Impact of Dividend Policy on Stock Price: Analysis of Indian Market.

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Introduction

A dividend is the share of profits that is distributed to shareholders in the company and the return that shareholders receive for their investment in the company. The number of dividends that a company pays to its shareholders and how often they are paid out are determined by its dividend policy. A business that turns a profit must decide what to do with the money. They have two options: they can pay dividends to shareholders or keep the income inside the business (retained earnings on the balance sheet). Each company in a certain industry adheres to a dividend model or policy, which is seen as a measure of the company's financial performance.

An increase in dividend payment is seen as a positive indicator whereas a decrease in dividend payment as a negative indicator on the future earnings prospects of the company, thus leading to an increase or decrease in share prices of the firm. It is a method of determining whether or not the business can turn a profit. With knowledge of dividend yield (DY) and dividend payout ratio (DPO), an investor may assess the company's financial performance more precisely and effectively. The payout ratio (POR) or dividend payout ratio (DPO) has a significant impact on the company's potential earnings growth in the future (Al-Twaijry, 2007). The consideration of POR and DY by investors is crucial when making investment decisions, and as such, dividend policy could impact the volatility of share prices. The present study has been undertaken to evaluate the effect of dividend policy on market prices of shares of nifty 50 companies listed on the National Stock Exchange (NSE) for 2013 –2023.

Literature Review

A number of theories have been proposed to justify the payment of monetary dividends. Three main theories may be able to best explain the relationship between dividends and a company's share price: the information-signalling, free cash flow, and dividend channel hypotheses. The information content theory states that dividends provide information about the company's prospects for the future.

Following its introduction by Lindner (1956) and Miller and Modigliani (1961), the idea of the information content of dividends was formalized as a signalling theory by Bhattacharya (1979), John and Williams (1985), and Miller and Rock (1985). The dividend hypothesis's informational value has been backed by a number of research (Aharony & Dotan, 1994; Lang & Litzenberger, 1989; Pettit, 1976; Woolridge, 1983).

Jensen's (1986) agency theory serves as the foundation for the cash flow hypothesis. The division of ownership and control of the company is reflected in the agency problem. The free cash flow theory states that management is hesitant to issue dividends because they prefer unlimited free cash flow within the company. In order to reduce agency costs, cash dividends can be utilized as a monitoring and controlling tool over management (Easterbrook, 1984; Jensen, 1986; Jensen & Johnson, 1995). Different tax preferences among investors have given rise to the dividend clientele effect theory, with some preferring dividend payments while others prefer earnings to be maintained within the company.

The tax clientele effect was defined by Miller and Modigliani (1961) and Black and Scholes (1974) as the tax preference of investors. Out of all the research that has been done, the signalling hypothesis has the most evidence to explain why the market reacts the way it does to cash dividend announcements (Woolridge, 1983).

Despite a great deal of research on the subject, little is known about how cash dividend announcements affect the manufacturing industry, particularly in India. Furthermore, it has been stated that the US financial crisis was a major worldwide event in addition to the US. As a result, the study's originality lies in its analysis of the aberrant returns that the manufacturing sector's BSE 500 indexed companies saw both before and after the recession.

There are several research on different facets of the dividend decision in the literature. Several studies have been carried out to analyse the value creation of shareholders worldwide and gauge the market's reaction to the release of cash dividends. Many others (Aharony & Swary, 1980; Kalay & Loewenstein, 1985; Woolridge, 1983) expanded on the seminal work by Ball and Brown (1968) and Beaver, Clarke, and Wright (1979) employing event investigation. A number of empirical investigations have looked into the informational value of dividend announcements. There have also been conflicting tests of the dividend announcement's influence on other global stock markets.

(Refer to Akbar & Baig, 2010, on the stock exchange in Karachi; Capstaff, Klaeboe, & Marshall, 2004 on the stock exchange in Oslo; Hossain, Siddiquee, & Rahman, 2006 on the stock exchange in Dhaka; Kaleem & Salahuddin, 2006 on the stock exchange in Lahore; Lyroudi, Dasilas, Ginoglou, & Hatzigayos, 2007, on the Athens stock exchange; Odabasi, 1998, on the stock exchange in Istanbul, etc.)

According to research findings by Gonedes (1978) and Watts (1973), the market received little information from unexpected dividends. Unexpected dividend changes, however, were found to have substantial announcement effects in some later research (Aharony & Dotan, 1994; Asquith & Mullins, 1983; Dyl & Weigand, 1998; Michaely et al., 1995). A large body of research indicates that stock prices and dividend changes are positively correlated

(Asquith & Mullins, 1983; Below & Johnson, 1996; Benartzi, Michaely, & Thaler, 1997; Denis, Denis & Sarin, 1994; Dhillon & Johnson, 1994; Lonie, Abeyratna, Power, & Sinclair, 1996; Nissim & Ziv, 2001; Urooj & Zafar, 2008; Yilmaz & Gulay, 2006). Their findings aligned with past empirical research conducted in the US, UK, and other developed economies.With positive returns suggesting that investors view this development as good news, these empirical data support the use of dividends as signalling mechanisms (Aamir & Shah, 2011; Baker, Dutta, Gandhi, & Saadi, 2007; Dasilas, Hughes, 2008; Kale, Kini, & Payne, 2012; Koch & Sun, 2004; Lyroudi, & Ginoglou, 2008; Sylvester, 2015).
Nevertheless, there are still some contradictory findings. Conversely, research has also shown that cash dividends don't appear to be related to stock performance, which supports the dividend irrelevance theory. According to these research (Basse, 2013; Benartzi et al., 1997; DeAngelo, Deangelo, & Skinner, 1992; Kadioglu, 2008; Qudah & Badwai, 2015; Peterson, 1996), adjustments to cash distributions offer minimal added value.
Research from the past has also shown that when a cash dividend increases or drop was announced, share prices rose or fell in tandem, but share prices remained unchanged when distributions were left unchanged. Similar to this, a company's share prices are greatly impacted when it declares a dividend or does not pay one (Michael et al., 1995).
The dividend signalling hypothesis has not received much empirical attention in the Indian setting, particularly in the manufacturing industry.
In their 2007 analysis of Bombay Stock Exchange (BSE) equities, Chander, Sharma, and Mehta discovered negative returns preceding dividend announcements and positive average abnormal returns (AARs) surrounding and following them. Mallikarjunappa and Manjunatha (2009) reported similar outcomes. Proposed by the signalling models, Lukose and Rao (2010) discovered considerable wealth effects surrounding dividend changes. Taneem and Yuce's (2011) study, which concentrated on the information included in dividends, found that people reacted favourably to firms that raised their payouts and negatively to those that cut them.
The outcomes aligned with the empirical discoveries of Sharma (2011) and Kumar and Raju (2013), which suggested that the company's cash dividend announcements projected a more optimistic and robust future. The results also showed that dividend announcements have signalling characteristics. In contrast to the aforementioned findings, a small number of studies (Chen, Hsiang & Huang, 2009; Elfakhani, 1995; Savita, 2014; Sharma & Pandey, 2014) also found no evidence to support the idea that announcements of dividend increases or decreases do not signal a change in a company's financial performance.

Data and Methodology

The goal of the study is to look into how the National Stock Exchange's (NSE) share price performance is affected by dividend policy. Thus, this study investigates how market price of shares (MPSs) is determined by earnings per share (EPS), dividend per share (DPS), DY, return on equity (ROE), profits after tax (PAT), and retention ratio (RR) for the period 2013-2023. The data has been extracted from CMIE prowess IQ. The impact of dividend policy on the company's share price is analysed by panel data methodology. In panel data regression, MPS is taken as the dependent variable while DY, RR, EPS, DPS, ROE and PAT are taken as independent variables.

MPS = market price per share which represents the end- of-the-year price for each of the companies for the sample period. Adjusted closing price is taken as MPS.

DY = dividend yield that is viewed as the rate earned on an investment. It is calculated by dividing DPS by the MPS.

$$DY = \frac{Dividend\ per\ share}{MPS}$$

RR = the retention ratio calculated by dividing the total retained earnings by the total earnings at the end of the financial year.

$$RR = \frac{PAT - dividends}{PAT}$$

EPS = earnings per share which is calculated by dividing total earnings by the total number of outstanding shares of a firm's stock at the end of the financial year.

DPS = dividend per share which is the sum of declared dividends issued by a company for every equity share outstanding.

$$DPS = \frac{dividend\ paid}{number\ of\ shares\ outstanding}$$

PAT = profit after tax is the net amount earned by a business after all taxation-related expenses have been deducted.

ROE = return on equity is the measure of a company's net income divided by its shareholders' equity. ROE is a gauge of a corporation's profitability and how efficiently it generates those profits.

$$ROE = \frac{PAT}{average\ shareholder's\ equity}$$

For the statistical analysis, we have winsorized the dataset at 5% upper and lower level. Winsorization is a technique used in statistics to deal with outliers in a dataset. The method involves setting extreme values (outliers) in the dataset to be equal to some specified percentile of the data, rather than the actual extreme value.

We have Created plots for POLS models of MPS and each of the variables and we create linear and quadratic fits for each variable.

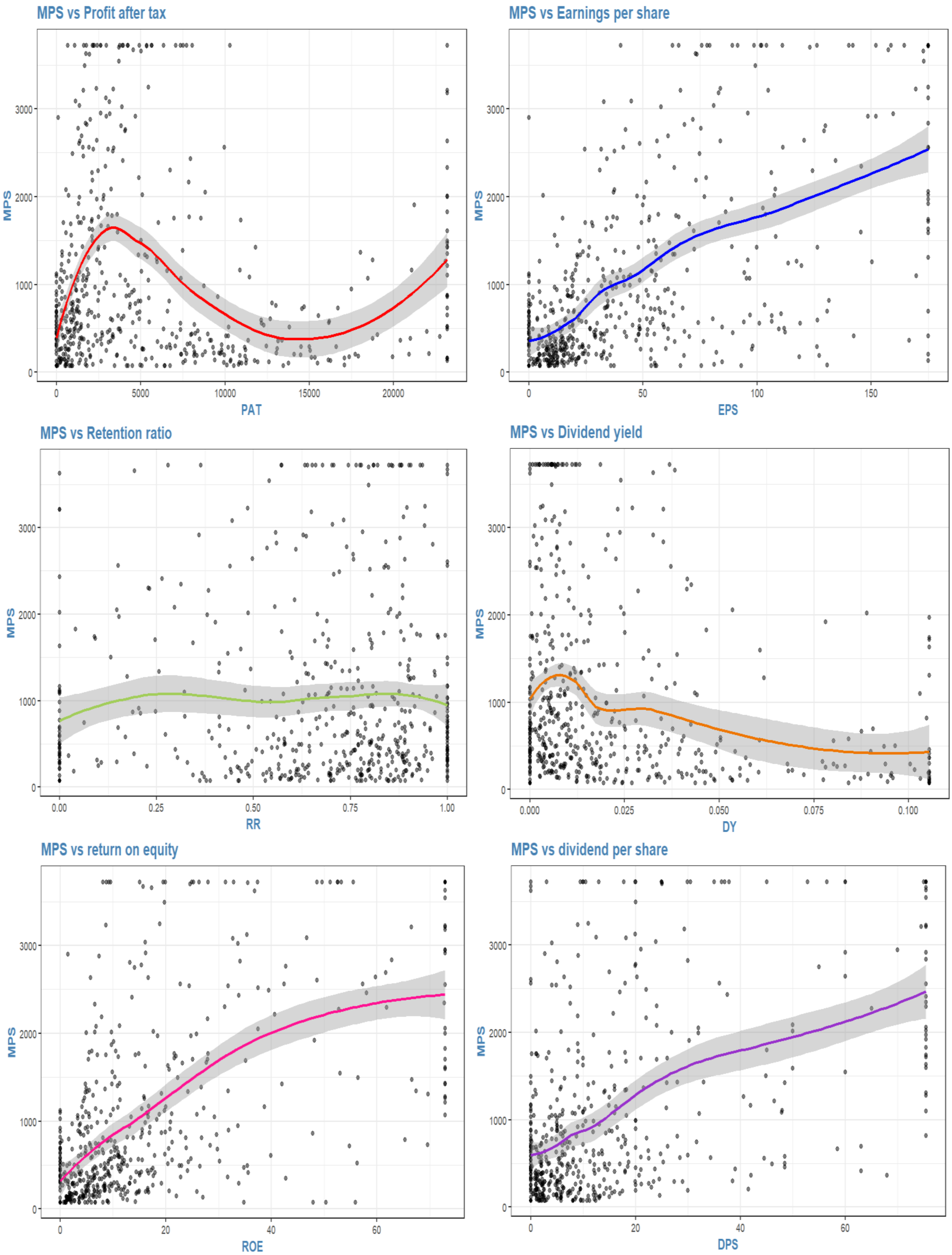

Figure 1: linear fit of each variable with MPS

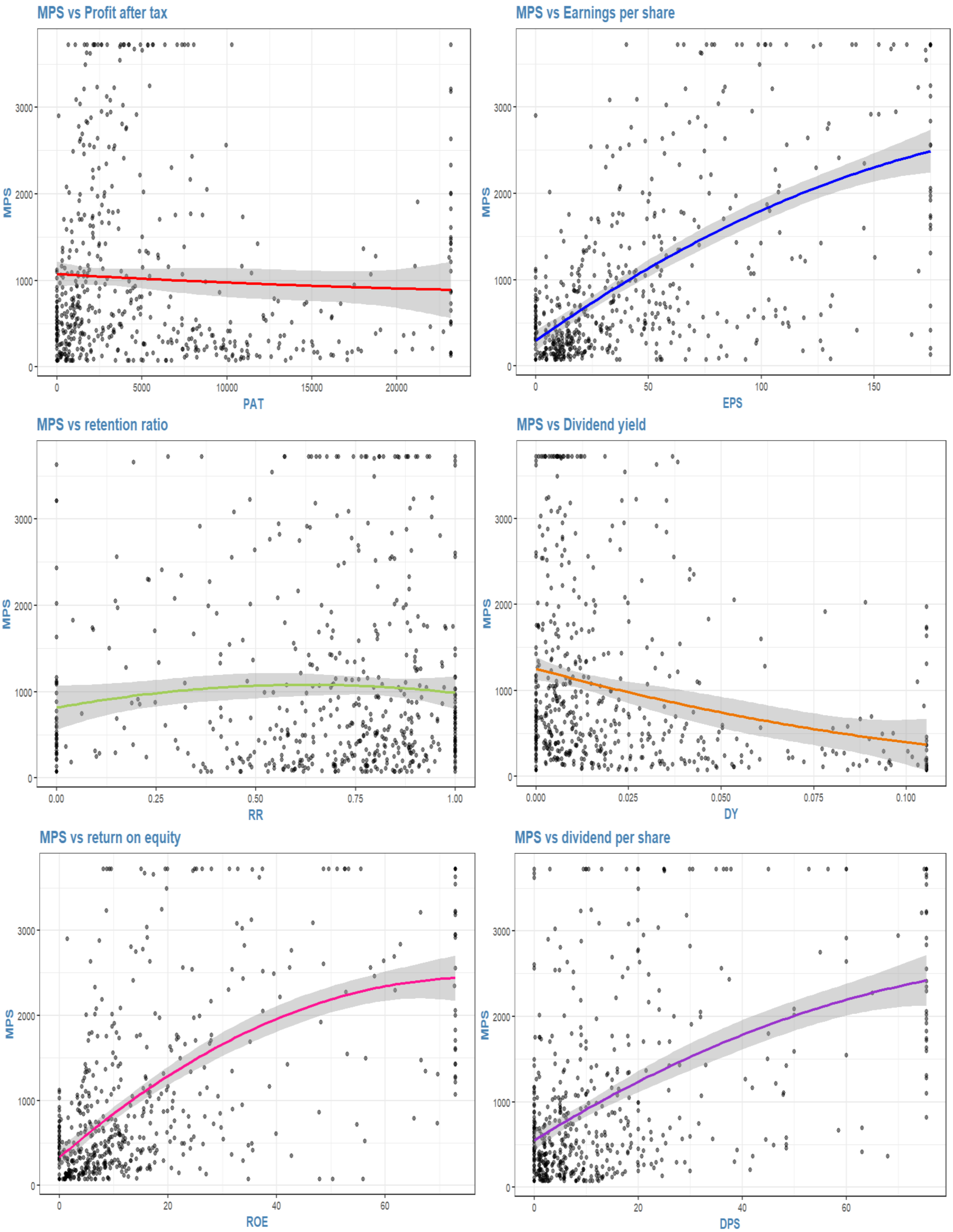

Figure 2: Quadratic fit of each variable with MPS

Empirical analysis/ Result

A type of mathematical regression analysis called pooled OLS identifies a dataset's line of best fit and shows the relationship between the data points visually. Assuming that businesses have unique traits that affect the relationships between variables, fixed effect models investigate the correlations between independent variables and explanatory variables in distinct entities. In this case, the intercept has a fixed value for a cross-section (which does not change with time) but is supposed to vary between cross-sections. According to random effect models, variations in businesses are random and unrelated to the explanatory variables. The intercept is taken to be random in this case. We run all 3 models and test the significance of each and report the results below.

Pooled regression model (POLS):

```
Balanced Panel: n = 50, T = 11, N = 550

Residuals:
    Min.  1st Qu.   Median  3rd Qu.     Max.
-1717.70  -381.73  -121.42   267.05  2582.04

Coefficients:
               Estimate  Std. Error  t-value  Pr(>|t|)
(Intercept)  7.5237e+02  8.4837e+01   8.8685 < 2.2e-16 ***
PAT1        -5.5953e-03  4.3553e-03  -1.2847  0.199438
EPS1         1.1735e+01  1.0121e+00  11.5946 < 2.2e-16 ***
RR1         -1.8046e+02  1.1271e+02  -1.6011  0.109943
ROE1         7.2182e+00  1.9181e+00   3.7632  0.000186 ***
DY2         -1.8497e+04  1.1163e+03 -16.5702 < 2.2e-16 ***
DPS2         1.1384e+01  2.8406e+00   4.0078 6.986e-05 ***
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Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Total Sum of Squares:    591450000
Residual Sum of Squares: 202790000
R-Squared:      0.65713
Adj. R-Squared: 0.65334
F-statistic: 173.445 on 6 and 543 DF, p-value: < 2.22e-16
```

We can Interpret the coefficients in the following way-The coefficient for EPS1 is 11.735. This suggests that, on average, a one-unit increase in EPS1 is associated with an increase of 11.735 units in the MPS, holding all other variables constant and ignoring time and individual effects. This coefficient is highly statistically significant ($p < 0.001$). In similar fashion we can interpret other coefficients. Intercept, Retention Ratio, return on equity, dividends per share, earnings per share are highly significant. The adjusted R-squared of 0.65334 suggests that the model provides a good fit for the data. EPS, ROE, DPS have a positive impact on MPS, while DY and RR have a negative impact on MPS.

To assess the validity of pooled regression, we run a *poolability test*. H0: coefficients for each variable are the same across all cross-sectional units, implying that the data is "poolable." H1: data is not poolable.

```
F = 6.4434, df1 = 294, df2 = 200, p-value < 2.2e-16
alternative hypothesis: unstability
```

here, H0 is rejected as p value is less than 0.05 and therefore pooled model won't be stable or reliable.

We Test for the presence of individual and time effect in panel data using *Gourieroux, Holly and Monfort test* from the LM test family. We are testing for significance of both individual and time specific effects at once, hence it is a two-way test.

$Yit=\mu+\beta Xit+\alpha i+\lambda t+\eta it$ where, αi= individual specific effect, λt= time specific effect
H0: no significant individual and time effect. H1: significant individual and time effect

```
Lagrange Multiplier Test - two-ways effects (Gourieroux, Holly and
Monfort)

data:  MPS1 ~ PAT1 + EPS1 + RR1 + ROE1 + DY2 + DPS2
chibarsq = 476.01, df0 = 0.00, df1 = 1.00, df2 = 2.00, w0 = 0.25, w1 =
0.50, w2 = 0.25,
p-value < 2.2e-16
alternative hypothesis: significant effects
```

Clearly, p value is less than 0.05 implying that HO is rejected that is, there is significant time and individual effect in our data.

Fixed Effects model (FEM):

```
Balanced Panel: n = 50, T = 11, N = 550

Residuals:
     Min.   1st Qu.    Median   3rd Qu.      Max.
-1337.394  -263.173   -51.163   202.824  1852.357

Coefficients:
        Estimate  Std. Error t-value  Pr(>|t|)
PAT1  3.4270e-03  8.3961e-03  0.4082  0.683333
EPS1  3.2326e+00  1.2123e+00  2.6665  0.007917 **
RR1  -8.2288e+01  1.3711e+02 -0.6002  0.548664
ROE1  2.2182e+01  3.1651e+00  7.0084 7.943e-12 ***
DY2  -1.4661e+04  1.5088e+03 -9.7176 < 2.2e-16 ***
DPS2  1.4243e+01  2.9828e+00  4.7752 2.369e-06 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Total Sum of Squares:    195450000
Residual Sum of Squares: 114450000
R-Squared:      0.41444
Adj. R-Squared: 0.34925
F-statistic: 58.2735 on 6 and 494 DF, p-value: < 2.22e-16
```

Here, p value of F statistic is less than 5% which implies that our model is significant. On average, a one-unit increase in EPS is associated with an increase of 3.2326 units in the MPS, holding all other variables constant. This coefficient is statistically significant ($p = 0.007917$) and so are ROE, DY, DPS. The adjusted R-squared of 0.34925 suggests that the model provides a good fit for the data. DY and MPS are negatively related. Of the significant variables, ROE, EPS, DPS are positively related to MPS while DY negatively impacts MPS.

Random effects model(REM): Running a random effects model here, p value of F statistic is less than 5% which implies that our model is significant.

```
Balanced Panel: n = 50, T = 11, N = 550

Effects:
                   var  std.dev share
idiosyncratic 231672.3    481.3 0.666
individual    116153.3    340.8 0.334
theta: 0.6082

Residuals:
    Min.  1st Qu.   Median  3rd Qu.     Max.
-1439.65  -280.39  -103.38   214.93  2164.95

Coefficients:
               Estimate  Std. Error  z-value  Pr(>|z|)
(Intercept)  7.0569e+02  1.1115e+02   6.3488 2.170e-10 ***
PAT1        -2.0145e-03  6.2702e-03  -0.3213    0.7480
EPS1         6.3026e+00  1.1093e+00   5.6818 1.333e-08 ***
RR1         -9.8970e+01  1.2731e+02  -0.7774    0.4369
ROE1         1.5757e+01  2.5982e+00   6.0647 1.322e-09 ***
DY2         -1.6895e+04  1.3282e+03 -12.7205 < 2.2e-16 ***
DPS2         1.4777e+01  2.8649e+00   5.1580 2.496e-07 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Total Sum of Squares:    256230000
Residual Sum of Squares: 132670000
R-Squared:      0.48222
Adj. R-Squared: 0.4765
Chisq: 505.705 on 6 DF, p-value: < 2.22e-16
```

On average, a one-unit increase in EPS is associated with an increase of 6.3026 units in the dependent variable, holding all other variables constant. Similarly, we can interpret other coefficients. EPS, ROE, DY, DPS are all significant. EPS, ROE, DPS have a positive effect on MPS while DY has negative effect on MPS.

Now we conduct ***Restricted F test*** to choose between POLS and FEM. H0:POLS is significant H1:FEM is significant.

```
F = 7.7826, df1 = 49, df2 = 494, p-value < 2.2e-16
alternative hypothesis: significant effects
```

clearly, FEM is significant.

Hausman test is conducted. H0:REM is significant ,H1:FEM is significant

here, FEM is significant as H0 is rejected. *Since, result of both Restricted F test and Haussman test yields fixed effect model as significant, therefore we proceed with fixed effects model.*

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Hausman Test

data:  MPS1 ~ PAT1 + EPS1 + RR1 + ROE1 + DY2 + DPS2
chisq = 51.566, df = 6, p-value = 2.279e-09
alternative hypothesis: one model is inconsistent
```

We now Estimate our FEM model through LSDV. The **LSDV (Least Squares Dummy Variable)** model is a fixed effects panel data model that includes a set of dummy variables for each entity (individual, firm, etc.) to control for unobserved heterogeneity. Time effect is controlled through LSDV and individual effects are properly revealed. All the dummy coefficients depict the effect of all these explanatory variables for each of the companies on MPS. ex-the model is significant for apollo hospitals enterprise limited company.

```
Residuals:
     Min       1Q   Median       3Q      Max 
-1337.39  -263.17   -51.16   202.82  1852.36 

Coefficients:
                                                       Estimate Std. Error t value Pr(>|t|)    
PAT1                                                  3.427e-03  8.396e-03   0.408 0.683333    
EPS1                                                  3.233e+00  1.212e+00   2.666 0.007917 ** 
RR1                                                  -8.229e+01  1.371e+02  -0.600 0.548664    
ROE1                                                  2.218e+01  3.165e+00   7.008 7.94e-12 ***
DY2                                                  -1.466e+04  1.509e+03  -9.718  < 2e-16 ***
DPS2                                                  1.424e+01  2.983e+00   4.775 2.37e-06 ***
factor(company)Adani Enterprises Ltd.                 6.071e+02  1.857e+02   3.269 0.001156 ** 
factor(company)Adani Ports & Special Economic Zone Ltd. 3.728e+02  1.833e+02   2.034 0.042490 *  
factor(company)Apollo Hospitals Enterprise Ltd.       1.577e+03  1.771e+02   8.906  < 2e-16 ***
factor(company)Asian Paints Ltd.                      9.538e+02  1.772e+02   5.381 1.15e-07 ***
factor(company)Axis Bank Ltd.                         4.108e+02  1.877e+02   2.188 0.029127 *  
factor(company)Bajaj Auto Ltd.                        1.660e+03  2.136e+02   7.771 4.55e-14 ***
factor(company)Bajaj Finance Ltd.                     1.184e+03  1.997e+02   5.932 5.63e-09 ***
factor(company)Bajaj Finserv Ltd.                     6.417e+02  1.837e+02   3.493 0.000520 ***
factor(company)Bharat Petroleum Corpn. Ltd.           7.886e+02  2.024e+02   3.896 0.000111 ***
factor(company)Bharti Airtel Ltd.                     4.759e+02  1.899e+02   2.507 0.012504 *  
factor(company)Britannia Industries Ltd.              8.619e+02  2.065e+02   4.175 3.53e-05 ***
factor(company)Cipla Ltd.                             3.954e+02  1.867e+02   2.118 0.034634 *  
factor(company)Coal India Ltd.                        8.830e+02  1.973e+02   4.474 9.52e-06 ***
factor(company)Divi'S Laboratories Ltd.               8.851e+02  1.879e+02   4.710 3.23e-06 ***
factor(company)Dr. Reddy'S Laboratories Ltd.          2.043e+03  1.892e+02  10.798  < 2e-16 ***
factor(company)Eicher Motors Ltd.                     5.228e+02  2.260e+02   2.314 0.021095 *  
factor(company)Grasim Industries Ltd.                 6.802e+02  1.772e+02   3.838 0.000140 ***
factor(company)H C L Technologies Ltd.                1.560e+02  1.889e+02   0.826 0.409279    
factor(company)H D F C Bank Ltd.                     -4.557e+01  2.252e+02  -0.202 0.839691    
factor(company)H D F C Life Insurance Co. Ltd.        3.081e+02  1.451e+02   2.123 0.034275 *  
factor(company)Hero Motocorp Ltd.                     9.975e+01  2.552e+02   0.391 0.696073    
factor(company)Hindalco Industries Ltd.               1.712e+02  1.813e+02   0.944 0.345531    
factor(company)Hindustan Unilever Ltd.                7.273e+02  1.708e+02   4.257 2.48e-05 ***
factor(company)I C I C I Bank Ltd.                    3.886e+02  2.097e+02   1.854 0.064400 .  
factor(company)I T C Ltd.                             3.046e+02  1.905e+02   1.599 0.110413    
factor(company)Indusind Bank Ltd.                     8.299e+02  1.874e+02   4.428 1.17e-05 ***
factor(company)Infosys Ltd.                           5.057e+02  2.180e+02   2.320 0.020745 *  
factor(company)J S W Steel Ltd.                       3.096e+02  2.052e+02   1.509 0.131971    
factor(company)Kotak Mahindra Bank Ltd.               9.386e+02  1.945e+02   4.824 1.87e-06 ***
factor(company)Larsen & Toubro Ltd.                   4.363e+02  1.912e+02   2.282 0.022918 *  
factor(company)Ltimindtree Ltd.                      -2.011e+02  2.303e+02  -0.873 0.382974    
factor(company)Mahindra & Mahindra Ltd.               4.941e+02  1.784e+02   2.770 0.005823 ** 
factor(company)Maruti Suzuki India Ltd.               1.616e+03  2.187e+02   7.389 6.35e-13 ***
factor(company)N T P C Ltd.                           5.895e+02  2.119e+02   2.782 0.005614 ** 
factor(company)Nestle India Ltd.                      8.216e+02  2.214e+02   3.711 0.000230 ***
factor(company)Oil & Natural Gas Corpn. Ltd.          6.123e+02  2.466e+02   2.483 0.013358 *  
factor(company)Power Grid Corpn. Of India Ltd.        8.265e+02  2.103e+02   3.931 9.68e-05 ***
factor(company)Reliance Industries Ltd.               8.559e+02  2.631e+02   3.253 0.001222 ** 
factor(company)S B I Life Insurance Co. Ltd.          4.897e+02  1.451e+02   3.374 0.000798 ***
factor(company)Shriram Finance Ltd.                   6.604e+02  1.888e+02   3.498 0.000512 ***
factor(company)State Bank Of India                    3.883e+01  2.154e+02   0.180 0.857023    
factor(company)Sun Pharmaceutical Inds. Ltd.          6.669e+02  1.662e+02   4.012 6.97e-05 ***
factor(company)Tata Consultancy Services Ltd.        -2.516e+02  2.631e+02  -0.957 0.339249    
factor(company)Tata Consumer Products Ltd.            3.338e+02  1.676e+02   1.992 0.046954 *  
factor(company)Tata Motors Ltd.                       4.022e+02  1.835e+02   2.192 0.028850 *  
factor(company)Tata Steel Ltd.                        1.037e+03  2.364e+02   4.387 1.41e-05 ***
factor(company)Tech Mahindra Ltd.                     5.422e+02  1.780e+02   3.047 0.002438 ** 
factor(company)Titan Company Ltd.                     7.412e+02  1.802e+02   4.113 4.57e-05 ***
factor(company)Ultratech Cement Ltd.                  2.316e+03  1.968e+02  11.769  < 2e-16 ***
factor(company)Wipro Ltd.                             2.440e+02  1.983e+02   1.231 0.218985    
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Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 481.3 on 494 degrees of freedom
Multiple R-squared:  0.9016,	Adjusted R-squared:  0.8905 
F-statistic: 80.85 on 56 and 494 DF,  p-value: < 2.2e-16
```

Interpretation: a one-unit increase in EPS is associated with an increase of 3.233 units in MPS, holding all other variables constant. Similarly, we can interpret other coefficients. EPS, ROE, DY, DPS are all significant. EPS, ROE, DPS have a positive effect on MPS while DY has negative effect on MPS. Each company dummy coefficient represents the effect of belonging to a specific company compared to the reference or benchmark category (not included in the output). For example, the coefficient of 607.1 for "Adani Enterprises Ltd." suggests that, on average, MPS is 607.1 units higher for this company compared to the reference category, holding all other variables constant. This coefficient is statistically significant (p = 0.001156). Our LSDV model is significant with adj.R^2=89%

We conduct some Diagnostic tests to ascertain the problems(if any)

Test of autocorrelation:

1. *DW test:* DW statistic ranges from 0-4 .In general, DW=2 indicates no autocorrelation DW\<2 indicates positive autocorrelation DW\>2 indicates negative autocorrelation.

H0- No autocorrelation in error term

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Durbin-Watson test for serial correlation in panel models

data:  MPS1 ~ PAT1 + EPS1 + RR1 + ROE1 + DY2 + DPS2
DW = 0.99272, p-value < 2.2e-16
alternative hypothesis: serial correlation in idiosyncratic errors
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Clearly, idiosyncratic error term has autocorrelation.

2. *Wooldridge test for autocorrelation*: H0 is there is no autocorrelation in error terms.

```
Breusch-Godfrey/Wooldridge test for serial correlation in panel models

data:  MPS1 ~ PAT1 + EPS1 + RR1 + ROE1 + DY2 + DPS2
chisq = 200.61, df = 11, p-value < 2.2e-16
alternative hypothesis: serial correlation in idiosyncratic errors
```

Test of multicollinearity: Breusch-pagan test. H0: there is homoscedasticity.

```
Breusch-Pagan test

data:  MPS ~ PAT + EPS + RR + ROE + DY1 + DPS1
BP = 680.79, df = 6, p-value < 2.2e-16
```

here, as p value is less than 0.05, hence we have MC in our dataset.

Treating Heteroscedasticity and autocorrelation through ARELLANO-BOND model (standard error is made robust):

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t test of coefficients:

        Estimate  Std. Error t value  Pr(>|t|)    
PAT1  3.4270e-03  1.3847e-02  0.2475  0.804631    
EPS1  3.2326e+00  2.2779e+00  1.4191  0.156502    
RR1  -8.2288e+01  1.6296e+02 -0.5050  0.613813    
ROE1  2.2182e+01  6.7548e+00  3.2839  0.001096 ** 
DY2  -1.4661e+04  3.2343e+03 -4.5331 7.302e-06 ***
DPS2  1.4243e+01  5.6306e+00  2.5296  0.011728 *  
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Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
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Interpretation: The significance of the coefficients indicates the strength of the relationship between the independent variables and the dependent variable after accounting for heteroscedasticity and autocorrelation. Therefore, ROE, DY, DPS are the significant coefficients after accounting for multicollinearity and autocorrelation.

Test for cross sectional dependence: Cross-sectional dependence in panel data occurs when the observations (e.g., individuals, firms, countries) are not independent of each other across the cross-section (i.e., at a single point in time) as per Baltagi, cross sectional dependence is a problem of macro panels(t>i) with long time series. This is not a problem in micro panels(i>t). we can check C.S dependence through: a) Breusch-pagan LM test for C.S dependence b) pesaranCD for C.S dependence. H0:there is no cross-sectional dependence

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Breusch-Pagan LM test for cross-sectional dependence in panels

data:  MPS1 ~ PAT1 + EPS1 + RR1 + ROE1 + DY2 + DPS2
chisq = 3890.1, df = 1225, p-value < 2.2e-16
alternative hypothesis: cross-sectional dependence
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        Pesaran CD test for cross-sectional dependence in panels

data:  MPS1 ~ PAT1 + EPS1 + RR1 + ROE1 + DY2 + DPS2
z = 21.567, p-value < 2.2e-16
alternative hypothesis: cross-sectional dependence
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clearly, we have C.S dependence as per both tests.

Stationarity test using ADF test: H0: data is non-stationary. For all variables, H0 was rejected implying they are stationary.

Conclusion

Regression results for all three models indicate that, at the 5 percent or maximum 10 percent levels of significance, EPS, ROE, and DPS have a positive impact on MPS, whereas DY has a negative impact. Given that the null hypothesis is not rejected, the Hausman test and restricted F test suggest that the FE model is more applicable in explaining the relationship between the provided variables. We deduce from the FE regression (LSDV) model analysis that MPS is positively impacted by EPS, ROE, and DPS, and negatively impacted by DY at lower DY. In summary, we find that MPSs are impacted by the dividend distribution, and that stock price is subsequently impacted by the dividend policy. The study's findings are valuable and significant for lenders, managers, investors, and other stakeholders. It is significant to investors because they perceive dividends as a means of evaluating companies from an investing perspective in addition to being a source of income. In order to maximize shareholder value, the management must take the results into consideration while formulating the dividend policy.

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