Factors Affecting Stock Prices : The Linkage Between Stock Market And Product Market

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INTRODUCTION

Movement of stock prices is guided by both fundamentals as well as sentiments. Perhaps, sentiments dominate fundamentals in the short run. For instance, in the bearish phase of the Indian stock market during 2008-09, almost all stocks depreciated. Indexes of Bombay Stock Exchange and National Stock Exchange came down considerably. The depreciation in stock prices could be partly attributed to erosion of fundamentals, but mostly, it was due to adverse market sentiments. Indeed, intra day movements in stock prices and large swings within a short period of time cannot be due to fundamentals, because fundamentals do not change so quickly and also, the flow of information on fundamentals is far from complete. In the long run, on the other hand, stock prices approximate the true worth of a company, which is reflected in its fundamentals; and market sentiments can have a negligible effect. In fact, if in the long run, stock prices were also guided by market sentiments only, then any stock could sell at any price or in other words, stock prices would be ad hoc altogether, which is, however, far from reality. Blue-chip stocks (having strong fundamentals), for instance, seldom sell at a very low (compared to others) price, even in an otherwise depressed market.

A wide number of investigations have been made into the short-run stock price movement and volatility. Short run movement of stock prices is wonder watching and unpredictable. Predictability would go against *'efficient market hypothesis'*. Despite this fact, practitioners, mainly speculators, always attempt to predict stock prices in order to take their investment decisions. Technical analysis consisting of various charts and diagrams are regularly used for that purpose. Theoreticians, on the other hand, depend more on-time series econometrics for predicting stock prices. While short-run stock price movement has drawn so much attention of academicians as well as business personnel, long-run price trend has been of considerably less importance in the literature. The present study, however, attempts to explain yearly fluctuations in stock prices.

Studies based on annual data, however, have all relied upon the single equation model, where stock prices are taken as the dependent variable. In the single equation approach, explanatory variables are regarded as exogenous, which is obviously far from reality. In order to avoid this restrictive presumption, an attempt is made in this paper to formulate a simultaneous equation model for understanding the behavior of stock prices.

REVIEW OF LITERATURE

A wide number of investigations have been made to identify the factors determining stock prices. Studies have been made at both - the micro level and the macro level. At the micro level, the query is regarding the stock price of a single company, and attempts have been made to find out the company-specific and other variables that might influence it. In the macro-level studies, on the other hand, people attempted to find out the factors that affect the stock price level of a country. Various macroeconomic and financial variables were used as explanatory variables to explain the movement of the overall stock price level of the country, reflected by the popular stock price indexes in circulation. The present study makes a survey of the existing literature in this field.

❁Micro Studies : In micro level studies, dividend per share appears to be the single most important explanatory variable. However, significance of other variables, viz., earning per share, book value per share, yield and company size differed across studies. While Zahir and Khanna (1992) observed book value per share to be significant, findings of Mahapatra and Sahu (1993) fail to corroborate the same. Earning per share is found to be insignificant in many other studies. Perhaps, the strong association between earning per share and dividend per share is responsible and at the same time, inflicts the situation.

The role of company size is equally ambiguous. The coefficient of size has been observed to have the expected positive

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sign, but in most cases, failed to be statistically significant. Yield (dividend – price ratio) coefficient with a negative sign, however, has been found to be significant in many studies. It has its explanation in the fact that the movement of share price is always faster than that of the dividend. Thus, with a rise in the price of share, yield falls and vice versa. However, not without reason, one may question whether the dividend – price ratio can be taken as an explanatory variable when price (share price) is the explained variable.

A vast literature has grown up concerning the relative importance of dividend and retained earnings. Evidence favours the former to the latter. Dividend and retained earning, as a matter of fact, are two alternative options to any firm to dispose of its earned profit. It may be paid out as a dividend to the shareholders, or it may be retained for future growth of the firm. When a firm pays a dividend, shareholders are instantly satisfied because it enhances their present income. Retained earning, on the other hand, does not give such an instant and certain income to the shareholder. It implies an increase in the firm's capital and hence investment, which in turn entails the prospect of the firm to induce forward movement in its share price, implying capital appreciation of the shareholder. Thus, shareholders are also left with two options. Increased dividend assures them of a certain present income; retained earnings, on the other hand, tempts them for capital appreciation, which will materialize in the future, obviously with some uncertainty.

In the context of western economies, Irwin Friend and Marshall Puckett (1964) have opined that there is a little basis for the customary view *'that in the stock market generally, except for unusual growth stocks, a dollar of dividends has several times the impact on share price of a dollar of retained earnings. This may be valid for non-growth industries, and the opposite may be true in growth industries. To the extent that this conclusion holds, it is possible that the management might be able, at least in some measure, to increase stock prices in non-growth industries by raising dividends, and in growth industries by greater retention'*.

The study by S. Kumar and Manmohan (1975) brings out the characteristics of the Indian stock market. It refutes the common notion that retained earning generally has greater importance in case of growth industries. Instead, the authors pointed out quite strongly that the impact of dividend is stronger in case of growing industries like Engineering and Electricals, while retained earning has a stronger influence in case of old industries like tea or cotton textiles. Thus, we have every reason to question the applicability of the above finding in the Indian capital market. Investors possibly do not seem to distinguish between growth and non-growth industries. Since Indian shareholders are risk-averse, they need higher risk premium for the growth- oriented industries, and feel comfortable with higher dividends. Ironically, they seem to be complacent by allowing higher retained earning in case of established industries like *'tea plantations and cotton textiles'*, with the understanding that these industries involve lower risk.

In a more recent work, Chaudhury M. Irfan and Mohammed Nishat (2002) tested the role of company fundamentals in guiding stock prices. The work was based on the Karachi stock market. Irfan and Nishat considered six explanatory variables, viz., dividend yield, payout ratio, leverage, asset growth, size of the firm, and earning volatility to explain share price volatility. The study was impaired by multicollinearity, which was overcome by applying step-wise regression technique. The study found that excepting earning volatility and asset growth, other four explanatory variables significantly affect share prices. However, the overall explanatory power of the model was low. It led investigators to opine that company fundamentals play a relatively less important role in driving prices in an underdeveloped market, as compared to the developed markets. In underdeveloped markets, share prices are guided by sentiments and macro environment, than by company-specific data.

❁Macro Studies : The impact of macroeconomic variables on asset prices has been subjected to extensive research. Early US studies of Bodie (1976), Fama and Schwert (1977), Jaffe and Mandelker (1977), Linter (1973), Nelson (1976), and Oudet (1973), examined whether the financial assets were hedges against inflation, and all reported a negative relation between stock returns and changes in the general price level.

Fama (1981) produced documented evidence of a strong positive relationship between equity returns and real economic activities, such as industrial production, capital expenditure and gross national product.

Chen et al. (1986) who built on Fama's investigation, tested whether a set of macroeconomic variables would explain unexpected changes in equity returns. They documented evidence that the economic variables such as industrial production, changes in the risk premium and twists in the yield curve were significant in explaining stock returns. Pearce and Roley (1985) found that unexpected announcements in monetary policy had a significant influence on stock prices, while Jain (1988) also noted that announcements about money supply, and the consumer price index were significantly associated with stock price changes.

Similar investigations were made on European markets. Errunza et al. (1998) investigated the impact of

macroeconomic factors on monthly stock returns for eight countries viz., Italy, U.K., France, Germany, Switzerland, Netherlands, Belgium and USA. Monetary instability was found to be significant for Germany and France, whereas industrial production was a significant factor for Italy and Netherlands. In the case of U.K., Switzerland and Belgium, the importance of macroeconomic factors did not improve their ability to forecast. Tsoukalas, D. et al. (1999) investigated the determinants of stock prices in U.K., with the application of Vector Autoregression (VAR) technique and found that dividend price ratio affected stock returns.

Enough research has been made on emerging economies. Ibrahim, M.H. (1999), for instance, found that Malayasian stock market was informationally efficient in the short run, but was not so in the long run. Kwon, C. S. et al. (1999) found that stock price indices were not a leading indicator for economic variables in Korea.

After testing Vector Error Correction Model (VECM) on Singapore stock index, Mayasami and Koh (2000) found that the market was interest and exchange rate sensitive. Tsoukalas (2003) examined the relationship between stock prices and macroeconomic factors in Cyprus by using the VAR model. They found that equity market in Cyprus was sensitive to variations in the exchange rate and industrial production.

While many studies have been conducted in this area abroad, only a few studies have so far been undertaken on the Indian economy. Studies by Pethe and Karnik (2000), Bhattacharya and Mukherjee (2002), Ray and Vani (2006), Sharma and Singh (2007), Ahmed (2008), Chakrabarti (2001), and Rai and Bhanumurthy (2004) are noteworthy in this context. The studies differ in choice of variables, methodology and time span.

Pethe and Karnik used cointegration and error correction model to test for causality between macro variables and the two major share price indices in India, viz., SENSEX and NIFTY, using monthly data for the period extending from April 1992 to December 1997. Five macroeconomic variables were considered for the investigation, viz., exchange rate of rupee against dollar, prime lending rate, narrow money supply (M1), broad money supply (M3) and index of industrial production. Results showed that only index of industrial production affects SENSEX and NIFTY, but not the converse. The study, however, found no evidence of causality between other macro variables, and the stock price indices.

Bhattacharya and Mukherjee (2002) used Toda and Yamamoto's long run Granger causality test to examine the causal relationships between SENSEX and five macroeconomic variables, viz., money supply, index of industrial production, national income, interest rate and rate of inflation using monthly data from 1992-93 to 2000-01. They found that index of industrial production causes SENSEX causality, while there exists a bi-directional causality between SENSEX and rate of inflation.

Ray and Vani (2006) applied non-linear techniques like VAR and Artificial Neural Network (ANN) to examine the causal linkages between the economic variables, viz., index of industrial production, interest rate, inflation, exchange rate, money supply, fiscal deficit and foreign institutional investment and the stock market index SENSEX. Monthly data for the period from 1994 to 2003 were considered for the empirical investigation. Exchange rate, index of industrial production, money supply, interest rate and inflation rate came out as the most influencing variables for the Indian stock market.

Sharma and Singh (2007)'s work was based on the monthly data of a comparatively long horizon, covering the period from April 1986 to March 2005. They applied multiple regression analysis to test for the significance of the variables, viz., foreign exchange reserves, claims on the private sector, wholesale price index, call money rate, index of industrial production, exchange rate and broad money on SENSEX. Variables like foreign exchange reserves, exchange rate, index of industrial production, money supply (M3) and claims on the private sector were found to have a considerable influence on the stock market movement. However, a few variables like interest rate and wholesale price index showed a very negligible influence on the stock market.

In a more recent work, covering the period from March ,1995 to March, 2007 and using quarterly data, Ahmed (2008) studied causal relation between the index of industrial production, exports, foreign direct investment, money supply, exchange rate, interest rate, NIFTY and SENSEX. Toda and Yamamoto's Granger causality test was applied to explore the long-run relationship between the variables, while BVAR modeling for variance decomposition and impulse response functions were applied to examine the short run relationships. The results of the study revealed differential causal links between aggregate macroeconomic variables and stock indices in the long run. However, the revealed causal pattern was similar in both markets in the short run. The study indicated that stock prices in India lead exchange rate, exports, index of industrial production, money supply, while interest rate and foreign direct investment lead stock prices. In a number of studies, researchers tried to find out the determinants of FII flows into India, and also the impact

of such flows on the stock market of the country. The studies obtained contradictory results.

Chakrabarti (2001), for instance, investigated the causal relationship between FII and stock market returns. The study marked a regime shift in the determinants of FII after the Asian crisis. The study found that in the pre-Asian crisis period, any change in FII had a positive effect on the equity returns. But in the post-Asian crisis period, the causation was reverse – equity returns rather caused FII.

In another study, Rai and Bhanumurthy (2004) also found that FII flows depend, among others, on stock market returns. However, the study did not find any causation running from FII inflows to stock returns.

DETERMINANTS OF STOCK PRICES : A MICRO STUDY

The present study is a micro level study. It aims at explaining the stock price of an individual company. The study relies upon the fundamental stock valuation principle - that price should reflect the true worth of a stock in the long run. The worth of a stock is measured by the present value of the cash flows from the stock. A stock generates dividends to the investor for an infinite period of time the stock is held. Thus,

$$P_s = D_1 / (1 + r)^1 + D_2 / (1 + r)^2 + D_3 / (1 + r)^3 + ...$$

where P_s is the price of the stock, r is the market rate of interest and D_1, D_2, D_3 are dividends in period 1, 2, 3,..... respectively. It is obvious, therefore, that stock price depends on the dividend. The only problem in this stock price valuation process lies in the unknown future dividends. One can only predict them, and the prediction must be based on the earning potential of the company. A Company pays dividends only if it earns profit.

A positive relationship is always expected between the dividend and the earning. The profitability of the company, in turn, should be determined by the sales volume, other things (including cost of raw materials and technology) remaining the same.

The determination of stock price can ,therefore, be best explained by the following set of equations :

$$P_s = \beta_{10} + \beta_{11} DPS + U_1 \quad .....(1)$$

$$DPS = \beta_{20} + \beta_{21} EPS + \beta_{22} EPS_{-1} + U_2 \quad .....(2)$$

$$EPS = \beta_{30} + \beta_{31} SS + U_3 \quad .....(3)$$

Here P_s stands for stock price, DPS for dividend per share, EPS for earning per share, and SS for sales volume of the company.

The model contains three endogenous variables : P_s, DPS and EPS ; one lagged endogenous variable : EPS_{-1}, and one pure exogenous variable : SS.

The model is identified. Furthermore, the order condition shows that all the equations of the model (and hence the model) are (is) overidentified .

The reduced form of the model is given below :

$$P_s = \beta_{10}' + \beta_{11}' EPS_{-1} + \beta_{12}' SS + U_1' \quad .....(4)$$

$$DPS = \beta_{20}' + \beta_{21}' EPS_{-1} + \beta_{22}' SS + U_2' \quad .....(5)$$

$$EPS = \beta_{30}' + \beta_{31}' SS + U_3' \quad .....(6)$$

where β_{ij}' s are the reduced form coefficients; i = 1, 2, 3 and j = 1,2.

The reduced form model shows that stock price as well as the dividend ultimately depends on current sales and previous year's earning. The peculiarity of the model is that it establishes the link between the stock market and the product market. Since product sales is the only pure exogenous variable in the system, it may be postulated that stock market ultimately depends upon the state of the product market. Empirical testing of the model examines the validity of the model.

EMPIRICAL ESTIMATION OF THE MODEL

The proposed model has been fitted for the cement industry in India. The cement industry has been chosen in view of the fact that the firms belonging to this industry show comparatively less product heterogeneity.

The model relates profit earning of a firm to its sales volume. The conjecture seems to be more appropriate when product differentiation is limited.

DATA AND METHODOLOGY

For empirical estimation of the model, panel data have been collected on six major cement companies in India for a period of eight years ranging from 1999-2000 to 2007-08. Data have been collected from the PROWESS database and other CMIE (Centre for Monitoring Indian Economy) publications. Panel data have been considered in lack of long run time series. Cross-section analysis, too, would be inappropriate, as only a few companies in the industry are found to display information on all these variables.

The study formulates a fixed effect panel regression model for each of the equations of the simultaneous equations system. Fixed effect model is appropriate here because disturbance terms are likely to be correlated with explanatory variables. The disturbance terms capture the effect of company size, the quality of management, etc. which, in turn, might influence the explanatory variables. Thus, the simultaneous equations system to be empirically fitted stands as :

$$P_{sit} = \beta_{10i} + \beta_{11} DPS_{it} + U_{1it} \quad \text{.....(7)}$$

$$DPS_{it} = \beta_{20i} + \beta_{21} EPS_{it} + \beta_{22} EPS_{i(t-1)} + U_{2it} \quad \text{.....(8)}$$

$$EPS_{it} = \beta_{30i} + \beta_{31} SS_{it} + U_{3it} \quad \text{.....(9)}$$

where P_{sit} = price of share of the i^{th} company in period t,

DPS_{it} = Dividend per share of the i^{th} company in period t,

EPS_{it} = Earning per share of the i^{th} company in period t,

SS_{it} = Sales volume of the i^{th} company in period t, and,

U_{1it}, U_{2it} and U_{3it} are the three disturbance terms.

Two Stage Least squares (2SLS) method has been applied for estimation of each of the equations of the model, as they are all overidentified. Thus, at the first stage, the researcher regresses the endogenous explanatory variable in the equation on all the predetermined (lagged enodogenous and exogenous) variables in the model and at the second stage, the researcher regresses the dependent variable on the estimated values of the endogenous explanatory variables and other explanatory variables in the equation.

EMPIRICAL FINDINGS

The estimated equations of the model appear as follows :

$$P_s = 292.9014 + 50.5281\, DPS$$
$$(3.6711)^{*} \quad (4.4643)^{*}$$

$R^2 = 0.7579$ Adj $R^2 = 0.7225$

$F = 21.4028^{*}$ D.W. = 1.4430

$$DPS = 2.7232 - 0.0451\, EPS + 0.1510\, EPS_{-1}$$
$$(3.1703)^{*} \quad (-1.4085) \quad (4.9326)^{*}$$

$R^2 = 0.7492$ Adj $R^2 = 0.7053$

$F = 17.0719^{*}$ D.W. = 1.6160

$$EPS = 18.7048 + 0.0141\, SS$$
$$(5.4518)^{*} \quad (8.2960)^{*}$$

$R^2 = 0.8011$ Adj $R^2 = 0.7720$

$F = 27.5294^{*}$ D.W. = 1.3157

* indicates statistical significance at 1% level.

The empirical findings suggest that the model is a close approximation of the factual world; explanatory power of each equation is considerably high and F-statistics are all significant at 15 level. R^2 values are above 70% for all the equations. For the equation relating earning to sales, it is even as high as 80%.

Except EPS in equation (2), the coefficients of all other explanatory variables in the model are statistically significant at 1% level. The insignificance of the EPS coefficient and at the same time, significance of the EPS_{-1} coefficient in the dividend equation implies that corporate dividend depends on profitability, but with one period lag.

CONCLUSION

The proposed model identifies the crucial variables affecting stock price of a company in the long run. Furthermore, it explores the interdependence between the variables. Hence, the system approach is more informative than the single equation method. The empirical results suggest that the model is a close approximation of the reality.

The model further relates the stock market to the product market. Stock price ultimately depends on the sales volume of the product that the firm produces, the only pure exogenous variable in the model. The stock market-product market linkage helps investors in that investment decisions can be taken simply and mainly keeping an eye on the sales growth of the firm. Thus, for the companies which produce commodities of increasing demand in the society, we have every reason to expect an upward movement in its stock price in the secondary market. It appears ,therefore, that the investor need not be over concerned with a company's details. Instead, they should prudently assess the product market dynamics. Company fundamentals that represent the financial and functional strength of the firm may be of secondary importance in this regard.

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