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IMPACT OF FINANCIAL RATIOS ON STOCK PRICES OF MANUFACTURING COMPANIES: EVIDENCE FROM INDIA[3]

The present study examines the impact of financial ratios on the stock prices of Indian manufacturing companies. Since the manufacturing sectors play an essential role in the economic development of an emerging market like India, the study results can be helpful for investors looking to invest in India, and, in particular the manufacturing companies operating in the country. The study consists of a balanced panel dataset of selected manufacturing companies from fourteen manufacturing sectors listed on the NIFTY 500 index. The study employs the Prais-Winsten panel regression technique, which uses panel-corrected standard error estimators to analyze the data and derive the necessary empirical outcomes. The results reveal that the valuation ratios, namely market-to-book value, enterprise value multiple, and earnings per share, along with asset efficiency, exhibit a positive and significant relationship with the share prices. On the other hand, dividend payout and leverage exhibit an insignificant relationship with the share prices.
Keywords: financial ratios, share prices; Prais-Winsten panel regression; Panel corrected standard errors; manufacturing companies; India
JEL: B26; C23; G10

1. Introduction

The implementation of capital market reforms in 1991 saw the opening of Indian capital markets to global companies and investors. These reforms also paved the way for entrepreneurs operating in the private sector to set up new companies and take advantage of better economic prospects. This period witnessed phenomenal growth in the services and industrial production sectors of the country owing to the policy measures taken by the government. These reforms enabled the Indian securities market to become more efficient and competitive with its global peers and drew the attention of both domestic and international investors to look at the Indian capital markets more closely (Ahmad et al., 2005).

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The emergence of new tools and techniques for investment analysis and the promise of huge rewards are some of the reasons for emerging markets like India to continue to be popular investment destinations. While investors are interested in reaping the gains from identifying the right emerging markets to invest in, they are also interested in determining the risks involved in such actions.

Stock market volatility is a matter of concern not just for investors, who are concerned about the risk element associated with investing in equity markets. It is also a subject matter for academics and researchers interested in determining which internal and external factors significantly contribute to the fluctuations in the equity markets. Some researchers have pointed out in their studies that fundamental corporate factors such as earnings-to-price (Ou and Penman, 1989; French and Poterba, 1991), cash flow-to-price (Campbell and Hamao, 1992), dividend-to-price, book-to-market equity (Griffin, 2002) and leverage (Cai and Zhang, 2011) are important determinants of share prices. However, other researchers have determined in their studies that the same variables had an insignificant or reverse impact on the share prices (Conroy et al., 2000; Kumar and Sehgal, 2004; and Dörner, 2005). Thus, the empirical studies on the impact of firm-specific factors on share prices have yielded inconclusive and sometimes contradictory results.

There needs to be more consensus on which financial variables significantly impact the company share prices. Also, few studies were conducted on Indian manufacturing stocks in the literature. The current study attempts to determine the empirical relationship between company-specific financial variables and the NIFTY 500 indexed manufacturing companies' stock prices from 2009 to 2021. The reason for choosing the Indian manufacturing industries for this study is their vital role in shaping the Indian economy regarding the investments they attract and the employment opportunities they provide. A panel dataset of 225 companies in India's manufacturing sectors has been chosen for this study. Panel data is preferred to time-series data because it is information-rich, can identify and highlight statistical effects better than pure time-series data, and minimizes estimation biases. For the above reasons, a panel data regression model has been employed in the study to obtain the desired results.

2. Literature Review and Hypotheses Formulation

Several empirical studies have been conducted in different regions to determine how financial ratios influence stock prices. This section of the study aims to shed light on some of the studies by researchers to determine the nature of the relationships between various microeconomic factors and market prices.

The instrumental research carried out by Ball and Brown (1968) provided empirical evidence that the financial statements contained information that could influence a firm's share returns. Their study paved the way for several studies to determine how accounting variables could influence stock prices.

Omran and Pointon (2004) used multiple regression analysis to determine the impact of financial variables on the share prices of listed Egyptian firms. The findings of the study revealed that capital gearing, Tobin's Q, and retained earnings significantly impacted the

stock prices of actively traded Egyptian firms. However, dividend payout significantly impacted the stock prices of non-actively traded firms. Gallizo and Salvador (2006) investigated the impact of accounting variables on the share prices of New York stock exchange (NYSE) listed firms using a hierarchical Bayesian model. The study results revealed that company size and asset turnover efficiency were significant in explaining the share price movements of the NYSE-listed companies.

Nisa and Nishat (2011) Investigated the relationship between financial and economic ratios and the stock prices of Karachi Stock Exchange listed firms using the dynamic panel Generalized Method of Moments (GMM) technique. The findings revealed that leverage, market-to-book value, earning per share, share turnover, and firm size positively and significantly impacted stock prices. On the other hand, liquidity ratios had a positive but insignificant impact on stock prices. Muhammad and Scrimgeour (2014) investigated the relationship between accounting variables and the stock returns of Australian firms using panel regression analysis. The results of the study revealed that cash flow return on investment, market-to-book value, Tobin Q, and price-to-earnings had a significant relationship with Australian stock returns. In contrast, return on assets and dividend payout had an insignificant relationship with the stock returns. Zaheri and Barkhordary (2015) studied the relationship between financial variables and stock returns of firms in Tehran using panel regression analysis. The results revealed that firm size, asset efficiency, and book-to-market were positively and significantly related to stock returns. In contrast, the return on equity was negatively related to the stock returns.

Aveh and Awunyo-Vitor (2017) studied the impact of firm-specific financial variables on the stock prices of Ghana Stock Exchange-listed firms using panel regression analysis. The results revealed that return on equity, earnings per share, book-to-market value, and market capitalization positively and significantly affected the Ghana stock exchange market prices. Also, a significant negative relationship was found between market prices and dividend yield. Nautiyal and Kavidayal (2018) investigated the influence of financial variables on the share prices of NIFTY 50 listed firms using both static and dynamic panel regression models. The study findings determined that earnings per share and debt had no significant relationship with stock prices. However, dividends exhibited a negative and significant relationship with the share prices. Arshad et al. (2020) studied the impact of company and macroeconomic variables on the stock returns of South Asian companies using panel fixed effect regression analysis. The results revealed that earnings-to-price and book-to-market had a negative and significant effect on the stock returns of South Asian companies. In contrast, the market risk was insignificant in influencing the stock returns.

Akhtar (2021) studied the impact of financial ratios on the Association of Southeast Asian Nations (ASEAN) and European stock returns using the panel fixed effects and the GMM regression techniques. The study findings revealed that price-to-sales, price-to-dividend, price-to-cash flow, and price-to-book value had a positive relationship with the stock returns of both markets. Dividend growth and Price-to-earnings had a negative relationship with the ASEAN stock returns. Dividend growth exhibited a positive relationship with the European stock returns, while price-to-earnings was insignificant. Sareen and Sharma (2022) used panel regression analysis to study the impact of various financial variables on Indian automobile stock prices. The findings of the study revealed that the EBITDA-to-total assets

and market value of equity to total liabilities had a positive and significant relationship with the automotive sector stock prices.

Based on prior literature covering this area of research, we posit the following hypotheses to study the relationships between the financial variables and stock prices:

H_0: Financial ratios have no significant effect on the share prices of manufacturing companies listed on the NIFTY 500 index.

H_1: Financial ratios have a significant effect on the share prices of manufacturing companies listed on the NIFTY 500 index.

3. Research Methodology

The data for the study pertains to the Indian manufacturing firms listed on the S&P CNX NIFTY 500 Index. According to the Centre for Monitoring Indian Economy (CMIE) classification, this index represents companies that are the leading members of various industrial segments of the Indian economy. The financial, information technology, healthcare services, and general services sectors are quite different from the manufacturing sectors regarding reporting their assets, functions, and regulatory requirements. Hence, the companies belonging to these sectors are excluded from the study. A few manufacturing sectors have also been excluded from the estimation process because of the limited number of companies that constitute these sectors and missing data. The final sample size consists of 225 companies. These companies are categorized into fourteen sectors based on the classification given by CMIE, including Automobile and Auto Components, Capital Goods, Chemicals, Construction and Construction Materials, Consumer Durables, Fast Moving Consumer Goods, Pharmaceuticals, Metals & Mining, Oil & Gas, Power, Realty, Telecommunication, and Textiles sectors. The breakdown of the companies into different industries is given in Table 1.

Table 1. Sample Distribution by Sector Classification

Sector	Number of Companies
Automobile and Auto Components	16
Capital Goods	39
Chemicals	26
Construction and Construction Materials	17
Consumer Durables	20
Fast Moving Consumer Goods	28
Pharmaceuticals	27
Metals & Mining	14
Oil & Gas	13
Power	8
Realty	7
Telecommunication	3
Textiles	7
Total	225

The data, relevant to the variables, are collected from secondary sources, namely the CMIE Prowess database and the annual reports from various company websites from 2009 to 2021. The period of 13 years has been chosen for the current study to explore how the various economic variables vary with time and how these variables can affect the company's stock prices.

The companies' annual adjusted closing stock prices (MP) are taken to be the dependent variable for this study, and six firm-specific financial variables are the regressors. The reason for including the adjusted closing price over the regular closing price is that corporate announcements relating to new stock offerings, dividends, and stock splits, are usually made post-market hours, and their effects are not reflected in the regular closing prices. In other words, the adjusted closing price factors in corporate decisions relating to dividends, stock splits, and new stock offerings to arrive at the final stock price and thus serves as a better and more accurate measure of stocks' value.

The definitions for the six regressors are mentioned in Table 2. The dependent variable, along with the regressors, namely the earnings per share, enterprise value multiple and market-to-book value, have been converted to their natural log values. On the other hand, dividend payout, asset efficiency, and leverage are calculated as percentages and expressed in their level values for the duration of the study.

Table 2. The explanatory variables used for the study

Variable Name (Symbol)	Description
Earnings per Share (EPS)	Calculated as the ratio of a firm's net income to the outstanding shares of its common stock.
Enterprise Value Multiple (EVM)	Calculated as the ratio of a firm's enterprise value to its earnings before interest, taxes, depreciation, and amortization (EBITDA).
Market-to-Book Value (MBV)	Calculated as the ratio of a firm's market value to the book value of its equity.
Dividend Payout (DIV)	Calculated as the ratio of dividends paid out by the firm throughout the year to its net income.
Asset Efficiency (EFF)	Calculated as the ratio of a firm's net income to its total assets.
Leverage (LEV)	Calculated as the ratio of a firm's total debt to its total assets.

As the data used in the study comprises both time-series and cross-sectional data, it is desirable to use panel data regression models, which consider both time-series and cross-section effects and control for individual heterogeneity and the multicollinearity problem.

For carrying out the present study, we use the following equation to estimate our model:

$$MP_{it} = \beta_0 + \beta_1 EPS_{i,t} + \beta_2 EVM_{i,t} + \beta_3 MBV_{i,t} + \beta_4 DIV_{i,t} + \beta_5 EFF_{i,t} + \beta_6 LEV_{i,t} + \varepsilon_{it}$$

where,

MP_{it} = The stock price of company (i = 1, . . ., 225) at year (t = 2009, . . ., 2021).

β_0 = intercept
$\beta_{1\text{-}6}$ = model coefficient parameters.
ε_{it} = residual term

The pooled Ordinary Least Squares estimator is rarely ideal for panel models since it assumes that the cross-sections have no individual heterogeneity. The fixed-effects models estimated using the Least Squares Dummy Variable estimators, and the random-effects models estimated using the Generalized Least Squares estimators consider the heterogeneity among the cross-sections. However, these models do not account for heteroskedasticity, serial correlation, and cross-sectional dependence, which may lead to biased estimations. The problems of endogeneity, unobservable heterogeneity, and simultaneity have been tested for the current data set and are found to be significant. Thus, to circumvent the above problems, the Feasible Generalized Least Square (FGLS) model developed by Parks (1967) can be utilized to study the impact of financial variables on stock prices. Beck and Katz (1995) highlight in their study that the FGLS model results tend to be biased because of underestimated standard errors. Instead, they proposed the Panel Corrected Standard Error (PCSE) model. This model corrects contemporary correlations, heteroscedasticity, and even serial autocorrelation. The results of the PCSE model rely on more accurate standard error estimates and have almost the same efficiency as the FGLS. Reed and Ye (2011) support using the Beck and Katz methodology for research purposes, highlighting its robustness in many situations and its ability to capture the endogeneity that may exist among the study variables. Thus, for this study, the Panel Corrected Standard Error (PCSE) econometric technique was employed to measure the extent to which financial variables can impact the share prices of companies in various manufacturing sectors.

4. Results

Table 3 shows the mean, standard deviation, minimum and maximum values of the study variables. The market prices (MP) of the manufacturing companies listed on the NIFTY 500 index range from 3.49 to 9.12 and have a standard deviation of 1.19. The earnings per share (EPS) of the manufacturing companies range from 0 to 6.67, which suggests that some companies were profitable during the period covered in the study compared to others. Since the EPS for the companies is taken in the log format, companies having EPS values less than one or having negative earnings reported for the year are taken to be 0.

The enterprise value multiple (EVM) compares a company's total value to its financial performance. Financial and investment analysts generally consider a low EVM to signal that a stock is potentially undervalued, and a high EVM implies that the company is overvalued. The EVM for the companies ranges from 0 to 5.08, indicating that some of the manufacturing companies are overvalued by the market compared to the other companies. Since the EVM for the companies is taken in the log format, companies having EVM values less than one are taken to be 0.

The market-to-book value (MBV) ratio is another metric used to determine a company's overall value by comparing its current market value to its book value. Generally, analysts consider a low MBV value to indicate that a company’s stock is undervalued, and a high ratio could mean that the stock is overvalued. The market-to-book value (MBV) for the companies ranges from 0 to 7.08, indicating that some of the manufacturing companies are overvalued

by the market compared to the other companies. Since the MBV for the companies is taken in the log format, companies having MBV values less than one are taken to be 0.

Table 3. Descriptive statistics

Variable	Mean	Min	Max	Std. dev.
MP	6.34	3.49	9.12	1.19
EPS	2.16	0	6.67	1.17
EVM	2.76	0	5.08	0.94
MBV	2.15	0	7.08	1.19
DIV	21.45	0	59.82	14.95
EFF	8.49	-33.23	115.83	7.67
LEV	14.38	0.00	65.08	13.26

Source: Authors Calculations.

The dividend payout (DIV) ranges from 0 to 59.82%, indicating that some firms reward their shareholders with dividends, while others do not distribute their earnings to their shareholders. DIV has a standard deviation of 14.95%, indicating significant variation in how much of the earnings are distributed as dividends to their shareholders by the firms. The mean DIV indicates that the manufacturing firms payout 21.45% of the earnings to the shareholders on average while retaining 78.55%.

The companies' asset efficiency (EFF) ranges from -33.23% to 115.83%, indicating that some firms can convert their assets into earnings while others cannot. The mean EFF value is 8.49%, which indicates that, on average, the firms have been able to convert their assets into profits. A standard deviation of 7.67% for EFF indicates significant variation in how the firms utilize their assets to generate earnings. The leverage (LEV) for Indian manufacturing firms ranges between 0 and 65.08%, and the mean LEV value is 14.38%. The standard deviation for LEV is 13.26%, which indicates that firms differ significantly in how they employ debt in their capital structure.

A correlation matrix has been constructed to determine the correlation coefficients among the study variables and is displayed in Table 4. High correlation coefficient values of 0.70 and above between two or more independent variables are usually taken as an indication that multicollinearity might be present in the estimation model. Multicollinearity is a particular problem in regression analysis as it makes it much more challenging to determine the regressors that impact the dependent variable.

Table 4. Correlation matrix

Variable	MP	EPS	EVM	MBV	DIV	EFF	LEV
MP	1						
EPS	0.4916	1					
EVM	0.5199	-0.0496	1				
MBV	0.5223	-0.206	0.6294	1			
DIV	-0.0078	0.0754	-0.0042	-0.0231	1		
EFF	0.1690	0.4409	0.1028	0.1729	0.1289	1	
LEV	-0.1478	-0.1237	-0.1667	-0.1714	-0.0189	-0.3084	1

Source: Authors Calculations.

The results from Table 4 reveal that the dependent variable (MP) is positively correlated with all explanatory variables except for DIV and LEV. These two variables are negatively correlated with the dependent variable. The maximum correlation coefficient from the above table is 0.6294, which is observed between EVP and MBV. Since the maximum correlation coefficient from Table 4 is less than 0.70, we can confirm that multicollinearity will not be a concern in the estimation process.

In order to test whether a unit root exists in the panel data set, the Im et al. (2003) unit root test has been selected, which is a modified version of the classic Dickey-Fuller procedure. The null hypothesis for this test is the presence of a unit root in the time series data, and the alternative is that the series has no unit root. The unit root test is essential because if regression analysis is carried out on a non-stationary series, the results obtained can be spurious, which means that the regression results obtained will have incorrect magnitude and parameter signs for the regressors, leading to wrongly inferred implications. The Im, Pesaran and Shin (IPS) test results are presented in Table 5.

Table 5. IPS Unit Root Test Results

Variable	Level	Order of Integration
MP	-2.211** (0.014)	I(0)
EPS	-7.637* (0.000)	I(0)
EVM	-4.513* (0.000)	I(0)
MBV	-5.563* (0.000)	I(0)
DIV	-20.075* (0.000)	I(0)
EFF	-12.976* (0.000)	I(0)
LEV	-29.471* (0.000)	I(0)

***Note:** * and ** indicate significance at 1 and 5 percent level, respectively. P-values are indicated in parentheses.*

The results from Table 5 indicate that at the 1 percent significance level, all variables are stationary at the level except for the dependent variable (MP), which is stationary at the 5 percent significance level. The above results indicate that all variables used in the study are integrated of order zero and suggest that the regressors and the dependent variable do not share a significant long-run relationship.

To ensure the reliability and validity of the statistical results and to deal with the problems of heteroskedasticity and autocorrelation in the model, the study uses the Beck and Katz estimator. This method extends the standard version of ordinary least squares (OLS) with the panels' corrected standard errors (PCSE) estimators. Moundigbaye et al. (2018) determined that the Beck and Katz proposed PCSE regression model is the best estimator for hypothesis testing among the estimators considered in their study. The results of the Prais-Winsten regression model with PCSE estimators are reported in Table 6.

Table 6. PCSE Regression results

Prais-Winsten Regression (Dependent Variable – MP)	
EPS	0.316* (0.000)
MBV	0.336* (0.000)
EVM	0.430* (0.000)
DIV	-0.261e-03 (0.539)
EFF	0.018* (0.000)
LEV	-0.240e-04 (0.986)
Constant	3.888* (0.000)
Number of Firms	225
Number of Observations	2925
Wald Prob(χ^2)	0.0000
R^2	0.8483

** indicate significance at 1 percent. P-values are indicated in parentheses.*

The above table results reveal that the Wald chi-square coefficient for the PCSE estimator is significant at the 5 percent level, which means that the model chosen for the present study is adequate for regression analysis and hypothesis testing. The R-squared for the PCSE regression is 0.8483, which means that the company variables explain 84.83 percent of the variation in stock prices.

The regression results from Table 6 show that a positive and significant relationship exists at the one percent significance level between the financial ratios, namely the earnings per share (EPS), market-to-book ratio (MBV), and enterprise value multiple (EVM), and the market prices.

The regression results also reveal a negative and insignificant relationship between share prices and the dividend payout (DIV). Share prices are positively and significantly impacted by asset efficiency (EFF) at the 5 percent significance level. Also, share prices share a negative and insignificant relationship with leverage (LEV).

5. Discussion

This study uses the Prais-Winsten regression technique with panel-corrected standard error estimators to determine whether the firm-specific financial ratios affect the share prices of NIFTY 500 indexed manufacturing companies. The results from Table 6 indicate that earnings per share (EPS) has a positive and significant relationship with share prices. The null hypothesis that EPS has no significant relationship with the market prices is rejected. This implies that when the EPS of manufacturing companies increases, their respective share

prices also increase. The results are supported by the findings of Srinivasan (2012), who found that the share prices of companies belonging to various manufacturing sectors in India are positively impacted by the EPS. Similarly, Masril and Martha (2020) found that the share prices of Indonesia Stock Exchange (IDX) listed pharmaceutical companies are positively impacted by the EPS.

The null hypothesis that enterprise value multiple (EVM) has no significant relationship with market prices is rejected as the results from Table 6 confirm that EVM has a positive and significant relationship with market prices. This implies that when the EVM of manufacturing companies increases, their respective share prices also increase. The results are supported by the findings of Shittu et al. (2016) and Yamin and Gulzar (2020), who found that EV multiples positively and significantly influenced the Nigerian and Pakistani firms' stock prices, respectively.

Similarly, Table 6 confirms that market-to-book value (MBV) has a positive and significant relationship with the share prices. Thus, the null hypothesis that MBV has no significant relationship with the stock prices is rejected. This implies that when the market-to-book value of manufacturing companies increases, their respective share prices also increase. The results are supported by the findings of Chiek and Akpan (2016), who determined that the stock prices of Nigerian oil and gas companies, which increased their dividend payments during the study period and also those companies that did not issue dividends, were significantly and positively impacted by the MBV. For those companies that decreased their dividend payments during the period, MBV had a positive but insignificant impact on the share prices. Similarly, Bustani et al. (2021) found that the Indonesian food and beverage companies' stock prices were significantly and positively impacted by the MBV.

The findings from Table 6 reveal a negative but insignificant relationship between the share prices and the dividend payout (DIV). Thus, the null hypothesis that DIV has no relationship with stock prices fails to be rejected. The results align with the findings of Gupta and Modise (2012), who found that the impact of dividend payout on South African companies' share prices was insignificant. Hashim and Shahrumzaki (2020) also found that the impact of dividend payout on Malaysian food and beverage companies' share prices was negative and insignificant.

The results from Table 6 indicate that the Indian manufacturing companies' market prices are positively and significantly impacted by asset efficiency (EFF). Thus, the null hypothesis that EFF has no significant relationship with market prices is rejected. This implies that when the asset efficiency of manufacturing companies increases, their respective share prices also increase. The results are supported by the findings of Ligocká (2018), who determined that the Prague stock exchange-listed companies' share prices were significantly impacted by asset efficiency. Also, Indrajaya et al. (2019) found that asset efficiency positively and significantly affected Indonesian share prices.

The findings from Table 6 reveal that the relationship between leverage (LEV) and the share prices is negative and insignificant. Thus, the null hypothesis that LEV has no significant relationship with stock prices fails to be rejected. The findings of the study align with the findings of Barakat (2014) and Astutik et al. (2015), who found a negative but insignificant

relationship between leverage and stock prices of Saudi Arabian firms and Indonesian manufacturing firms, respectively.

6. Conclusion

This study attempted to determine the relationships between certain firm-specific financial variables and manufacturing companies' stock prices. The empirical findings from the study revealed that financial ratios, namely earnings per share, market-to-book, asset efficiency, and enterprise value multiple, positively and significantly influenced the Indian manufacturing companies' stock prices. The relationship between dividend payout and the share prices was revealed to be negative and insignificant, suggesting that the market prices of manufacturing companies were not significantly influenced by the dividend decisions taken by management. A similar relationship was uncovered between leverage and market prices.

The findings of this study can serve as a guide for potential investors looking to invest in Indian capital markets, particularly the stocks of Indian manufacturing companies. Such investors should pay considerable attention to valuation ratios such as earnings per share, market-to-book value, and enterprise value multiples, as these variables have been revealed to influence the share prices significantly. Value investors should look for those companies having low valuation ratios because such companies could turn out to be undervalued by the market. Growth investors can consider adding companies with high asset efficiency to their portfolio because the study has confirmed asset efficiency to influence the share prices of these companies positively.

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