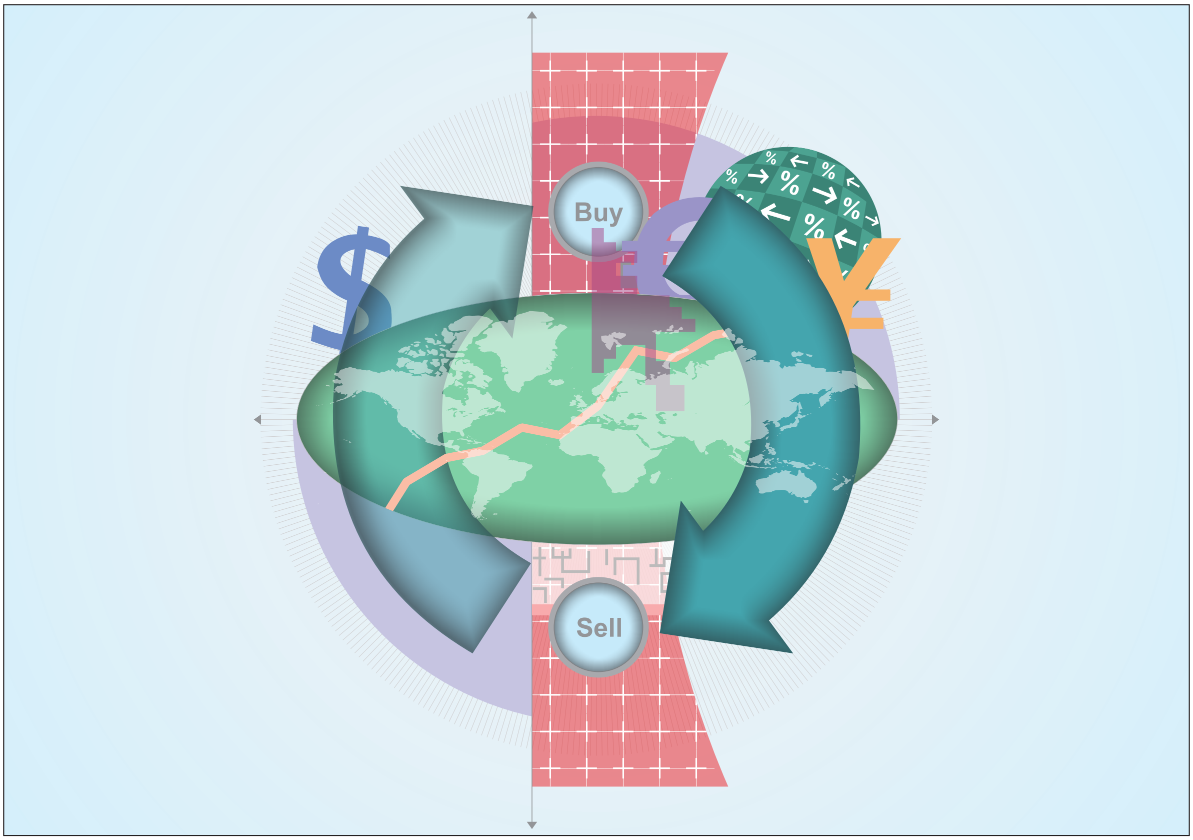

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Asymmetric Dividend Policy of Indian Firms: An Econometric Analysis

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ABSTRACT

Empirical study on determinants of dividend policy has assumed a positive relation between profit and dividend pay-outs. This study has argued that, while firms whose profit rate has risen increases their dividend pay-outs, firms whose profit rate has fallen, have behaved asymmetrically in the sense that they tend have either reduced dividend pay-outs or maintained such pay-outs. The paper was based on firm level data collected from PROWESS for the period 2005-2006 to 2008-2009. Five sectors were studied-Software, Finance, Steel, Electrical Machinery and Drugs and Pharmaceuticals. Statistical tests indicated a significant difference in elasticity of dividend with respect to rate of profit between the two groups of firms, providing support to the hypothesis of asymmetric dividend policy. The study has concluded by re-examining Lintner's dividend pay-out model; it has suggested that the Lintner model may have to be modified to incorporate this asymmetric behavior.

Key words: Dividend policy, hausman test, lintner model, panel data

INTRODUCTION

Dividend is a taxable payment paid out of net profits by a company to its shareholders, after keeping aside a part of earnings as reserves. While Miller and Modigliani (1961) argued that dividend is a residuary payment that does not affect net worth of the company (the Dividend Irrelevance Theorem), such pay-outs are considerable and have been studied in numerous theoretical and empirical works[1].

The origin of empirical studies of determinants of dividend policy is traced to Lintner's classic study (Lintner, 1956). Tinbergen (1939), Dobrovolsky (1951) and Harkavy (1953)[2]. In the mid-1950s John Lintner conducted a series of interviews with corporate managers about dividend policies and used his findings to develop a simple model of dividend pay-outs of US firms. Lintner started with the proposition that firms tended to follow an adaptive process in settling per share. According to him, firm's actual dividend share per share was a function of adjustment of their existing dividend per share (D_{it-1}) to their target dividend (D_{it}). Lintner started with the proposition that:

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[1]The Dividend Irrelevance Thorem has itself been termed as irrelevant by De Angelo and De Angelo (2006)

[2]Lintner's work, however, is preceded by Tinbergen (1939), Dobrovolsky (1951) and Harkavy (1953)

$$\Delta D_{it} = \alpha\,(D_{it-1} - D_{it}) + \varepsilon_{it} \tag{1}$$

$$D_{it} = \beta\,\pi_{it} \tag{2}$$

when, D is dividend, π is profit level, ε is the disturbance term, i represent firm and t is time. Combining Eq. 1 and 2, we get:

$$\Delta D_{it} = \alpha\,\beta\,\pi_{it} - \alpha\,D_{it-1} + \varepsilon_{it} \tag{3a}$$

$$\Delta D_{it} = \gamma\,\pi_{it} - \alpha\,D_{it-1} + \varepsilon_{it} \tag{3b}$$

Using firm level published by the US Department of Commerce from 1918-1941 Lintner successfully tested (3') using least squares technique.

Although alternative models of dividend behaviour has been put forward by Darling (1957), Florence (1959), Dhyrmes and Kurz (1964), Higgins (1972) and Dewenter and Warther (1998), the Lintner model has fared well in relation to its competitors. Subsequent research by Brittain (1966), Fama and Babiak (1968), Fama (1974) and Turnovsky (1967) have all confirmed Lintner's model. In the Indian context, too, the Lintner model has stood the test of time. Most of the studies in the Indian context have found the Lintner model to be appropriate in explaining dividend decisions of Indian firms (Krishnamurthy and Sastry, 1971, 1975; Agarwal, 1987; Swamy and Rao, 1975; Ojha, 1978; Khurana, 1985). After liberalization of the Indian economy, too, the Lintner model has retained its relevance-as evidenced from the works of Bhat and Pandey (1994), Raghunathan and Dass (1999) and Anand (2004), Bhole (1980), Mahapatra and Sahu (1993) and Mahapatra and Panda (1995)[3], though additional factors may have to be incorporated in the model (Anil and Kapoor, 2008; Kumar, 2003).

All these works have a common thread. This is the acceptance of Eq. 2, the proposition that dividend is positively related to profit. In Lintner's work, for instance, β is assumed to be positive. This assumption has been questioned by Husain and Ahmed (1994) in a study of major firms spread across different industries. This study found some evidence of a non-linear relation between dividend and profit. However, financial deregulation can lead to significant changes in behavior of economic agents (Okpara, 2010) and it is necessary whether such asymmetric behavior persists after the liberalization measures in India. In the present study, we propose to explore this issue and examine whether dividend is indeed positively and linearly related to profit. Specifically, our research question is whether firms whose profit declines in relation to the past year will correspondingly reduce dividend or not.[4]

DATABASE AND METHODOLOGY

Database: The study is based on data extracted from PROWESS. This is a database of large and medium Indian firms maintained by the Centre for Monitoring Indian Economy. It contains

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[3]On the other hand, Bhole (1980), Mahapatra and Sahu (1993) and Mahapatra and Panda (1995) do not find support for the Lintner model in industries like cotton, sugar, paper, etc.

[4]Such asymmetric behavior may be observed for other financial parameters also (Mathuva, 2009; Saibu and Oladeji, 2007).

detailed information on over 23,000 firms. Prowess provides database of the financials covering 1,500 data items and ratios per company. Firm level data on Dividend payout, Profit before Tax and Sales has been extracted from the database.

The period of study is 2005-06 to 2008-09. Just before this period, in order to restore confidence in markets shaken by several scams, the Securities and Exchange Board of India (SEBI) had introduced several important measures to control manipulations and malpractices. For instance, in 2002, SEBI had decided that preferential allotments of 15% or more would be referred to the Takeover Panel on a case-by-case basis. SEBI had also capped the price of inter transfers of shares between promoters by stipulating that if the transfer premium is more than 25% above market price, there will be no automatic exemption from making an open offer. A change in management had to be ratified through a special resolution, that too by a postal ballot. Sebi would also consider the price in the two weeks preceding the announcement to determine the offer price. It is expected that the impact of these measures will be felt on the study period, so that the dividend policy in this period would be based on fundamentals.

This paper studies dividend behaviour of firms from five industries: Drugs and Pharmaceuticals, Steel, Finance, Electrical Machinery and Software. Some basic facts about these sectors are stated in Table 1. Drugs and Pharmaceuticals and Steel are the major manufacturing sectors of India, contributing a large portion to the growth rate of GDP of India. These industries play a major role in India's economic development. The Finance (Asset and Investment) sector is gaining heights in the economic map of India. It is rapidly growing and becoming an influential sector of the economy. The Electrical Machinery sector has been experiencing robust growth in the recent years. It plays a key role for the development of the country. With the huge success of the Software companies in India, the Indian Software industry in turn has become successful in making a mark in the global arena. This industry has been instrumental in driving the economy of the nation on to a rapid growth curve. So examining dividend policy in these sectors will be an interesting study.

Only those firms for which data was available throughout the entire study period were considered in our study[5]. As a result we obtained a balanced panel data. The exact number of firms in each sector is given in Table 2.

Methodology: Present objective is to examine the relation between dividend and profit. In particular we want to see how firms react to changes in profit levels by varying dividend. Using the value of Profit After Tax (PAT) given in the PROWESS database directly, however, has one problem. A marginal change in PAT, say a fall in PAT by several lakhs, is not of any major consequence to a corporate firm. However, in our analysis it will be grouped along with other firms whose PAT has fallen. Therefore we need to normalize PAT. One way to do this is to take profit rate (PAT) as a ratio of sales. In the case of Finance, we have used 'Income from financial services', as the latter is equivalent to Sales.

Now, present study question is: Do firms whose profit rate has fallen also reduce dividend payouts? In order to test this hypothesis, we have used the concept of elasticity of dividend with respect to profit rate:

[5]Firms which have made an exit during the study period are obviously not financially sound. Such firms are not studied as their dividend policy does not have any analytical or policy relevance

Table 1: Some basic statistics relating to sectors studied

Sector	2005-06	2006-07	2007-08	2008-09
Software Exports (USD billion) Drugs and Pharmaceuticals	37.4	47.8	64	71.7
Production (metric tones)	6477.3	4378.3	22157.1	NA
Export (Rs, crores)	22116	24942	29100	31607
Electrical Machinery				
Electric generators (Rs. Crores)	969	1260	1474	1778
Electric motors ('000)	1974	2049	2101	2151
Production of Steel (million tones)				
Pig Iron	4.695	4.993	5.314	5.289
Finished Carbon Steel	44.544	55.416	58.233	59.02

Sources: www.rbi.org.in, http://indiabudget.nic.in/, www.nasscom.org/, www.ibef.org, http://www.pharmaceutical-drug-manufacturers. com/,www.infoshine. com/industry.

Table 2: Number of firms in each sector

Sectors	Number of firms	Percentage of total
Drugs and Pharmaceuticals	46	27.9
Steel	20	12.1
Finance	17	10.3
Electrical Machinery	41	24.8
Software	41	24.8
Total	165	100.0

$$e = \frac{\Delta D}{\Delta P} * \frac{P}{D} \tag{4}$$

when D is dividend and P is profit rate (=100*PAT/Sales).

It is easy to see that if firms increase (decrease dividend in response to increase (decrease) profit rates, $\Delta D/\Delta P$ and elasticity, will be positive for all firms. On the other hand, if firms behave asymmetrically then there will be differences in the sign of elasticity. Consider two groups of firms:

- Firms whose profit rate has increased: If such firms increase their dividend then $\Delta D/\Delta P$ and elasticity will both be positive
- Firms whose profit rate falls: If such firms do not reduce dividend payouts, then $\Delta D/\Delta P$ and hence elasticity will be negative for these firms

It is easy to test for differences in dividend policies-we simply have to test for statistically significant different value of elasticities between the two firms using the t-test. Now the t-test is based on the assumption that elasticity is normally distributed. Although the sample size is large enough to allow us to make this assumption (even in Finance, where we have data for 17 firms, we have a total of 68 observations), we have also used non-parametric tests (the Kruskall Walhs H and Mann Whitney U tests) to recheck our results.

Note, however, that initially we simply test for *differences in elasticity*. Subsequently, we have also tested whether elasticity for the second group of firm is negative or not. For this the null hypothesis is $e = 0$ (against the alternative of $e<0$). Here, only the t-test has been applied.

RESULTS

Exploring relation between dividend and profit rate: The literature on dividend policy suggests that the relation between profit rate and dividend pay-outs should be positive-if the profit

Table 3: Dividend policy of firms whose profit rate has increased-classified by sectors

Industry	Dividend increased	Dividend same	Dividend decreased	Total firms
Drugs and pharmaceuticals	80 (82.5%)	14 (14.4%)	3 (3.1%)	97(100%)
Steel	23 (71.9%)	9 (28.1%)	0 (0.0%)	32 (100%)
Finance	8 (25.8%)	20 (64.5%)	3 (9.7%)	31(100%)
Electrical machinery	60 (63.8%)	31 (32.9%)	3 (3.2%)	94 (100%)
Software	51(65.4%)	21 (26.9%)	6 (7.7%)	78 (100%)

Table 4: Dividend policy of firms whose profit has fallen-classified by sectors

Industry	Dividend decreased	Dividend same	Dividend increased	Total firms
Drugs and Pharmaceuticals	22 (26.51%)	22 (26.51%)	39 (46.99%)	83 (100%)
Steel	13 (29.55%)	12 (27.27%)	19 (43.18%)	44 (100%)
Finance	8 (24.24%)	14 (42.42%)	11(33.33%)	33 (100%)
Electrical Machinery	21 (32.81%)	22 (34.38%)	21(32.81%)	64 (100%)
Software	21 (24.7%)	23 (27.1%)	41(48.2%)	85(100%)

Table 5: Elasticity of dividend with respect to profit rate-by sectors

		Mean elasticity		
Industry	No. of observations	Profit rate increased	Profit rate decreased	t-value
Drugs and pharmaceuticals	180	303.16	-254.81	-4.001*
Steel	76	308.99	-283.43	-3.430*
Finance	64	176.39	-134.80	-1.235
Electrical machinery	158	278.01	-203.29	-4.763*
Software	163	-490.72	-1,118.69	-0.783

The Levene's test is used to test between equal and unequal sample variances. Based on the results, the appropriate formula for the t-statistic is chosen. * Means significant at 5% level

rate increases, dividend payouts will be increased and vice versa. In fact this is what we observe when we look at the firms whose profit rate has increased during the period of study (Table 3). In Drugs and Pharmaceuticals, 83% of firms have increased their profits; this proportion is 72% in Steel, 64% in Electrical Machinery and 65% in Software. Only Finance sector firms standout -26% of firms have increased dividends, while 65% have maintained dividend.

However, the analysis of dividend policies of firms whose profit rate has fallen gives a different result from what is expected (Table 4). A large proportion of the firms in our sample have not reduced dividend payouts. About 33% of firms in the Electrical Machinery sector have reduced dividend pay-outs in response to a decline in profit rates. This proportion is even lower in the other sectors (27% in Drugs and Pharmaceuticals, 30% in Steel, 24% in Finance and 25% in Software).

There are thus considerable grounds to argue that dividend policies of Indian firms are asymmetric and not consistent with theory or commonsense expectations.

Tests for asymmetrical behavior: The asymmetrical behavior of firms calls for closer examination. In particular is the observed difference between the two groups of firms statistically significant? In order to arrive at a conclusion, we have estimated the elasticity of dividend with respect to profit rate for each firm and then estimated average elasticity for the two groups of firms (viz. whose profit rate has increased, and whose profit rate has decreased). Statistical tests of the difference in elasticity would imply that the dividend policy of the two groups of firms is indeed different. Table 5 reports the results for the tests.

From Table 5 we can see that the elasticity of firms whose profit rate has increased is positive. This means that the expected positive relation between dividend payouts and profit rate exists for this group of firms. The sole exception is Software (-491). However, the elasticity of dividend payout with respect to profit rate for the firms whose profit rate has fallen is negative for all five sectors. Further, t-tests of the difference between elasticities for the two groups of firms reveals that the differences are significant at 1% level in three industries (t-ratios of Drugs and Pharma., Steel and Electrical Machinery are -4.001, -3.430 and -4.763, respectively). The exceptions are Finance and Software (with t-values are -1.235 and -0.783, respectively). This confirms the existence of the asymmetrical dividend policy of firms.

Now an important limitation of the classical t-test is that it assumes that the observations are normally distributed. Given the sample size used in this paper this is not an unreasonable assumption, but a more rigorous test of statistical difference between dividend policies would be using non-parametric tests. Since these tests are based on ranks and not absolute values of elasticity, this would also nullify the effect of outliers in the data. We have used the Mann-Whitney U-statistic and Kruskall Wallis H-statistic tests. Both are based on the null hypothesis that the two samples are drawn from the same population or not, without making any assumption about the nature of sampling distribution.

The results of the non-parametric tests, however, are almost identical to the earlier results Table 6. Results of both the U-statistic and H-statistic indicate (at the 1% level of significance) that the hypothesis that the two samples are drawn from the same population is rejected for all sectors, excepting firms in the financial sector (U and H statistics are 129 and 1.450, respectively)- indicating that the dividend policies of the two groups of firms (profit rate has increased and profit rate has decreased) are indeed different.

A disaggregated analysis: Now an important issue is that some firms have a record of having a more volatile dividend policy-that is their dividend policies fluctuate to a sharper extent than other firms in the same industry group. An interesting question is whether the asymmetry observed for the industry as a whole is present in firms with a history of sharp fluctuations in dividend and firms with a record of relatively stable dividend payouts.

The classification of firms in each industry group by their dividend policy is undertaken as follows. The standard deviation of dividend payouts over of each firm is estimated over the period of study and their median calculated for each industry group. The median is then used to divide each industry group into two groups-firms whose standard deviation is greater than the industry median (volatile dividend history) and firms whose standard deviations are less than the industry median (stable dividend history). The reluctance of firms whose profit has declined to reduce dividend payouts observed in Table 4 may be seen for the disaggregate sample also (Appendix Table).

Table 6: Results of non-parametric tests-by Sectors

Industry	Number of observations	Mann Whitney U test	Kruskall Wallis H test
Drugs and pharmaceuticals	180	1028.0**	49.684**
Steel	76	81.0**	26.160**
Finance	64	129.0	1.450
Electrical machinery	158	573.5**	38.489**
Software	163	859.5**	27.721**

*Means significant at 5% level. **Means significant at 1% level

Table 7: Elasticity of dividend with respect to profit rate-by sector and dividend record

			Elasticity		
Industry	Dividend history	N	Mean for PR increase	Mean for PR decrease	t-value
Drugs and Pharmaceuticals	Volatile	92	263.63	-397.29	-2.940*
	Stable	88	364.91	-61.78	-2.725*
Steel	Volatile	40	296.15	-320.26	-2.289*
	Stable	36	333.09	-221.12	-2.188*
Finance	Volatile	32	253.23	-200.23	-1.357
	Stable	32	7.3450	143.26	1.069
Electrical Machinery	Volatile	80	300.37	-415.06	-3.514*
	Stable	78	245.70	-7.786	-3.659*
Software	Volatile	84	-865.90	-1,769.09	-0.744
	Stable	79	259.69	46.61	-2.556*

The Levene's test is used to test between equal and unequal sample variances. Based on the results, the appropriate formula for the t-statistic is chosen. *Means significant at 5% level

From Table 7, we can see that the elasticity of dividend payout of both sub samples (i.e., firms with history of volatile dividend and firms characterized by stable dividend policy) of four industries -namely Drugs and Pharmaceuticals, Steel, Electrical Machinery and Softwar-is positive when profit rate has increased. The only exception is 'volatile firms' in the Software sector (-866 and -1769), though firms with a record of stable dividend pay-outs in the software sector have a positive elasticity (260 and 47), as expected.

If we look at differences in elasticities between firms whose profit rate has increased and those firms whose profit rate has fallen, a statistically significant difference at 1% level can be observed for both groups of firms in the Drugs and Pharmaceuticals (-2.940 and -2.725), Steel (-2.289 and -2.188) and Electrical Machinery sectors (-3.514 and -3.659), irrespective of whether the firms are characterized by stable or volatile dividend history. In the financial sector, elasticities are not significantly different for all firms, irrespective of their dividend history. In the Software sector, firms with stable dividend policies behave asymmetrically (the t-statistic of -2.556 indicates significant difference in elasticities at 1% level), while firms with volatile dividend policies have same elasticities (t-statistic of -0.744 is statistically insignificant at 5% level), irrespective of whether their profit rate increases or decreases.

The result of the non-parametric tests is similar to the earlier results (Table 8). In firms in the Drugs and Pharmaceuticals sector, the Mann Whitney U and Kruskall Wallis H statistics are statistically significant at the 1% level for both the volatile firms (H = 322.50, H = 32.54) and stable firms (U = 191, H = 17.63). Similar results are obtained for Electrical Machinery (Stable firms: U = 109.50, H = 27.08; Stable: U = 191.00, H = 9.11) and Software (Stable firms: U = 328.00, H = 21.42; Stable: U = 115.00, H = 7.65). In the case of the Steel industry, these statistics are significant at 1% level for volatile firms (U = 7.00, H = 23.90) but significant at only the 5% level for stable firms (U = 19.00, H = 5.75). Thus the alternative hypothesis-that firms are drawn from different populations-is accepted for both groups of firms (with stable and volatile dividend policies) not only for Drugs and Pharmaceuticals, Steel and Electrical Machinery sectors but also for the Software sector. In Finance, once again, the observed difference in elasticity of dividend is not statistically significant at even the 10% level (Volatile: U = 64.50, H = 1.88; Stable: U = 7.00, H = 0.56).

Table 8: Results of non-parametric tests-by sector and dividend record

			Period	
Industry	Sub-sample	N	Mann Whitney U test	Kruskall Wallis H test
Drugs and pharmaceuticals	Volatile	92	322.500**	32.541**
	Stable	88	191.000**	17.634**
Steel	Volatile	40	7.000**	23.900**
	Stable	36	19.000*	5.749*
Finance	Volatile	32	64.500	1.879
	Stable	32	7.000	0.559
Electrical machinery	Volatile	80	109.500**	27.077**
	Stable	78	191.000**	9.109**
Software	Volatile	84	328.000**	21.417**
	Stable	79	115.000**	7.649**

*Means significant at 5% level, **Means significant at 1% level

Table 9: Testing for value of elasticity of dividend

Sector	Mean	τ	Probability
Drugs and Pharmaceuticals	-254.81	-1.9366	0.03
Electrical Machinery	-203.59	-2.1167	0.02
Steel	-283.44	-2.0047	0.03
Software	-1118.70	-2.1245	0.02
Finance	-134.80	-0.9605	0.17

Is elasticity of dividend negative?: Now, we had seen that elasticity of firms whose profit rate has decreased is negative. The analysis of the previous sub-sections has merely shown that the responsiveness of elasticity with respect to profit is significantly higher for firms whose profit rate has increased compared to those firms whose profit rate has decreased-it had not established the sign of elasticity for the latter group of firms. In this section, we test for the sign of elasticity. This comprises of testing:

$$H_0: (e = 0) \text{ against } H_1: (e < 0)$$

Using the t-test. Table 9 reports the results. The average value of elasticity of dividend with respect to profit is -254.81 (Drugs and Pharmaceuticals), -203.59 (Electrical Machinery), -283.44 (Steel), -1118.70 (Software) and -134.80 (Finance). For financial sector firms, the τ-statistic (= -0.96) is insignificant at even the 10% level. This indicates that the elasticity value is equal to 0. For the other sectors, however, the value of the τ-statistic (-1.94, -2.12, 2.00, -2.12, respectively) indicates that elasticity is significantly lower than 0 at 1% level. These results imply that firms whose profit rate falls increases dividend, instead of reducing it.

DISCUSSION

Does the Lintner model survive?: Our findings clearly indicate that dividend is not linearly related to profit rate. Indian firms tend to, in general, display a reluctance to reduce dividend payouts irrespective of whether profit rate declines or not. This leads us to question the Lintner model which fails to take into account this asymmetric behaviour.

Table 10: Modified lintner model for each sector

	Drugs and pharmaceuticals	Electrical machinery	Steel	Software	Finance
D_{it-1}	-0.25 (11.24)**	-0.12 (2.40)**	-0.59 (6.61)**	-1.70 (33.37)**	-0.32 (6.58)**
Slope Dummy	-0.11 (5.41)**	-0.03 (0.1.54)	-0.0003 (0.01)	-0.34 (13.77)**	-0.11 (1.77)*
π_{it}	0.16 (17.73)**	0.07 (6.00)**	0.18 (7.92)**	0.56 (20.86)**	0.17 (1.17)**
Intercept	-3.24 (1.85)*	-0.14 (0.36)	-5.17 (1.27)	16.05 (2.46)**	-3.73 (0.88)
N	180	160	76	164	64
F	122.99	28.04	56.68	641.43	44.83
R^2	0.68	0.35	0.70	0.64	0.68
Rho	-	-	-	0.85	-
Model	FEM	FEM	FEM	REM	FEM

Values in parentheses are absolute values of t-ratios. ** and * denote significance level at 5 and 1% levels, respectively.

We suggest that instead of the linear form of the dividend-profit relationship stated in Eq. 2, we should adopt an alternative form that distinguishes between firms whose profit rate has decreased and those whose profit rate has increased. This calls for incorporation of a slope dummy:

$$\Delta D_{it} = \alpha\ D_{it-1} + \beta\ \Delta\ \pi_{it} + \gamma\ SD + \varepsilon_{it}, \tag{5}$$

when SD $= \pi_{it}$ for profit rate increases,
= 0 otherwise.

Now we are using cross sectional time series data-that is we have data for a set of firms over several years. This is also referred to as panel data. While it is possible to use ordinary multiple regression techniques on panel data, they may not be optimal. The estimates of coefficients derived from regression may be subject to omitted variable bias-a problem that arises when there is some unknown variable or variables that cannot be controlled for that affect the dependent variable. With panel data, it is possible to control for omitted variables that differ between firms but are constant over time and also omitted variables that vary over time but are constant between firms.

The standard procedure in such cases is to apply the LM test. If the null hypothesis (no significant time/cross-section differences) is accepted then we can simply pool the data and apply OLS. In our study we found that the value of χ^2 was lower than the tabulated value in Drugs and Pharmaceuticals, Steel, Finance and Electrical Machinery.[6] Only in case of Software, do we have to control for omitted variables. In this case we have to apply the Hausman test to choose between the Fixed Effects Model (omitted variables vary systematically with either time or between firms) and Random Effects Model (omitted variables do not vary systematically-some vary across time, others between firms). Unfortunately, the data fails to meet some of the asymptotic properties of the Hausman test, so that we obtain a negative value of χ^2. In this case, therefore, we have used reported the fixed effects model as the estimates will always be efficient.

The regression results are reported for each sector in Table 10.

The F-statistic is significant at the 1% level for all the five models, indicating that the model holds. The goodness of fit (R^2) ranges from 0.64 (Software) to 0.70 (Steel), with only Electrical Machinery having a low value of R^2 (0.35). This is quite satisfactory. Now the coefficient of lagged

[6]The values of χ^2 are 1.22 (0.27), 0.83(0.36), 0 (0.95), 59.34 (0.00) and 0.27 (0.61) for Drugs and Pharmaceuticals, Steel, Finance, Software and Electrical Machinery, respectively. Figures in parentheses state the probability values

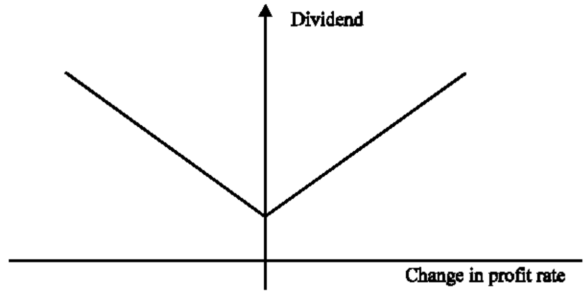

Fig. 1: Relationship between dividend and change in profit rate

dividend is negative and significant at 1% level in all five sectors, while current profit is positive and significant at 1% level. Both results are expected and in line with Lintner's model. However, it is in the coefficient of the slope dummy that we are interested in. If this is significant then, the Lintner model calls for some modification. It can be seen that the coefficient of this dummy is significant at 1% level in Drugs and Pharmaceuticals (γ = -0.11, t = 5.41), Software (γ = -0.34, t = 13.77) and at 10% level in Finance (γ = -0.11, t = 1.77) sectors. This implies that the Lintner model has to be modified for these sectors. In Electrical Machinery and Steel, the t-ratios of γ are 1.54 and 0.01, respectively), indicating that the null hypothesis (γ = 0) has to be accepted at the 10% level.

CONCLUSION

To sum up, our findings indicate that Indian firms have a reluctance to reduce dividend pay-outs. While the majority of firms tend to increase dividend pay-outs when their profit rate increases, a decrease in profit rate leads to asymmetric behaviour. A large proportion of the firms either maintains dividend pay-outs, or even increases such payments. This behaviour is observed in key sectors of the Indian economy like Steel, Electrical Machinery and Drugs and Pharmaceuticals. In the case of Software, another sunrise industry, the evidence is mixed. While the t-tests indicates that asymmetric behaviour is observed only among firms with stable dividend history, stronger tests find evidence of asymmetric behaviour also in firms with a record of volatile dividend pay-outs. Only the firms belonging to the Finance sector appear to behave 'normally'. This leads to a V-shaped dividend-profit rate curve (Fig. 1) for most of the firms studied.

Now the question is why do firms behave in this manner? One reason may be that firms may believe that dividend announcement as perceived by investors as a signal of their financial conditions (Lukose and Sapar, 2010; Nazir *et al.*, 2010; Rashid and Rehman, 2008; Seetharaman and Raj, 2011).[7] In this context it should be kept in mind that during the period of study the Indian economy was in a strong position. This was reflected in the bullish sentiments prevailing in the stock markets. The majority of firms were announcing high dividend at this time. In such a situation, the reduction of dividend payouts by a firm may be interpreted as a sign of

[7]For instance, studies show that lenders may base their lending decisions on annual reports, containing inter alia, dividend announcements (Kitindi *et al.*, 2007)

financial weakness. This explanation may be tested by examining the relationship between dividend announcements and share prices-we have to investigate the direction of movement of share price of the firm when dividend is announced. Similarly we should also test whether this asymmetric behaviour holds when the stock market is down. This forms an interesting agenda for future research.

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APPENDIX

Table A.1: Change of dividend in response to change in profit rate-by sector and dividend history

Sector	Dividend record	Change in profit rate	Dividend decreased	Dividend same	Dividend increased	Total firms
Drugs and	Stable	Decrease	10 (24.4)	17 (41.5)	14 (34.2)	41 (100)
Pharmaceuticals		Increase	1 (2.1)	11 (23.4)	35 (74.5)	47 (100)
	Volatile	Decrease	12 (28.5)	5 (11.9)	25 (59.5)	42 (100)
		Increase	2 (4.0)	3 (6.0)	45 (90.0)	50 (100)
	Composite	Decrease	22 (26.5)	22 (26.5)	39 (46.9)	83 (100)
		Increase	3 (3.1)	14 (14.4)	80 (82.5)	97 (100)
Steel	Stable	Decrease	3 (15.8)	8 (42.1)	8 (42.1)	19 (100)
		Increase	0 (0.0)	9 (52.9)	8 (47.1)	17 (100)
	Volatile	Decrease	10 (40.0)	4 (16.0)	11 (44.0)	25 (100)
		Increase	0 (0.0)	0 (0.0)	15 (100)	15 (100)
	Composite	Decrease	13 (29.5)	12 (27.3)	19 (43.2)	44 (100)
		Increase	0 (0.0)	9 (28.1)	23 (71.9)	32 (100)
Finance	Stable	Decrease	3 (20.0)	11 (73.3)	1 (6.7)	15 (100)
		Increase	0 (0.0)	14 (82.3)	3 (17.6)	17 (100)
	Volatile	Decrease	5 (27.8)	3 (16.7)	10 (55.6)	18 (100)
		Increase	3 (21.4)	6 (42.9)	5 (35.7)	14 (100)
	Composite	Decrease	8 (24.2)	14 (42.4)	11 (33.3)	33 (100)
		Increase	3 (9.7)	20 (64.5)	8 (25.8)	31 (100)
Electrical machinery	Stable	Decrease	13 (39.4)	11 (33.3)	9 (27.3)	33 (100)
		Increase	1 (2.2)	22 (48.9)	22 (48.9)	45 (100)
	Volatile	Decrease	8 (25.8)	11 (35.5)	12 (38.7)	31 (100)
		Increase	2 (4.1)	9 (18.4)	38(77.5)	49 (100)
	Composite	Decrease	21 (32.8)	22 (34.4)	21 (32.8)	64 (100)
		Increase	3 (3.2)	31 (32.9)	60 (63.8)	94 (100)
Software	Stable	Decrease	12 (29.3)	20 (48.8)	9 (22.0)	41 (100)
		Increase	1 (2.6)	19 (50.0)	18 (47.4)	38 (100)
	Volatile	Decrease	9 (20.5)	3 (6.8)	32 (72.7)	44 (100)
		Increase	5 (12.5)	2 (5.0)	33 (82.5)	40 (100)
	Composite	Decrease	21 (24.7)	23 (27.1)	41 (48.2)	85 (100)
		Increase	6 (7.7)	21 (26.9)	51 (65.4)	78 (100)

In parentheses are percentages

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