DYNAMIC RELATIONSHIP BETWEEN INVESTMENT, EARNINGS AND DIVIDENDS: EVIDENCE FROM ENGINEERING SECTOR OF PAKISTAN

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Abstract

This study examines the relationship among profit, investment and dividend decisions for the firms of engineering sector listed in Karachi Stock Exchange. Using the multivariate vector autoregressive model, granger causality and impulse response function, this study identifies the strong relationship among profit, dividend and investment. Investment and dividends have bi-directional causality while in case of investment and net profit causality runs from investment to profits. In case of dividends and profits, causality runs from dividends to net profit indicating the presence of information content of dividends. However, investment is the most important particularly with regard to its substantial and long lasting impact on profits and consequently on dividend decisions.

As far as allocation of profits towards investments and dividends are concerned, it is found that profits are allocated more towards paying dividends rather than making investments and most of the investments are made out of external financing. However, in view of relationship among investments, dividends and profits it is important to review decisions regarding making investment and dividends after four years and three years respectively.

Keywords: Dividend Decisions, Investment Decisions, Dynamic Relationship, Causality, Multivariate Vector Autoregressive Model, Impulse Response Function.

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Introduction

Investment, financing and dividend decisions are an integral part of corporate financial management policy. Investment decision requires an appropriate choice and combination of internal and external sources of finance, while decision regarding dividends involves about determining portion of profit to be distributed among shareholders consequently restricting the internal sources of finance. If the amount of dividend paid is larger, the residual funds retained for reinvestment purposes will be reduced and consequently the firm will have to depend upon alternative sources of long term finance like further issues of equity and/or debt capital to finance current and new projects. Earning is a main target and major source of internal funds. Therefore, for investment and dividends decisions, the internally generated funds i.e. profitability needs to be a top priority for firms. While making decisions about cash dividend, a firm may rely on the past earnings or the expected future earnings. Objective of firms' investment is to enhance their future capacity of earnings (Bar-Yousef, Callen, & Livn, 1987) which in turn enables the firms to raise future dividend distributions to maximize shareholders wealth (DeFuscoa, Dunhamb, & Geppertc, 2007). Thus dividend distributions also signal about future earnings and motivate favorable stock price reactions (Kao & Wu, 1994) adding further to shareholders wealth in the form of capital gains. Consequently, the earnings, investment and cash dividends have causal relationship among them which has also some serious implications for firms' capital structure. Objective of this study is to explore these causal relationships, identify their consequences and suggest some policy implications.

This study uses panel data of 35 firms of engineering sector listed on Karachi Stock Exchange of Pakistan for the period of 1999 to 2009. This paper identifies the dynamic relationships among investments, earnings and dividends using vector auto regression (VAR) model. In order to identify the relationship among investment, dividends and earnings, granger causality and Wald restriction test is

used, which helps to identify whether past value of one variable can provide statistically significant future values of other variable or not i.e. one variable granger causes other or not. We use impulse response function and variance decomposition to test long term relationship and measure the strength of each variable in predicting other variables.

This study identifies the strong relationship among profit, dividend and investment. Investment and dividends have bi-directional causality while in case of investment and net profit causality runs from investment to profits. In case of dividends and profits, causality runs from dividends to net profit indicating the presence of information content of dividends. However, investment is the most important particularly with regard to its substantial and long lasting impact on profits and consequently on dividend decisions.

As far as allocation of profits towards investments and dividends are concerned, it is found that profits are allocated more towards paying dividends rather than making investments and most of the investments are made out of external financing. However, in view of relationship among investments, dividends and profits it is important to review decisions regarding making investment and dividends after four years and three years respectively.

The rest of the paper is organized as follows: section 2 reviews literature. Section 3 identifies data sources, research design and methodology. Section 4 presents results and discussion. Section 5 gives conclusion and policy inferences and recommendations.

Review of the Literature:

Several studies are documented regarding relationship between investments, dividends and profits. These studies are mostly related to bi-variate and tri-variate analysis.

Relationship between Dividends and Earnings/profits

A firm that earns profit faces the choice of allocation of its profits between dividends and reinvestment. Miller and Modigliani (1961) theorem says that investment policies are the main determinants of firm value and therefore dividend payments must be made out of the earnings in excess of the required capital expenditure. However, dividend payments are necessary and at least current dividends must be maintained (Lintner, 1956). According to Linter dividends must be paid out of earnings and not from residual earnings.

In order to find out the relationship between dividend payouts and only permanent part of earnings or stable earnings, earnings were decomposed into permanent and transitory parts by Lee (1996) in a time series analysis. The study of dividends in relation to only permanent part of earnings supported the notion that dividends show strong behavior towards the permanent change in earnings- which is also called permanent earning hypothesis in literature. On the other hand there is a hypothesis called partial adjustment hypothesis which states that managers have a target dividend and they partially adjust their dividend to that target dividend over time (Lee, 1996). They only make adjustments if they have reasonable indications to believe that the change in dividends will not have to diminish in near future. These inferences were made using vector auto regressive models and co-integration regression and suggested that permanent adjustment hypothesis is true only in case where target dividends are in particular proportion of permanent income rather than current earnings.

Fama and Babiak (1968), Pettit (1972) and Watts (1973) view earnings as the possible causation of dividends particularly in case of micro behavior of individual firms. Their analysis and finding support the notion that managers increase dividend payments only to increase in unanticipated and non-transitory changes in earnings, which is also propagated by Lintner (1956). According to the theory of dividend stabilization in practice most of the firms adopt stable dividend policies

that do not adjust their dividend policies straight away when their earnings change (Lintner, 1956) because firms are reluctant to decrease dividends thus they only increase dividends when they have reasonable evidence that the earnings will increase in future with stability (Miller and Modidliani, 1961).

Higher dividend payouts are associated with higher future earnings. Higher dividends and higher future earnings relationship was found in a company level or individual analysis. Zhou and Ruland, (2006) analyzed this relationship under various conditions and results have strong association between dividend payouts and future earnings for example in case of different measures of earnings, after controlling mean reversion in earnings, different sub-periods, taking into account different industry effects and impact of share repurchases. Zhou and Ruland, (2006) also tested Free Cash Flow Theory; relationship between payouts and earnings was found stronger for low growth companies or for companies which have tendency towards over-investment.

Future earning information plays an important role in the determination of dividend policy. Hsu et al. (1998) tested the impact of future earning information on dividend policy by decomposing earnings into two parts namely transitory and permanent earnings and found that permanent part of earnings plays an important role in explaining the dividend behavior. Further dividend adjustment model performed better in case when target dividends were taken as proportion to the permanent component of earnings. Supporting the hypothesis of information content of dividends Nissim and Ziv (2001) investigated the relationship between dividends and future earnings or abnormal earnings. Following the change in dividends, earnings were found positively related to dividend for two years while controlling the expected change in earnings. Further dividends were also positively related to profitability when measured in terms of future earnings and future expected earnings and results get stronger in case of abnormal earnings. And the above findings were non-

symmetric in the sense that dividend increases had relationship with profitability, even up to four proceeding years: but dividend decreases did not have any relationship with the profitability. However, Nissim and Ziv (2001) attributed this non-symmetry of results to accounting conservatism.

There exist some theoretical arguments about the importance of taxation and firm prospects as determinants of dividend policy. Sarig (2004) used vector auto regression models, and found that increase in profitability lead to increased number of repurchases and then payouts but over time increase in taxation on capital gains has increased the dividend payouts and decreased number of repurchases. Sarig (2004) supported that investment decisions guide the way to dividend policies and opposite is not true. Information content of dividends was also supported by him i.e. corporate payouts show the increase in future profitability. Many diagnostics checks like re-estimation with shorter sample and larger sample and controlled legal changes yielded same results that show that results were quite strong.

Baumol et al. (1970) find insignificant relationship of reinvestment of corporate earnings with future corporate earnings. However, Bar-Yousef et al.(1987) identified that corporate earnings have considerable impact on future investment of the firm but reverse is not possible. In addition, in case earnings provide an indication of the firm's capability to locate and exploit profitable investment opportunities, shareholder would like to forgo dividends and prefer reinvestment, thus implying that dividend payments will not affect investments. Kao and Wu (1994) established a positive relationship between dividend payments and corporate earnings. Mozes and Rapaccioli (1998), Nissim and Ziv (2001) conclude that large increases in dividend payments lead to a decrease in future earnings and minor increase leads to an increase in future earnings. Nissim and Ziv (2001) point out that dividend changes are directly related to future increase in earnings for the firms listed on NYSE. Farslo et al. (2004) conclude that there is no long run relationship between dividends and earrings.

Time series analysis of dividends and earnings was used on Swiss companies data from 1982-2003, in which Linter model and Chi-square test showed that dividends depend more on current growth. Signaling model shows that companies which with positive increase in dividends normally have higher average earnings and firms which have dividend cuts are not in better conditions. So it supported the signaling content of dividends and showed that managers only cut dividends when they think they don't have sufficient earnings and increase dividends only when they think that their earnings have sufficiently or permanently increased (Stacescu, 2006). Therefore, price volatility had negative relationship with dividends because price volatility increases the unpredictability of earnings and thus reduces the chances of dividend payouts due to unpredictable future.

Relationship between Dividend and Investment Decisions

Miller and Modidliani (1961) gave an idea that dividend policy of a firm does not affect its value in a perfect capital market. The underlying reason for this irrelevance of dividend policy and firm value is that stockholder can reproduce any desired stream of payments by purchasing and selling equity.

Morgan and Pierre (1978) tested the idea related to independence of investment and dividend payouts developed by Modigliani and Miller (1961) who replicated the work of Fama (1974). Morgan & Pierre (1978) not only replicated the work of Fama (1968) but they also tested long-run objectives of investment rates and payouts, another addition was testing the impact of parent companies on the payout dicisions of subsidairies. However, they ristricted their study to only transitory changes in investments and found cosistent result with the optimal investment behavior. Further they establish that in Canadian firms' dividend payout policies are not affected by parent companies particularly due to same level of access to capital market and payouts does not restrict the availability of funds for investment.

Recent studies have found that there is a relationship between the investment, dividend and financing decisions of a firm i.e. they go against the independence principal. Independence principal says that there is no relationship between the financing, investing and dividend decision of a firm. De Fuscoa et al (2007) find that firms with larger investment opportunities show larger positive shocks in dividends. He used vector autoregressive models; variance decompositions and impulse response function to find the short term and long term interdependencies on investment, dividend and financing decisions. On the other hand investment decreases mildly to the positive shocks in dividends. Results also went against the independence principal hypothesis as dividend and investment both show log term effect on each other and thus has bi-directional interdependence.

Jensen (1986) presented the overinvestment theory which states that instead of paying dividends managers may take on negative NPV projects in order to increase the size of the firm. Larger firms are considered to be more prestigious by the managers and expect to get more income from the larger firms. But this does not go well with the interest of the shareholders. Black (1976) argues that dividend payments can reduce the problem of over-investment, due to reduction in free cash flows for making investments. Analysis of Chinese firms indicates the relationship between dividend payments and net operating cash flow of the firms; however, firms with little investment opportunities have plenty of cash flow (Liu and Hu, 2005). Bhaduri and Durai (2006) verified that in emerging economy with imperfect market, the dividends and investment decisions are taken jointly.

Relationship between Investment and Earnings

It is well documented in literature that investment decisions related to capital expenditures and research and development (R&D) expenses, have long-term impact on the business of a company. Most of the studies are in agreement that investments have positive impact on earnings (Cheng and Farber, 2008; McNichols and Stubben, 2008;

Bergtstresser et.al 2006). Dividends policy sometimes signals investors about the long term earning behavior of firms (Ganging, 2000). According to Bar-Yosef et al (1987) relationship between a firm's earnings and investment revealed that decisions regarding investment will be affected significantly by earnings but not the other way around. Taking into consideration both long term and short term numerals for internal funds and fixed investments into consideration at the same time, they found that there exists only uni-directional relationship from fixed investments to cash flows (Mahdavi et al, 1994).

In addition to previous studies, the (Lee & Nohel, 1997) study finds that there is bi-directional relationship between investments and earnings. In general, if expected earnings or permanent earnings increase, then firm is inclined to make additional investment, this is because permanent earnings are taken as annuitized NPV (Black and Scholes, 1973; Ohlson and Zhang, 1998). Thus in this case the earnings have positive impact on investments, and if earnings are of high quality or earnings are of permanent in nature then firm usually increase investments. However, if earnings are only transitory there are no corresponding changes in investment levels.

Data, Research Design and Methodology

This study uses a panel of 35 companies of engineering sector of Pakistan listed at Karachi Stock Exchange for the time period 1999-09. There were total 38 listed firms in engineering sector; three firms were excluded due to non-availability of complete series for the period. All firms are included whether they have paid or have not paid dividends over the whole time period in order to avoid sample bias in the data. The analysis of investment, dividends and profits require fairly large number of firms that had to have declared dividends for the period under study. The KSE listed engineering firms are selected because, owning to industrial growth during 1999-2009, these firms declared large amounts of dividends and undertook massive investments. However, the findings cannot be applied to the firms in

other sectors of the economy because underlying structure of other firms significantly differs from those of the engineering sector.

Table 1 shows that on average total amount of dividends paid during the time period of 1999-09 were Rs. 82.80 million while net profit and real investment Rs. 131.09 million and Rs. 211.35 million respectively. This shows that on average net profit for the engineering sector was reasonably greater than dividends and investments were on average substantially greater than both net profit and dividends. While values of median and maximum value made the picture more clear because 50% of the total amount of dividends is less than only Rs. 7.4 million and maximum value is Rs. 3756.9 million. Similarly median for net profit is Rs. 7.8 million and maximum net profit is Rs. 3488.9 million while median investment is Rs. 54.3 million and maximum investment amount is Rs. 3268 million.

Investment have the higher amount of standard deviation showing that firms substantially differ in terms of investment compared to average investment in the engineering industry. Similarly firms have considerably high standard deviations in dividends and net profit.

All three variables are positively skewed and the values greater than one is showing that data are highly skewed. However skewness in dividends is more than investment and net profit. While all have value of kurtosis greater than 3 showing that all have higher and sharper central peak and longer and fatter tails compared to a normal distribution.

As discussed earlier our purpose is to identify the interdependence and dynamics of investment, earnings and dividend behavior. So we use Vector Multivariate Autoregressive Model (VAR) in order to uncover the level of interdependence and causality. The main advantage of VAR model is that we need not to classify variables as endogenous or exogenous as it treats all variables as endogenous variables. They allow a variable to depend upon lags of its own and combination all other variables included in the VAR structure so they

Table 1:
Summary Statistics

	DIV (Rs. Millions)	NP (Rs. Millions)	INV (Rs. Million)
Mean	82.80	131.09	211.36
Median	7.40	7.80	54.30
Maximum	3756.90	3488.90	3268.00
Minimum	0.00	-833.40	-1510.00
Std. Dev.	260.75	414.42	492.31
Skewness	9.02	4.09	3.04
Kurtosis	116.50	24.79	16.29
Jarque-Bera	192049.60	7875.66	3106.58
Probability	0.00	0.00	0.00
Sum	28898.10	45751.00	73763.40
Sum Sq. Dev.	23661077	59765441	84345972

Source: State Bank of Pakistan and Authors' Calculations

are flexible and allow covering more features of data. One of the main advantages of the VAR approach to modeling and forecasting is that since only lagged variables are used on the right hand side, forecasts of the future values of the dependent variables can be calculated using only information from within the system. VAR is n-equation and n-variable linear model and as discussed earlier the n-variables included in the VAR structure depend upon their own lags and lags of n-1 variables. So in case of our data, the VAR structure will look like following:

$$INV_{i,t} = \beta_{10} + \beta_{11}INV_{i,t-1} + \cdots + \beta_{1k}INV_{i,t-k} + \alpha_{11}NP_{i,t-1} + \cdots + \alpha_{1k}NP_{i,t-k} + \gamma_{11}DIV_{i,t-1} + \cdots + \gamma_{1k}DIV_{i,t-k} + \mu_{1t} \quad ------(1)$$

$$NP_{i,t} = \beta_{20} + \beta_{21}INV_{i,t-1} + \cdots + \beta_{2k}INV_{i,t-k} + \alpha_{11}NP_{i,t-1} + \cdots + \alpha_{2k}NP_{i,t-k} + \gamma_{21}DIV_{i,t-1} + \cdots + \gamma_{2k}DIV_{i,t-k} + \mu_{2t} \quad ------(2)$$

$$DIV_{i,t} = \beta_{30} + \beta_{31}INV_{i,t-1} + \cdots + \beta_{3k}INV_{i,t-k} + \alpha_{31}NP_{i,t-1} + \cdots + \alpha_{3k}NP_{i,t-k} + \gamma_{31}DIV_{i,t-1} + \cdots + \gamma_{3k}DIV_{i,t-k} + \mu_{3t} \quad ------(3)$$

Where μ_{it} is a white noise disturbance term with $E(\mu_{it}) = 0, (i = 1, 2, 3), E(\mu_{1t}\mu_{2t}) = .0$ *or* even more precisely as

$$y_t = \beta_0 + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \cdots + \beta_k y_{t-k} + \mu_t \quad ------(4)$$

$g \times 1 \quad g \times 1 \quad g \times gg \times 1 \quad g \times g\,g \times 1 \qquad g \times g\,g \times 1 \quad g \times 1$

In above equation $\boldsymbol{y_t}$is the vector of dependent variables where $g = 3$ variables in the system. Extending the model to the case where there are k lags of each variable in each equation is also easily accomplished using this notation.

In case of economic and finance theories it's hardly possible that these provide the information amount of lags to be used in the VAR system or in other words how much time a variable takes to work through the system. In such cases, there are two methods through which lag length is selected i.e. imposing restrictions on the coefficients of lags and using the information criterion. In our case, we will use information criterion such as Akaike information criterion, Schwarz information criterion or Hannan-Quinn information criterion. However, violation of $COV(u_t u_{t-s}) = E(u_t u_{t-s}) = 0$ for all $t \neq s$ is often observed in time series data and panel data. To test serial autocorrelation in the data Breusch–Godfrey serial correlation Lagrange multiplier test is used which has null hypothesis that there is no serial correlation of any order up to k (lags) used in the test. This test is used to identify such number of lag at which there is no serial autocorrelation.

In case of our VAR structure, no clear interpretation can be made until we impose restrictions according to the theoretical background. For example, if we want to test that current value of investment is affected by the history of dividends and not the other way around then we will have to put restrictions that $\gamma_{11} = \gamma_{12} \cdots \gamma_{1k} = \beta_{31} = \beta_{32} = \cdots \beta_{3k} = 0$ Table 3.2 shows some of the possible restrictions and their explanation.VAR fitted on the differences of the data (not co-integrated) cannot be used for testing Granger Causality; however, for purposes other than granger causality such VAR model can be used.

Table 2:

Test of Granger Causality and Restrictions on VAR Models Hypothesis Implied Restriction

Sr.	Hypothesis	
1	Lags of NP_{it} do not explain current INV_{it}	$\alpha_{11} = \alpha_{12} = \cdots = \alpha_{1k} = 0$
2	Lags of DIV_{it} do not explain current INV_{it}	$\gamma_{11} = \gamma_{12} = \cdots = \gamma_{1k} = 0$
3	Lags of INV_{it} do not explain current INV_{it}	$\beta_{11} = \beta_{12} = \cdots = \beta_{1k} = 0$
4	Lags of NP_{it} do not explain current NP_{it}	$\alpha_{21} = \alpha_{22} = \cdots = \alpha_{2k} = 0$
5	Lags of DIV_{it} do not explain current NP_{it}	$\gamma_{21} = \gamma_{22} = \cdots = \gamma_{2k} = 0$
6	Lags of INV_{it} do not explain current NP_{it}	$\beta_{21} = \beta_{22} = \cdots = \beta_{2k} = 0$
7	Lags of NP_{it} do not explain current DIV_{it}	$\alpha_{31} = \alpha_{32} = \cdots = \alpha_{3k} = 0$
8	Lags of DIV_{it} do not explain current DIV_{it}	$\gamma_{31} = \gamma_{32} = \cdots = \gamma_{3k} = 0$
9	Lags of INV_{it} do not explain current DIV_{it}	$\beta_{31} = \beta_{32} = \cdots = \beta_{3k} = 0$

As explained earlier, the approach to VAR modeling makes it a theoretical model and thus it's difficult to interpret because it becomes difficult to explain the effect of lags on the future values of the variables included in the model due to changing values of lags and interdependence of the variables. Therefore, impulse response function and variance decomposition minimizes this problem. Impulse responses depict the degree of responsiveness of the dependent variables in the VAR to the shocks to each of the variables. So, for each variable from each equation separately, a unit shock is introduced to the error, and the effects upon the VAR system (all variables included except exogenous) over time are noted. There is a bit different method of examining VAR system dynamics called variance decomposition. It is more reasonable due to the fact that it shows the proportion of movements in the dependent variable due to its own shock and shock of other variables. And thus allow comparison because shock in one variable not only affects itself, but also to all other variables in the VAR. Variance decomposition finds out how

much steps-ahead (time) forecast error variance of a given variable is explained by innovations to each explanatory variable for time period t=1,2,3,.....

Empirical Results and Discussion

In order to determine integration, we use Fisher based Augmented Dickey Fuller ADF as panel unit root test, the null hypothesis of which is non-stationary. Because VAR can be applied only on stationary series, therefore, we have generated Fisher based ADF for all three variables. Table 3 shows results of Fisher based ADF test at levels with trend and intercept. It shows that all variables are stationary, investment and dividends are stationary at 1% level of significance while net profit is stationary at 5% level of significance.

Table 3:

Test of Stationarity

Variable	Method	Statistic	Prob.
INV	Fisher-ADF	107.947	0.0024
NP	Fisher-ADF	97.7655	0.0159
DIV	Fisher-ADF	104.744	0.0028

Table 4 shows lags suggested by different criterions, Hannan-Quinn Information Criterion and Schwarz Information Criterion the appropriate lag length is 2 and the number of lags that minimizes the value of Akaike Information criterion and all other criterions is 4.

Nevertheless, in order to remove possible serial autocorrelation we have applied the LM test for serial independence for $k = 1...12$. This serial correlation is removed (at least at the 5% sig. level) if we increase the maximum lag length to $p = 6$ as shown in Table 5. Thus there will be $(1 + 4 \times 3) = 13$ variables in each equation.

Table 4:

VAR Lag Order Selection Criteria

Lag	Log L	LR	FPE
0	-4690.54	NA	6.44E+15
1	-4539.72	295.88	1.66E+15
2	-4529.83	19.11	1.64E+15
3	-4512.23	33.52	1.51E+15
4	-4501.01	21.04*	1.48e+15*
	AIC	**SIC**	**HQ**
0	44.91	44.96	44.93
1	43.56	43.749*	43.63*
2	43.55	43.88	43.68
3	43.47	43.95	43.66
4	43.45*	44.07	43.70

Table 5:

VAR Residual Serial Correlation LM Tests

Lags	LM-Stat	Prob.	Lags	LM-Stat	Prob.
1	12.25	0.20	7.00	6.42	0.70
2	20.75	0.01	8.00	10.99	0.28
3	56.96	0.00	9.00	4.26	0.89
4	29.36	0.00	10.00	10.06	0.35
5	59.38	0.00	11.00	7.78	0.56
6	2.93	0.97	12.00	3.54	0.94

Results of restrictions on Vector Autoregressive Model show bi-directional relationship between dividend and net profit as we can reject null hypothesis of DIV does not granger cause NP and NP does not granger cause DIV even at 1% level of significance. This is because dividends are paid out of available cash flows which increase

with increase in net profits therefore net profit causes dividends, on the other hand, dividends are paid only when management is certain about generating future profits thus dividends bear information content.

The results of restrictions on Vector Autoregressive Model (Table 6) are showing bi-directional relationship between dividend and net profit as we can reject null hypothesis of DIV does not granger cause NP and NP does not granger cause DIV even at 1% level of significance. This is because dividends are paid out of available cash flows which increase with increase in net profits therefore net profit causes dividends, on the other hand dividends are paid only when management is certain about generating future profits thus dividends bear information content and can be used as prediction for increase in future profitability.

Table 6:
Panel Causality Test

Null-Hypothesis	Test-statistic		p-value
DIV does not granger cause NP	F-statistic	6.6972	0.0000
	Chi-square	40.1833	0.0000
NP does not granger cause DIV	F-statistic	6.1886	0.0000
	Chi-square	37.1319	0.0000
INV does not granger cause DIV	F-statistic	2.8667	0.0121
	Chi-square	17.2003	0.0086
DIV does not granger cause INV	F-statistic	0.4508	0.8432
	Chi-square	2.7050	0.8448
NP does not granger cause INV	F-statistic	1.5720	0.1611
	Chi-square	9.4320	0.1507
INV does not granger cause NP	F-statistic	1.8150	0.1017
	Chi-square	10.8903	0.0918

As we can reject null hypothesis of INV does not granger cause DIV at 5% level of significance, so investment does granger cause dividends but reverse is not true. With increase in dividends, there remain fewer funds for investment but the reason behind this uni-directional relationship is that in our case firms give more importance to investment which is in most availed for external resources

rather than internal, this increase in investment causes increase in net profit and then effect is channeled to dividends. But with making dividend payments, investments are not much affected because effects on investment are dominated by external finances.

Net profit does not Granger cause investment because we are unable to reject null hypothesis even at 10% level of significance. As discussed above, this is because firms have more focus on getting external finances and are not able to use their own profits as reinvestments. While investment also does not cause net profit as we are unable to reject null hypothesis (INV does granger cause DIV).

In the following paragraphs, impulse responses and variance decompositions of each variable are generated separately against other variables in the VAR system. While computing the impulse responses and variance decompositions, there were few available options regarding order of variables because movements in any of the variables are likely to follow or precede other variables, which depend upon the policy and/or importance given by firms mainly to either investment or dividend payments. However, impulse responses are computed considering investment as leading variable and net profit and dividends as following variables respectively. Other orders are given in appendix for comparison purpose and are not discussed here because there was not much impact of change in Cholesky Ordering because residuals were uncorrelated from estimated equations.

Figure 1 shows responses of net profit and investment to one standard deviation (Rs. 260.75 million) positive change in dividends. Investment decreases by maximum of Rs. 66.81 million in third year due to one standard deviation positive shock in dividends and remains below base line up to fourth time period. One reason to this is that with increase in dividends firms are left with less internal funds for investment and thus investment decreases to increase in dividends. It converges to base line in fourth time period after which it becomes unstable and works out of the system. These results are

contrary to the independence principal, that there is no relationship between the financing, investing and dividend decision of a firm. Our results are consistent with those in DeFuscoa et al(2007) identify that larger investment opportunities show larger positive shocks in dividends but investment decreases mildly to the positive shocks in dividends.

Figure 1:

Responses of Investment and Net profit to Dividend

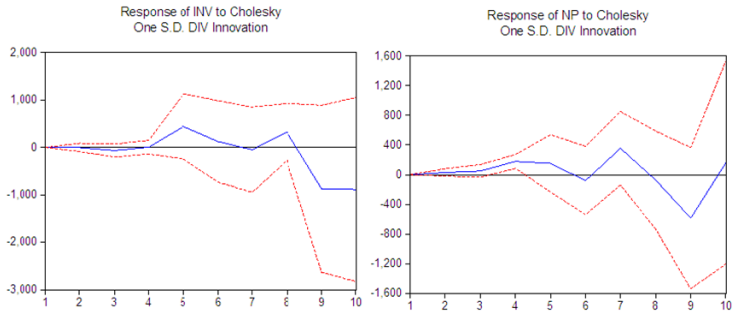


Table: 7

Response of INV and Net Profit to Dividends

Period	INV	NP
1	0.0000	0.0000
2	-2.3323	29.3165
3	-66.8146	49.3856
4	4.2047	178.6627
5	443.7347	152.0317
6	124.0684	-79.7203
7	-48.7025 4	355.6854
8	327.7517	-72.4748
9	-873.0362	-586.2458
10	-887.8190	160.6446

Responses of net profit show that with one standard deviation (Rs. 260.75 million) positive change in dividends, net profit increases and remain above base line till fifth time period. After fourth time period it starts converging to base line; however, it reaches to maximum of Rs. 178.66 Million in fourth time period, which is higher than the average net profit in the whole industry. In Figure 1 the movement of net profit above the base line shows that dividends have the information content i.e. increase in dividends can be used as the indication to increase in future profits. But net profit becomes unstable after fifth year and works out of the system. It supports information content of dividends and study of Nissim and Ziv (2001) because following the change in dividends, earnings are found to have positive relationship with dividends for at least four years after which these become unstable.

Figure 2:

Responses of Investment and Dividend to Net profit

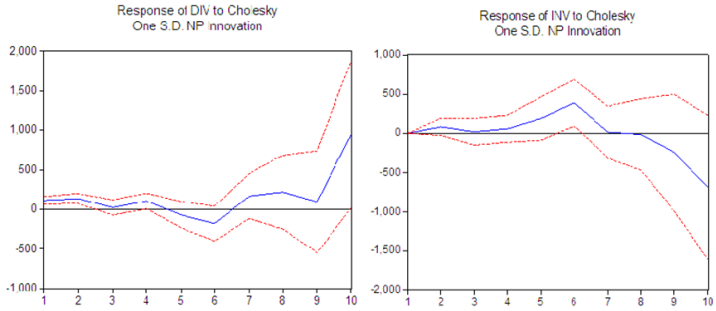


Table: 8

Response of DIV and investment to NP

Period	DIV	INV
1	112.7396	0.0000
2	134.2860	84.6291
3	21.6785	19.5593
4	103.4550	60.2856
5	-68.6356	190.9397
6	-181.7011	393.8494
7	167.0524	16.7921
8	216.2716	-12.4695
9	93.9066	-243.2851
10	943.6131	-688.8798

Figure 2 shows responses of investment and dividend to one positive standard deviation shock in net profit. Result show that with one positive shock in net profit (Rs. 414.41million) both dividends and investment increases and dividends starts converging to their base line after fourth time period while investment starts coming back to its base line after sixth time period and dividend in eighth time period and after that both move away and downwards from base line.

The above graph shows that the firms increase their dividends with increase in net profit but they do not pay much out of current earnings because the value of responses of dividends starts converging after fourth time period. Dividends achieve maximum value of Rs. 134.28 million in year two, which is higher than the industry average of Rs. 82.80 million. However, after fourth time period, dividends are also not stable as because they are moving away from the base line showing that dividends are not entirely controlled through net profit after fourth year. These results are consistent with the findings in Fama and Babiak (1968), Pettit (1972) and Watts (1973) i.e. causation runs from earnings to dividends and the notion that managers increase dividend payments only to increase in unanticipated and non-transitory change in earnings, which is also promulgated by Lintner (1956). It also supports study of Lintner (1956) and theory of dividend stabilization according to which in practice most of firms adopt stable dividend policies that do not adjust their dividend policies straight away when their earnings change.

Figure 3:

Responses of Net profit and Dividend to Investment

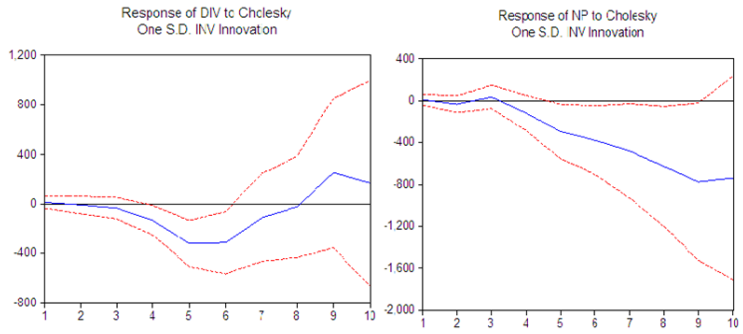


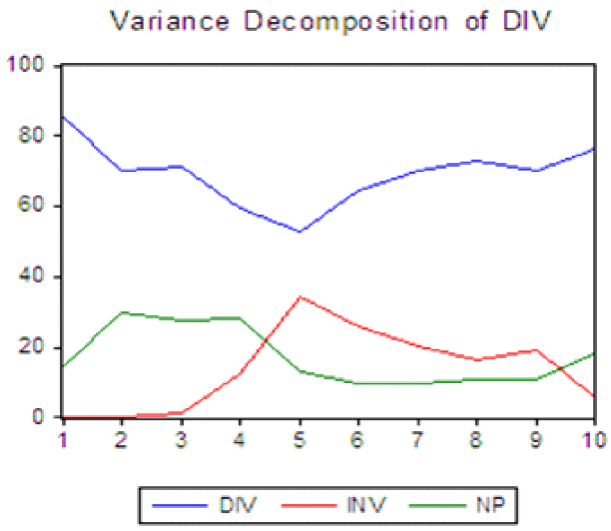
Table:9

Response of Net Profit and Dividends to Investment

Period	NP	INV
1	8.369306	13.40004
2	-34.23256	-8.718078
3	35.91891	-33.44870
4	-119.7205	-130.7263
5	-294.8229	-319.0318
6	-377.1354	-313.2153
7	-480.7489	-110.3561
8	-627.9697	-22.36166
9	-775.0477	250.0488
10	-738.1443	167.4167

Figure 4:

Variance Decomposition of Dividend



Investments also increase due to one positive shock in net profits and achieve maximum of Rs. 84.63 million in second year and converge in third time period after which it becomes unstable. One important finding is that apportionment of investment out of net profits is less than dividends. Investments are also not stabilized through net profits because entire investments are not financed only through net profits there are other external financing options also. On the other hand, investments also depend upon the growth opportunities and upcoming projects. Our results of casualty in Table 6 and impulse response function in figure 2 contrary to that in Bar-Yosef et al., (1987) and Mahdavi et al. (1994) which suggested that there exist uni-directional relationship from real investments to earnings. However the reason for no causality between investment and earnings is the working of Pecking Order theory, according to which investment decisions deeply affect debt ratio and profitability of a firm. But in our case investments are causing rapid increase in financing cost and thus debt ratio due to shortage of internal funds and therefore, earnings are not strong enough to affect investments.

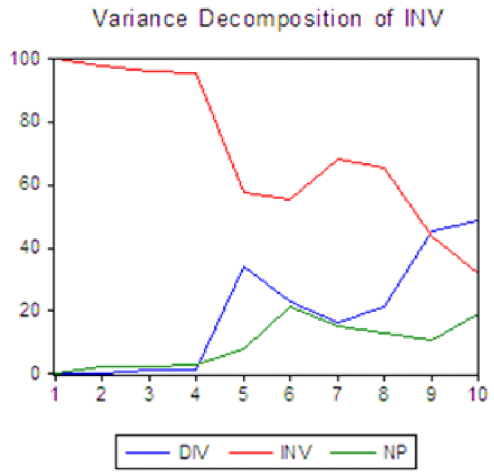
Figure 3 shows responses of net profit and dividend to one positive standard deviation shock in investment (Rs. 211.35 million). The results show that with one positive shock in investment dividends increases to only Rs.13.40 million and after which it starts decreasing and remain below base line till eighth time period. The reason behind this behavior is the residual dividend policy i.e. firms only pay dividends after retaining sufficient funds for the investments in upcoming projects. After only two years dividends becomes unstable showing that companies don't dividends policy is not being controlled by investment policy.

On the other hand, net profit shows only Rs. 3.081 million increase in first year and then show a decrease of Rs. 39.70 million then increase of Rs. 29.67 million after which it decreases and this negative effect does not die down.

In case of response of both dividends and net profit to investment, responses diverge immensely after two year in case of dividends and after 3 years in case of net profits. Although in case responses dividends to investment, dividends converge in eighth time period but there is huge gap of divergence. Therefore, it is better to review policy regarding making investments every three years despite this there is only mild effect of investment on dividend policy and profits in first three years but after three years condition get worse.

For dividends, it is clear that it depends mainly on its own variance, around 80% of the variance is coming from pure shock to dividends itself, independent of the investment and net profit. As far as investment and net profit is concerned, net profit is more important as variance due to net profit is more than investment i.e. approximately 30% but variance due to investment starts increasing after 3 three time periods and outperforms net profit after 4 time periods. But in long run, own variance of dividends dominates both investments and dividends.

Figure 5:
Variance Decomposition of Investment



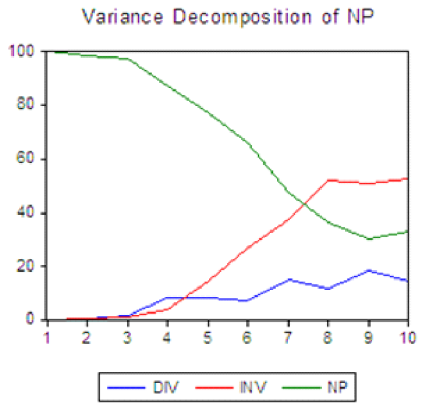
Investment depends mainly own its own error terms up to ninth time period after which dividends gain more importance and out performs investment after this point variance due to dividends increase above 50% and variance due to investment itself comes below 40%. However, dividends does not have much part in the variance of investments, even they remain below net profit up to 4th time period after which they start gaining importance in the variance of investments.

From variance decomposition of net profit, it is clear that it mainly depends upon its own error terms and which dominated the contribution of investments and dividends. However, after third and fourth time period investment starts gaining importance more and more in the variance of net profits and outperforms dividends after fourth and net profits after seventh time period. After this point, variance due to investments becomes more than 50% and variance due to net profit itself is around 30% while remaining 20% variance is due to dividends (Figure 7).

If we look at variance decompositions of investment, net profit and dividends at a time then it is clear that in the long run investments are of more importance than net profit and dividends in

Figure 6:

Variance Decomposition of Net Profit



the overall policy regarding profits and dividends due to strength of its impact on other variables.

Conclusions and Policy Implications

Our results are indicative of strong relationship among net profit, investment and dividend decisions. Dividend and net profit have bi-directional relationship signifying the information content of dividends and showing that with increase in net profit firms are inclined to pay more dividends. While investment causes dividends but reverse is not true. Investment also causes net profit but this relationship is not so strong and net profit does not cause investment in turn. Investment and dividends both increase for a reasonable long time due to positive change in net profit i.e. for more than 5 years, our result also support the dividend adjustment hypothesis that firms do not pay much out of current profits rather dividend payouts increase more afterwards to positive change in profits when managers believe that their earnings have risen permanently.

It is interesting to note the relationship between investment and net profit. Increases in investment does not result in positive trend in net profit in first two time periods, it starts increasing after second time period and it increases and crosses the base line in third time period. Our study also supports information content of dividends; increase in dividend is good indication of future growth in earnings.

However, keeping in view relationship between investment, dividends and profits, it is suggested to review the policy regarding dividends every four years, while policy regarding investment needs serious consideration because it does not have significant effect on net profits and dividends.

Based on result of variance decompositions of investment, net profit and dividends, it is suggested that in the long run investments are of great importance in the overall policy regarding profits and dividends. This is so because investment has greater contribution in the determination of net profits and policy regarding dividends.

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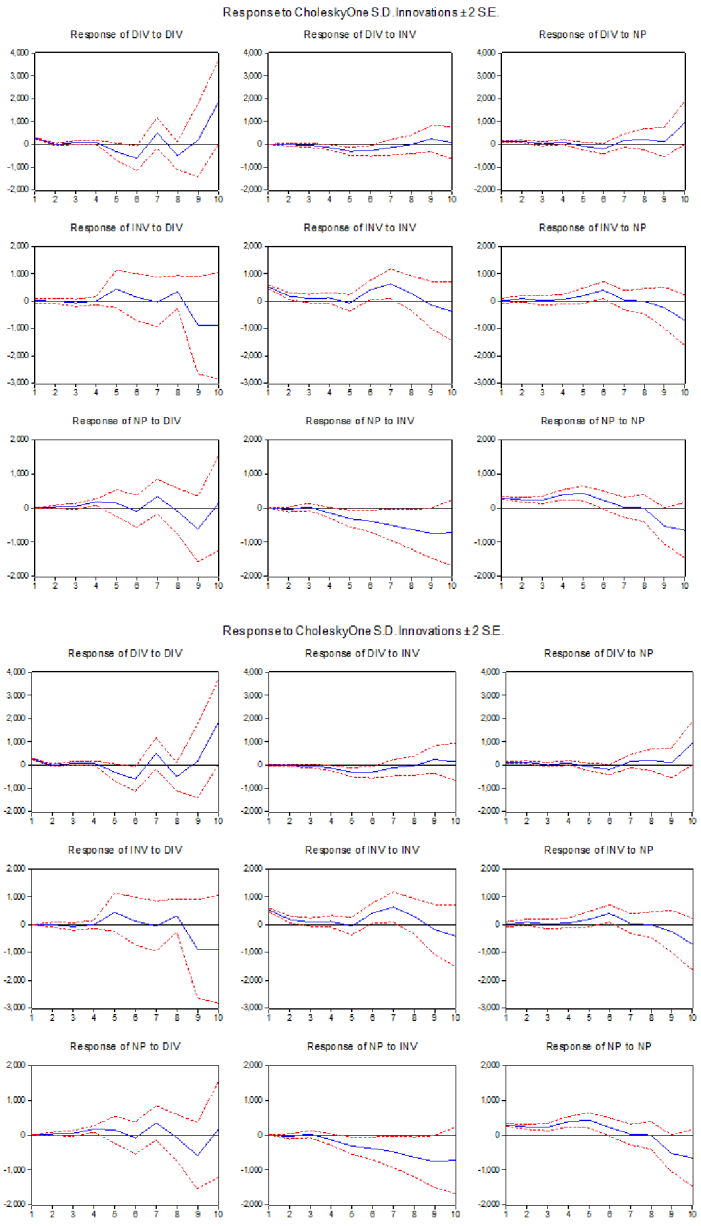
Appendix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