Impact of Financial Meltdown on the Relationship Between Dividend Policy and Shareholders' Wealth

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Dividend policy (DP) is considered one of the major decisions of the corporate firms regarding how much earnings could be paid as dividend. Such a DP will greatly influence the shareholders' wealth (SW). Hence, the objective of the paper is to analyze the impact of DP on SW of Basic Material Sector in India. Out of 29 firms listed on Bombay Stock Exchange (BSE), 13 firms that have been paying dividend consecutively for the past ten years are considered for analysis. Besides descriptive statistics, Augmented Dickey Fuller Test (ADF), Levin, Lin, and Chu (LLC) t-test, Philip Perron (PP) Fisher χ^2 test, Im-Pesaran-Shin W (IPS-W) and Breitung test are used to test whether the data are stationary and to satisfy one pre-condition for co-integration Johansen Co-integration test is used. Regression and Chow test are also applied. The results of the co-integration test proves that there exists a stationary, long-run relationship between dividend per share (DPS) as well as dividend yield (DY) with SW. Regression result proves that DP has significant impact on SW and the Chow test result proves that the impact of DP on SW of Basic Material sector has been significantly affected by the event, financial meltdown.

Key words: dividend policy, firm's performance, financial meltdown, shareholders' wealth

Introduction

The dividend is the key indicator of share price and firm's value. The dividend policy (DP) determines the division of earnings between payment to stockholders and reinvestment in the firm. The question on whether the DP is an indicator of an increase in shareholders' wealth (SW) is often debated. Therefore, the present study

is aimed at to study the long-run relationship between the DP and SW, and the impact of DP on SW considering an event viz., the global financial meltdown. Previous researchers have propounded many theories about the firm's value as well as the SW. There is a substantial literature on the relationship between DP and SW. The review of the past literature drew attention to the importance and value of several research studies that are significant for building a framework for the study. The studies revolve around emphasizing the significance of DP in maximizing the SW.

Miller and Modigliani (1961) stated that in the world without taxes, transactions costs or market imperfections, DP is actually irrelevant. Black and Scholes (1974), on the same line of Miller and Modigliani (1961), stated that the choice between common stocks that pay dividend and of those stocks pay no dividend was similar, if transaction costs and taxes are absent. Arnott and Asness (2003) were of the view that there was a positive relationship between dividend payout and growth in future earnings. A high dividend payout indicated the firm's confidence in stability and growth in future earnings while a low dividend payout suggested that the firm was not confident about the stability of earnings or sustainability of growth in earnings.

Azhagaiah and Sabaripriya (2008) stated that the SW was greatly influenced by variables viz., *growth in sales, improvement in profit margin, capital investment decision, capital structure decision and cost of capital.* Aminimeh and Iqbal (2008) stated that car-manufacturing firms created positive value for their shareholders. Aravanan and Mannarakkal (2011) stated that there was a significant impact of DP on SW in Alloy steel firms, while it was not so in Ferro alloy steel firms in India. Iqbal, Waseem, and Asad (2014) found that the *firm size* and *firm's growth* had significant positive impact on SW while Tahir and Raja (2014) proved significant correlation between DP and SW.

The literature provides an overview of impact of DP on SW. Most of the previous studies had followed similar methodology to estimate the impact of DP on SW, hence in present study; an attempt has been made to estimate the difference in the impact of DP on SW considering an event viz., financial meltdown (between before and after the event periods) happened during 2008–9.

Study Rationale and Plan of the Paper

There is a considerable debate on how does the DP affect the SW, which resulted into a mixed response and inference. Previous researchers viz., DeAngelo and Skinner (2004) believed that DP in-

creased the SW however, others viz., Miller and Modigliani (1961) proved that the DP was irrelevant and it didn't affect the SW; but, some other empirical evidences supported for classic dividend irrelevance proposition viz., Miller and Scholes (1978), Black and Scholes (1974), Jose and Stevens (1989), Toby (2014), and Baker et al. (2007) believed that the DP decreased the SW. However, studies considering an event methodology are seldom hence, the present study mainly analyses the difference in the impact of the DP on the SW considering the financial meltdown as an event.

The paper has been structured in to 10 sections. Introduction is given in the first section, while the second section substantiates the rationale and plan of the study. The third section states the main objectives and hypotheses. The fourth deals the research methodology of the study. Analysis on descriptive statistics is presented in the fifth section. In the sixth section, the relationship between DP and SW is discussed. The seventh section discusses the results of impact of DP on SW, while the eighth Section shows the difference in the impact of DP on SW in pre and post-financial meltdown periods. The ninth section deals with the concluding remarks and limitations of the study.

Main Objectives and Hypotheses

The paper proposes to achieve the following objectives:

1. To study the long-run relationship between *dividend per share* (DPS), *dividend payout* (DPO) as well as dividend yield (DY) and shareholders' wealth (SW) of the Basic Material Sector in India.
2. To estimate the impact of dividend variables along with finance variables on shareholders' wealth of the Basic Material Sector in India.
3. To estimate the influence of finance factors on shareholders' wealth of the Basic Material Sector in India.
4. To study the difference in the impact of dividend policy on shareholders' wealth of Basic Material Sector between pre and post-financial meltdown periods.

The hypotheses are as follows:

H_0^1 *There is no co-integration between dividend per share (DPS) and shareholders' wealth (SW).*

H_0^2 *There is no co-integration between dividend payout (DPO) and shareholders' wealth (SW).*

H_0^3 *There is no co-integration between dividend yield (DY) and shareholders' wealth (SW).*

H_0^4 *There is no significant impact of dividend policy (*DP*) on shareholders' wealth (*SW*).*

H_0^5 *There is no significant difference in the impact of dividend per share (*DPS*) on shareholders' wealth (*SW*) between pre and post-financial meltdown periods.*

H_0^6 *There is no significant difference in the impact of dividend payout (*DPO*) on shareholders' wealth (*SW*) between pre and post-financial meltdown periods.*

H_0^7 *There is no significant difference in the impact of dividend yield (*DY*) on shareholders' wealth (*SW*) between pre and post-financial meltdown periods.*

Research Methodology

The study used secondary data of Basic Material Sector, which are collected from the capital market database called Centre for Monitoring Indian Economy Private Limited (Prowess CMIE) for a period of 10 years on year-to-year basis from 2003–4 to 2012–3.

SAMPLING PROCEDURE AND TECHNIQUE

The study used multi-stage non-random sampling technique and the different stages involved in it are shown in table 1.

Table 2 shows the number of firms of Basic Material Sector listed in Bombay Stock Exchange (29), out of which dividend non-paying firms (12), and firms for which adequate data were not available in

TABLE 1 Multi-stage Non-Random Sampling Procedure

Stage 1	The study proposed to include all the listed firms of Basic material sector (29).
Stage 2	Out of 29 firms, 12 firms are dividend non-paying firms, hence they are eliminated, the result being 17 dividend paying firms.
Stage 3	Out of 17 dividend paying firms, for 4 firms adequate data were not available in the data source, hence they are also eliminated, the result being 13 firms.
Stage 4	Hence, the final sample comprises 13 dividend paying firms only.

TABLE 2 List of Basic Material Sector Firms Selected for the Study

(1) Total no. of firms	29
(2) Dividend non-paying firms	12
(3) Adequate data not available in the data source	4
(4) Total number of firms not considered for the study (2 + 3)	16
(5) Ultimate sample firms selected for the study (1 – 4)	13

the data source (4) are eliminated, hence the ultimate number of sample firms considered for the study is 13 only.

The Basic material sector includes mining and refining of metals, chemical producers and forestry products. It is sensitive to change in the business cycle, because it supplies materials for construction, which depends on a strong economy. The sector is also sensitive to supply and demand fluctuations because the price of raw materials, such as gold or other metals, is largely demand driven. A basic material comprises chemicals, fertilizers, iron and steel and cement industries.

RESEARCH METHODS AND VARIABLES (RATIOS) USED FOR ANALYSIS

The paper used variables viz., dividend related (DP) ratios, shareholders' wealth (SW) ratios, profitability ratios, leverage ratios, owners' fund ratios, liquidity ratios, earnings ratios, working fund ratios, and asset quality ratios to study the difference in the impact of dividend policy on shareholders' wealth.

Market price per share (MPS) is considered as proxy response variable for shareholders' wealth (SW) while dividend per share (DPS), dividend payout (DPO), dividend yield (DY), return on capital employed (R_CE), return on net worth (R_NW), return on assets (R_A), return on long term fund (R_LF), return on equity (R_E), total debt to equity (TD_EQ), total debt to total assets (TD_TA), total debt to fixed assets (TD_FA), equity multiplier (EM), proprietary ratio (PR), total liabilities to net worth (TL_NW), current ratio (CR), quick ratio (QR), earnings per share (EPS), price earnings ratio (PER), working capital to total assets (WC_TA), current assets to total assets (CA_TA), net fixed assets to net worth (NFA_NW) are considered as predictor variables. Besides using various dividend variables and finance factors, statistical methods viz., Augmented Dickey Fuller Test, Johansen Co-integration, Ordinary Least Square method and Chow test are applied for analysis using Eviews 7 Econometrics software package.

The study used Panel unit root test (Augmented Dickey Fuller Test) to find out whether the time series data are stationary; six different lag selection criteria viz., Log Likelihood (Log L), Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike's Information Criterion (AIC), Schwarz Information Criterion (SC or SIC), and Hannan-Quinn Criterion (HQ or HQC); Johansen Co-integration test to determine whether a set of endogenous variables share a common long-run stochastic trend; factor analysis, extracting factors viz., profitability (P), leverage (LEV), owner's fund (OF), liquidity (LQ), earnings

per share (EPS), working fund (WF), and asset quality (AQ) are used as predictors in the regression model; regression analysis to ascertain the unique impact of DP on SW; and Chow test (1960) to determine whether the predictor variables have different impact on different sub-groups of the population.

Analysis and Discussion

The analysis is done using descriptive statistics (Jarque-Bera test) to specify if the data are normally distributed. The study used mean, standard deviation (SD), skewness, kurtosis and Jarque Bera (JB) test. (If skewness lies between –0.50 and +0.50, the data are considered to be approximately symmetric; it is considered as moderate if it lies either between –1 and –0.50 or between +0.50 and +1; the data series led to kurtic if kurtosis >3, i.e. excess kurtosis is >0; a normal distribution has kurtosis exactly 3).

The JB test for normality is based on the null hypothesis that the data are normally distributed with skewness zero and excess kurtosis is zero (alternate hypothesis is that the data are non-normally distributed). The significance of the test statistics is ascertained by a χ^2 statistics with 2 degrees of freedom. The null hypothesis of normality is rejected if the calculated JB test statistics exceeds the critical value of χ^2 at given level of significance, say 1% or 5%. If null hypothesis is accepted, the data series are normally distributed.

Panel unit root test (Augmented Dickey Fuller Test) is carried out to find out whether the time series data are stationary. There are three test statistics to ascertain the statistical significance viz., Levin, Lin, and Chu (LLC) *t*-test (2002), Augmented Dicky Fuller (ADF) Fisher χ^2 test, and Philips and Perron (PP) Fisher χ^2 test (1988). The Im-Pesaran-Shin W (IPS-W) (2003) statistics for the second model and Breitung test (2000) for the third model is added besides the three test statistics to ascertain whether time series data are stationary and to satisfy one pre-condition for co-integration test.

The number of lags required for running co-integration test is determined by means of six different lag selection criteria viz., Log Likelihood (Log L), Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike's Information Criterion (AIC), Schwarz Information Criterion (SC or SIC), and Hannan-Quinn Criterion (HQ or HQC). Johansen Co-integration test provides a mean to determine whether a set of endogenous variables share a common long-run stochastic trend. A finding of co-integration indicates interdependence of the endogenous variables, which may be the result of economic linkages between the markets or arbitrage activity between the investors.

The approach to testing for co-integration relies on the relationship between the rank of a matrix and its characteristic roots, or eigen-values (Johansen and Juselius 1990). Let X_t be a vector of n time series variables, each of which are integrated of order (1), and assume that X_t can be modelled by a Vector Auto Regression (VAR):

$$X_t = A1x_{t-1} + \cdots + Apx_{t-p} + \varepsilon_t. \tag{1}$$

Rewriting the VAR as

$$\Delta x_t = \Pi X_{t-1} + \Sigma\Gamma\Delta X_{t-i} + \varepsilon_t, \tag{2}$$

Where, $\Pi = \Sigma A_i - I, \Gamma_i = -\Sigma A_i$.

If the coefficient matrix Π has a reduced rank ($r < k$) there exists kxr matrices where α and β each with rank r such that $\Pi = \alpha\beta$ and $\beta' xt$ are stationary. The number of co-integrating relations is given by r, and each column of β is a co-integrating vector.

According to Johansen (1991), there are three possibilities to exist i.e. co-integrated Vector Autoregressive Model:

1. If Π is of full rank, all elements of X become stationary and none of the series has a unit root.
2. If the rank of $\Pi = 0$, there are no combination which are stationary and there are no co-integrating vectors.
3. If the rank of Π is r such that $0 < r < k$, then the X variables are co-integrated and there exists r co-integrating vectors. Equation (4) can be modified to allow for an intercept and a linear trend.

The number of distinct co-integrating vectors can be obtained by determining the significance of the characteristic roots of Π. To identify the number of characteristic roots that are not different from unity, the study used two statistics viz., the trace test and maximum eigen value test:

$$\lambda_{\text{trace}}(r) = -T\Sigma\ln(1 - \lambda_i) \tag{3}$$

and

$$\lambda_{\max}(r, r+1) = -T\ln(1 - \lambda_{r+1}) \tag{4}$$

Where λ_i is the estimated values of the characteristic roots (eigen values) obtained from the estimated Π matrix, r is the number of co-integrating vectors, and T is the number of usable observations. The trace test evaluates the null hypothesis that the number of distinct co-integrating vectors is $\leq r$ against a general alternative hypothesis (the number of distinct co-integrating vectors $\geq r$). The maximum

eigen-value test examines the number of co-integrating vectors versus the number plus one. If the variables in X_t are not co-integrated, the rank of Π is zero and all the characteristic roots are zero. Since $ln(1) = 0$, each of the expressions $\ln(1 - \lambda_i)$ will be equal to zero (Johansen and Juselius 1990; Osterwald-Lenum 1992).

The extracted factors (factor analysis) viz., profitability (P), leverage (LEV), owner's fund (OF), liquidity (LQ), earnings per share (EPS), working fund (WF), and asset quality (AQ) are used as predictors in the regression model. There are two regressions; the first one with dividend variables (DPS, DPO and DY) along with financial factors (P, LEV, OF, LQ, EPS, WF and AQ) and the second one is with financial factors only. The significance of the explanatory power of DP on SW, when all the financial factors are held constant, is estimated based on F-Value and R^2 values of the two models using the following formula:

$$F = \frac{\frac{R_L^2 - R_S^2}{df_L - df_S}}{\frac{1 - R_L^2}{N - df_L - 1}}, \tag{5}$$

where $R_L^2 = R^2$ from the larger model (full model), $R_S^2 = R^2$ from the smaller model (subset model after removing certain predictors), df_L are row degrees of freedom (or number of predictors) in the larger model, df_S are row degrees of freedom in the smaller model, and N is the number of observations.

REGRESSION EQUATION

Regression model (full model with dividend variables and financial factors):

$$\begin{aligned} \text{MPS} = {} & \beta_1(\text{P}) + \beta_2(\text{LEV}) + \beta_3(\text{OF}) + \beta_4(\text{LQ}) + \beta_5(\text{EPS}) \\ & + \beta_6(\text{WF}) + \beta_7(\text{AQ}) + \beta_8(\text{DPS}) + e, \end{aligned} \tag{6}$$

where MPS is market price per share, P is profitability, LEV is leverage, OF is owners' fund, LQ is liquidity, EPS are earnings per share, WF is working fund, AQ is asset quality, and DPS is dividend per share.

Regression model (subset model after removing dividend variables i.e. only with the financial factors):

$$\begin{aligned} \text{MPS} = {} & \beta_1(\text{P}) + \beta_2(\text{LEV}) + \beta_3(\text{OF}) + \beta_4(\text{LQ}) + \beta_5(\text{EPS}) \\ & + \beta_6(\text{WF}) + \beta_7(\text{AQ}) + e, \end{aligned} \tag{7}$$

where MPS is market price per share, P is profitability, LEV is lever-

age, OF is owners' fund, LQ is liquidity, EPS are earnings per share, WF is working fund, and AQ is asset quality.

In evaluation, the Chow test (1960) is used to determine whether the predictor variables have different impact on different subgroups of the population. Therefore, the chow test is applied using the following formula:

$$F = \frac{\frac{RSS_p - (RSS_1 RSS_2)}{k}}{\frac{RSS_1 RSS_2}{N_1 + N_2 - 2k}}, \tag{8}$$

where F is the test statistic, RSS_p is residual sum of squares for the whole sample, RSS_1 is residual sum of squares for the first group (before dividend announcement), RSS_2 is residual sum of squares for the second group (after dividend announcement), N is the number of observations, k is the number of regressors (including the intercept term) in each unrestricted sub-sample, $2k$ is the number of regressors in both the unrestricted sub-sample regressions (whole sample), N_1 is the number of observations for the first group (before dividend announcement), and N_2 is the number of observations for the second group (after dividend announcement).

Relationship Between DP and SW

Table 3 presents the descriptive statistics along with Jarque Bera test results for market price per share (MPS) and dividend variables. The mean of MPS ranges from 78.47 (Berger Paints India) to 1553.04 (Larsen and Toubro) (see table 3). From the standard deviation, it is found that for most of the firms, the MPS is highly dispersed from their central tendency (mean) (standard deviation is high for majority of firms) and it is positively skewed (skewed to the right) for four firms (skewness >1), which shows that the data are asymmetrical for these four firms. For six firms, the data are moderately skewed (moderately asymmetric) whereas skewness is trivial for the other three firms. The data led to kurtic for three firms while it plays kurtic for the other 10 firms (kurtosis < 3). Out of 10 firms with play kurtic, the MPS data are found to be with kurtosis, approximately equals to 3 for 5 firms, which reveal that the MPS data are approximately symmetric. As no conclusive decision about the normality of the data can be arrived from the skewness and kurtosis, the Jarque Bera (JB) test is carried out. The JB test statistics for MPS data are insignificant for all the (13) firms, which led to accept the null hypothesis that the data are normally distributed i.e. the MPS of firms are normally distributed.

TABLE 3 Descriptive and Jarque-Bera Normality Test Statistics for Market Price per Share and Dividend/Earning Variables

Firm	(1)	(2)	(3)	(4)	(5)	(6)
Market Price per Share (MPS)						
ACC	761.54	361.01	–0.19	1.92	0.55	0.7597
Ambuja Cements	163.29	80.23	1.36	4.01	3.49	0.1747
Asian Paints	1479.90	1266.10	0.91	2.48	1.49	0.4739
Berger Paints India	78.47	35.20	0.77	2.53	1.08	0.5822
Coromandel International	197.15	115.70	0.99	3.14	1.65	0.4390
Divi's Laboratories	1292.00	669.74	1.14	2.96	2.16	0.3397
Larsen & Toubro	1553.00	674.78	0.27	3.58	0.26	0.8771
Pidilite Industries	192.97	80.51	0.66	1.84	1.28	0.5261
Sesa Goa	810.83	751.95	1.35	3.94	3.42	0.1807
Shree Cement	1297.80	1072.20	0.92	3.24	1.44	0.4874
Tata Chemicals	248.28	85.56	–0.32	2.03	0.56	0.7573
Tata Steel	464.86	125.04	0.60	2.89	0.60	0.7394
United Phosphorus	269.57	178.45	1.10	2.75	2.03	0.3620
Dividend Per Share (DPS)						
ACC	1.86	0.97	–0.22	1.66	0.83	0.6598
Ambuja Cements	1.33	0.38	–0.43	1.96	0.76	0.6830
Asian Paints	2.23	1.32	0.66	2.02	1.13	0.5684
Berger Paints India	0.64	0.24	–0.21	2.12	0.40	0.8190
Coromandel International	3.35	2.62	0.25	1.43	1.13	0.5695
Divi's Laboratories	3.06	2.48	0.72	2.08	1.23	0.5420
Larsen & Toubro	8.43	2.49	0.91	3.16	1.39	0.4981
Pidilite Industries	1.58	0.51	0.37	3.02	0.22	0.8946
Sesa Goa	2.91	1.47	–0.79	2.33	1.22	0.5424
Shree Cement	1.03	0.63	0.48	1.88	0.91	0.6332
Tata Chemicals	0.85	0.14	–0.37	1.62	1.02	0.5991
Tata Steel	1.24	0.31	–0.15	1.80	0.63	0.7281
United Phosphorus	0.81	0.34	–0.10	1.64	0.79	0.6729

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As far as the DPS data are concerned, skewness lies between –0.50 and +0.50 for most of the firms, which shows that the DPS data are approximately symmetric. The kurtosis < 3 for most of the firms and is around 3 for two firms. The JB test statistics are not significant at level for all the firms, which confirm the existence of normality in the DPS of firms. The JB test result is greater than the critical value of χ^2 at 5% level for all the firms and for 12 firms in respect of DY and DPO respectively; also in case of EPS, the normality violation is rejected for most of the firms (10 out of 13), hence it is found that the data

TABLE 3 *Continued from the previous page*

Firm	(1)	(2)	(3)	(4)	(5)	(6)
Dividend Yield (DY)						
Ambuja Cements	0.98	0.41	−1.03	2.72	1.79	0.4088
Asian Paints	0.19	0.06	0.49	2.12	0.71	0.7002
Berger Paints India	0.85	0.31	1.44	4.40	4.30	0.1165
Coromandel International	1.67	1.09	0.87	3.37	1.33	0.5151
Divi's Laboratories	0.33	0.33	0.63	1.71	1.35	0.5089
Larsen & Toubro	0.75	0.64	1.48	3.69	3.83	0.1473
Pidilite Industries	0.98	0.47	−0.66	1.75	1.38	0.5009
Sesa Goa	0.58	0.55	1.04	2.70	1.84	0.3989
Shree Cement	0.12	0.08	1.38	3.97	3.55	0.1698
Tata Chemicals	0.38	0.11	1.65	4.76	5.81	0.0548
Tata Steel	0.28	0.08	−0.03	1.41	1.05	0.5916
United Phosphorus	0.44	0.33	0.57	2.04	0.92	0.6314
Dividend Payout (DPO)						
ACC	4.14	1.18	0.81	2.66	1.13	0.5677
Ambuja Cements	15.12	6.42	−0.40	2.58	0.34	0.8430
Asian Paints	4.97	0.65	0.52	2.49	0.56	0.7559
Berger Paints India	15.43	7.33	1.12	4.20	2.70	0.2587
Coromandel International	16.61	9.94	0.00	2.03	0.39	0.8211
Divi's Laboratories	7.50	7.35	0.68	1.66	1.51	0.4703
Larsen & Toubro	16.82	10.48	1.93	5.55	8.92*	0.0116
Pidilite Industries	22.19	12.92	−0.45	1.68	1.06	0.5873
Sesa Goa	6.04	5.31	0.66	1.86	1.27	0.5311
Shree Cement	2.16	1.74	1.43	3.96	3.79	0.1507
Tata Chemicals	4.83	1.19	−0.71	2.87	0.85	0.6538
Tata Steel	2.07	0.53	−0.03	1.74	0.66	0.7172
United Phosphorus	18.01	10.53	−0.33	1.51	1.11	0.5750

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of MPS, DPS, DY, DPO and EPS are normally distributed for the firms.

The results of the panel unit root test are shown in table 4. From the table it is seen that all the three test statistics (LLC, ADF, and PP) for the first model (no intercept and no trend) are insignificant for MPS data at level, hence it implies that the MPS at level has unit root and therefore is non-stationary. On the other hand, all the three test statistics are significant for the first difference MPS data series i.e. the MPS data are non-stationary at level and are stationary when they are first differenced.

The MPS data series have unit root at level but has no unit root when first differenced about a constant as well as with time trend

TABLE 3 *Continued from the previous page*

Firm	(1)	(2)	(3)	(4)	(5)	(6)
Earnings Per Share (EPS)						
ACC	49.37	26.74	−0.53	1.76	1.12	0.5723
Ambuja Cements	9.99	3.68	1.60	4.87	5.73	0.0569
Asian Paints	47.28	31.33	0.63	1.89	1.19	0.5522
Berger Paints India	4.80	3.34	2.17	6.48	12.88**	0.0016
Coromandel International	19.31	8.12	0.33	3.05	0.19	0.9103
Divi's Laboratories	51.42	16.72	0.51	2.52	0.54	0.7647
Larsen & Toubro	57.46	15.09	−1.81	5.89	8.93*	0.0115
Pidilite Industries	10.94	7.87	1.07	2.46	2.03	0.3632
Sesa Goa	81.36	67.32	0.36	1.44	1.23	0.5409
Shree Cement	77.09	68.77	1.18	3.75	2.55	0.2787
Tata Chemicals	19.22	7.97	1.42	4.65	4.49	0.1058
Tata Steel	61.27	11.7	−1.22	3.61	2.65	0.2656
United Phosphorus	6.60	5.49	1.80	4.93	6.95*	0.0309

NOTES Column headings are as follows; (1) mean, (2) standard deviation, (3) skewness, (4) kurtosis; Jarque Bera Test: (5) value, (6) *p*–level.

as test statistics, the IPS-W statistics for model with intercept and without trends, the Breitung *t*-test for model with both intercept and time trend is insignificant at level and significant at first difference besides LLC, ADF and PP test statistics. Hence, it is evidence that the MPS data are integrated in order 1, i.e. I(1), satisfying one precondition for co-integration test. With regard to DPS data series, it is found from the unit root test with zero-mean (no intercept and no trend) that only intercept (intercept and no trend) and with both intercept and trend, the DPS data series are non-stationary (unit root) at level but stationary (no unit root) when it is first differenced, which evidences that the DPS data series is I(1).

With regard to DPO data series, the unit root test statistics are significant both at level as well as at first difference based on the models without deterministic trend (no intercept and no trend) and with deterministic trend having only intercepted. Both the IPS-W statistics and the Breitung *t* statistics are significant at level and at first difference, the DPO data series with time trend is considered stationary at both the levels and at first difference as majority of the test statistics are significant i.e. the DPO data series is both integrated of order zero (I(0)) and one (I(1)) respectively.

In respect of DY, the unit root test statistics are significant for both at level and at first difference based on models without intercept and trend as well as with only intercept. However, 3 out of 5 test statistics

TABLE 4 Unit Root Test (Panel) Results for Market Price per Share and Dividend Variables

Variable/ method		No Intercept No Trend				Intercept No Trend				Intercept and Trend			
		Level		First Difference		Level		First Difference		Level		First Difference	
		(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
MPS	(a)	3.01	0.9987	−8.05**	0.0000	0.46	0.6756	−8.29**	0.0000	−3.61**	0.0002	−24.57**	0.0000
	(b)									2.53	0.9942	−4.56**	0.0000
	(c)					1.10	0.8644	−3.55**	0.0002	0.65	0.7431	−2.65**	0.0040
	(d)	15.81	0.9407	99.29**	0.0000	21.16	0.7336	60.22**	0.0002	18.03	0.8746	62.87**	0.0001
	(e)	15.99	0.9365	107.61**	0.0000	24.80	0.5301	68.37**	0.0000	19.57	0.8117	102.90**	0.0000
DPS	(a)	4.98	1.0000	−3.51**	0.0002	4.85	1.0000	−6.51**	0.0000	−1.21	0.1140	−18.62**	0.0000
	(b)									4.88	1.0000	−1.98*	0.0239
	(c)					3.75	0.9999	−3.07**	0.0011	0.92	0.8224	−3.88**	0.0001
	(d)	7.71	0.9998	74.34**	0.0000	14.07	0.9721	60.33**	0.0002	17.59	0.8901	92.65**	0.0000
	(e)	7.09	0.9999	88.52**	0.0000	14.57	0.9647	80.58**	0.0000	23.34	0.6139	104.09**	0.0000
DPO	(a)	−3.47**	0.0003	−13.23**	0.0000	−10.93**	0.0000	−11.21**	0.0000	−8.84**	0.0000	−8.87**	0.0000
	(b)									−1.82*	0.0344	−1.54	0.0621
	(c)					−4.37**	0.0000	−5.41**	0.0000	−1.49	0.0687	−1.42	0.0784
	(d)	42.71*	0.0207	147.94**	0.0000	66.44**	0.0000	83.30**	0.0000	46.4**	0.0082	52.37**	0.0016
	(e)	42.34*	0.0226	150.07**	0.0000	55.19**	0.0007	106.21**	0.0000	60.9**	0.0001	78.48**	0.0000
DY	(a)	−3.12**	0.0009	−9.80**	0.0000	−9.45**	0.0000	−8.20**	0.0000	−5.45**	0.0000	−8.55**	0.0000
	(b)									1.37	0.9149	−1.11	0.1329
	(c)					−3.44**	0.0003	−4.48**	0.0000	−0.72	0.2360	−1.14	0.1275
	(d)	46.71**	0.0076	127.82**	0.0000	63.87**	0.0000	72.21**	0.0000	35.61	0.0990	48.67**	0.0045
	(e)	54.35**	0.0009	134.68**	0.0000	58.10**	0.0003	91.04**	0.0000	71.87**	0.0000	93.24**	0.0000

NOTES Column headings are as follows: (1) statistic, (2) *p*-value. Row headings are as follows: (a) Levin, Lin & Chu *t* (LLC), (b) Breitung *t*-stat, (c) IPS W-stat, (d) ADF – Fisher Chi-square, (e) PP – Fisher Chi-square. ** Significant at 1% level. * Significant at 5% level.

TABLE 5 Lag Length Selection Criteria for Co-Integration Test for Market Price per Share with Dividend Variables

Lag	LogL	LR	FPE	AIC	SC	HQ
Market Price per Share (MPS) *and Dividend per Share* (DPS)						
0	−542.50	–	$4.3e^6$	20.94	21.02	20.97
1	−443.20	187.10	$1.1e^5$	17.28	17.50*	17.36
2	−436.00	12.92	$9.7e^4$	17.15	17.53	17.30
3	−432.20	6.61	$9.8e^4$	17.16	17.69	17.36
4	−424.80	12.22	$8.6e^4$	17.03	17.71	17.29
5	−419.90	7.80	$8.3e^4$	16.99	17.82	17.31
6	−413.30	9.86*	$7.6e^4$*	16.90*	17.87	17.27*
Market Price per Share (MPS) *and Dividend Payout* (DPO)						
0	−612.10	–	$6.2e^7$	23.62	23.70	23.65
1	−535.20	144.90	$3.8e^6$	20.82	21.04	20.90
2	−525.00	18.42	$3.0e^6$	20.58	20.95*	20.72
3	−524.40	1.19	$3.4e^6$	20.71	21.23	20.91
4	−511.10	21.99*	$2.4e^6$*	20.348*	21.02	20.61*
5	−508.50	4.04	$2.5e^6$	20.40	21.23	20.72
6	−507.40	1.71	$2.8e^6$	20.51	21.49	20.89
Market Price per Share (MPS) *and Dividend Yield* (DY)						
0	−463.70	–	$2.1e^5$	17.91	17.99	17.94
1	−391.20	136.70	$1.5e^4$	15.28	15.51*	15.36
2	−383.50	13.94	$1.3e^4$	15.13	15.51	15.28
3	−378.10	9.31	$1.2e^4$	15.08	15.61	15.28
4	−368.40	15.98*	$9.8e^3$	14.86	15.54	15.12*
5	−362.90	8.66	$9.3e^3$	14.80	15.63	15.12
6	−358.50	6.63	$9.3e^3$*	14.79*	15.76	15.16

are found to be insignificant at level based on model with time trend (drift process) while 2 out of 5 test statistics are insignificant at first difference. Based on most of the cases, the variable, DY has unit root at level and has no unit root at first difference i.e. the DY is non-stationary at level, but stationary at first difference, which suggests that the DY data series is I(1).

The results of the analysis determining the lags for co-integration model between MPS and dividend variables are shown in table 5. The Log L, LR, FPE, AIC and HQ criteria suggests use of six lags; while SC criterion suggests use of one lag for co-integrating DPS with MPS; the criterion LR, FPE, AIC and HG suggest six lags while SC criterion suggests one for better fit the model co-integrating MPS with DPS. Based on the lag length suggested by majority of criterion, six lag is chosen for co-integration test between MPS and DPS. The chosen

TABLE 6 Co-integration Test Results for Market Price per Share and Dividend Variables

Test	No Deterministic Trend				Linear Deterministic Trend							
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Market Price per Share (MPS) *and Dividend per Share* (DPS)												
(a)	0.4808	26.56**	12.32	0.0001	0.4830	26.71**	15.49	0.0007	0.4892	27.19**	18.4	0.0023
(b)	0.0253	1.00	4.13	0.3679	0.0250	0.99	3.84	0.3205	0.0251	0.99	3.84	0.3191
(b)	0.4808	25.56**	11.22	0.0001	0.4830	25.73**	14.26	0.0005	0.4892	26.20**	17.15	0.0019
(c)	0.0253	1.00	4.13	0.3679	0.0250	0.99	3.84	0.3205	0.0251	0.99	3.84	0.3191
Market Price per Share (MPS) and *Dividend Payout* (DPO)												
(a)	0.0352	3.23	12.32	0.8185	0.0279	1.84	15.49	0.9968	0.0328	2.17	18.4	0.9995
(b)	0.0137	0.90	4.13	0.3978	0.0000	0.00	3.84	0.9783	0.0000	0.00	3.84	0.9751
(c)	0.0352	2.33	11.22	0.8834	0.0279	1.84	14.26	0.9939	0.0328	2.17	17.15	0.9989
(d)	0.0137	0.90	4.13	0.3978	0.0000	0.00	3.84	0.9783	0.0000	0.00	3.84	0.9751
Market Price per Share (MPS) *and Dividend Yield* (DY)												
(a)	0.5252	29.07**	12.32	0.0000	0.5273	29.36**	15.49	0.0002	0.5279	29.28**	18.4	0.001
(b)	0.0006	0.02	4.13	0.8997	0.0037	0.14	3.84	0.7056	0.0001	0.00	3.84	0.9555
(c)	0.5252	29.05**	11.22	0.0000	0.5273	29.22**	14.26	0.0001	0.5279	29.27**	17.15	0.0005
(d)	0.0006	0.02	4.13	0.8997	0.0037	0.14	3.84	0.7056	0.0001	0.00	3.84	0.9555

NOTES Column headings are as follows: (1) eigenvalue, (2) statistic, (3) critical value, (4) p-value. Row headings are as follows: (a) trace (none), (b) trace (at most 1), (c) maximum (none), (d) eigenvalue (at most 1). ** Significant at 1% level.

lag length for co-integration test is four between MPS and DPO and it is six between MPS and DY (the lag suggested by FPE and AIC is superior over LR test) hence, the chosen lag length for co-integration test between MPS and DPS; MPS and DPO; and MPS and DY is six, four and six respectively.

The results of the co-integration analysis are shown in table 6. Both trace and maximum eigen value test statistics are significant for CE with intercept but without time trend as well as CE with intercept and time trend hypothesized as 'none,' which proves that the DPS and the MPS are co-integrated when the selected variables in the models are allowed for linear deterministic trend, hence there exists a long-run co-integration between DPS and SW with time trend.

The test results show that the data series are co-integrated as both the trace test and the maximum eigen-value test reject the null hypothesis of no co-integration, and suggest that there are two significant co-integrating vectors in the model, which implies that there are two common stochastic trends, showing market integration. The long-run relationship between DPS and MPS is proved by trace rank test statistics and maximum eigen value test without deterministic trend, with intercept without time trend as well as with intercept and time trend.

The results of trace test and maximum eigen value test without deterministic trend for DPS and MPS show the critical value as 12.32

and 11.22, statistical value as 26.56 and 25.56 respectively; that of for with intercept and without time trend the critical value as 15.49 and 14.26, statistical value as 26.71 and 25.73 respectively; and that of for with intercept and time trend the critical value as 18.40 and 17.15, statistical value as 27.19 and 26.20 respectively, which are highly significant at 1% level.

The statistical values of the trace test and maximum eigen value test > critical values for three situations i.e. without deterministic trend, with intercept without time trend as well as with intercept and time trend hence, the null hypothesis H_1^0: 'there is no co-integration between dividend per share (DPS) and shareholders' wealth (SW)' is rejected at 1% level. Therefore, it proves that there exists a stationary, long-run relationship between DPS and MPS.

The results of trace test and maximum eigen value test without deterministic trend for DPO and MPS show critical value as 12.32 and 11.22; statistical value as 3.23 and 2.33 respectively; that of for with intercept and without time trend the critical value as 15.49 and 14.26, statistical value as 1.84 each respectively; and that of for with intercept and time trend the critical value as 18.40 and 17.15, statistical value as 2.17 each respectively, which are not significant as the data series is not co-integrated for both the trace test and the maximum eigen value test hence, the null hypothesis H_2^0: 'there is no co-integration between dividend payout (DPO) and shareholders' wealth (SW)' is accepted, implying that there is insignificant co-integrating vectors in the model. The absence of long-run relationship between DPO and MPS is proved by trace test and maximum eigen value test without deterministic trend, with intercept without time trend as well as with intercept and time trend. The statistical values of the trace test and maximum eigen value test < critical value for the three situations.

The results of trace test and maximum eigen value test without deterministic trend for long-run relationship between DY and MPS show the critical value as 12.32 and 11.22, statistical value as 29.07 and 29.05 respectively; that of for with intercept and without time trend the critical value as 15.49 and 14.26, statistical value as 29.36 and 29.22 respectively; and that of for with intercept and time trend the critical value as 18.40 and 17.15, statistical value as 29.28 and 29.27 respectively, which are highly significant.

The statistical values of the tests are > critical values for three situations i.e. without deterministic trend, with intercept without time trend as well as with intercept and time trend respectively. Hence, the null hypothesis H_3^0: 'there is no co-integration between dividend

yield (DY) and shareholders' wealth (SW)' is rejected at 1% level. Therefore, the co-integration results prove that there exists a stationary, long-run relationship between DY and MPS.

Impact of Dividend Policy on Shareholders' Wealth

Table 7 is reported with the results of regression for eliciting the impact of DP on SW in the presence of general financial status of the firms. There are two regressions; first one with dividend variables (DPS, DPO and DY) besides the financial factors (P, LEV, OF, LQ, EPS, WF, AQ) and the second one is with financial factors (P, LEV, OF, LQ, EPS, WF, AQ) only. The significance of the explanatory power of DP on SW, when all the financial factors are constant, is ascertained based on F value obtained from comparing R^2 values of the two models.

Both full and subset models of regressions are fitted significantly (see table 7). The individual coefficients in both the models show that the SW tends to increase with significant decline in LEV, increase in OF as well as increase in EPS. Regarding the DP, it is apparent that the SW seems to increase at a significant level when there has been a significant increase in DPS ($\beta = 0.273$, $t = 10.56$, $p < 0.01$).

While the full model, with both dividend and financial factors as predictors, explains to the extent of 78.40% of the variation, the subset model, with only financial factors as predictors, explains to the extent of 43.44% of the variation only in SW. The additional variance in the dependent variable explained by the dividend variables is 36.38% ($R_L^2 - R_S^2$). Hence, the additional variance (in presence of dividend variables) is highly significant at 1% level ($F = 64.20$, $p < 0.01$). Therefore, it is found that the DPS has influence (impact) in creating additional wealth to the shareholders. Hence, H_0^4: 'there is no significant impact of dividend policy (DP) on shareholders' wealth (SW)' is rejected at 1% level.

Difference in the Impact of DP on SW in Pre- and Post-Financial Meltdown Periods

To test whether there is any significant difference in the impact of DP on SW between pre and post-financial meltdown periods, Chow test has been used and the results are shown in table 8. The result (vide table 8) reveals that the F values for DPO (4.96) and DY (4.57) are significant at 1% level. Hence, H_6^0: 'there is no significant difference in the impact of dividend payout (DPO) on shareholders' wealth (SW) between pre and post-financial meltdown periods' and H_7^0: 'there is no significant difference in the impact of dividend yield (DY) on

TABLE 7 Impact of Dividend policy (After Partialling out the Effect of Financial Performance) on Shareholders' Wealth

Predictors	Full model		Subset model	
	β	t	β	t
Intercept	5.667**	22.39	5.282**	14.79
Profitability (P)	–0.163	–0.83	–0.194	–0.63
Leverage (LEV)	–0.723**	–5.07	–0.933**	–4.16
Owners Fund (OF)	1.106**	2.99	1.629**	2.86
Liquidity (LQ)	0.071	0.47	0.428	1.79
Earnings per Share (EPS)	0.315*	2.57	1.047**	6.61
Working Fund (WF)	0.029	0.38	–0.018	–0.16
Asset Quality (AQ)	0.087	0.87	–0.059	–0.45
Dividend policy (DPS)	0.273**	10.56		
R^2	0.784		0.434	
Adjusted R^2	0.766		0.402	
F value	43.190**		13.390**	
Degrees of freedom	10.119		7.122	
Significance of the Change in R^2	F value 64.200**		DF 3.119	

NOTES ** Significant at 1% level. * Significant at 5% level. Significance of the change in R^2: F = 64.20**,

TABLE 8 Results of Chow Test for the Difference in the Impact of DP on SW between Pre and Post-financial Meltdown Periods

Item	F value	DF	p value
MPS = f(DPS, DPS_1)	1.04	98	0.3989
MPS = f(DPO, DPO_1)	4.96**	98	0.0004
MPS = f(DY, DY_1)	4.57**	98	0.0009

NOTES **Significant at 1% level.

shareholders' wealth (SW) between pre and post-financial meltdown periods' are rejected at 1% level.

However, the F value for DPS (1.04), which is insignificant, is far higher than 5% level, which proves that there is no significant difference in the impact of DP (DPS) on SW (MPS) between pre and post-financial meltdown periods i.e. the impact of DP (DPS) on SW (MPS) is unaffected by the financial meltdown event. Hence, H_5^0: 'there is no significant difference in the impact of dividend per share (DPS) on shareholders' wealth (SW) between pre and post-financial meltdown periods' is accepted.

Hence, it is found that the impact of DP on SW is significantly affected by the financial meltdown in respect of dividend variables viz., DPO and DY and not DPS.

Concluding Remarks and Limitations

The study attempts to answer the question: Is there any significant difference in the impact of DP on SW due to financial meltdown. To test the relationship between DP and SW, and to estimate the impact of DP on SW before and after financial meltdown periods, 13 firms from Basic Material Sector are considered with one pre condition that the firms should have consistent track record in paying dividend over the period. The response variable viz., market price per share (MPS) is considered as proxy for SW and the dividend variables viz., DPS, DPO, and DY are considered as proxies of predictor variables (DP). The study used Johansen co-integration, factor analysis, regression and Chow test to study the impact of DP on SW.

The overall result of the study reveals that the trace and maximum eigen value statistics for the CES without and with deterministic trend for MPS with DPS, DPO as well as DY hypothesized as 'at most 1' are not significant at level, which leads to accept null hypothesis that there is at most one co-integration equation for MPS with each one of the dividend variables, meaning that the MPS and dividend variables are co-integrated. Therefore, there is a long-run relationship between DP and SW of the selected firms.

The financial factors viz., profitability (P), leverage (LEV), owners' fund (OF), liquidity (LQ), working fund (WF), asset quality (AQ) and dividend variables viz., earnings per share (EPS), market price per share (MPS), and dividend per share (DPS), which are used to estimate the impact of DP on SW show that the DP has influence (impact) in creating additional wealth to the shareholders; there is a significant difference in the impact of DPO and DY (DP) on MPS (SW), hence it can be concluded that the impact of DP on SW of firms of Basic Material Sector in India is significantly affected by the financial meltdown event.

The results of the study corroborates with the findings of the previous research studies viz., Asquith and Mullins (1983), Farrelly, Baker, and Edelman (1985), Nagar (2007), Ashamu, Abiolo, and Bbadmus (2008), Aravanan and Mannarakkal (2011), Azhagaiah and Sabaripriya (2008), Olandipupo and Okafor (2011), Arindam and Samanta (2012), Atiyet (2012), Gul et al. (2012), Onwumere, Ibe, and Feank (2012), Warrad et al. (2012), Zafar, Chaubey and Khalid (2012), Altroudi and Milhem (2013), and Bawa and Kaur (2013), Chidinma et al. (2013), Dewet and Mpinda (2013), Haque et al. (2013), Mokaya, Nyangara, and James (2013), Oladele (2013), Salman (2013), Kumaresan (2014) and Toby (2014).

The study is based on secondary data of 13 firms of Basic Material Sector in India collected from Centre for Monitoring Indian Economy Private Limited (Prowess CMIE). Besides, one of the main limitations is that the study has used data of few firms with short time series data. Further, the quality of the study depends upon the accuracy, reliability, and quality of data source.

The analysis has produced some meaningful inferences and results, and one avenue for future research is to extend the investigation to other sectors and across sectors in India. The present study has used market price per share (MPS) as proxy for measuring the shareholders' wealth (SW), hence future studies may be conducted using the response variable viz., economic value added (EVA) or market value added (MVA).

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