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Effect of Market Crisis of Financial Efficiency on Underpricing: an VAR Overview of Indian IPOs

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Abstract
This paper attempts to design for and tests empirical models, which integrate theoretical and firm's economic capabilities. Which are interacting to explain financial efficiency, i.e. several financial & liquidity ratios at the level of underpricing after the Indian stock market crunch? The study is founded on IPO that listed at Bombay stock exchange given that April-2008 to Dec-2011. VAR (vector autoregressive analysis) is used to distinguish the relationship between all independent variables with the dependent variable, i.e. level of underpricing. The results of VAR display that variable of DEBTQ, APATM, ROCE and RONW have a consequential association at the level of Market adjusted return ratio (MARRO), AND VAR indicates 46% R^2 and 30% adjusted R^2. Nevertheless, ROCE and RONW have a significant difference in the level of traditional underpricing, and VAR indicates 49% R^2 and 32% adjusted R2. However, in the mutually of a case i.e. LOGMAARO & LOGUNDER verified the assumptions of Akaike information criterion and Schwarz's criterion. We executed unit root testing to verify stationary of time series and autocorrelation function. Durbin Watson's value subsisted *1.58*. Which indicate, there is no heteroskedasticity problem exist for the model?
Key words: IPOs, Post market crisis, ownership structure, share holding pattern, BSE, Underpricing, firm specific factors, market related variables.
JEL: G14, G32, G12

1. Introduction

The underpricing of IPOs is anomalous in the sense that it appears to contradict the efficient markets' hypothesis. In particular, one would expect the underpricing of IPOs to disappear over time as the overwhelming majority of investors will recognize the implied profit opportunities and make good use of them. However, the underpricing of IPOs seems to be persistent in most markets. Furthermore, it would be hard to rationally justify the behavior of existing owners to sell shares to outsiders at discounted ices. The fact that these anomalies exist in numerous developed and developing markets makes them even more demanding to explain.

There are a number of theoretical explanations and models underpinning this IPO underpricing. The popular justifications for this observed phenomenon rest upon the possible existence of information asymmetries, mainly in the form of ex ante uncertainties about share prices. Also, according to (Welch, 1989), (Benveniste & Spindt, 1989) and other similar studies, there exists a signaling mechanism where firms send signals to the market by underpricing their listed IPOs. Moreover, there are other possible explanations such as underwriter reputation theories, investor sentiment theories and prospect theories to explain the degree of underpricing in the IPO market.

The empirical evidence on the performance of private and government firms is also inconclusive. (Megginson and Weiss, 1991), suggested that privatized firms perform better than their counterparts. On the other hands, (*Kay, 1986),* documented, which is supportive of government enterprise. The accuracy of pricing of an IPO affects the value of the firm, as well as the initial returns available to its subscribers. (Loughran & Ritter, 1994), (Allen and Faulhaber, 1989), explained underpricing as a signaling device used by high-quality firms which intend to make subsequent equity issues to distinguish themselves from the other firms. (Baron, 1982), (Rock, 1986) and (An & Chan, 2008), proposed non signaling explanations for underpricing. In baron's model, advisers are better informed about the equilibrium price of an issue than the issuing company and investors. Advisers provide underwriting, marketing, and price. Baron examines that they have an incentive to underprice so as to reduce the selling effort and the chance that they will left with unsold shares. Most of the researchers are continuously exploring various facets of the pricing mechanism to find suitable explanations for the underpricing. (Rock, 1986), winner curse model, information revelation theory by (Benveniste & Spindt, 1989), price stabili-

zation theory by *Rudd (1993)*, tried to give reasons for the Underpricing phenomenon. (Rock, 1986), developed the '*winners curse'* model based on the information asymmetry between informed and uninformed investors. To entice uninformed investors, companies underpriced new issues so that after market price exceeds the offer price.

The remainder of the paper proceeds as follows. Section 2 discusses the theories and models about IPO underpricing, and section 3 elaborates the empirical evidence regarding literature. Section 4 develops the hypotheses. Section 5 introduces our data and sample. Section 6 analyzes VAR regarding IPO underpricing including dependent variable and all independent variables. Section 7 addresses the results. And Section 8 considers the association between the IPO underpricing and independent variables. Section 9 concludes the paper.

1.1 Role of BSE in book building process

BSE suggests the book building services through the book building software that runs on the BSE private network. This system is one of the largest electronic book building networks anywhere spanning over 350 Indian cities through over 7000 trader work stations via leased lines, VSATs and campus LANS. The software is operated through book-runners of the issue and by the syndicate member brokers. Through this book, the syndicate member brokers on behalf of themselves or their clients' place orders. Bids are placed electronically through syndicate members, and the information is collected on line real-time until the bid date ends. In order to maintain transparency, the software gives visual graphs displaying price v/s quantity on the terminals.

1.2. Why IPO Underpricing

An initial public offering (IPO) issue process requires the active involvement of three key players: the firm, a single investment bank or group of investment banks (for underwriting & marketing the IPO), and the investors (institutional & non-institutional) intending to buy shares. The issuing firm wants to obtain the maximum price per share (issue price) while the investors want to buy the shares at a minimum price. Investment banks acting as intermediaries help in matching the opposite expectation of both the parties. Investment banks also perform various other functions like certifying the economic rationale of the issue to regulatory bodies like the Securities & Exchange Board of India (SEBI), deciding the issue price, allocating shares to investors and other issue specific responsibilities.

1.3. Theories and models of underpricing

Thus, according to the winner's curse theory, IPO underpricing should decrease if the information asymmetry between informed and uninformed investors is reduced. Empirical studies have found evidence that the underpricing for IPOs of financial institutions is related to proxies for asymmetric information. Signaling (Allen and Faulhaber, 1989) asymmetric information (Ibbotson, 1975) *Offer size* (Megginson and Weiss, 1991) *age of the* firm, liquidity ratios, financial efficiency (Muscarella and Vetsuypens, 1989) market capitalization*, credibility of firms, firm performance* (McDonald and Fisher, 1972), (Baker and Wurgler, 2007), *Pricing mechanism* (Bansal and Khanna, 2012) *determinants of IPO underpricing.*

(Leite, 2007), generalized the informational assumptions of the (Rock, 1986) to address empirical evidence and conjectures that the standard model based on informed and uninformed investors is unable to address. They showed that high (low) market returns induces the issuer to price the issue more conservatively (aggressively) to create a negative relation between the public signal and the quality of the marginal investor, and in turn a positive relation between market returns and underpricing.

(Dolvin and Jordon, 2008), addressed the question of whether or not periods of high underpricing adversely affect pre-existing shareholders. They found that high levels of underpricing are associated with increased share retention, which effectively offsets much of the potential cost. Overall, the percentage of shareholder wealth lost is stable over time, unlike underpricing itself. Also many factors known to be related to underpricing are not significant determinants of the cost of going public to pre-existing owners.

(Kumar, 2010), examines the efficiency of IPO issuing mechanisms using a sample of Indian IPOs that tapped the primary market during 2003-07 by taking in to consideration the total costs the issuers have to face i.e., including both direct as well as indirect costs. He finds that from a total cost point of view the issuers fare neither better nor worse using either book building or the fixed price offers. Their results also showed that the issue expenses associated with book building is more than those associated with fixed price offers after controlling for issue size and firm specific characteristics.

(Bansal and Khanna, 2012), analyzes that whatever there is any significant difference in the magnitude of level of underpricing of IPOs that priced through book build with those that are priced through the fixed price option. They found that the magnitude of underpricing is concerned; the book-build and fixed price option gave different results. They found significant difference in level of magnitude of underpricing in IPOs that priced through book build with those that are priced through the fixed price option.

2. Research objectives

1) To measures, the IPOs initial performance on first trading day at Bombay stock exchange from (April

2008 to Dec-2011).

2) To analysis, the diverse factors (firm's age, number of shares offered, market capitalization, and sub-scription pattern) that affecting the dependent variable i.e. degree of underpricing after the stock market crisis. And to distinguish the association between several financial ratios and level of underpricing.

3. Research Methodology

The data is analyzed using multiple linear regressions. To find out which variables are significant in determining the underpricing. Empirical studies have found evidence that the underpricing for IPOs of financial institutions is related to proxies for asymmetric information. Liquidity positions, firm efficiency, *Offer size* (Megginson and Weiss, 1991), *age of the* firm (Muscarella and Vetsuypens, 1989), (Barry & brown, 1985), Company size, activity ratios, firm's profitability, (McDonald and Fisher, 1972), (Bansal and Khanna, 2012), have all been associated with IPO underpricing, Offer timing from price setting to listing date found negatively related with underpricing (Singh & Mittal, 2003).

1.2 Measures for Variables

The variables used in the study have been measured as described below.

1.2.1 Measure of underpricing

Consistent with the standard methodology, underpricing is calculated as the percentage change from the offer price to the closing price in the secondary market.

Traditional underpricing = ((closing price - offer price) /offer price) * 100…….. (1)

Log underpricing = ln (P1-P0/P0)* 100 ……. (2)

Log Underpricing = ln (closing price/ offer price) is used to determine the level of underpricing and to make standard practice and to avoid heteroskedasticity. We have got marketed adjusted returns on securities (MAARO).

Firstly, we have calculated the return on, i security, where we have used Ri= (P1-P0)/P0 in which, Ri= return on, i security, P1= Price of, i security on first listing day, P0= offer price of, i security.

Equation 1Ri= (P1-P0)/P0…… (3)

Secondly, we have also calculated index return on corresponding days, where we have used Mi= (Ii- I0)/ I0 in which, Mi= market return on ith day, Ii = closing index at listing day, I0= closing index at offer day.

Equation 2 Mi= (Ii- I0)/ I0……..…… (4)

Finally, we have calculated market adjusted return on security, where we have taken Ri from equation (1) and Mi from equation (2).

Equation 3 MAARO = {100* [(1+Ri)/ 1+Mi)1]}…….(5)

Underpricing is used as dependent variable in this multiple regression model.

Insert Table 1 Description of variables

1.3 Hypothesis Model

On the basis of empirical studies which have found evidence that the underpricing for IPOs with independent variables. We have constructed various hypothesis related to our research problems, research objectives and variables. Two tailed hypothesis test has been used to find the significant association between various variables at the 5% significance level.

Null hypothesis: H0: There is no significant difference between independent variables with the dependent variable i.e. level of underpricing.

1.3.1.1 Debt-Equity Ratio (D/E Ratio)

Debt- equity ratio indicates the relationship between loan funds and new worth of the company, the long term financial stability of the firm. We have taken previous Year before issuing IPO year. Afterwards we converted it into the natural logarithms to make standardized value and to remove the heteroskedasticity.

D/E Ratio = Long- term Debt / Shareholders Funds

H1*: There is positive significant association between Debt- equity ratios with the level of underpricing.*

1.3.2 Current Ratio (CR)

Current ratio is calculated current assets divided by current liabilities. It is indicating the liquidity & solvency of the firm in the short term. We have taken current ratio to reveal liquidity condition of a company.

CR= Current assets, Loans & advances / Current Liabilities & Provisions

H2: There is negative significant difference between Current Ratio and the level of underpricing.

1.3.3 Creditors payment period (CPP)

The measurement of the creditor turnover period shows the average time taken to pay for goods and services purchased by the company. In general the longer the credit period achieved the better, because delay in payment mean that the operations of the company are being financed interest free by suppliers of materials.

CPP = Average creditor/ credit purchase * 365 (in days)

H3: There is negative significant difference between Creditors payment period and the level of underpricing.

1.3.4 Debtors turnover ratio

Debtor's turnover, which measures whether the amount of resources tied up in debtors, is reasonable and whether the company has been efficient in converting debtors into cash. The higher the ratio is indicating the better the position. We converted it into the natural logarithms.

DV = Credit sales/ Average Debtors

H4: There is positive significant link between Debtors turnover ratio and the level of underpricing.

1.3.5 Fixed Assets to long term funds ratio

This ratio indicates the proportion of ling term funds deployed in fixed assets. Fixed assets represent the gross assets minus depreciation. Nevertheless, fixed assets are good scale to measure the long run efficiency.

FALTF = Fixed Assets / Long- term funds

H5: There is positive significant difference between fixed assets to long term funds ratio with the level of underpricing.

1.3.6 Interest coverage ratio

The interest coverage ratio shows how many times interest charges are covered by funds that are available for payment of interest. A very high ratio indicates that the firm is conservative in using debt and low ratio indicates excessive use of debt.

ICR = Profit before Interest, Depreciation and tax / Interest

H6: There is negative significant difference between Interest coverage ratios with the level of underpricing.

1.3.7 Inventory turnover ratio

A considerable amount of a company's capital may be tied up in the financing of raw materials, work in progress and finished goods. We converted it into the natural logarithms.

ITR = Cost of Goods sold or sales / Average Inventory

H7: There is positive significant difference between Inventory turnover ratio and the level of underpricing.

1.3.8 Profit before Depreciation and taxation

Total profit before depreciation & tax that has been recorded before finalizing interest on debts and make tax payment. However, we converted it into the natural logarithms to make standard value.

H8: There is positive significant association between profit before depreciation and taxation and the level of underpricing.

1.3.9 Profit before interest depreciation and taxation

Total profit before interest, depreciation & tax has been recorded before finalized interest on debts, depreciation on equity. However, we converted it into the natural logarithms to make standard value and to remove the heteroskedasticity.

H9: There is positive significant association between profit before interest, depreciation and taxation and the level of underpricing.

1.3.10 Profit before interest and taxation

Total profit before interest & tax that has been recorded before finalizing interest on debts and make tax payment. However, we converted it into the natural logarithms to remove the heteroskedasticity.

H10: There is negative significant difference between profit before interest and taxation and the level of underpricing.

1.3.11 Return on capital employed

This ratio is also called as return on investment (ROI). The strategic aim of a business enterprise is to earn a return on capital. We converted it into the natural logarithms to remove the heteroskedasticity. Net profit/ capital employed.

ROCE = Net profit / Capital employed

Or

ROCE = Net profit / sales * sales / Capital employed

H11: There is positive significant difference between Return of capital employed and the level of underpricing.

1.3.12 Return on net worth

The ratio expresses the net profit in terms of equity shareholders funds. This ratio is an important yardstick of performance for equity shareholders since it indicates the return on the finished employed by them.

RONW = Net profit after interest and tax / net worth * 100

H12: There is negative significant difference between Return on net worth and the level of underpricing.

1.3.13 Profit after interest and tax

Total profit after interest & tax that has been recorded after finalizing interest on debts and make tax payment.

However, we converted it into the natural logarithms to make standard value and to remove the heteroskedasticity.

H13: There is positive significant difference between profit after interest and tax and the level of underpricing.

1.3.14 Long Term Debt-Equity Ratio

The ration compares long term debt to the new worth of the firm i.e the capital and free reserves less intangible assets. This ratio would be of more interest to the contributories of long term finance to the firm. Afterwards we converted it into the natural logarithms to make standardized value and to remove the heteroskedasticity.

LTDE = Long- term debt / Shareholders net worth

H14: There is negative significant difference between long term debt- equity ratio and the level of underpricing.

Estimation Proc:

==========

EC(C,1) 1 2 LOGMAARO LOGUNDER @ LOG_DEBEQ LOGAPATM LOGCPM LOGCURRNTR LOGDEBTORS LOGFIXDAST LOGINTCVR LOGINVNTRY LOGPBDTM LOGPBIDTM LOGPBITM LOGROCE LOGRONW LOGTERMDEBTE

VAR Model estimation

D(LOGMAARO) =
A(1,1)*(B(1,1)*LOGMAARO(-1) + B(1,2)*LOG UNDER(-1) + B(1,3)) + C(1,1)*D(LOGMAARO(-1)) + C(1,2)*D(LOGMAARO(-2)) + C(1,3)*D(LOGUNDER(-1)) + C(1,4)*D(LOG UNDER(-2)) + C(1,5) + C(1,6)*LOG_DEBEQ + C(1,7)*LOGAPATM + C(1,8)*LOGCPM + C(1,9)*LOGCURRNTR + C(1,10)*LOGDEBTORS+ C(1,11)*LOGFIXDAST + C(1,12)*LOGINTCVR + C(1,13)*LOGINVNTRY + C(1,14)*LOGPBDTM + C(1,15)*LOGPBIDTM + C(1,16)*LOGPBITM + C(1,17)*LOGROCE + C(1,18)*LOGRONW + C(1,19)*LOGTERMDEBTE

D(LOGUNDER) =
A(2,1)*(B(1,1)*LOGMAARO(-1) + B(1,2)*LOGUNDER(-1) + B(1,3)) + C(2,1)*D(LOGMAARO(-1)) + C(2,2)*D(LOGMAARO(-2)) + C(2,3)*D(LOGUNDER(-1)) + C(2,4)*D(LOGUNDER(-2)) + C(2,5) + C(2,6)*LOG_DEBEQ + C(2,7)*LOGAPATM + C(2,8)*LOGCPM + C(2,9)*LOGCURRNTR + C(2,10)*LOGDEBTORS+ C(2,11)*LOGFIXDAST + C(2,12)*LOGINTCVR + C(2,13)*LOGINVNTRY + C(2,14)*LOGPBDTM + C(2,15)*LOGPBIDTM + C(2,16)*LOGPBITM + C(2,17)*LOGROCE + C(2,18)*LOGRONW + C(2,19)*LOGTERMDEBTE

5.0 Data collection and result analysis

The data for the study was obtained from the website of the Bombay stock Exchange (BSE) http://www.bse-india.com/IPO under the heading of book building in IPOS. We also supplemented these data from CMIE & Capital line database. The period for which the data was taken for the study was Oct 2008 to 31st Dec 2011. BSE was selected for this study because it is the largest exchange in the country in relations of trading volumes.

Insert Table 2 Magnitude of initial public offer at Bombay stock exchange (2000-2011)

Insert Table 3 Descriptive results of all variables i.e. dependent variable such as LOG Maaro and all other independent variables

Insert Figure 1 Details for IPOs listed at Bombay stock exchange

Insert Figure 2

Insert Table 4 unit root test by KPSS

Insert Table 5 VAR results showing relationship between dependent variable with other independent variables

Insert Table 6 Results of null hypothesis @ 5% significance level t= 1.64 one tailed test

Insert Table 7 Results of null hypothesis @ 5% significance level t= 1.96

Insert Figure 3

6. Results & findings of VAR by LOGMAARO

Based on the multiple linear VAR results it was construct that the variables' debt-equity ration, Profit after depreciation & tax, Return on capital employed and return on net worth show significant relationship with the level of underpricing by taken LOGMAARO. There is a significant relationship between the debt-equity ratio and the level of underpricing at 5 % significance level (t value= -2.05). This examined that debt equity ratio has the significant negative effect on the level of underpricing. Therefore, null hypothesis 1 is rejected. There is no significant association between current ratio and level of underpricing at 5% significance level (t=-.1.14). The *current ratio contains no effect* on the level of underpricing. Therefore null hypothesis 2 is accepted. *There is no significant* dissimilarity between creditor payment period *and level* of underpricing at 5% significance (t= -.67). Therefore, null hypothesis 3 is accepted. There is no significant association between debtors turnover ratio and level of underpricing at 5% significance level (t= -.61). This reveals that debtor's turnover ratio has not acceptable. Therefore, null hypothesis 4 is accepted. There is no significant relationship between fixed assets turnover ratio and level of underpricing at 5% significance level (t=-.21). Therefore, null hypothesis 5 is accepted. *There is no significant* dissimilarity between interest coverage ratio *and level* of underpricing at 5% significance (t= .64). Therefore, null hypothesis 6 is accepted.

Insert Figure 4

Insert Figure 5

There is no significant association between inventory turnover ratio and level of underpricing at 5% significance level (t= -.34). This reveals that inventory turnover ratio has not acceptable. Therefore, null hypothesis 7 is accepted. *There is no significant* dissimilarity between profit before depreciation and tax *and level* of underpricing at 5% significance (t= -.36). Therefore, null hypothesis 8 is accepted. There is no significant association between profit before interest, depreciation and taxation and level of underpricing at 5% significance level (t= .82). This reveals that profit before interest, depreciation and taxation ratio has not acceptable. Therefore, null hypothesis 9 is accepted. There is no significant association between profit before interest and tax and level of underpricing at 5% significance level (t=-.011). The *profit before interest and tax contains no effect* on the level of underpricing. Therefore, null hypothesis 10 is accepted. *There is a significant* dissimilarity between return on capital employed *and level* of underpricing at 5% significance (t= 2.76). However, there is a positive effect of return on capital employed on the level of underpricing. Therefore, null hypothesis 11 is rejected.

There is a significant dissimilarity between return on net worth *and level* of underpricing at 5% significance (t= -3.24). However, there is a negative effect of return on net worth on the level of underpricing. Therefore, null hypothesis 12 is rejected. There is a significant relationship between the profit after interest and tax and the level of underpricing at 5 % significance level (t value= 1.99). This examined that profit after interest and tax has positive significant effect on the level of underpricing. Therefore, null hypothesis 13 is rejected. There is no significant association between long term debt equity and level of underpricing at 5% significance level (t= -.036). This reveals that long term debt equity has not acceptable. Therefore, null hypothesis 14 is accepted.

Insert Figure 6

6.1. Results & findings of VAR by LOG UNDER

Based on the multiple linear VAR results it was constructed that the variables' Return on capital employed and return to the net worth show relevant relationship at the level of underpricing by captured LOG UNDER. There is a significant relationship between the return on capital employed and the level of underpricing at 5 % significance level (t value= 2.76). This examined that return on capital employed has the significant positive effect of the level of underpricing. Therefore, null hypothesis 11 is rejected. *There is a weighty* dissimilarity between return on net worth *and level* of underpricing at 5% significance (t= -2.80). Notwithstanding, there is a negative effect of return on net worth on the level of underpricing. As a result, null hypothesis 12 is declined. Nevertheless, all other variables except ROCE & RONW have no significant association at the level of underpricing. However, in that situation null hypothesis is approved.

Insert Figure 7

7.0. Discussion

The results of the numerous VAR analyses are contained in Table 10. Based on the multiple additive VAR results it was constructed that the variables' debt-equity ratio, Profit after depreciation & tax, Return on capital em-

ployed and return to the net worth show significant relationship with the level of underpricing by interpreted LOGMAARO. Nevertheless, Based on the multiple additive VAR results it was constructed that the variables' Return on capital employed and return to the net worth show significant relationship with the level of underpricing by interpreted LOG UNDER.

The result pointing to the negative relationship of *return on net worth* and level of underpricing in the contemporary study is in confirmation of the result construct by *in their study.* It can be informed that large net worth leads to increase in supply of share in IPO, leading to lesser underpricing. The result is indicating positive relationship of return on capital employed and level of underpricing in the present study is in the confirmation with result found by (Bansal and Khanna, 2012) in their study. (Singh & Mittal, 2003), Regarding the relationship between offer timing and level of underpricing there is no significant relationship between firm's age and level of underpricing in the present study.

8.0. Conclusions

Taking into account all firms which completed public on the official market of the Stock Exchange of Bombay for the period 1999 until 2011, this study examines the evidence on the short-run under-pricing of IPOs. In particular, an average underpricing level within the range 50% is found based on first day. Using a regression approach, the degree of underpricing is explained by the ex-ante uncertainty hypothesis and the signaling hypothesis. Nevertheless, there is limited support for the signaling hypothesis. In particular, the results disclose that the ex- ante information and have a momentous positive impact on the initial returns while the signaling has no relevant negative effect on short-run underpricing. At the same time, the results show that there is no statistically significant relationship with other explanatory factors such as Debtor's turnover ratio, creditor payment period, current ratio and fixed assets ratio and the level of underpricing.

The results obtained from this study show that fresh issues on the BSE are subject to underpricing, consistent with developed and other emerging markets. In this respect, prospective investors should pursue the strategy of buying the fresh issues at the offer and selling them immediately on the initial day of trading. Notwithstanding, the study also reveals that investors should not hold new issues very long as the highest component of the initial returns is found on the first day of trading and that the average initial returns turn negative on the fourth day of trading.

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Appendix- list of tables

Varib ales	Description	Measurement
LOGD EBEQ	Debt-Equity Ratio	Debt- equity ratio indicates the relationship between loan funds and new worth of the company, the long term financial stability of the firm. We have taken previous Year before issuing IPO year. Afterwards we converted it into the natural logarithms to make standardized value and to remove the heteroskedasticity.
LOGA PATM	Profit after interest and tax	Total profit after interest & tax that has been recorded after finalizing interest on debts and make tax payment. However, we converted it into the natural logarithms to make standard value and to remove the heteroskedasticity.
LOGC PM	Creditors payment period	The measurement of the creditor turnover period shows the average time taken to pay for goods and services purchased by the company. Average creditor/ credit purchase * 365
LOGC URRN TR	Current Ratio	Current ratio is calculated current assets divided by current liabilities. It is indicating the liquidity & solvency of the firm in the short term. We have taken current ratio to reveal liquidity condition of a company.
LOGD EBTO RS	Debtors turnover ratio	Debtor's turnover, which measures whether the amount of resources tied up in debtors, is reasonable and whether the company has been efficient in converting debtors into cash. We converted it into the natural logarithms.
LOGF IXDA ST	Fixed Assets to long term funds ratio	This ratio indicates the proportion of ling term funds deployed in fixed assets. Fixed assets represent the gross assets minus depreciation. Nevertheless, fixed assets are good scale to measure the long run efficiency.
LOGI NTCV R	Interest cov-erage ratio	The interest coverage ratio shows how many times interest charges are covered by funds that are available for payment of interest. A very high ratio indicates that the firm is conservative in using debt and low ratio indicates excessive use of debt.
LOGI NVNT RY	Inventory turnover ratio	A considerable amount of a company's capital may be tied up in the financing of raw materials, work in progress and finished goods. We converted it into the natural logarithms.
LOGP BDT M	Profit before depreciation and taxation	Total profit before depreciation & tax that has been recorded before finalizing interest on debts and make tax payment. However, we converted it into the natural logarithms to make standard value.
LOGP BIDT M	Profit before interest de-preciation and taxation	Total profit before interest, depreciation & tax that have been recorded before finalizing interest on debts, depre-ciation on equity and make tax payment. However, we converted it into the natural logarithms to make standard value and to remove the heteroskedasticity.
LOGP BITM	Profit before interest and taxation	Total profit before interest & tax that has been recorded before finalizing interest on debts and make tax pay-ment. However, we converted it into the natural logarithms to remove the heteroskedasticity.
LOGR OCE	Return on capital em-ployed	This ratio is also called as return on investment (ROI). The strategic aim of a business enterprise is to earn a return on capital. We converted it into the natural logarithms to remove the heteroskedasticity. Net profit/ capital employed.
LOGR ONW	Return on net worth	The ratio expresses the net profit in terms of equity shareholders funds. This ratio is an important yardstick of performance for equity shareholders since it indicates the return on the finished employed by them. Net profit after interest and tax / net worth * 100
LOGT ERM DEBT E	Long Term Debt-Equity Ratio	The ration compares long term debt to the new worth of the firm i.e. the capital and free reserves less intangible assets. This ratio would be of more interest to the contributories of long term finance to the firm. Afterwards we converted it into the natural logarithms to make standardized value and to remove the heteroskedasticity.
LOG MAA RO	Market ad-justed return on under-pricing	We collected initial return on listing days of IPOs than we correct these return with market index performance. We can corrective the market moments and to avoid any market co incidence. We converted it into the natural logarithms to make standard value and to remove the heteroskedasticity.

Magnitude of IPOs

Table no 2. It contains magnitude of IPOs after Indian stock market crisis since October 2000 to dec 2011. It is divided on the basis of IPO that listed via book build and fixed price option. It is also shows % of underpricing and overpricing in different years. It segregates issue that is priced through book build and that is price through fixed price option. Data is collected with BSE websites and Capitaline database. However Book build mechanism (BB), fixed price option (FPO), Book building underpricing (BBU), Book building overpricing (BBO), fixed price option underpricing (FPOU), and fixed price option overpricing (FPOO).

Year	BSE Issue	BB	FPO	BB-Under	BB-Over	FPO-Under	FPO-over	% BBU	%BBO	%FPOU	%FPOO
2000	67	11	56	6	5	30	26	21.96	**-46.87**	191.32	-32.3
2001	10	2	8	0	2	2	6	0.00	-62.00	47.50	-52.0
2002	5	1	4	0	1	4	0	0.00	-50.93	16.07	0.0
2003	11	4	7	3	1	5	2	90.16	-87.41	97.86	-85.3
2004	25	17	8	9	8	6	2	54.43	-45.45	74.10	-56.0
2005	67	48	19	26	21	14	5	31.47	-51.75	60.37	-63.8
2006	89	68	21	36	32	14	7	36.75	-46.33	38.91	-25.0
2007	105	91	14	58	32	7	7	51.54	-21.42	113.67	-3.3
2008	38	33	5	16	17	2	3	36.45	-26.36	18.06	-32.3
2009	21	21	0	14	7	0	0	19.09	-14.52	0.00	0.0
2010	73	71	2	47	24	2	0	22.35	-12.85	60.77	0.0
2011	39	38	1	19	19	0	1	47.36	-33.32	0.00	-70.4
Total	550	405	145	234	169	86	59	**34.29**	**-41.6**	**59.88**	**-35**

Descriptive statistics results

Varia-bles	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability	Sum	Sum Sq.Dev	Ob-servation
LOG DEBEQ	-0.07	0.01	4.28	-4.61	1.46	-0.32	4.80	12.43	0.00	-5.97	172.25	82
LOG APATM	2.22	2.19	6.94	-1.20	1.35	0.09	3.85	2.60	0.27	181.89	147.08	82
LOG CPM	2.49	2.42	6.94	-0.27	1.22	0.22	4.11	4.91	0.09	203.99	119.81	82
LOG CURRNTR	0.68	0.43	3.94	-1.27	0.81	1.11	5.53	38.61	0.00	55.56	52.99	82
LOG DEBTORS	2.05	1.74	10.37	-0.31	1.63	2.42	11.32	316.29	0.00	168.40	215.40	82
LOG FIXDAST	1.12	1.24	4.29	-2.21	1.45	-0.19	3.07	0.50	0.78	91.87	170.56	82
LOG INTCVR	1.90	1.49	6.78	0.00	1.66	1.32	4.10	28.04	0.00	155.85	224.12	82
LOG INVNTRY	2.23	2.32	7.61	-0.60	1.57	0.41	3.58	3.45	0.18	182.55	199.22	82
LOG MAARO	2.63	3.00	4.96	-0.49	1.40	-0.47	2.35	4.43	0.11	215.92	158.10	82
LOG PBDTM	2.74	2.79	7.05	-0.17	1.26	-0.16	4.02	3.91	0.14	224.53	128.95	82
LOG PBIDTM	3.08	2.97	7.17	-0.13	1.13	-0.11	5.03	14.21	0.00	252.89	103.35	82
LOG PBITM	2.88	2.86	7.17	-0.87	1.27	-0.31	4.59	9.89	0.01	236.42	130.08	82
LOG ROCE	2.84	2.95	5.23	-1.14	1.17	-1.25	4.68	30.94	0.00	232.51	110.32	82
LOG RONW	2.93	3.22	5.11	-0.30	1.10	-1.19	4.39	26.03	0.00	240.46	98.81	82
LOG TERM DEBTE	-0.32	-0.24	3.58	-4.61	1.32	-0.24	5.16	16.65	0.00	-26.10	140.24	82

Table no 3; descriptive results of variables

Kwiatkowski-Phillips-Schmidt-Shin test statistic Null Hypothesis: LOGMAARO is stationary				
				LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic				0.43563
Asymptotic critical values*:		1% level		0.73900
		5% level		0.46300
		10% level		0.34700
*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)				
Residual variance (no correction)				1.67911
HAC corrected variance (Bartlett kernel)				2.46398
S.E. of regression	1.298001	Akaike info criterion		3.36290
Sum squared resid	497.0176	Schwarz criterion		3.37536
Durbin-Watson stat	1.761576	Hannan-Quinn criter.		3.36789

Table 4 ***Kwiatkowski-Phillips-Schmidt-Shin test statistic result***

Table no 5. Vector Auto regression model expresses association among the dependent variable level of under-pricing (LOG Under & LOG Maaro) with independent variables i.e. firm's age, issue size, market capitalization, subscription level, pricing mechanism and ownership structure @ 5% & 10% significance level. In this model we compare level of underpricing with two methods. First is traditional underpricing method & second is market adjusted return (Maaro) and tried to find any association of market moments. Results show a significant relationship among variables by using t- statistics and p-value.

Included observations: 79 after adjustments

Standard errors in ( ) & t-statistics in [ ]

Variables	D(LOGMAARO)	D(LOGUNDER	Variables	D(LOGMAARO	D(LOGUNDER)
CointEq1	0.354942 (0.37798) [0.93906]	0.976004 (0.34811) [2.80373]	LOGDEBTORS	-0.071767 (0.11711) [-0.61281]	-0.035667 (0.10786) [-0.33069]
D(LOGMAARO(-1	-0.772243 (0.36494) [-2.11611]	-0.563798 (0.33610) [-1.67747]	LOGFIXDAST	-0.034729 (0.17240) [-0.20144]	0.054115 (0.15878) [0.34081]
D(LOGMAARO(-2))	-0.202505 (0.29371) [-0.68947]	-0.081807 (0.27050) [-0.30242]	LOGINTCVR	0.138555 (0.14840) [0.93364]	0.088136 (0.13668) [0.64485]
D(LOGUNDER(-1))	0.235222 (0.45764) [0.51399]	0.239315 (0.42148) [0.56779]	LOGINVNTRY	-0.042058 (0.12055) [-0.34888]	-0.003245 (0.11103) [-0.02923]
D(LOGUNDER(-2))	0.004081 (0.32926) [0.01239]	-0.031882 (0.30324) [-0.10514]	LOGPBDTM	-0.546712 (1.49899) [-0.36472]	-1.163609 (1.38055) [-0.84286]
C	0.892944 (0.92384) [0.96656]	0.490037 (0.85084) [0.57594]	LOGPBIDTM	0.541879 (0.64342) [0.84218]	0.608214 (0.59258) [1.02638]
LOG_DEBEQ	0.406014 (0.24486) [1.95812]	0.379931 (0.22552) [1.68472]	LOGPBITM	-0.009205 (0.79703) [-0.01155]	0.023359 (0.73405) [0.03182]
LOGAPATM	1.143779 (0.63709) [1.99532]	0.771619 (0.58675) [1.31507]	LOGROCE	1.360950 (0.49164) [2.76817]	0.970093 (0.45279) [2.14246]
LOGCPM	-0.973829 (1.45314) [-0.67015]	-0.018673 (1.33832) [-0.01395]	LOGRONW	-1.615333 (0.49772) [-3.24548]	-1.285052 (0.45839) [-2.80340]
LOGCURRNTR	-0.318729 (0.27800) [-1.14653]	-0.119307 (0.25603) [-0.46599]	LOGTERMDEBTE	-0.008936 (0.24270) [-0.03682]	-0.171438 (0.22353) [-0.76697]

	LOG MAARO	LOGUNDER		
R-squared	**0.466639**	**0.488971**	Determinant resid covariance (dof adj.)	0.694054
Adj. R-squared	**0.294878**	**0.324403**		
Sum sq. resids	138.8104	117.7405		
S.E. equation	1.533858	1.412657	Determinant resid covariance	0.387118
F-statistic	2.716798	2.971229		
Log likelihood	-134.3608	-127.8580	Log likelihood	-186.7057
Akaike AIC	3.907868	3.743241		
Schwarz SC	4.507728	4.343101	Akaike information criterion	5.790018
Mean dependent	**0.018713**	**-0.007724**		
S.D. dependent	1.826640	1.718671	Schwarz criterion	7.049725

S.No.	*Variables*	*t-Statistic*	*t- value @ 5% t =(±1.64)*	*Null hy-pothesis H0*	*Relationship With Dependent var*
1	**LOG_DEBEQ**	2.05812	1.64	Rejected	Positive
2	**LOGAPATM**	1.99532	1.64	Rejected	Positive
3	**LOGCPM**	-0.67015	-1.64	Accepted	No relation
4	**LOGCURRNTR**	-1.14653	-1.64	Accepted	No relation
5	**LOGRONW**	-3.24548	-1.64	Rejected	Negative
6	**LOGTERMDEBTE**	-0.03682	-1.64	Accepted	No relation
7	**LOGDEBTORS**	-0.61281	-1.64	Accepted	No relation
8	**LOGFIXDAST**	-0.20144	-1.64	Accepted	No relation
9	**LOGINTCVR**	0.93364	1.64	Accepted	No relation
10	**LOGINVNTRY**	-0.34888	-1.64	Accepted	No relation
11	**LOGPBDTM**	-0.36472	-1.64	Accepted	No relation
12	**LOGPBIDTM**	0.84218	1.64	Accepted	No relation
13	**LOGROCE**	2.76817	1.64	Rejected	Positive
14	**LOGPBITM**	-0.01155	-1.64	Accepted	No relation

Table no 6 null hypothesis results by Log Maaro

S.No.	*Variables*	*t-Statistic*	*t- value @ 5% t = (±1.64)*	*Null hy-pothesis H0*	*Relationship With Dependent var*
1	**LOG_DEBEQ**	1.68472	1.64	Accepted	No relation
2	**LOGAPATM**	1.31507	1.64	Accepted	No relation
3	**LOGCPM**	-0.01395	-1.64	Accepted	No relation
4	**LOGCURRNTR**	-0.46599	-1.64	Accepted	No relation
5	**LOGRONW**	-2.80340	-1.64	Rejected	Negative
6	**LOGTERMDEBTE**	-0.76697	-1.64	Accepted	No relation
7	**LOGDEBTORS**	-0.33069	-1.64	Accepted	No relation
8	**LOGFIXDAST**	0.34081	-1.64	Accepted	No relation
9	**LOGINTCVR**	0.64485	1.64	Accepted	No relation
10	**LOGINVNTRY**	-0.02923	-1.64	Accepted	No relation
11	**LOGPBDTM**	-0.84286	-1.64	Accepted	No relation
12	**LOGPBIDTM**	1.02638	1.64	Accepted	No relation
13	**LOGROCE**	2.76817	1.64	Rejected	Positive
14	**LOGPBITM**	0.03182	1.64	Accepted	No relation

Table no 7 Null hypothesis results by Log under

Appendix- List of figures

Figure no 1 indicating the listed of the initial public offers at Bombay stock exchange since April 2000. On y axis we have taken years and on x axis number of IPOs have been listed. It indicates the number of IPOs that has been underpriced out of total IPOs was listed at BSE.

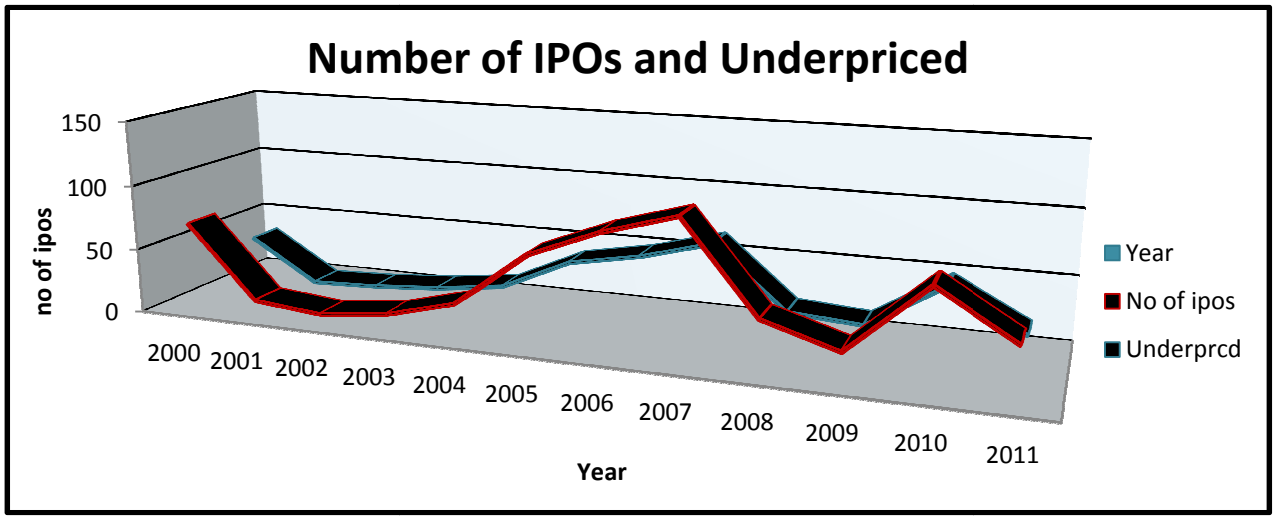

Figure 1 **Number of IPOs and underpricing**

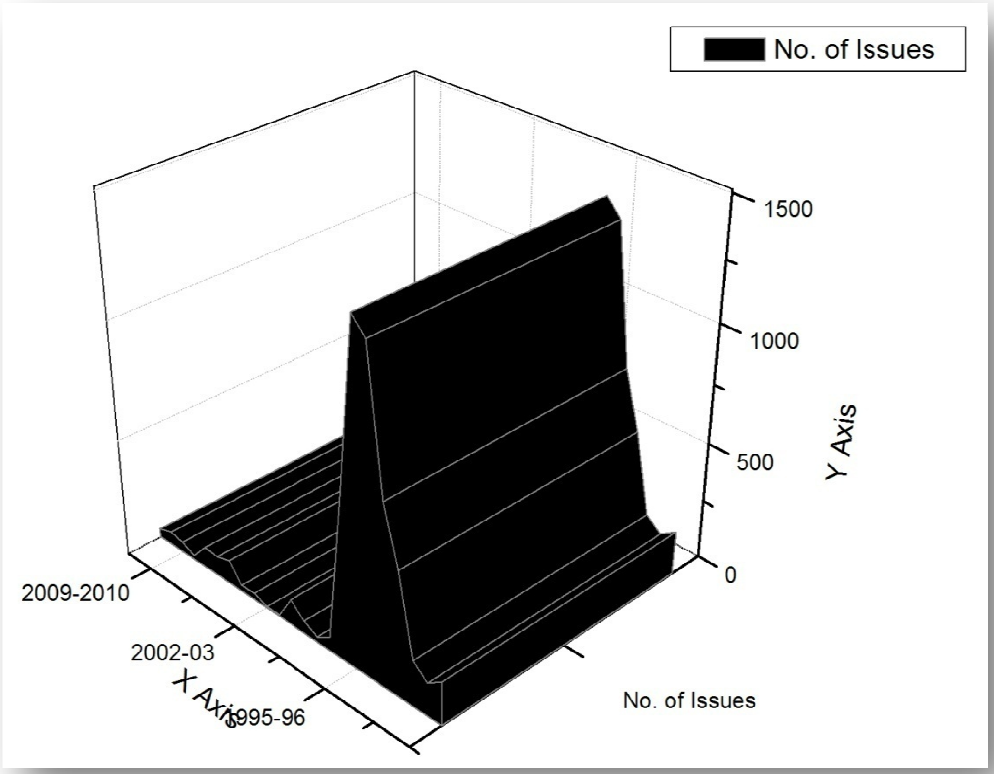

Figure 2 Number of IPOs was listed at Bombay stock exchange from (1995-2011)

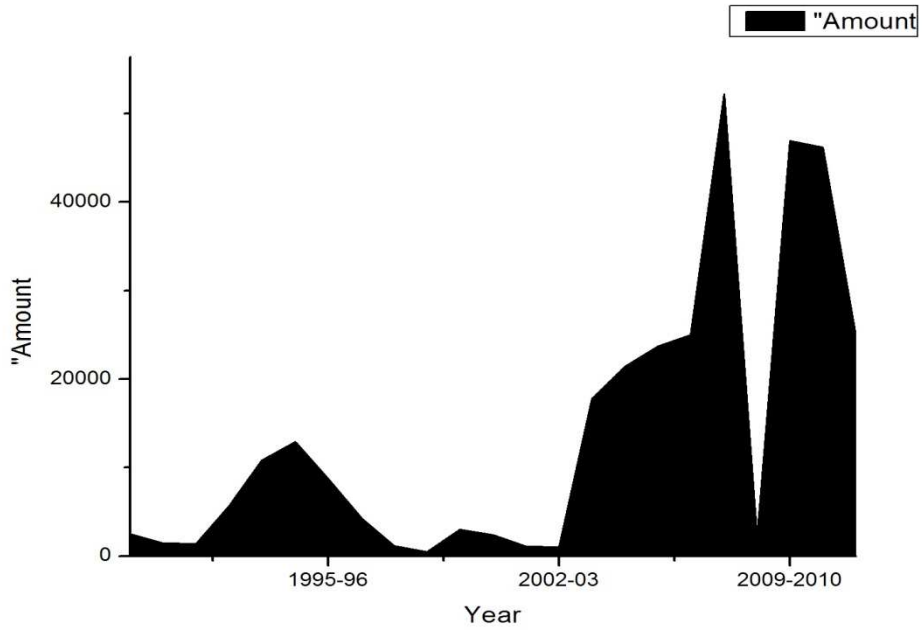

Figure 3 Total amount raised by IPOs in Indian market

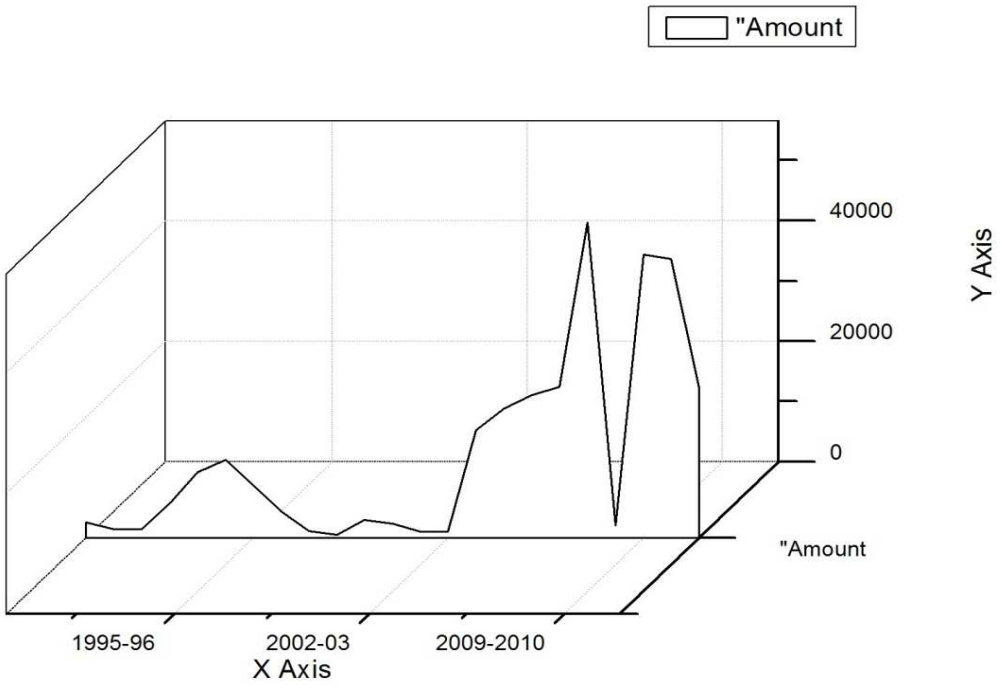

Figure 4 Total amount were raised by IPOs at the Bombay stock exchange from (1995-2011)

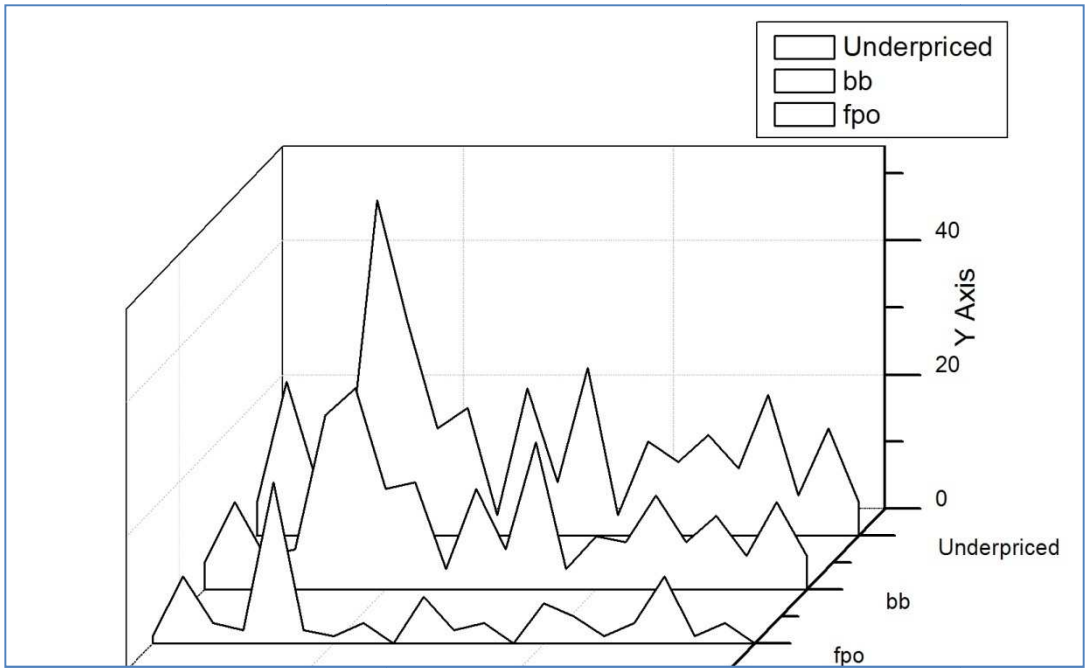

Figure 5 Details for IPOs underpriced and their pricing mechanism (book build & fixed price option)

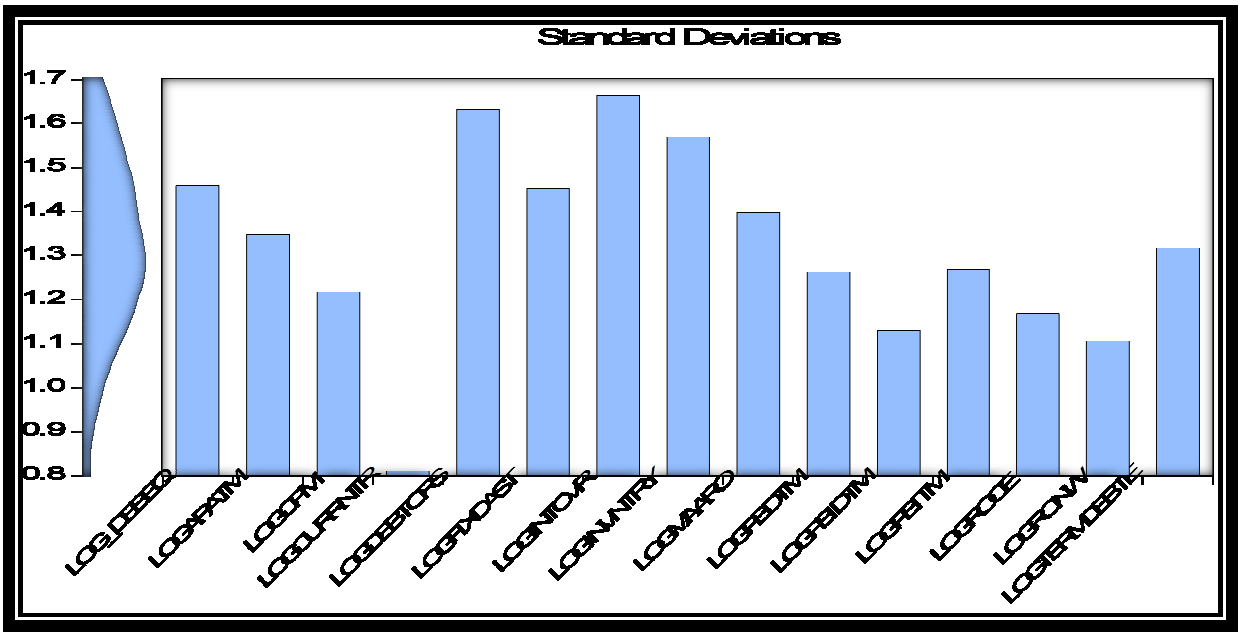

Figure 6 Graphical representation of Standard deviation for all independent variables

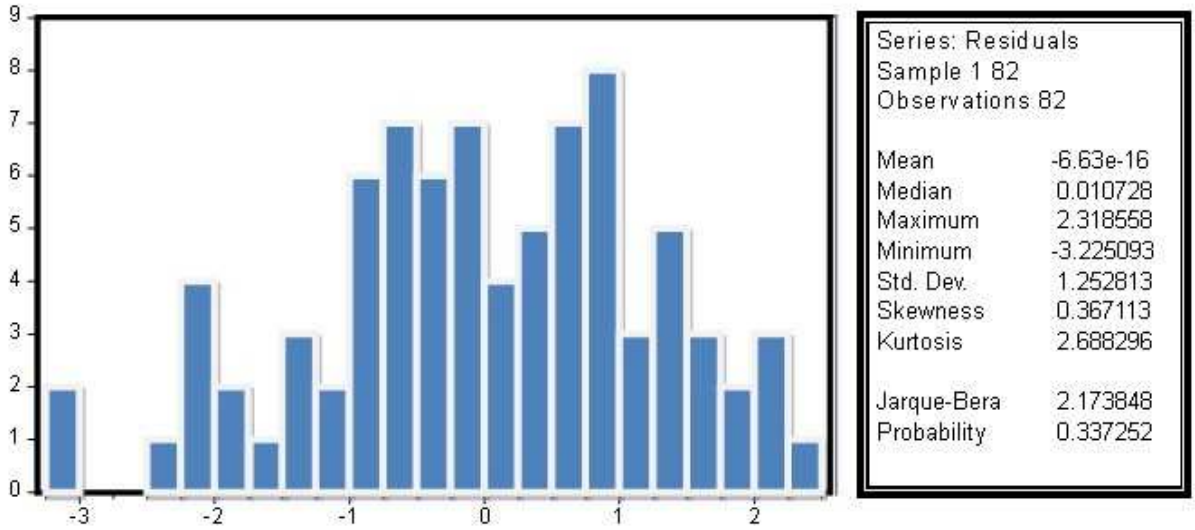

Figure 7 ***Normality test of dependent variable i.e. log underpricing by Jarque Bera testing***

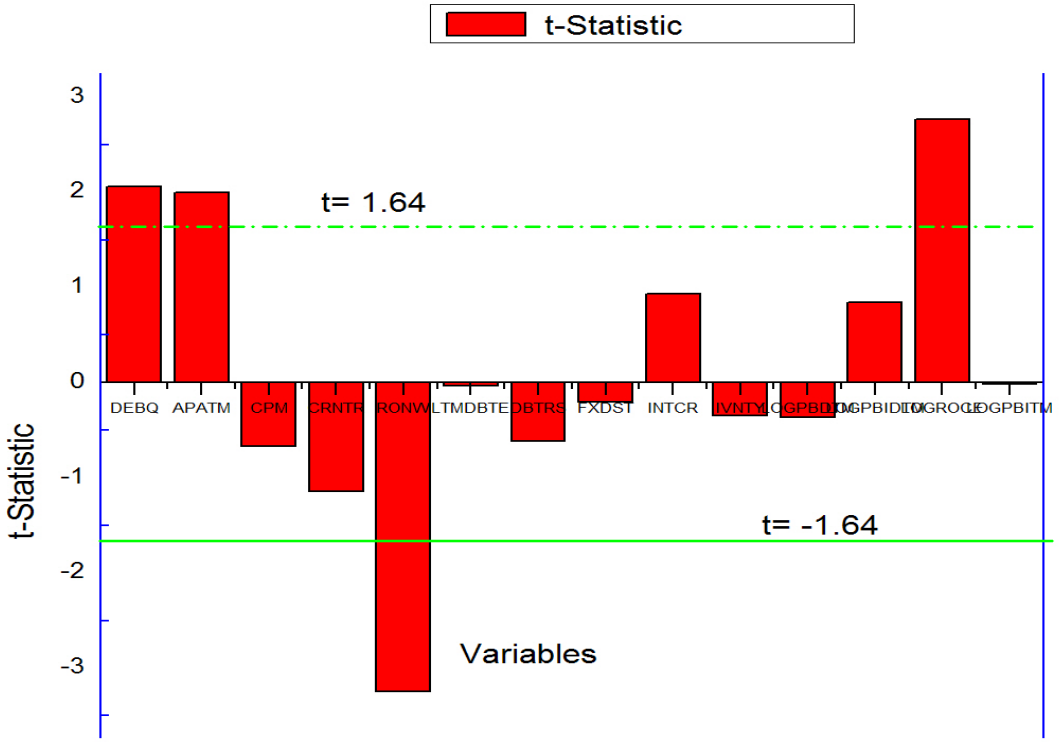

Figure 8: Result of t statistics for Ex-ante variables are used in regression model

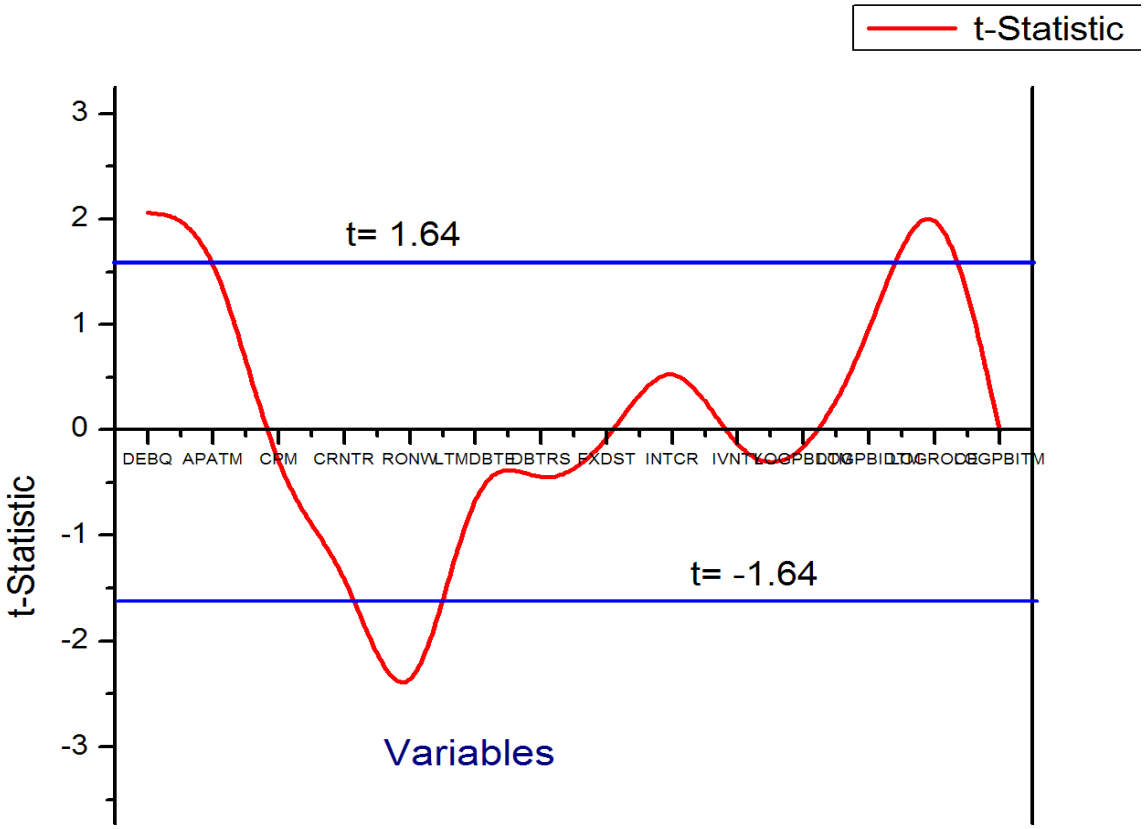

Figure 9: Result of t statistics (Line graph) for Ex-ante variables are used in regression model