



Stock Market Valuation and Output Growth: Panel Data Evidence from the Indian Public Limited Manufacturing Firms

K. Dhananjaya¹

Abstract

The paper examines the relationship between stock market valuation and output growth at the firm level. Specifically, it aims to understand the impact of firms' stock market valuation and stock liquidity on real output growth. The sample for the study includes panel data of Indian public limited manufacturing firms. The study covers the period from March 2005 to March 2020. Firms with at least two consecutive years of data have been included in the sample. The full sample includes firm-year observations of 877 firms. The findings show that both stock market valuation and turnover ratio significantly positively impact output growth, even after controlling for other important determinants of output. Further, both stock market variables and bank credit significantly influence output growth. This suggests that banks and the stock market provide complementary financial services required for the growth and development of the stock market will not undermine the institution-based financial system's role.

I. Introduction

The world stock market has witnessed significant growth in size and turnover since the 1980s. The world market capitalisation ratio of listed domestic companies has increased from 29.5 per cent in 1980 to 133.76 per cent of GDP in 2020. Similarly, stocks traded value as a percentage of GDP, a measure of liquidity, increased from just 8.9 per cent in 1980 to 157.24 per cent of GDP in 2015 (World Bank, 2022). India has also witnessed unprecedented growth in the stock market since the early 1990s due to various reform measures introduced in the 1990s. For instance, the market capitalisation ratio of NSE increased from 33.8 per cent in 1995-96 to 111.5 per cent in 2013-14. The turnover ratio of NSE increased from 16.8 per cent in 1995-96 to 43.4 per cent in 2012-13. The capital

¹ Associate Professor, Post Graduate Department of Business Administration, St.Aloysius (Autonomous) College, Mangalore, Karnataka, India- 575022.E-mail-dhananjayaimit@gmail.com, dhananjaya@stalloysius.ac.in

raised through public issues also increased substantially from Rs.40.7 billion in 2002-03 to Rs.1103 billion in 2018-19 (NSE, 2019 and NSE, 2004). The stock market in India has significantly developed in terms of size and activity in the post-reform period.

Though the bank-based financial system continues to be the major component of the financial system, the emergence of the stock market has become the symbol of capitalism (Wachtel, 2003). The rapid development of emerging stock markets has also attracted the attention of academics and policymakers. An interesting and long-standing question is whether stock market development promotes economic growth. However, the literature is divided on the issue of the stock market-growth nexus. The divergent opinions are based on several arguments. Firstly, it is argued that the stock market positively influences economic growth by providing various financial services (Levine and Zervos 1998). Secondly, it is propounded that the stock market does not play any major role in economic growth (Mayer 1988). Rather, it just responds to the needs of economic growth. Economists also contend that the stock market may negatively affect economic growth (Stiglitz, 1985). Empirically, the literature provides mixed evidence (Levine & Zervos, 1998; Caporale et al., 2004; Adusei, 2014; Zegada, 2011; Fink & Haiss, 1999; Chakraborty, 2008), indicating that the stock market-growth nexus is still a moot issue. Further, since most of these studies are conducted at the aggregate level, it would be more appropriate to examine the impact of the stock market at the firm level as the stock market is expected to affect the output of only public limited companies directly. Therefore, the paper reexamines the relationship between the stock market and output growth at the firm level.

The remainder of the paper is structured as follows. Section I presents a review of the literature. Section II describes the variables and methodology. Section III presents empirical results and discussion. Section IV contains the conclusion.

II. Stock Market and Economic Growth: Related Literature

Although economists recognise the importance of a well-developed financial system (Mackinnon, 1973; Shaw, 1973; Pagano, 1993; Thiel, 2001; Saint-Paul, 1992; Devereux & Smith, 1994; Gurley & Shaw; 1955; Patrick, 1966), there are divergent views on the impact of stock market development on the economic growth. For instance, the supply-leading hypothesis of Patrick (1996) postulates that stock market development plays an active role in promoting economic growth. Supporting this hypothesis, Levine & Zervos (1996) argue that stock markets promote growth by creating liquidity, risk diversification, reducing information asymmetry, enhancing corporate control and governance, and saving mobilisation. In contrast, the demand-leading hypothesis argues financial system only responds to the demands of the growth of the real sector (Patrick, 1996) and the evolution of the financial system is the consequence of the process of economic development (Gurley & Shaw, 1955; Goldsmith, 1969; Jung, 1986). The third view sheds doubt on the role of the stock market in promoting economic growth. Economists like Stiglitz (1985) and Demirguc-Kunt & Levine (1996) argue that stock

market development may negatively impact economic growth. Stiglitz (1985) questions the argument that stock markets improve information asymmetry.

According to him, in well-functioning stock markets, information is quickly revealed through price changes. Therefore, it would create a free rider problem on the part of the investors, which would reduce the incentive for spending private resources to obtain information. Demirguoc-Kunt & Levine (1996) contend that the stock market could negatively impact at least three channels; First, higher stock market liquidity by increasing the return on investment may result in a reduction in savings. This, according to them, could happen through the income and substitution effects of increased return on investment. Hence, higher liquidity may hamper economic growth if the saving rate declines enough to affect capital accumulation. Secondly, greater stock market liquidity results in a reduction in the uncertainty associated with the investment. They argue that while risk-averse investors find investing more attractive under less uncertainty, it would lower the demand for precautionary savings. Hence, they note that the impact of the liquid stock markets on saving is ambiguous. Thirdly, greater liquidity may reduce the incentive for investors to participate in corporate governance. In a highly liquid stock market, dissatisfied investors can quickly and inexpensively sell their shares, which weakens investors' commitment to the long-term finance of the project and to monitor firm performance and exercise corporate control. Therefore, it could adversely affect corporate governance and eventually undermine economic growth. Further, Bhide (1993) maintains that the stock market development results in the diffusion of ownership, where firms are widely held by many small investors who are not active in corporate governance.

The empirical literature is also divided on the stock market-economic growth nexus. The literature has produced at least three different results: (1) stock market development promotes economic growth (Levine, 1996; Levine & Zervos, 1998; Caporale et al., 2004; Arestis et al., 2001; Boubakari & Jin, 2010; Alajekwu & Achugbu, 2012; Adusei, 2014; Caporal & Spagnolo, 2011; Mauro, 2000; Fama, 1990; Schwert, 1990), (2) Stock market development does not promote economic growth (Adusei, 2014; Zegada, 2011; Fink & Haiss, 1999; Singh, 1996), and (3) economic growth stimulates stock market development (Balco, 2009; Zakaria & Ahmed, 2011; Adamopoulos, 2008). Studies examining the stock market-growth link in India also produce mixed results. For example, Nagaishi (1999) Nagaraj (1996) Azarmi et al. (2005) Chakraborty (2008) Paramati & Gupta and Pethe & Karnik (2000) show that stock market does not influence economic growth. In contrast, Biswal & Kamaiah (2001), Srinivasan (2014), and Pradhan (2011), Azarmi et al. (2005) provide evidence that the stock market development contributes to economic growth. The literature provides diverse evidence on the stock market- growth nexus. Further, the extant studies have examined the stock market-growth link at the aggregate level. However, the market valuation is expected to affect the output of only public limited companies directly. Therefore, the paper reexamines the role of market value in output growth at the firm level.

II. Variables, Source of Data and Methodology

The study examines the link between market valuation and output at the firm level in the case of public limited manufacturing companies in India. The model broadly includes four sets of variables: finance, physical capital, human capital and trade. The model is specified as follows;¹

$$GVA_{it} = \beta_0 + \beta_1 Finance_{it-1} + \beta_2 Capital_{it-1} + \beta_3 Humancapital_{it-1} + \beta_4 Trade_{it-1} + \epsilon_{it-1} \quad (1)$$

Where GVA is the real gross value added. The finance variable includes stock market variables, bank credit and bond finance. Capital includes both physical capital and intangible capital. Human capital includes the proportion of the population with at least a Bachelor's or equivalent educational attainment and the proportion of the labour force. Trade is the export and import of the firms.

A measure of output in terms of Gross Value Added:

The output is measured by Gross Value Added (GVA) at the firm level. GVA is arrived at simply by subtracting the cost of all materials and services that external suppliers provide.

The firm's GVA can be arrived at from retained profit with the following adjustments (ICAI, n.d);

$$R = S - B - D - W - I - T - DV \quad (2)$$

Where R= Retained profit, S=Sales revenue, B=Cost of raw materials and services, D is the depreciation, W = Annual wage cost, I = Interest expenses for the year, T = Corporate tax, and DV is the total dividend payable for the year.

Rearranging the equation (2), we obtain GVA as follows;

$$S - B = R + D + W + I + T + DV \quad (3)$$

Where S-B is the GVA. However, apart from the sales revenue firm may have other source income such as any other direct income, investment income and extraordinary items, which are also part of the GVA. Therefore, equation (3) becomes;

$$(S + Di) - B + Inv + EI = R + D + W + I + T + DV \quad (4)$$

Where Di = Direct incomes, Inv =Investment income, and EI = extraordinary items.

Real GVA will be arrived at using the GDP deflator at 2011-12 prices.

Stock Market Variables:

Two stock market variables are used following the literature. First, the MB ratio is used to understand the impact of the market valuation on output growth. It is the ratio of total

¹ Explanatory variables are lagged by one period to reduce the problem of endogeneity
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assets minus book equity plus market capitalisation divided by total assets. MB ratio reflects the firm's market valuation; hence, a positive relationship between the MB and output is expected.

Studies also find that liquidity-based indicators of the stock market, such as the ratio of the value of shares traded to market capitalisation, and the value of shares traded to GDP, influence economic growth. The turnover ratio, the ratio of the total turnover to the size of the market/economy, reflects trading frictions and information flow in the market (Levine, 2005). Hence, a higher turnover ratio implies better liquidity in the market. However, as discussed above, theoretical disagreements exist regarding the relationship between liquidity and growth. Accordingly, the relationship between liquidity and output growth is not unambiguous. In this study, the ratio of stock market turnover to a firm's gross value added is used to measure the liquidity of a firm's stock.

Other Control variables:

The model also includes a set of firm-specific and macro variables as control variables. Firstly, the growth of non-food bank credit from scheduled commercial banks has been included in the model to account for the role of bank finance in the growth of output. Secondly, market-based debt financing is also included in the model. Finally, the ratio of borrowing through debentures and bonds to the total assets is included in the model to capture the role of market-based borrowing in output growth.

Several firm-specific fundamental variables have also entered into the model as control variables. Firstly, two measures of capital are used. Asset tangibility is included in the model to control the impact of physical capital. Asset tangibility is measured as the firm's fixed assets ratio to total assets. Secondly, the proportion of intangible assets is used to understand the impact of it on the growth of output. The intangible asset is the ratio of intangible assets to total assets. Return on assets is also used to examine the impact of profitability. Return on assets is measured as the ratio of profit after tax to total assets. Net investment is also included in the model. Net investment is defined as the ratio of the net addition of fixed assets to total assets.

Two measures of the human resource have been included in the model. Firstly, the percentage of the labour force has entered into the model as an explanatory variable to control the impact of the size of the labour force on growth. Secondly, education attainment is included to account for the role of human capital in growth.

The Sample, Source of Data and Methodology:

The sample for the study includes panel data of Indian public limited manufacturing firms. The study covers the period from March 2005 to March 2020. Further, each firm must have at least two consecutive years of data. Firms in the 1st and 99th percentile of total assets are not included in the sample to reduce the effect of extreme values and reporting errors if any. The full sample includes firm-year observations of 877 firms.

The data on firm-specific variables have been obtained from the CMIE database. The data on the non-food bank credit has been collected from RBI's Handbook of statistics on Indian economy. The data on the two human resource measures have been obtained from the World Bank development indicators. The study employs a fixed effect panel model for the analysis.

III. Results and Discussion

Table I presents the results of the F test and LM test. F-test for fixed effect is significant, indicating a fixed effect in the data. Similarly, the significant LM test indicates the presence of a random effect in the data. The Hausman test result suggests that the fixed effect model is appropriate.

Table I: Results of F and LM Tests

Tests	Test values
F Test for fixed effect	155.92 (0.000)
LM Test random effect	1967.37 (0.000)
Hausman Test	319.75 (0.000)
p values in the bracket.	

Table II presents the results of panel regression estimation. The results show that the market value has a significant positive impact on the output of public limited firms. The positive coefficient is stable as more control variables are included in the model. The results suggest that the firm's market valuation is an important determinant of the output growth of public limited companies. Three important channels may explain this finding. Firstly, the market value contains information about the firm's growth prospects. Particularly, it includes private information about the firm's value, which the stockholders communicate through trading activities. This provides useful signals for the management to increase the investment and output level. Secondly, market value also includes elements of stock mispricing. Stock overvaluation helps firms raise equity capital at a cheaper cost, as evident from market timing. The cheaper cost of capital reduces the discount rate and enables the firm to invest in outstanding projects with low NPV, thereby positively affecting output growth. Thirdly, market mispricing also communicates the overall positive wave in the industry and the economy, which is

futuristic (Dhananjaya, 2021). This forward-looking market sentiment may encourage the firms to increase investment and output.

Table II: Determinants of Gross Value Added

	1	2	3	4
MB	15.66 (2.17**)	16.35 (2.20**)	16.46 (2.23)	16.45 (2.23)
TR	13.34 (2.94*)	13.19 (2.90*)	13.31 (2.90*)	13.34 (2.90*)
Bank	.00021 (2.27**)	.0002 (2.26 **)	.00021 (2.28**)	.0002 (2.28**)
AT	107.65 (2.01**)	104.14 (1.94**)	109.46 (2.05 **)	109.70 (2.05**)
InA	1307.65 (1.24)	1306.61 (1.27)	1306.43 (1.28)	1305.39 (1.28)
ROA	.967 (1.57)	.962 (1.56)	.966 (1.57)	.966 (1.57)
Laborforce	1731.19 (1.09)	1715.01 (1.08)	1747.72 (1.08)	1715.01 (1.08)
HC	4.58 (2.32**)	4.52 (2.28**)	4.57 (2.28**)	4.562 (2.32**)
Inv	-	10.91 (2.09**)	10.87 (2.07**)	10.96 (2.08**)
Trade	-	-	3.48 (0.76)	3.48 (0.76)
Bond	-	-	-	35.74 (0.53)
F test	5.98 (0.000)	5.76 (0.000)	5.36 (0.000)	4.91 (0.000)

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

The turnover ratio also has a significant positive impact on firms' real output. This indicates that the stock market also influences the growth of output through the creation of liquidity. The result supports the argument that liquid stock markets are crucial for long-term financing projects. Since long-term high-return-risk projects require a long-term capital commitment, investors may not be ready to relinquish their control over their savings for long periods. However, the liquid stock market helps them to sell their assets in the market quickly. As a result, higher liquidity would help the firms have permanent use of capital raised through the equity market for long-term projects, which positively contributes to long-term economic growth.

Bank credit has a significant positive impact on the level of output. This finding reinforces that bank borrowing plays an important role in the growth of the corporate sector as it is the major source of corporate debt financing (Dhananjaya, 2019). The finding supports the idea that banks and stock markets are complementary to each other and help improve each other's role in influencing economic growth. The results show that both the banking system and the stock market will continue to coexist in providing essential financial services for economic growth. The results support the view that a balanced financial structure is important for economic growth as debt and equity are not perfect substitutes.

Bond financing does not show up any significant relationship with output, though the coefficient is positive. This underpins the corporate bond market plays a very limited role in India. Moreover, as the role of DFIs declined, corporate debt financing burden shifted to banks rather than the corporate bond market. This has resulted in excessive pressure on the banking sector and continued underdevelopment of the corporate bond market.

As far as the fundamental variables are concerned, tangible assets or fixed capital positively and significantly determines output growth. However, intangible assets do not significantly affect the growth of output. This suggests that intangible assets play a limited role in the case of public-limited manufacturing firms. This may be because most of the investment is on tangible assets in both Private and Public non-financial corporations. The combined share of the tangible assets constituted 92.78 per cent and 76.69 per cent of the total investment in Public non-financial corporations and Private non-financial corporations, respectively in 2016-17 (Dhananjaya, 2019). This also suggests that corporate investment in Research and Development (R&D) is limited, as observed by FICCI (2017) and GoI (2018). Secondly, the dominance of fixed capital also indicates that in manufacturing, fixed assets dominate the intangibles as against the service sector, where intangible assets are supposed to play a dominant role in output growth. Return on assets is positively related to output, though it slightly falls short of being statistically significant. Net investment is another firm-specific fundamental variable that positively influences output growth. The positive coefficient of the trade exposure of the firm indicates that it has a positive effect on the output of public limited manufacturing companies, although the coefficient is statistically insignificant.

Conclusion

The study reexamines the role of the stock market in the growth of output at the firm level. It shows that both stock market valuation and turnover ratio have a significant positive impact on the real output, even after controlling for other important determinants of output. Further, both stock market variables and bank credit significantly influence output growth. This suggests that banks and the stock market provide complementary financial services required for the growth and development of the stock market will not undermine the institution-based financial system's role.

Rather, it contributes to the further evolution of financial institutions, as Demirguc-Kunt & Levine (1996) argued.

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