Impact of Firms' Market Value on Capital Structure Decisions: Panel Data Evidence from Indian Manufacturing Firms

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Abstract India witnessed a significant development in stock market in the post-1990s due to series of reform measures. As a result, firms are able to raise market-based capital which helped them to reduce their dependence on institution-based finance. Consequently, market valuation of the firm has become an important variable in corporate finance decisions. However, traditional theories of capital structure fail to offer unambiguous explanation on the impact of market value on capital structure. To bridge this lacuna in capital structure literature, Baker and Wrugler (J Financ 57(1):1–32 2002) propounded market timing theory which argues that firms' time the market, that is, firms raise equity capital when market valuation is high and buy back when market valuation is lower and hence the current capital structure of the firm is the cumulative result of past attempts to time the equity market. This study attempted to understand the role of market value in influencing the capital structure decisions of the manufacturing firms in India. The study found that market value negatively influences the debt ratio both in short term and in long term, indicating the practice of market timing. Further, the study also shows that the negative impact does indeed come from changes equity issues rather than changes retained earnings or debt retirement.

Keywords Capital structure · Market valuation · Market timing

JEL Classification G3

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1 Introduction

Over the last two decades stock market in India has witnessed tremendous growth due to the series of capital market reforms initiated in the early 1990s. As a result, stock market has emerged as an important alternative source of finance for corporate which helped to diffuse excessive burden on banking system (RBI 2015). Traditional theories seem to have overlooked the role of stock market in influencing firms' capital structure. For instance, in the irrelevance theory of Modigliani and Miller (1958), there is no gain from shifting between debt and equity as in efficient capital markets costs of these sources of finance do not change independently. Trade-off theory argues that the capital structure is primarily determined by the cost and benefits of debt financing; hence, temporal fluctuations in the market value of the firm should have only temporary or short-term effect on capital structure. Similarly, agency theory maintains that debt financing involves agency cost and tax benefits and optimum capital structure balances these two elements of debt financing. On the other hand, pecking order hypothesis states that information asymmetry in the capital market determines the source of finance for the firm. Firm facing least information asymmetry problem would be dependent more on external finance, and internal capital would be the major source of finance for firms facing information asymmetry. However, as argued by Demirguc-Kunt and Maksmovic (1996), optimum capital structure may not be possible in the absence of well-functioning equity market which implies that stock market is an important determinant of capital structure. However, they argue that the impact of stock market on capital structure of the firm is not unambiguous. Sudden access to well-developed stock market may result in substitution of outside equity for outside debt in the case of firms that are previously constrained to issue only outside debt resulting in decrease in firms' debt/equity ratio; substitute outside equity for inside equity in which case debt/equity ratio will not be affected; or firms may find expansion more attractive as well-functioning stock market enhances entrepreneur's ability to diversify risks and impact of this on debt/equity ratio depends on how the expansion is financed. In this connection, Baker and Wurgler (2002) expounded market timing hypothesis which argues that a firms' capital structure is the result of past market timing. Firms issue more equity when market value is high and buy back when they experience low market value. Hence, market timing theory establishes direct connection between firms' market value and its capital structure decisions. With this background, the paper attempts to empirically examine the impact of firms' market value on the capital structure decisions in Indian manufacturing firms.

The remainder of the paper is structured as follows. In Sect. 2, we briefly review the theoretical and empirical literature on capital structure decisions. In Sect. 3 we discuss composition of the capital structure of sample firms. Section 4 focuses on source of data and methodology used in the paper. Section 5 presents the results of the analysis and findings, and Sect. 6 contains conclusion.

2 Determinants of Capital Structure: Theory and Evidence

Modigliani–Miller irrelevance theorem kick started the debate on the issue of capital structure. Modigliani and Miller (1958) claimed that the value of the firm depends on the marginal productivity and cost of the capital and source of capital is irrelevant to the value of the firm which came to be known as Modigliani and Miller irrelevance theorem. According to Modigliani and Miller (1958) in a world of perfect capital market and no tax, firms' investment depends on the return on investment and cost of capital. Investment opportunity will be pursued if and only if the return on investment is equal or more than marginal cost of capital. This implies that marginal cost capital is the cutoff point for the investment and the kind of instruments used to finance the investment is irrelevant. However, unrealistic assumptions of perfect capital market, no taxes and no bankruptcy costs of debt financing of Modigliani and Miller (1958) irrelevance theorem came under severe criticisms. In response to this, Modigliani and Miller (1963) acknowledged the tax benefits involved in debt financing. They maintained that firms' value would be influenced by the benefits conferred by the debt financing through the tax deductibility of the interest payments. Due to this, firms may be motivated to rely completely on debt financing as it provides tax shield. But Miller (1977) pointed out that tax advantage conferred by debt financing would be offset by the disadvantages of personal tax, and hence irrelevance theorem would hold good even in the presence of tax. Further, Miller (1977) presumed that debt financing does not have any bankruptcy costs and, hence, riskless. Therefore, according to Modigliani and Miller (1963) there is motivation for higher leverage due to the tax advantage and absence of bankruptcy costs of debt financing. However, Baxter (1967) recognized the bankruptcy cost of debt financing. He pointed out that high leverage would increase the bankruptcy costs emanating from the probability of default. This would increase the riskiness of the earning and the consequent cost of capital to the firm. Jensen and Mackling (1976) argued that debt financing also involves agency cost. According to them, financing through debt capital will motivate shareholders (agents) to invest in risky projects. If the project generates high return, shareholders will take away most of this return, and if it fails, creditors will have to bear the cost as shareholders have limited liability.

Based on the tax benefit and bankruptcy cost of debt financing, DeAngelo and Masulis (1980) developed static trade-off theory which argues that the tax benefits offered by debt financing is offset by increased bankruptcy costs of debt financing. Trade-off theory proposes that the firm will have a target capital structure which balances between the benefits and costs associated with the debt financing. However, Hovakimian et al. (2001) expounded dynamic trade-off theory wherein they argued that the optimum target capital structure is not static. It deviates as firms' conditions change from time to time. Jalal (2007) claims that actual leverage ratio varies around the target within an acceptable range in response to the changes in the firm conditions.

On the other hand, Myers (1984) proposed pecking order theory which argues that due to the problem of information asymmetry in capital market, firms follow pecking order in their financing decisions. According to Myers and Majluf (1984)

inside managers possess more information about the true value of the firm than outside managers. Because of this outside investors face adverse selection problem in their investment decisions. This may result in mispricing of the equity by the market leading to higher cost of capital. They argue that the problem of information asymmetry and resultant friction in the capital market is more in equity market as compared to debt market leading to varying cost of capital for the firm. In response to this problem, firms will follow pecking order in their financing decisions, that is, they would prefer to finance all their projects through internal capital, if possible, and if sufficient internal capital is not available, they will prefer debt capital to equity capital. Hence, equity capital is the least preferred capital in the presence of information asymmetry in the capital market. The theory clearly implies that the underdevelopment of the capital market will seriously limit the financing options available to the firms which will adversely affect corporate investment. Conversely, it argues that as capital market develops the problem information asymmetry and resulting adverse selection problem reduces and firms will be able to finance their projects from capital market.

However, none of the above theories unambiguously explains the role of market value of the firm in capital structure decisions. For instance, though modified version of trade-off theory recognizes importance of market value in capital structure decisions, it argues that market value results in only short-term deviation from target capital and these deviations quickly reverse to target capital structure (Alti 2006). On the other hand, market value reflects the growth opportunities of the firm under pecking order hypothesis. However, Myres and Majluf (1984) argues that firm with growth opportunities will not issue the equity immediately and will wait till information asymmetry reduces in order to avoid issuing at an average and unfavorable price that reflects the fact that lower-quality firms also issue. As a result, firms may have to find interim source of finance until they can issue equity. Therefore, market value may actually increase the debt capacity of the firm as adverse selection problem is less in the case of debt financing than equity. Secondly, firms may not issue equity even if they experience higher market value, if there is no need for immediate proceeds. Hence, the impact of market value on capital structure is not unambiguous under pecking order hypothesis. To address this lacuna in finance literature, Baker and Wurgler (2002) proposed market timing theory that directly links stock market and capital structure. According to them, equity market timing denotes the practice of raising equity capital at high price and repurchasing shares at low price with the objective to exploit the fluctuations in the cost of equity capital. Baker and Wurgler (2002) argue that firms are likely to issue equity rather than debt when the market value is high and tend to repurchase equity when market value is low. Hence, market timing theory argues that the current capital structure of the firm is the result of past attempts to time the market depending on the market value of the firm. The theory also implies that the financing decision is influenced by the conditions in the stock market. Baker and Wurgler (2002) documented strong negative relationship between past market valuations, measured by market-to-book value, and leverage ratio. Whereas trade-off theory argues that temporary fluctuations in market-to-book value will have temporary effects, Baker and Wurgler (2002) showed that market-

to-book value will have long-term impact on the capital structure of the firm. They further demonstrated that market timing leads to permanent change in the cash balance of the firms, which indicates that firms issue equity when market value is high even if there is no need for proceeds. Therefore, according to Baker and Wurgler (2002), the natural explanation for the negative and persistent effect of market value on capital structure is market timing.

Diverse theoretical arguments ignited to extensive empirical research on the determinants of capital structure. Most of the studies focused on firm-specific determinants of capital structure such as asset tangibility, size, financial distress costs, profitability, growth rate, tax rates, non-debt tax shields, interest coverage, liquidity (Harris and Raviv 1991; Fama and French 2000; Frank and Goyal 2003, 2009; Ali Ahmed and Hisham 2009; Tong and Green 2005; Daskalakis and Psillaki 2008).

Few studies also examined the link between stock market and corporate structure. For instance, in a cross-country study, Demirguc-Kunt and Maksmovic (1996) examined the role of stock market development on debt/equity ratio at aggregate level. Using an index of stock market development consisting of stock market size, and liquidity, they found that during the initial stage of stock market development debt/equity ratio increases as both debt and equity capital increases and later equity capital substitutes debt capital resulting in lower debt/equity ratio. Following market timing theory of Baker and Wurgler (2002), few studies also examined the role market value of the firm on debt/equity ratio. For example, Chen and Zhao (2006) detected inverse relationship between market-to-book ratio and debt/equity ratio which indicates that stock market development will increase equity capital. Similarly, Rajan and Zingales (1995), Korajczk et al. (1991), Jung et al. (1996), Welch (2004) and Huang and Ritter (2009) recorded negative relationship between debt/equity ratio and market-to-book ratio which supports the predictions of market timing theory. Complement to these findings, Graham and Harvey (2001) showed that 67% of the Chief Finance Officers (CFOs) indicated that they time the market when issuing the equity. Similarly, Brav et al. (2005) report that 86% of the CFOs said that undervaluation of the stock is the major reason for stock buyback. However, Rajan and Zingales (1995) argued that higher market-to-book value may also reflect the growth opportunities of the firm in which case one may find positive relationship with debt/equity ratio. Therefore, Chen and Zhao (2006) urged that more empirical investigation is required to clearly understand the relationship between leverage and market-to-book value in corporate financing. The main focus of this study is to find out the link between market value and capital structure. The study also includes Rajan and Zingales (1995)'s asset tangibility, firm size and profitability, and Fama and French (2000)'s depreciation as control variables in the leverage regression.

Rajan and Zingales (1995) argue that higher portion of tangible assets act as collateral which minimizes the agency cost involved in debt financing. Scott (1977) and Myers (1977) contend that large amount of tangible asset may also help the firm to reduce interest cost of debt financing. Therefore, firms with higher tangible assets will have higher debt capacity and it is expected to positively influence the debt/equity ratio. Empirically, Titman and Wessels (1988), Rajan and Zingales (1995), Espinosa et al. (2012), Bhaduri (2002a,b), Khasnobis and Bhaduri (2002),

Bole and Mahakud (2004) and Mahakud (2006) documented positive relationship between asset tangibility and long-term indebtedness. On the contrary, few studies also found negative relationship between asset tangibility and debt to equity (Hall et al. 2004; Sogorb-Mira 2005). Two possible explanations may justify this result. Firstly, higher tangible assets may help in reducing information asymmetry problem in the equity market enabling the firm to raise equity capital. Secondly, the firm with large fixed assets may already have generated enough internal capital for financing new projects which reduces its dependency on external capital, particularly, debt capital. However, Berger and Udell (2005) claimed that asset structure may not be important for a firm which maintains close relationship with lenders which serves as a substitute for physical collateral.

Firm size is another important variable which is found to be influencing capital structure. It has been argued that the probability of financial distress may be less in large firm (Titman and Wessels 1988; Rajan and Zingales 1995; Bhabra et al. 2008). In this regard, Warner (1977) showed that the bankruptcy cost is the negative function of firm's size. Psillaki and Daskalakis (2009) argue that large firms will be in a position to minimize transaction cost and agency cost involved in debt financing. However, Rajan and Zingales (1995) added that relationship between leverage and size is ambiguous. They argued that there may be inverse relationship between the two as large firms may be able to raise more equity capital due to lesser information asymmetry problem. Empirically, most of the studies documented positive relationship between leverage and size (Barton et al. 1989; Rajan and Zingales 1995; Psillaki and Daskalakis 2009; Espinosa et al. 2012; Bole and Mahakud 2004; Mujumdar 2014; Mohamad 1995).

Extant literature also shows that profitability is another major determinant of capital structure. Theoretically, there are divergent views on the role of profitability in influencing leverage. According to pecking order hypothesis there is inverse relationship between profitability and leverage as profitable firms will be able generate more internal capital and hence reliance on external capital diminishes (Harris and Raviv 1991; Rajan and Zingales 1995; Booth et al. 2001). On the contrary, trade-off theory postulates opposite prediction (Jensen and Meckling 1976; Myers 1977; Harris and Raviv 1990). Debt financing offers tax advantages to the firms, and this is more so in the case of highly profitable firms which may induce these firms to go for more debt. On the other hand, creditors will be more willing to lend to a profitable firm. Empirically, several studies recorded negative relationship between leverage and profitability which is in consistent with the prediction of pecking order hypothesis (Harris and Raviv 1991; Rajan and Zingales 1995; Booth et al. 2001; Gaud et al. 2005; Ozkan 2001; Van der Wijst and Thurik 1993; Hall et al. 2004; Strebulaev 2007; Um 2001). On the other hand, Espinosa et al. (2012) found positive relationship which may support trade-off theory. Depreciation is also included in the leverage regression as another control variable. Trade-off theory highlights the tax advantages conferred by debt financing, postulated positive relationship between tax rate and leverage ratio. Alternatively, firms can also save tax through depreciation charges. In such case, depreciation acts as non-debt tax shield and hence negative relationship between depreciation and leverage may be expected (Chauhan 2015).

3 Capital Structure—Some Stylized Facts

Table 1 presents the composition of stockholders' equity. As evident from the table, reserves and funds are the major component of stockholders equity of which retained earning accounts for about 78%. This shows that internal capital continues to be the major source of finance for firms in India. High share of cumulative retained profit may also be due to stock market development and resulting capital gain for the shareholders as investors may be willing to accept lower dividends with higher capital gains. Hence, one could argue that development stock market, on the one hand, will help the firms to raise equity capital from the market; on the other hand, it would also help them build internal capital through retained earnings. This will help the firm to reduce the dependence on external finance and the risk associated with external finance, particularly, the debt finance.

Table 2 presents the composition of long-term borrowing. It is clear from the table that bank borrowing is the major source of debt for sample firms. The share of long-term borrowing from banks has steadily increased over the period of time. This shows that Indian financial system is still a bank-dominated one as far as financing the corporate sector is concerned. Secondly, the table shows that long-term capital raised through bonds and debentures accounts for only 15.9% in 2015–2016. This demonstrates that the corporate bond market in India is playing limited role in corporate financing. Clearly, there is excessive pressure on the banking sector as far as the corporate financing is concerned. As a result, there is disproportionate risk concentration in one part of the financial system. Concentration of credit and the consequent risk is a serious threat to the financial soundness of the banks with the potential to create systemic crisis, particularly, during the downturn of the business cycle. Unprecedented increase in bad loans in Indian public sector banks in the past few years is clear indication of the problem of concentration of risk.

Table 1 Composition of stockholders' equity

	2010–2011	2011–2012	2012–2013	2013–2014	2014–2015	2015–2016
	%	%	%	%	%	%
Stock holders' equity						
Paid-up equity capital	5.16	4.79	4.64	4.36	4.19	3.99
Paid-up preference capital	0.38	0.35	0.30	0.30	0.41	0.50
Capital contribution and funds by govt, others	0.00	0.21	0.19	0.17	0.16	0.15
Money received against convertible share warrants	0.13	0.08	0.09	0.03	0.03	0.02
Forfeited equity capital	0.01	0.01	0.01	0.01	0.01	0.00
Reserves and funds	94.09	94.48	94.68	95.11	95.03	95.26
Of which retained profit	76.97	75.34	77.61	79.05	78.88	78.78
Share application money and suspense account	0.23	0.08	0.10	0.03	0.19	0.07

Source Compiled from CMIE Prowess database

Table 2 Composition of long-term borrowings (in percent)

	2010–2011	2011–2012	2012–2013	2013–2014	2014–2015	2015–2016
Long-term borrowing from banks	42.67	47.36	48.17	49.17	51.39	53.92
Long-term borrowing from financial institutions	1.51	1.30	1.44	1.30	1.19	1.45
Long-term borrowings from central and state govt	2.22	1.86	1.31	0.98	1.00	1.10
Long-term borrowings syndicated across banks and inst.	0.00	0.00	0.01	0.02	0.01	0.01
Long-term debentures and bonds	15.48	14.32	14.21	12.53	14.47	15.59
Long-term foreign currency borrowings	17.46	22.86	21.98	24.42	22.70	22.30
Long-term loans from promoters, directors and shareholders	0.04	0.03	0.04	0.06	0.07	0.07
Long-term intercorporate loans	0.87	1.87	1.81	1.87	1.80	1.64
Long-term deferred credit	1.89	2.18	1.64	1.18	1.05	1.04
Long-term maturities of finance lease obligations	0.15	0.15	0.12	0.66	0.70	0.71
Long-term fixed deposits	1.17	1.08	0.93	0.76	0.35	0.19
Other long-term borrowings	1.95	1.73	1.43	1.18	1.09	1.12
Current portion of long-term borrowings	13.15	18.93	15.49	12.95	13.22	16.95
Interest accrued and due (long term) on borrowings	0.01	0.03	0.01	0.01	0.01	0.01

Source Compiled from CMIE Prowess database

Another important observation from Table 2 is that the share of foreign currency borrowing in the long-term borrowing has increased from 17.6% in 2010–2011 to 22.30% in 2015–2016. An increased foreign currency borrowing is dangerous in the event of large currency depreciation. Patnaik et al. (2016) pointed out that unhedged foreign currency borrowing is a concern in emerging market where exchange rate is not fully floating. They also observed that in an emerging market with managed floating exchange rate regime firms may choose to have unhedged foreign currency borrowing because firms expect central bank to intervene when faced with large depreciations. However, short-term foreign currency borrowing has decreased significantly from 29.31% in 2010–2011 to 13.99 in 2015–2016 as evident from Table 3. This is a welcome trend as high short-term foreign currency borrowing may put pressure on the current account, thereby widening the deficit.

Another important feature of corporate debt is the dominance of secured borrowing which has steadily increased over the period as evident from Table 4. This implies that asset-based lending approach dominates in banks and financial institutions. In this regard, Reddy (2004) questioned the practice of asset-based lending, particu-

Table 3 Composition of short-term borrowings (in percent)

	2010–2011	2011–2012	2012–2013	2013–2014	2014–2015	2015–2016
Short-term borrowing from banks	60.14	52.74	53.62	62.028	66.39	63.50
Short-term borrowing from financial institutions	0.16	0.20	0.11	0.184	0.36	0.25
Short-term borrowings from central and state govt	0.00	0.00	0.00	0.000	0.00	0.00
Short-term borrowings syndicated across banks and institutions	0.00	0.00	0.00	0.006	0.01	0.01
Short-term debentures and bonds	0.37	0.07	0.01	0.000	0.17	0.00
Short-term foreign currency borrowings	29.31	31.70	32.59	24.585	15.53	13.99
Short-term loans from promoters, directors and shareholders	0.06	0.06	0.06	0.095	0.08	0.11
Short-term intercorporate loans	2.91	3.28	2.41	1.833	2.87	3.11
Short-term deferred credit	2.37	5.74	5.63	5.533	6.40	6.83
Short-term fixed deposits	0.15	0.13	0.13	0.091	0.07	0.09
Short-term commercial papers	2.68	4.67	4.29	4.245	6.26	10.36
Other short-term borrowings	1.85	1.42	1.14	1.401	1.86	1.77
Interest accrued and due on borrowings	0.31	0.39	0.47	0.641	1.32	2.50

Source Compiled from CMIE Prowess database

larly, in an era where technology and other intangible assets are more important than material components of the firm. This is more so in the case of service sector where intangible components such as technology, software, human capital and brand are more valuable than tangible assets. One argument for collateral-based lending is that it reduces the problem of NPAs. But as argued by Reddy (2004), in microfinance, with no collaterals and high interest rates, the level of NPAs is very low.[1] Clearly, there is a need for income-based lending where the lending is based on a firm's ability to generate income rather than stock of collateral assets.

Table 5 presents the frequency of firms in terms of debt/equity ratio. About 64% of the firms are sound in terms of leverage. Around five percent of the firms are overleveraged with debt/equity ratio more than 5. Though there are few firms with high debt/equity ratio, their share in total debt is very high. For example, top twenty highly indebted firms accounted for 63.18% of the total bank borrowings of the sample firms in 2015–2016 (Table 7). This concentration of credit and the resulting concentration of NPA are major problems in India banking sector, particularly, among the public sector banks. For example, The Hindu (2016) reported that the amount

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[1]For example, Bangalore-based leading microfinance institute Ujjivan Financial Services Pvt. Ltd reported gross NPA rate of just 0.28% in FY 2016–2017 as against 13.37% in public sector banks.

Table 4 Secured and unsecured borrowings

	2010–2011	2011–2012	2012–2013	2013–2014	2014–2015	2015–2016
	%	%	%	%	%	%
Secured borrowings	57.72	56.33	60.37	63.50	65.75	65.78
Unsecured borrowings	42.28	55.86	39.63	36.50	34.25	34.22
Secured long run	60.26	61.16	62.49	62.07	65.63	64.56
Secured short run	39.74	38.84	37.51	37.93	34.37	35.44
Unsecured long run	46.19	45.18	45.57	55.87	68.76	69.90
Unsecured short run	53.81	54.82	54.43	44.13	31.24	30.10

Source Compiled from CMIE Prowess database

of top twenty NPA accounts of PSBs stood at Rs. 1.54 lakh crores as of June 2016 which is about 28.52% of the total NPAs of PSBs in FY2016. State Bank of India, the largest bank in India, had NPA concentration ratio[2] of 27.36% in FY2016. RBI (2017) also found that large borrowers account for 56% of gross advances and 86.5% of GNPAs of SCBs in India. Table 6 presents the percentage distribution of firms in terms of interest coverage ratio. As evident from the table, the position has worsened over the period of time as the percentage of firms in distress has increased from about 13% in 2009–2010 to 21.10% in 2015–2016. Another 10 per of the firms have ICR in the range 0–1 which again indicates that they are very vulnerable. Further, 105 firms with negative interest coverage ratio accounted for about 30% of the total bank barrowings of the sample firms in 2015–2016. Table 7 shows the position of top twenty indebted firms which accounted for 63.18% of the total bank borrowings of the sample firms in 2015–2016. Majority of the firms reported negative profit, negative return on assets, lower current ratio, and interest cover ratio and higher debt/equity ratio which clearly points out the vulnerability of these firms. This has ramification for the banking sector in terms of rising bad debts given the fact that borrowing from the banks constitutes about 60% of the total corporate debt as shown in Tables 2 and 3. Clearly, it appears that corporate distress is one of the major reasons behind the increasing problem of bad loans in banking sector.

[2]Share of top four NPA accounts.

Table 5 Distribution of firms in terms of debt/equity ratio

Debt/equity ratio (times)	2009–2010	2010–2011	2011–2012	2012–2013	2013–2014	2014–2015	2015–2016
Equal or less than one	1035 (63)	1047 (62.77)	1036 (61.7)	1022 (60.65)	1026 (60.78)	1044 (62.62)	1051 (64.39)
More than one less or equal to 5	565 (34)	569 (34.11)	582 (34.66)	607 (36.02)	591 (35.01)	552 (33.11)	499 (30.57)
More than 5 less or equal to 10	36 (2)	28 (1.68)	33 (1.96)	36 (2.14)	47 (2.78)	43 (2.57)	38 (2.32)
More than 10	19 (1)	24 (1.44)	28 (1.66)	20 (1.19)	24 (1.42)	28 (1.67)	44 (2.69)

Source Compiled from CMIE Prowess database. Percentage in bracket

Table 6 Distribution of firms in terms of interest coverage ratio

	2009–2010	2010–2011	2011–2012	2012–2013	2013–2014	2014–2015	2015–2016
Less than 0	234 (12.97)	214 (11.73)	316 (17.27)	321 (17.64)	354 (19.50)	382 (21.50)	364 (21.10)
More than 0 less than or equal to 1	118 (6.54)	116 (6.36)	182 (9.95)	181 (9.95)	200 (11.01)	195 (10.97)	173 (10.02)
More than 1 less than or equal to 5	927 (51.38)	949 (52.05)	898 (49.09)	918 (50.46)	858 (47.27)	768 (43.24)	717 (41.56)
More than 5 less than or equal to 10	196 (10.86)	196 (10.75)	140 (7.65)	131 (7.20)	123 (6.77)	145 (8.16)	149 (8.63)
More than 10	329 (18.23)	348 (19.08)	293 (16.01)	268 (14.73)	280 (15.42)	286 (16.10)	322 (18.66)

Source Compiled from CMIE Prowess database. Percentage in bracket

4 Source of Data and Methodology

The study aims at examining the role of firm's market value on its capital structure decisions in the case of public limited manufacturing firms in India. To do this, the sample consists of firms for which the date of first trading (DFT) on BSE or NSE is available. CMIE Prowess gives the date of first trading in stock exchange and not IPO date. Therefore, the first trading date is considered instead of IPO as IPO could not be identified for all the firms. Studying firms from DFT helps us to understand the evolution of leverage from a given starting point, that is, DFT. Firms with DFT from 1995 through 2015 are included for the analysis. Data start from 1995 as stock market was largely underdeveloped prior to 1995. The data stop at March 2015 in order to get at least one year of data after DFT. The analysis is done in 3 subsamples DFT+1 year, DFT+5 year and DFT+10 year to understand both short-term and long-term impact market value on equity issues. The sample size is 605, 490 and 317 firms for DFT+1, DFT+5 and DFT+10, respectively. Sample size decreased as with the

Table 7 Top 20 indebted firms (as on March 2016)

Company name	Profit after tax (₹ crore)	Return on assets (%)	Current ratio(times)	Debt to equity ratio (times)	Interest cover (times)	Total bank borrowings (₹ crore)
Reliance Industries Ltd.	27384	6.23	0.66	0.42	10.53	67341
Bhushan Steel Ltd.	−2839.37	−5.3	0.77	9.92	−0.23	32555.68
Videocon Industries Ltd.	−55.81	−0.15	2.01	2.31	0.97	22304.06
Jaiprakash Associates Ltd.	−3239.9	−5.75	0.85	2	−0.02	21841.25
Jindal Steel & Power Ltd.	−1018.88	−2.29	0.46	2.27	0.38	18299.99
Hindalco Industries Ltd.	607.25	0.52	1.95	0.78	1.23	17644.1
Alok Industries Ltd.	−3722.8	−12.84	1.17	12.7	−1.21	16081.2
Vedanta Ltd.	5472.79	6.35	0.57	1.11	2.63	15889.84
J S W Steel Ltd.	−3529.67	−5.08	0.51	1.82	−0.68	10315.94
Electrosteel Steels Ltd.	−326.55	−2.55	0.24	23.27	0.7	9082.16
Bajaj Hindusthan Sugar Ltd.	−114.28	−0.91	1.1	3	0.86	6812.19
Bombay Rayon Fashions Ltd.	48.85	0.36	1.24	2.06	1.06	5355.27
Jyoti Structures Ltd.	−503.34	−9.04	0.94	50.46	0.09	4760.6
Century Textiles & Inds. Ltd.	−54.52	−1.1	0.61	2.63	0.77	4414.57
National Fertilizers Ltd.	197.09	1.12	1.15	1.28	1.52	4177.23
Jayaswal Neco Inds. Ltd.	−86.54	−0.86	0.74	1.96	0.89	3867.47
United Spirits Ltd.	981.16	5.22	0.91	1.5	2.47	3719.14
Kesoram Industries Ltd.	137.12	−8.8	1.1	16.81	0.07	3682.21
Piramal Enterprises Ltd.	1061.15	3.82	0.36	1.1	2.29	2870.05
Metalyst Forgings Ltd.	−270.21	−1.1	0.72	3.49	0.27	2768.95

Source Compiled from CMIE Prowess database

number of years either due to exit of the firms or due to non-availability complete data.

The study employs panel data technique for the analysis for DFT+5 and DFT+10 analysis and cross-sectional regression for DFT+1 analysis. In order to overcome the problem of heteroskedasticity and autocorrelation, heteroskedasticity and autocorrelation-corrected (robust) standard error is used. The model is specified as follows;

$$\left(\frac{D}{A}\right)_t - \left(\frac{D}{A}\right)_{t-1} = a + b\left(\frac{M}{B}\right)_{t-1} + c\left(\frac{FA}{A}\right)_{t-1} + d\left(\frac{EBITDA}{A}\right)_{t-1} + f \log(S)_{t-1} + g\left(\frac{D}{FA}\right)_{t-1} + \mu_t \tag{1}$$

Descriptions of these variables are provided in Table 8. All the dependent variables are lagged by one year as changes in leverage in response to these variables may happen in lags. This also overcomes the problem of reverse causality which may exist between dependent and independent variables.

Table 8 Description of variables

S. no	Variables	Definition	Notation in (1)
1.	Change in debt ratio	Change in ratio of total debt to total assets	$\left(\frac{D}{A}\right)_t - \left(\frac{D}{A}\right)_{t-1}$
2.	Market-to-book ratio	Market capitalization plus book assets minus book equity all divided by total assets	$\left(\frac{M}{B}\right)$
3.	Asset tangibility	Ratio of fixed assets (FA) to total assets	$\left(\frac{FA}{A}\right)$
4.	Log sales	Logarithm of sales turnover	$\log(S)$
5.	Profitability	Ratio of operating profit to total assets	$\left(\frac{EBITDA}{A}\right)$
6	Depreciation	Ratio of total depreciation (D) to fixed assets	$\left(\frac{D}{FA}\right)$

Table 9 Results of panel data

Dependent variable: change in debt ratio	DFT+1	DFT+5	DFT+10
Market-to-book value	−0.0063 (−2.50*)	−0.00086 (−2.16**)	−01122 (−1.63***)
Asset tangibility	0.480 (2.54*)	0.0294 (0.81)	0.0877 (3.49*)
Size	−1.501 (−7.27*)	−1.6782 (3.69*)	−1.154 (3.41*)
ROA	0.126 (2.03**)	−0.1305 (−0.99)	−0.209 (−3.05*)
Depreciation	−0.1726 (−0.72)	0.0786 (0.58)	0.0786 (0.58)
F test	20.44 (0.000)	18.39 (0.000)	8.15 (0.000)

t values in parentheses. *Significant at 1%. ** Significant at 5%. *** Significant at 10%

5 Findings and Discussions

Extant literature shows that firms' capital structure is influenced by two factors, namely (a) internal factors and (b) market valuation. Variables such as firm size, asset tangibility, profitability and depreciation have been used to control the impact of internal variables on capital structure. Market-to-book ratio is used to explain the role of market valuation on capital structure. Table 9 presents the estimated results of regression (1).

As evident from the table, market-to-book ratio is found to be negatively influencing the debt ratio in all three subsamples. This indicates that firms' debt ratio decreases as market value increases, suggesting that firms prefer to issue equity when the market value is high. Our results also suggest that the impact of market valuation remains even after ten year from the date of first trading in the stock market. This indicates that market valuation has long-term impact on the capital structure. This is contrary to the predictions of trade-off theory that market value results in only short-term deviation from the optimum capital structure and quickly reverse to

the target rate. Therefore, our results are consistent with the predictions of market timing theory that firms with better market value may prefer equity to borrowing, and that the market value has persistent impact on the capital structure. Alternatively, negative relationship of market value with leverage would also support the arguments of Myers (1977), Rajan and Zingales (1995) and Frank and Goyal (2009) that firm with higher growth opportunities would use more equity finance. Since market value reflects the future growth opportunities of the firm, higher market value would induce the firm to use more equity finance.

With regard to the impact of asset tangibility on borrowing of the firms, a significant positive influence of asset tangibility on debt ratio is found which indicates that higher proportion of tangible assets increases the debt capacity of the firm as lenders will be willing to lend to a firm with higher tangible assets (Rajan and Zingales 1995). Alternatively, positive influence of tangible assets also supports the proposition that higher tangible asset helps in reducing information asymmetry problem associated with debt financing which may help the firm to minimize the interest costs of the debt as argued by Scott (1977) and Myers (1977). However, firm size is found to be negatively related to debt ratio. This suggests that large firms have lower debt, indicating that they raise more equity capital to finance their operation. This may be due to the fact that in India before 1990s firms were constrained to depend more on debt capital as the stock market was largely underdeveloped. Therefore, as stock market became more efficient, firms, particularly, large firms took advantage of it and raised more equity capital from the market. Alternatively, for a large and growing firm the problem of information asymmetry reduces and hence they would be able to raise capital from the market at better terms.

Further, we found a significant and positive relationship between profitability and debt ratio in DFT+1 suggesting that profitability positively affects the debt capacity of the firm. But, in the long run (DFT+10) profitability is negatively related to the debt capacity of the firm, suggesting that as firms expand their profitability helps them to raise more equity capital. Alternatively, the negative relationship may also reflect the dependence on internal capital, which is consistent with predictions of pecking order hypothesis. However, we did not find any significant relationship between depreciation and debt ratio which suggests that tax-based explanations are not relevant in the case of our sample firms.

Results of regression (1) indicate that firm's market value negatively influences the debt ratio. However, negative relationship between market value and debt ratio may also be due to higher retained earnings or lower debt. In order to ascertain that negative relationship is actually due to changes in equity issues, we further examined relationship between fresh equity issues and market value of the firm. We study the firms in 3 subsamples DFT+1, DFT+5 and DFT+10 to understand both short-term and long-term impact market value on equity issues. Our regression model is as follows:

$$\left(\frac{e}{A}\right)_t = a + b\left(\frac{M}{B}\right)_{t-1} + c\left(\frac{FA}{A}\right)_{t-1} + d\left(\frac{EBITDA}{A}\right)_{t-1} + e\left(\frac{D}{A}\right)_{t-1} + f \log(S)_{t-1} + \mu_t \quad (2)$$

where $\left(\frac{e}{A}\right)_t$ is the ratio of fresh equity issue to total assets.

Table 10 Results of regression (2)

Dependent variable: fresh equity issues	DFT+1	DFT+5	DFT+10
Market-to-book value	0.0017 (2.77*)	0.00151 (2.14*)	7.08 (3.83*)
Asset tangibility	–0.020 (–1.26)	–0.00061 (–3.57*)	–0.00092 (–2.03**)
Size	–0.709 (–2.86*)	–0.0065 (–3.09*)	–0.00058 (–2.05**)
Profitability	0.018 (0.66)	–0.00048 (–2.30**)	0.00061 (2.92*)
Depreciation	–0.023 (–0.76)	–2.01 (–0.99)	–0.00002 (–0.07)
F test	4.18 (0.060)	9.88 (0.000)	108.39 (0.000)

t values in parentheses. *Significant at 1%. ** Significant at 5%. *** Significant at 10%

Estimated results of regression (2) are presented in Table 10. As shown in the table market value is positively and significantly related to equity issue. This shows that higher market value leads to lower debt ratio through increase in equity issues which confirms that negative impact of market value on debt ratio is indeed traced to changes in equity issues than changes in retained earnings or debt retirement.

Further, the impact of market value on equity issues is more pronounced in DFT+10 which indicates the impact of market value on capital structure is persistent as opposed to the argument of trade-off theory that market value should have only short impact on capital structure. This shows that market value of the firm leads to long-term change in firms' capital structure which is consistent with the market timing theory of Baker and Wurgler (2002).

6 Conclusion

The study attempted to examine the impact of firm's market value on capital structure and found that debt ratio is negatively influenced by market value. Further, the study showed that the negative relationship actually comes through equity issue and the impact remains even after ten years from the date of first trading in the equity market. This is consistent with the predictions of market timing theory that the market value has long-term impact on firm's capital structure. The results also suggest that better market valuation enables the firm to raise capital from equity market, thereby diffusing excessive burden of financing corporate sector on banking system.

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