (year 2008), it is observed that the p-value of F-statistic is not significant at 5% significance level (i.e. the p-value of F-statistic > 0.05). Hence, the null hypothesis can be accepted ($H_0 : \beta_1 = \delta_1$ *and* $\beta_2 = \delta_2$), and two regression are the same. If the null hypothesis is accepted, there is no structural break in the data series. In other words, if the null hypothesis is accepted, the coefficients of two sub-period regressions are stable. Likewise, in case of break point (year 2009), it is also evident that the p-value of F-statistic is not significant at 5% level of significance (i.e. the p-value of F-statistic > 0.05) and there is no structural break in the data series.

The reported analysis yields three main conclusions. First, the reported ADF and PP tests indicate that the level series is going upward, yet the log-first-difference transformation yields a stationary series. Second, even if the Jarque-Bera test does not reject normalcy at conventional levels, dlnPI shows significant dispersion, with a standard deviation of 116.850 and extreme minimum and maximum values. Third, there is no statistical significance in the Chow tests at the 2008 and 2009 breakpoints. Therefore, under the tested scenario, there is no statistically significant break at those dates according to the evidence that is now available.

Practical Implications

The findings imply that the aggregate series under investigation did not show a statistically detectable break under the given test specification, which is important information for market players and regulators. This might be pertinent as a preliminary finding about the persistence of public-issue mobilization, but it shouldn't be relied upon in isolation to suggest that the market was immune to global financial strain. Changes in issue counts, issue sizes, sectoral

composition, price, withdrawals, listing performance, and the involvement of various investment groups should all be taken into account by issuers, investors, and regulators.

Conclusion

This study examined structural stability in money mobilisation through public issues in the Indian primary capital market over 2000–01 to 2017–18, with particular attention to the global financial crisis. The analysis considered the pre-recession period of 2000–01 to 2006–07 and the post-recession period of 2007–08 to 2017–18. It used descriptive statistics, ADF and PP unit-root tests, and Chow breakpoint tests at 2008 and 2009. The ADF and PP results indicate that the transformed series dlnPI is stationary under the three reported deterministic specifications. The descriptive statistics show wide variation in public-issue mobilisation growth. The Chow test results are statistically insignificant for both 2008 and 2009. Accordingly, the study fails to reject the null hypothesis of structural stability at these specified breakpoints. The findings do not establish that the crisis had no effect on Indian primary capital markets, nor do they prove that mobilisation was unaffected in every dimension. Rather, the reported Chow tests do not provide statistical evidence of a parameter break at the selected dates in the model estimated.

References

Avadhani, V. (2001). *Investment and Securities Markets in India.* Mumbai: Himalaya Publishing House.

Agu, B., Nwankwo, S. and Onwuka, I. (2017). Impact of Capital Market on Domestic Resource Mobilization for Economic Development in Nigeria (2000-2015). *Journal of Economics and Public Finance*, *3*(1), 1-16.

Burch, J. and Foerster, B. (2004). *Capital Markets Handbook* (6th Edition). Aspen Publishers Inc.

Chakrabarti, R. and De, S. (2010). *Capital Markets in India*. Sage Publications Pvt. Ltd. (Kindle Edition).

Jenica, S. (2017). Role of Indian Primary Market in Mobilization of Resources. *International Journal of Science and Research (IJSR)*, *6*(3), 1298-1302.

Machiraju, H. (1999). *Merchant Banking: Principles and Practice.* New Delhi: New Age International (P) Ltd.

Machiraju, H. (2000). *Indian Financial System.* New Delhi: Vikas Publishing House Pvt. Ltd.

Rubani, M. (2017). A Study of Structure and Functions of Capital Markets in India. *International Journal of Business Administration and Management, 7*(1), 183-194.

Saha, S. S. (2006, August). The Book Building Mechanism of IPOs. *The Chartered Accountant*.

Saha, S. (2013). *Indian Financial System and Markets.* New Delhi : McGraw Hill (India) Pvt. Ltd.

Saha, S. (2015). *Capital Markets and Securities Laws* (2nd Ed.). New Delhi: Taxmann Publications Pvt. Ltd.

Saha, S. (2016). *Capital Markets and Securities Law.* New Delhi : Taxmann Pvt. Ltd.

Saha, S. (2018). *Indian Financial System and Markets* (3rd Reprint). New Delhi: McGraw-Hill Education (India) Pvt. Ltd.

Stanley, C.(1984). *The Rise of Merchant Banking.* London: George Allen & Unwin.

Verma, J. (1990). *Merchant Banking: Origanisation and Management.* New Delhi: Tata McGraw-Hill Publishing Company Ltd.

Verma. J. (1993). *Manual of Merchant Banking (Concepts, Practices & Procedures).* New Delhi: Bharat Law House.

SEBI (2018). SEBI Bulletin. Available at: http://www.sebi.gov.in.

SEBI (2019). SEBI Bulletin. Available at: http://www.sebi.gov.in.

SEBI (ICDR) Regulations, 2018. SEBI (2019). Available at: http://www.sebi.gov.in.