



An Empirical Analysis of Market Timing Theory of Capital Structure: Evidence from Manufacturing Industries of India

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Abstract: The most popular theories of capital structure are Trade-off theory, Pecking Order theory and Market Timing Theory. Most of the studies on capital structure decisions are in context of developed nations whereas on developing nations, only few studies have been conducted. Out of them, there were hardly any studies that supported the empirical evidence of market timing theory especially in context of Indian market. So the present study attempts to test whether Indian firms time the market or not. Further, the study focuses on Indian manufacturing companies that went public or issued equity during the period 2003-2022. The sample consists of 316 manufacturing firms that are listed on Bombay Stock Exchange. Using Baker and Wurgler's model of market timing theory, the capital structure of the companies has been examined around their IPO years, taking the number of years since their IPO constant. The findings of the study revealed that Indian firm do time the market but not blindly and profitability is the key internal variable on which the companies rely the most.

Index Terms - Capital Structure Theories, Equity Market Timing, Indian Manufacturing Companies, Initial Public Offerings

I. INTRODUCTION

Decisions pertaining to finance mix of a firm are crucial at any stage, since the composition of debt or equity or both together will have a direct effect on firm's profitability and in the long run, it would affect firm's value as well. Any firm would intend to maximize its value which is possible only when the overall cost of capital is minimum. In order to have minimum overall cost of capital, a firm needs to decide a perfect combination of debt and equity in its capital structure. There are various theories that try to give a base to this complex procedure, stating the pros and cons of each one. From the pioneer work of Modigliani and Miller (1958), many theories have been introduced that are centred around capital structure decisions, whether to go for debt or equity issuance or trying to state a target level of debt that is most profitable for a firm along with the risks associated to them.

The most prominent theories are Trade-Off theory, Pecking Order theory and Market Timing Theory. The first two theories have a strong empirical support and have relied upon the internal frictions of the firm like firm size, profitability, etc. However, it wouldn't be incorrect to say that a firm cannot shield itself from the external influences. The most recent extension in capital structure theories is coined as 'Market Timing Theory' (Baker & Wurgler, 2002). According to this theory, the firms' decisions pertaining to issue of equity or repurchase are influenced by the market timing. Very less work has been done in this area, in context to Indian market and especially focusing on the manufacturing industries. Hence, it would be interesting to

comprehend whether the manufacturing firms in India time the market or not. For this, capital structure of manufacturing firms is observed around their IPO years taking the number of years constant since the IPO.

II. LITERATURE REVIEW

(Huang & Ritter, 2005) examined the time-series patterns of decisions related to external financing with a sample of publicly traded U.S. firms during the period 1963 to 2001. It was found that the firms use external equity to fund a larger proportion of their deficit financing. It can be inferred from the accumulated evidences that the Market Timing Theory justifies the observed time-series patterns of external funding decisions of publicly traded U.S. firms. Further, the study reveals that past securities issues have quite strong as well as long-lasting effects on capital structure.

(Bougatef & Chichti, 2010) in their study used a panel of Tunisian and French listed firms, to investigate the relevance of market timing in context of debt equity choice of Tunisia and France. The sample under the study consisted of 30 publically traded Tunisian firms as well as 100 non-financial French firms of the Paris Stock Market Index SBF 120, at any point from 2000 to 2008. The findings of the study reveals significant correlation between issue of equity and market conditions. There is a long-lived impact of Equity Market Timing as the Tunisian and French firms do not swiftly rebalance their capital structure so as to move towards the target leverage.

(Zhao, Lee, & Yu, 2020) investigated the impact of Equity Market Timing on capital structure by taking Δ INDACC i.e. change in individual securities account, as a proxy market timing measure for Chinese Equity market. The empirical findings of the study exclaims Δ INDACC to be an effective variable proxy for Equity Market Timing in the Chinese Equity Market. Further, it was also found that Δ INDACC/MT has long term impact on capital structure i.e. more than 7 years and firms cannot undo the leverage effect of market timing.

(Hovakimian, 2006) aims to re-evaluate Baker and Wurgler's conclusions about long lasting effects of Market-to-book ratios on capital structure. The study examined the Baker Wurgler's claim that the persistent impact of past attempts to time the equity market gets reflected through the substantial negative effect of Historical Market-to-Book ratios. The results revealed cumulative outcome of timing the equity market. However, the effects of Market timing on capital structure do not support persistence.

(Alti, 2006) proposes Initial Public Offerings as a strong measure of Market Timing. In order to capture market timing and its impact on capital structure, the entire focus is kept on single financing event, i.e. the Initial Public Offerings (IPOs). The period of study is from January, 1971 to December, 1999. The findings of the study revealed that when the market is hot, market timer firms issue considerably more equity as compared to cold market firms. Further, it was found that hot market firms encounter a great decline in their leverage or debt ratios in the IPO year. However, the debt ratios increase substantially in the 2 years following the IPO year. Market timing is a significant determinant of capital structure in short run. But in long run, its effects are limited.

(Wagner, 2008) studied the relevance of market timing for the public equity issuance using an extensive sample of IPO and SEO firms for the period from 1 January 1970 to 31 December 2002. The study investigated how market timing determine public equity issues and subsequently the capital structure of the firms. The results suggested that the firms that issue equity take advantage of the fluctuations due to information asymmetry and opt for issuing equity during windows of opportunity to finance strong growth in investment and the firm-specific adverse selection costs of doing it are low. It indicated market timing as a short term factor.

III. RESEARCH METHODOLOGY

The data of the firms is clubbed based upon the year in which the firms have issued their IPO to examine the individual year effect. For example, all the manufacturing firms with the IPO year 2003 had their IPO+1 data clubbed together, IPO +2 data together and so on up to IPO+10. Likewise, all the manufacturing firms which had their IPO in the year 2004, 2005, etc. their IPO+1, IPO +2 data and so on up to IPO+10 data had been clubbed together separately. This becomes first set of firms for analysis. Another set combines the data of all the firms that have gone public during the study period altogether so that the results of both the sets can be compared to figure out whether an individual year plays any significant role or not.

The sample consists of annual (audited) data of 316 manufacturing companies that have gone public i.e. issued their IPOs have been considered. The period of study is from 2003-2022 i.e. from the IPO year 2003 up to IPO year 2012 and it goes up to IPO+10 year for each of the IPO year respectively. Therefore, for the firms having an IPO year 2012, the data goes up to 2012 + 10 years i.e. 2022. Further, for the analysis, all the

manufacturing firms with missing information on the firm specific variables like total assets, profitability, etc. and firms with their book leverage values greater than or equal to one were dropped for that particular year have been removed for that particular year.

Table 1 Number of firms for different level of IPO for the IPO years 2003-2022

IPO YEAR	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
IPO + 1	12	23	37	51	49	34	8	29	27	12
IPO + 2	14	23	39	51	49	37	9	34	29	12
IPO + 3	14	24	40	51	49	37	9	34	27	12
IPO + 4	13	24	40	51	47	37	9	32	26	9
IPO + 5	11	24	39	49	46	35	9	30	24	10
IPO + 6	11	24	38	47	44	35	9	26	21	9
IPO + 7	11	23	37	47	40	32	7	24	20	9
IPO + 8	11	22	37	44	40	29	7	22	20	9
IPO + 9	10	19	36	39	37	27	7	22	20	9
IPO + 10	10	18	36	35	35	24	6	22	19	9

Source: Author's compilation

3.1 Variables under Study

To empirically test the market timing theory of capital structure, change in leverage, Net Equity Issue, Residual Change in Leverage and Newly Retained Earnings have been taken as dependent variable. Whereas, independent variables under the study are Market-to-Book Ratio, Tangibility, Size and Profitability. Here, change in leverage is used as the dependent variable and market-to-book ratio (MTB) which is used as a proxy of market timing is taken as the independent variable so as to capture the yearly timing of financing activities (Islam & Heaney, 2009).

3.2 Model Used

To empirically test the market timing theory, Baker & Wurgler's (2002) market timing model has been used (Equation 1.1):

$$\Delta \left(\frac{D}{A} \right) = \alpha + \alpha_1 (MTB)_{t-1} + \alpha_2 \left(\frac{PPE}{A} \right)_{t-1} + \alpha_3 \left(\frac{EBITDA}{A} \right)_{t-1} + \alpha_4 \log(Sales)_{t-1} + \alpha_5 \left(\frac{D}{A} \right)_{t-1} + \varepsilon \quad (1.1)$$

In the above equation, α represents the constant, $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ and α_5 represents the coefficients for MTB, Asset Tangibility, Profitability, Size and the lagged leverage respectively and ε shows the error term. The dependent variable i.e. Change in Book Leverage has been expressed as $\Delta \left(\frac{D}{A} \right)$, Δ expresses the change operator.

Further, the subscript 't' represents the time and 't-1' represents time lagged by one year. Also, in order to capture the time series effects, the lagged leverage $\left(\frac{D}{A} \right)_{t-1}$ has been included in the model as a control variable. Now, the above equation (1.1) was run for each level of IPO Year (viz. IPO+1, IPO+2 and so on till IPO+ 10) for all the IPO years under the study i.e. 2003-2022 independently. In addition, the equation was also run for different IPO levels, when the data of the firms were clubbed together without considering the year in which their IPOs were raised. Additionally, it is a well-recognized fact that the change in leverage is dependent upon the net equity issue, change in retained earnings and residual change in leverage. Equation 1.2 below shows the mentioned relationship:

$$\Delta \left(\frac{D}{A} \right) = - \left[\left(\frac{BE}{A} \right)_t - \left(\frac{BE}{A} \right)_{t-1} \right]$$

$$= - \left(\frac{e}{A}\right)_t - \left(\frac{\Delta \text{REA}}{A}\right)_t - \left[BE_{t-1} \left(\frac{1}{A_t} - \frac{1}{A_{t-1}}\right)\right] \quad (1.2)$$

Consequently, in order to test whether the manufacturing firms followed the equity market timing or not, each of the above parameters (from equation 1.2) had been regressed on MTB ratio as well as the other independent variables of equation 1.1 separately using OLS-regression technique. According to the equity market timing theory, the expected relationship between the variables used with the dependent variables is depicted in table 2 below:

Table 2 Expected Relation of coefficients of different variables:

Dependent Variables	Independent Variables			
	MTB	Asset Tangibility	Profitability	Size
Change in leverage	Negative	Positive	Negative	Positive
Net Equity Issue	Positive	Positive	Positive	Positive
Change in Retained Earnings	Negative	Negative	Positive	Positive
Residual Change in Leverage	Negative	Negative	Negative	Negative

The change in leverage here is expected to have a negative relationship with MTB Ratio and a positive relationship with net equity issue.

3.3 Hypothesis

H₀: The independent variables do not have a significant impact on the change in leverage (net equity issued, change in retained earnings and residual change in leverage)

H₁: The independent variables have a significant impact on the change in leverage (net equity issued, change in retained earnings and residual change in leverage)

For the hypothesis the significance level has been taken at 5%.

3.4 Data Analysis and Results

- The results of the OLS regression analysis have been presented below in the table 3 for all firms' data when they were analysed individually based on their respective IPO year and also when all the firms that had gone public during 2003-2022 were clubbed altogether.
- The table presents only those levels of IPO years for which the regression results were significant. Each row in the table exhibits the findings of the regression analysis for each IPO year of the present study. The year wise rows of the table shows that the firms' data have been clubbed together based on their IPO years individually. The results when the firms' data were combined without taking their IPO year into consideration are shown in the last row of the table.
- In table 3, there are four panels- A, B, C, and D presenting the results of the regression and the symbol @ in the table indicates the opposite relationship amongst variables in contrast to what was expected as per the theory.

Table 3: The Findings of the Regression Analysis for significant IPO levels

Panel A- Dependent variable = Change in Leverage				
IPO YEAR	MTB Ratio	Asset Tangibility	Profitability	Size
2003	+4	+8 +9@		
2004	+10@		+10	
2005	+1 +4 +9 +10		+1 +3 +4	
2006	+2 +6@		+3 +6 +7 +8	+9
2007	+3@	+1	+1 +5 +10	
2008	+4	+1 +3 +7@	+4@ +6	+1 +9@
2009				
2010			+1 +8	+1 +9@
2011			+9	
2012	+2@	+2	+2	+2
All firms	+1+3 +6+9 +10@	+1 +3 +9@	+1 +2 +3 +5 +6 +7 +8 +9@ +10	
Panel B- Dependent variable = Net Equity Issues to Assets				
IPO YEAR	MTB Ratio	Asset Tangibility	Profitability	Size
2003	+2@ +5		+2 +7	
2004	+7	+6@		+7
2005	+8+9+10		+1 +5@ +6 +8	
2006	+2		+1 +3 +5 +6 +7 +8+10	+9@
2007	+1@	+1@ +5@	+1 +4 +5 +7 +8 +10	+6
2008	+3 +4 +7@	+1@	+1 +2 +4@ +5 +6 +7 +10	+1@ +9
2009		+8@	+8	+8
2010	+8@		+3 +4 +5 +8	+3@ +4@ +9
2011			+7 +10	+1@ +10
2012		+2@	+2 +4 +10	
All firms	+1 +2 +3 +7 +9	+1@ +9	+1 +2 +3 +4 +5 +6 +7 +8 +9@ +10	+7
Panel C- Dependent variable = Change in Retained Earnings to Assets				
IPO YEAR	MTB Ratio	Asset Tangibility	Profitability	Size
2003	+4@ +8		+8	+8@
2004	+2@		+2@	+3
2005			+1@ +2@ +3 +4 +5 +6@	
2006		+1		
2007	+3 +4@	+1@ +2	+2 +3 +4@	
2008			+3@	+2
2009			+2@	
2010	+1@			+1@
2011				
2012				
All firms	+1@ +2@			+1@
Panel D- Dependent variable = Residual Change in Leverage				
IPO YEAR	MTB Ratio	Asset Tangibility	Profitability	Size
2003	+6			
2004			+9@	+1@
2005	+3 +8 +9 +10		+6	
2006	+5@	+5@	+1 +5	
2007		+1@ +7@	+1	
2008	+2@ +3 +4 +7@	+2@ +4@	+2 +4@ +6 +9 +10	
2009				
2010	+8@ +10	+10@		+4@ +8
2011			+1 +10	+1@

2012	+2 +4@ +8 +9		+4	+2 +4
All firms	+1 +3 +9 +10	+5@	+1 +2 +3 +4 +5 +6 +7 +8 +10	+7 +8 +9

IV. RESULTS AND DISCUSSION

- It has been observed in Table 3 that when firms' data has been clubbed based on their IPO years, for IPO years 2005 and 2008, Market-to-Book i.e. MTB ratio has an indirect relationship with change in leverage and direct relation with net equity which is as per the expectation and in line with market timing theory of capital structure. Therefore, it can be said that for the IPO year 2005 and 2008 null hypothesis gets rejected.
- Further, it also depicts that for the years 2009 to 2011, MTB ratio does not have a statistically significant relationship with change in leverage and net equity.
- Also, for the years 2004, 2006, 2007 and 2012 we can see that the Market-to-Book ratio has a direct relationship with change in leverage which is opposite to the theory and thus fails to reject the null hypothesis of H_1 .
- Also, change in retained earnings seems to have no significant relationship in most of the cases and the relationship of profitability with the respective dependent variables is not only significant but as expected in all the cases and so the null hypothesis gets rejected.
- Apart from this, the last row of table 3 (that depicts the firms' data clubbed without considering the IPO year), reveals that MTB is significant and inversely related to change in leverage for almost all the IPO levels and the major factor behind this is net equity issue which is in line with market timing theory. Hence null hypothesis is rejected and it can be said that there is a significant relationship between MTB and change in leverage.

V. CONCLUSION

The study reveals that the year in which firms raised funds through IPOs, played a crucial role in designing the optimal capital structure. The firms opted for equity (during IPO year 2005 and 2008) while the firms opted for debt for the remaining years. When the year of IPO was not given importance, then the firms preferred equity in most of the cases. Thus, it can be said that the Indian firms continually adapt their financing strategies in accordance with the changes in the Indian economy which is also evident from the results. Also, it is worth noting that profitability influences the capital structure in almost all the cases. This implies that the Indian manufacturing firms were quite prudent and they followed the equity market timing theory but not blindly.

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