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Review Article

Market Valuation of Nifty Firms in India: the Tobin's Q Approach

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Abstract

This research, considering Tobin's Q as a proxy for market valuation, determines the factors relevant in firm valuation in Indian equity markets. The study observes that Tobin's Q is a sound measure for judging the firms' valuation in both intrinsic and market terms. OLS based multiple regression models find the financial leverage and ROI as significant determinants of market valuations in India. However, the degree of impact of these firms financials on Tobin's Q is time varying and inconsistent.

Key Words: Tobin's Q, Market Valuation, Financial Leverage, ROI.

INTRODUCTION

Asset pricing and market valuation has been the focal point of research in the domain of finance for the past many years. There are many ways one can assess its market value ranging from considering the prices of shares in the market to Market Value Added measure taken by discounting the economic value added parameters of a specific firm. In addition to that, modern finance uses Tobin's Q, a measure computing relation between the market value of firms and their replacement cost. Such a measure takes into consider both book value and market value of debt and equity, hence more robust in asset pricing theories.

There are a host of factors affecting the value of firms at the market places. These factors include the performance of the economy, performance of the industry that the company belongs to and above all the fundamentals of specific firm itself. In fact, the market valuation is the function of the integration of these forces for the equity investor. One of the main functions of a security analyst is to identify which of these factors impel the market valuation in a specific country. The present research collecting financial data of 50 companies attempt to measure the market value of firms using Tobin's at first and then determine the prominent financial variables that affect the magnitude f such market parameters.

One of the serious difficulties faced by an equity investor particularly from an emerging market, is where he should invest and what factors he should consider while taking his investment decisions. Generally, it is believed that the earnings and financial conditions of a firm will be reflected in the prices at which the shares of such firms transacted in market bourses. Although many studies already dealt this matter under empirical framework, the findings of most of them are highly diverging in nature. Still, in an emerging market context, the determinants of market valuation are mysterious and investors are losing their way particularly under abnormal conditions. Hence, this study intends to focus mainly on the market valuation of the 50 nifty companies. Each company's book value is different from its market value depending upon various factors or parameters. Tobin's Q represents the ratio of the market value of a firm's existing shares to the replacement cost of the firm's physical assets. Using Tobin's Q the company's market performance over a number of periods can be evaluated and also find out the factors that influence their highest/lowest market valuation.

A study of this kind that uses Tobin's Q in firm valuation has many practical implications. The research expects to accurately measure both the market value and replacement costs of assets. Hence Tobin's Q is an ideal tool for evaluating the better performers in accordance with the different parameters and factors. Moreover, this market valuation measure incorporates to the past events, future tendencies (market value of the shares) including the expectations of success in the implementation of new projects. It is also possible to determine the degree of monopoly over change using Tobin's. The investors can make rational investment decisions by analyzing Tobin's Q and its determinants.

Firms can solicit the factors that influence their poor market valuation by comparing with their peers having higher Tobin's Q.

The remaining section of this paper is organised as follows. The next section presents the relevant literature. Then a discussion on the data and methodology used in the study is made. The empirical results and discussion on the same are made in the following section. The paper ends with some concluding remarks.

Literature Review

Tobin's Q has a significant predictive power in the explaining valuation consequences of major corporate policy variables Chung, Wright and Charoenwong [1]. Their study produced empirical evidence for this relation. In another study on Tobin's Q and financial policy, Chirinko [2] emphasized the importance of linking the financial and real sectors and working with optimizing models. Tobin's Q model of investment would appear to provide a framework satisfying these two criteria. In contrast to the original presentation of the *Q* model, the formal development has not recognized that the firm actively participates in a number of financial markets; in this broader context, *Q* may be an uninformative and possibly misleading signal for investment expenditures. In their research on Market valuation and the theory of investment, Ogawa and Kitasaka [3] examined why the performance of Tobin's average *Q*-type investment function is poor. They have constructed a series of average *Q* and another of marginal *Q* and investigated the relationship between the two. Their research failed to find the cointegrating relationship between the two measures. The research also showed that entrepreneurs place more emphasis on marginal *q* than on average *q* in investment decisions. In a study on the impact of Tobin's and cash flow on investments, Andrew and Janice [4] showed analytically that investment is positively related to Tobin's Q and cash flow, even in the absence of adjustment costs or financing frictions. Montgomery and Birger [5], using Tobin's Q as a measure of performance, seek to estimate the relative importance of industry, focus, and share effects in determining firm performance and the study found that industry effects account for the majority of the explained variance. Their findings are perfectly consistent with profit maximization by firms with different factor endowments. Bolton, Chen and Wang [6] conducted a study on a unified theory of Tobin's Q, Corporate investments, Financing and Risk management and concluded that investment depends on the ratio of marginal Q to the marginal value of liquidity. They also demonstrated the relation between investment and marginal Q changes with the marginal source of funding.

Blundell *et al.* [7], using data for an unbalanced panel of UK companies over the period 1975-86, estimated a Q model of investment. The results found Q as a significant factor in the explanation of company investment, although its effect is small and a careful treatment of the dynamic structure of Q models appears critical. In addition to Q, both cash flow and output variables are found to play an independent and significant role. However, Q models have not been noticeably successful in accounting for the time series variation in aggregate investment Summers [8], and Poret and Torres [9]. Lang and Stulz [10], showed that Tobin's Q and firm diversification are negatively related. Their evidence is consistent with the view that firms seek growth through diversification when they have exhausted internal growth opportunities. Thus they have failed to find evidence supportive of the view that diversification provides firms with a valuable intangible asset. Nikolaus [11] examined the determinants of firm performance of Indonesian and Dutch firms over the period of 2009-2013. Firm performance is measured by Tobin's Q and its relationship with leverage; ownership concentration and inflation were tested. The findings of the research showed that leverage is a strong predictor of Tobin's Q in both countries.

In business games on Total Enterprise Simulation model, Sauaia and Castro [11] compared the value of the Tobin's Q for each simulated company with seven other past performance indicators. Just like in entrepreneurial reality, the hypothesis was proven that companies with a high performance exhibited at the end of ten rounds a higher value for the Tobin's Q than those with a poor performance. Wolfe and Sauaia [12] explained that various economic indicators of a business game company's performance exist. The Tobin's Q was examined as an indicator of the firm's effectiveness from an investment perspective across a variety of top management games. The Tobin's Q was also compared to the Altman Z as another indicator of the firm's economic viability. The research finally suggests the use of Tobin's Q as a more-meaningful way to judge the comparative performance of firms in business games. Cuthbertson and Gasparro [13] showed that in a neoclassical inter temporal framework real investment is determined by Tobin's marginal-Q. The model is used to explain UK fixed investment in the manufacturing sector 1968–1990 using an error-correction model and cointegration techniques. They developed such approach to include both agency costs of debt a d regime changes, where in some periods the firm may be demand constrained. The research ultimately found that along with Tobin's Q, capital gearing and output determines the investment level of firms.

Empirical Methodology

Data

This research is descriptive in nature and use published information on share prices and financials of 50 firms listed in NSE. NSE website provides the share price data and firms' annual reports have been accessed for financial data. The period of the study is 6 years

covering the post recessionary and resilient period from 2010-11 to 2015-16.

Model

Two step analytical procedures have been pursued in this study. At first the study computes Tobin's Q for judging how far the firms are getting market valuation higher than their replacement cost or book value of assets. Thereafter, using Ordinary Least Square (OLS) multiple regression analysis, the study captures the financial factors relevant in affecting the market valuation of firms in India. Only four financial variables – Financial Leverage, Dividend Payout, Earnings Growth and ROI- have entered into our regression system as exogenous construct. The variable selection is based on empirical literature and the intuitive knowledge of the researcher. Tobin's Q has been used as the proxy variable for market value changes.

$$TobinQ_t = \alpha + + \beta_1 FL_i + \beta_2 DP_i + \beta_3 Growth_i + \beta_4 ROI_i + \varepsilon_t$$

Variables Used

Tobin's Q

Tobin's Q ratio is a ratio devised by James Tobin [14], who hypothesized that the combined market value of all the firms on the stock market should be about equal to their replacement costs.

Tobin's Q, or the Q ratio, is the ratio of the market value of a company's assets (as measured by the market value of its outstanding stock and debt) divided by the replacement cost of the company. The market value refers to the amount a firm is worth on the market (by multiplying shares by the going market share price), while the book value refers to the collective value of a company's net assets (less depreciation, debt, etc.).Tobin's Q is viewed as a snapshot of a firm's financial performance.

$$\text{Q Ratio} = \frac{\text{Total Market value of the company + liabilities}}{\text{Total assets (or book) value + liabilities}}$$

If q>1, then firms have an incentive to increase their capital stock because capital once installed and producing goods and services is priced more than its cost.

If q<1, then firms should scrap capital, close plants etc.

Financial Leverage

Financial leverage is the degree to which a company uses fixed-income securities such as debt and preferred equity. The more debt financing a company uses, the higher is its financial leverage. A high degree of financial leverage means high interest payments, which negatively affect the company's bottom-line earnings per share. The increase in debt and preferred equities in a company's capital structure causes increase in financial risk to the firm through increased interest payments and

Dividend Payout Ratio

The dividend payout ratio is the amount of dividends paid to stockholders relative to the amount of total net income of a company. The amount that is not paid out as dividends to stockholders is held by the company for growth. When the dividend payout ratio formula is restated on a "per share" basis, the formula will be:

$$\frac{\text{DividendS Per Share(DPS)}}{\text{Earnings Per Share(EPS)}}$$

Return on Investment (ROI)

A performance measure used to evaluate the overall efficiency of an investment or to compare the efficiency of a number of different investments. ROI measures the amount of return on an investment relative to the investment's cost. To calculate ROI, the benefit (or return) of an investment is divided by the cost of the investment, and the result is expressed as a percentage or a ratio. In fact ROI explains the twin performance of the company - profitability on one side and asset management efficiency on other side.

$$\frac{\text{Earnings After Tax}}{\text{Total Asset Investment}}$$

Earnings or Profit Growth

Earnings Growth rates refer to the year of year percentage change of profits within a specific time period, given a certain context. Such growth is mathematically measured by:

$$\frac{\text{Earnings After Tax}_t}{\text{Earnings After Tax}_{t-1}}$$

RESULTS AND DISCUSSIONS

The relations between market value and book values of Nifty firms from 2010-2011 to 2012-2013 are explained in Table 1. According to the results reported, McDowell is the company that receives highest market valuation using Tobin's Q. During the year 2010-2011, with a quotient of 26.85 the firm creates a better position in the market. Of the total 50 firms considered 38 companies have sound valuation as their Tobin's Q is greater than 1 and among which seven firms have higher Tobin's Quotient of greater than 5. Only 12 firms' market value fell into the level which is much below the book value of assets. Higher Tobin's Q to most firms revealed the existence of good investment climate in India during the year.

In 2011-2012, 34 firms have more market value than the book value of assets. Tobin's Quotient of all these firms is greater than 1 due to the greater market value relative to the book value of assets. Among the sampled nifty firms, like previous year McDowell's lead the group in terms of market valuation with highest quotient of 12.94. However, compared to the previous year the value of its quotient almost halved indicating steep decline in market value of equity. Tobin's Q of many of the PSU's in the list including IOC, HPCL, NHPC, BEL, SAIL, etc… along with some private firms like Reliance Communications, Shriram Transport Finance etc… are valued at lower rate relative to the book value of their assets.

During 2012-13 also, McDowell along with the Castrol India lead the nifty firms with significantly higher market value quotient. There is no significant changes occurred in the Tobin's Quotient of these firms relative to previous period. About 31 firms, almost all belong to the list of better performers during the last year was continued in the list prepared for 2012-13. Five firms of this group including Godrej, Pidilite India and Dabur received four times market valuation more than their book value of assets. Like in 2011-12, many PSU firms still were in the list of poor performers according to Tobin's measure.

Table-1: Market Value to Book Value of Nifty Firms 2010-2013: Tobin's Q Analysis

Company	2010-11	Rank	2011-12	Rank	2012-13	Rank
ABB	2.49	22	2.67	20	1.64	23
Apollo Hospital	4.09	12	2.51	24	2.92	17
Ashok Leyland	0.60	45	0.89	39	0.71	40
Bajaj Finance	0.60	44	0.72	44	0.74	39
Bajaj Financial Services	4.89	8	6.01	7	5.09	10
BEL	0.36	48	0.30	50	0.24	48
Bharat Forge	2.07	25	1.70	29	1.28	28
Britannia	3.47	18	3.97	13	3.71	14
Cadila	4.26	10	3.61	15	3.18	16
Cairn	2.01	27	1.91	27	1.47	25
Castrol India	3.75	14	8.48	3	9.76	2
Colgate Palmolive	5.52	5	6.50	5	6.72	4
Concor	1.84	29	1.30	30	1.33	27
Cummins India	3.38	19	4.23	12	3.77	13
DLF	1.82	28	10.59	2	1.26	29
Dabur	7.26	30	7.45	4	8.14	3
Divis Lab	1.86	2	1.79	28	2.10	20
Emami Ltd	3.63	16	3.48	17	5.33	8
GSK	4.46	24	4.43	9	0.00	49
Glaxo	6.03	7	6.11	6	5.89	7
Glenmark	2.30	9	2.71	19	3.40	15
Godrej	5.09	4	4.39	10	6.43	6
HPCL	0.41	47	0.36	49	0.27	47
Hind Zinc	2.30	23	1.99	25	1.44	26
Inidiabulls	0.00	50	0.67	45	0.68	41
IOC	0.58	46	0.47	48	0.49	46
JSW Steel	0.77	42	0.62	46	0.63	42
LIC HFL	0.91	41	0.93	35	0.85	36
Marico	2.56	21	2.64	21	0.00	50
Motherson SUMI	1.11	33	0.87	40	1.59	24
NHPC	0.98	36	0.85	42	0.89	34
NMDC	5.11	40	2.56	22	1.77	22
OIL	1.19	17	1.06	33	1.13	30
Oracle FSS	3.61	6	3.05	18	2.75	18
Pidilite	3.80	43	3.68	14	5.16	9
PFC	0.70	3	0.90	37	0.92	33
PGHH	7.20	35	5.71	8	6.47	5
PNB	2.07	13	0.90	36	0.53	44
Reliance Communications	3.70	26	0.54	47	0.52	45
REC LTD	0.99	15	0.89	38	0.86	35
Shree Cements	1.72	20	1.96	26	2.63	19
Shriram Transport Finance	1.05	39	0.86	41	0.84	37
Siemens	2.94	32	2.51	23	1.96	21
SAIL	1.07	37	0.76	43	0.57	43
Titan	0.23	38	3.58	16	4.23	12
Torrent Pharmaceuticals	1.24	49	1.15	32	1.04	31
UPL	1.30	11	1.26	31	0.99	32
UBL	4.20	34	4.34	11	4.83	11
Mcdowell	26.86	1	12.95	1	12.52	1
Vedanta	1.77	31	1.05	34	0.81	38

Source: Compiled from Annual Reports

Table 2 analyses Tobin's Q values of Nifty firms from 2013-14 to 2015-2016. In 2013-14, when the market bounces back to its historical level many firms received higher market valuation ratios. The surge in share prices in the bourses made the value of their Tobin's ratios almost doubled and the impact is more visible in leading firms like McDowell, Castrol and Dabur. More number of firms (9 firms) entered into the list of higher market valued group and their average Tobin's Q is greater than 5. However the firms which were at the bottom of the list still were at the lower level and could not improve their investment conditions considerably. They have not received incremental market value much on account of which their ratio is almost same to that of previous years. Now, 31 firms in the sample have Tobin's Q of greater than 1 indicating the larger market value of assets than their book value.

In 2014-15, more firms entered into the list of more than 1 Tobin's Q category. That year 36 firms were having better market valuation than the intrinsic value of their assets. Moreover, the market valuation ratios of higher end firms like McDowell, Castrol, Godrej, Emami, Dabur etc… did not receive significant increment in value. However, the firms lie at the lower end of the list somewhat able to bring some betterment in their market valuation despite they were still at the bottom of the list.

Table-2: Market Value to Book Value of Nifty Firms 2010-2013: Tobin's Q Analysis

Company	2013-14	Rank	2014-15	Rank	2015-16	Rank
ABB	2.44	23	3.77	23	3.25	23
Apollo Hospital	2.86	17	3.59	24	3.23	23
Ashok Leyland	0.7	40	1.78	30	2.3	27
Bajaj Finance	0.71	39	1	37	1.24	30
Bajaj Financial Services	4.69	12	8.61	9	9.7	6
BEL	0.22	49	0.64	47	0.16	47
Bharat Forg	1.92	26	4.91	17	3.27	22
Britannia	5.62	9	10.44	5	10.64	4
Cadila	2.73	18	3.77	22	13.12	2
Cairn	1.47	28	1.07	34	0.65	41
Castrol India	10.07	2	14.3	3	13.11	2
Colgate Palmolive	6.16	6	8.06	10	11.62	3
Concor	2.15	25	3.59	25	2.59	25
Cummins India	4.06	13	5.71	16	5.14	18
DLF	1.02	31	1.09	33	0.83	33
Dabur	9.86	3	12.85	4	9.7	7
Divis Lab	2.47	21	2.66	28	5.19	17
Emami Ltd	8.14	4	14.82	2	8.82	9
GSK	5.31	10	6.36	14	5.46	15
Glaxo	0	50	8.67	8	9.78	5
Glenmark	3.64	15	2.88	27	2.15	28
Godrej	6.32	5	7.67	12	8.77	10
HPCL	0.48	46	0.73	44	0.01	48
Hind Zinc	1.28	30	1.52	32	1.39	29
Inidiabulls	0.64	43	0.91	39	0.83	34
IOC	0.46	47	0.64	46	0.65	40
JSW Steel	0.68	41	0.69	45	0.8	36
LIC HFL	0.83	36	0.94	38	0.89	32
Marico	0.3	48	3.81	21	8.39	12
Motherson SUMI	4	14	7.8	11	8.62	11
NHPC	0.78	38	0.79	43	0.82	35
NMDC	1.68	27	1.54	31	1.08	31
OIL	0.97	32	0.79	42	0.58	42
Oracle FSS	2.63	19	4.8	19	5.7	14
Pidilite	5.26	11	9.3	6	8.32	13
PFC	0.86	34	0.89	41	0.8	38
PGHH	6.13	7	8.69	7	9.24	8
PNB	0.52	44	0.6	48	0.25	46
Reliance Com	0.66	42	0.37	50	0.38	44
REC LTD	0.86	35	0.91	40	0.76	39
Shree Cements	2.62	20	4.85	18	4.7	20
Shriram Transport Finance	0.82	37	1.02	36	0.80	37
Siemens	2.45	22	4.73	20	3.2	24
SAIL	0.51	45	0.5	49	0.38	45
Titan	3.25	16	6.16	15	4.91	19
Torrent Pharmaceuticals	2.33	24	3.28	26	3.35	21
UPL	1.33	29	2.57	29	2.35	26
UBL	5.66	8	6.95	13	5.3	16
McDowell	29.01	1	28.99	1	76.84	1
Vedanta	0.89	33	1.05	35	0.51	43

Source: Compiled from Annual Reports

For the year 2015-16, the study computed the market valuation of all the 50 firms. Large bullish rally in the market enabled many firms in the group to magnify the market value of assets relative to their book value. This year 17 firms received market valuation which is equal to more than five times of their book value. The market value of McDowell has almost tripled, partially because of the redemption of debt and mainly due to hike in share prices. Another notable trend in Tobin's Q during this year was many FMCG firms were replaced by pharma firms at the upper end of the list. This could be possibly because of the favorable investment climate that was prevailing in India for pharmaceutical sector relative to FMCG.

Table-3: Determinants of Tobin's Q: Multiple Regression Results

Year	Variables	Coefficient	t	P value	R
	FL	-0.463	-0.289	0.774	
	DP	0.022	0.665	0.509	
2010-2011	Growth	-0.002	0.228	0.821	0.042
	ROI	0.019	0.509	0.613	
	FL	2.877	3.938	0.000*	
	DP	0.016	0.796	0.430	
2011-2012	Growth	0.011	2.510	0.016**	.370
	ROI	0.040	1.777	0.082***	
	FL	2.965	6.233	0.000*	
	DP	0.006	0.487	0.629	
2012-2013	Growth	0.000	-1.404	0.169	0.596
	ROI	0.070	4.439	0.000*	
	FL	3.754	12.331	0.000*	
	DP	-0.001	-0.128	0.899	
2013-2014	Growth	-0.005	-1.523	0.135	0.859
	ROI	0.059	4.671	0.000*	
	FL	0.748	0.883	0.382	
	DP	-0.002	-0.232	0.817	
2014-2015	Growth	-0.003	-0.205	0.838	0.36
	ROI	0.027	0.705	0.480	
	FL	2.384	8.413	0.000*	
	DP	0.003	0.583	0.560	
Overall	Growth	0.000	-0.774	0.440	0.237
	ROI	0.031	2.650	0.009*	

*Significant at 1% level **significant at 5% level ***significant at 10% level

Table 3 reports the regression results of Tobin's Q and its relation with the select firm financials. On analyzing the results, it is quite obvious that certain financial parameters like Financial Leverage/Capital gearing practices and Overall Profitability (ROI) continuously impact the market valuation of firms in India. Its impact is significantly high and percentage variance explained by them is at larger degree especially during the year 2012-2013 and 2013-2014. In 2013-2014 about 85 percent of variations in Tobin's Q were explained by Financial Leverage and Return on Investment. However, during the beginning and end years the study could not see any statistical significance in the parameters.

It appears that, the market value predictions proxy based solely on firms' fundamentals have derived significant improvement during the years 2012-2013 and 2013-2014. It is quite surprising to note that the explained variance during such years produced about 40 to 50 per cent improvement over the previous year predictions. Such a finding reveals that the degree of impact of firms financials on the market valuation proxy of Tobin's Q is time varying and depends on the investment climate in the country. Interestingly, fundamental characteristics such as leverage ratios and ROIs significantly capture the systematic risk component of market fluctuations in India. Moreover, we should notice that the sign of regression is consistent with what one might intuitively expect. We should expect a positive relationship between Tobin's Q and leverage or debt ratio. Our research finds similar positive functional relation between market beta and debt financing by firms. Similarly, the existence of positive relation between beta and profit earnings suggests that the stronger the profitability over time, better the market value, assuming everything else remains constant.

CONCLUSION

This research, using Tobin's Q analysis, determines the factors that have relevance in market valuation of nifty firms during the post-recession period of 2010-11 to 2015-16. The study pursued both descriptive and inferential approach using multiple regression framework in its analytical methodology. Tobin' s Q is a sound measure for judging the market valuation of firms since it consider two dimensional aspects of valuation- intrinsic valuation and market valuation. The firms belong to the capital intensive sectors like FMCG and Pharmaceuticals have higher market valuation ratios and the Public Sector Undertakings (PSUs) like IOC, HPCL, BEL etc… are

continuously getting lower valuation relative to their book value according to Tobin's Q analysis. The bullish movement in the bourses is the major factor influencing higher market value of firms as per the analysis carried out in this study. Firms like McDowell, Castrol, Emami, Dabur and Pidilite India are continuously getting higher market valuation.

OLS based multiple regression models found statistically significant causal relations between market valuation of firms and financial leverage and overall profitability measure ROI. The explained variance by these two variables in regression during certain years received about 40 to 50 per cent improvement over the previous year predictions. Such a finding reveals that the degree of impact of firms financials on the market valuation proxy of Tobin's Q is time varying and depends on the investment climate in the country. The impact is persisting at aggravate level especially during bullish market conditions. During the beginning of resilience phase the study could not find any relations of market valuations with ROI and financial leverage. The impact on market valuation could be twice. One is through the increase in share prices in the market due to general price conditions and second is due to the presence of debt that brings benefits of financial leverage and profitability thereby appreciation in equity market prices.

This study invites many policy implications. Since capital formation in the economy lies at the core of stable and sustainable performance of the financial markets, the research discloses the firm-level factors that impact the market valuation mechanism in emerging economies like India. Hence, the market regulators should draft apposite policy framework to stabilize the market conditions for retaining investor confidence and stable prices. Investments in capital intensive sectors like Pharma and FMCG offer more stable and sustainable performance. However, one should be cautious enough to the fundamentals of industries in which the firm operates and need appropriate adjustment in this regard to warrant better estimations.

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