Modeling Dividend Behavior in Pakistan

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Abstract

This study examines the determinants of dividend policy by the use of some known models proposed by Lintner (1956) and Brittainn (1966) to examine their relative significance in the Pakistani context. The present study is carried out by selecting a sample of 35 companies from three sectors namely general, textile, chemical and energy. The analysis reveals that Lintner model is better than other models examined in the study. When depreciation as an extra variable is included it increases the explanatory power of the Lintner model. Depreciation acts here as a source of funds and because of liberal allowances granted it has significant impact over the dividend policy. Among other determinants tried the impact of investment demand, interest rate, share price behavior and debt are found insignificant. Only the impact of liquidity factor was found positive and significant in case of overall sectors and energy sector.

Key words: Dividend policy, partial adjustment model, Brittain cash flow model, Brittain Explicit Depreciation model.

1 Introduction

Explaining dividend policy has been one of the most difficult challenges faced by financial economists. Despite decades of studies, the factors that influence the dividend policy and the manner in which these factors interact is not well established. Black (1976) described "The harder we look into the dividend picture, the more it seems like a puzzle, with pieces that don't just fit together. According to Allen and Michaely (1995) more theoretical and empirical work is required before a consensus can be reached. Brealey and Myers (2002) list dividends as one of the ten unresolved issues in finance. A firm dividend policy refers to its choice of whether to pay shareholders a cash dividend, how large the cash dividend should be, and how frequently it

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should be distributed. Academicians and researchers have developed many theoretical models describing the factors that managers should consider while making dividend decisions. No formal mathematical models have so far been evolved to deal with this problem. During the last decades research work in this area led to the development of some models which focused on the residual nature of the dividend payout ratio (Miller and Modigliani, 1961). Later on some more behavioral model came out which attempted to explain different types of observed dividend behavior (Lintner, 1956; Darling, 1957; Brittain, 1966). All these models provide guidance to solve this problem.

The present study contributes to existing literature by testing Lintner (1956) and Braittan (1966) model and their extended version on overall manufacturing sector as well as on different sectors for example cement, energy, textile and chemicals etc .Understanding of factors which determine corporate dividend decisions is important for economists for several reasons. First, for the exact forecasts of national product it is necessary to know the factors which bring changes in the dividend contribution to personal income. Second pattern of economic growth depends upon heavily on the flow of net corporate savings and prediction of magnitude of this flow requires information about long-run dividend payout policies. Fourth it influences the company growth and the price of its shares in the market. Finally dividends are influenced by business expectations and liquidity. Therefore, managerial expectations and attitudes can be probed by studying fluctuations in the dividend flow.

The main objective of the study is to investigate which model fits the data well for dividend modeling for overall manufacturing sector and in different industries: textile, chemicals, cement and energy. The study also aims to find out the relative significance of various determinants having a direct bearing on the dividend policy decision of the sample companies.

The study is organized as follow. Section two provides a review of theoretical and empirical literature on the dividends policy in developed and developing markets. The methodological framework and data is presented in section three. The empirical results are discussed in section four and last section concludes the study.

2 Literature Review

Over the past three decades a substantial amount of attention has been directed toward identification of the determinants of corporate dividend policy. Even since the publication of Miller and Modigliani‘s 1961 paper dividend policy has been a controversial topic in the literature of finance. As a result researchers have proposed different theories about the factors which influence the dividend decisions of the firms.

The empirical work of Harkavy (1956) suggests that stock prices tend to vary directly with the proportion of income distributed. The results also revealed that corporations which retain the greater proportions of earnings tend to exhibit the greater price appreciation. Lintner (1956) conducted a classical research on how US mangers make dividend decisions. He developed a compact mathematical model based on survey of 28 well established industrial US firms. According to him the dividend pattern of a firm is influenced by the current year earnings and previous year dividends. Darling (1957), in his research substitutes lagged profit in place of lagged dividend in the Lintner’s model. According to him the weight assigned to it is a reflection of some other variables which covary with the lagged dividend. The study conclude that the regression function based on lagged dividend is useful for short term prediction while the one based on lagged profit would better explain the current level of the dividend. The research found support for the hypothesis that dividends will tend to vary directly with current profits, with past profits, depreciation and amortization recoveries and tend to vary inversely with persistent changes in the level of sales.

Miller and Modigliani (1961) show that under perfect markets the dividend policy of a firm does not affect the value of the firm. The empirical work of Smith (1963) classifies factors that influenced corporate saving behavior of the firms into two groups. The first arise from factors involved in investment decisions while the second arise from factors which promote stability of earnings. The results show that net income and previous level of dividend played a very important role in influencing corporate saving behavior in the short run while impact of investment demand is important in the long run. Dhrymes and Kurz (1964) present an alternative view of the dividend disbursal practices of electric utility firms that does not rely on the autoregressive character of the model presented by Lintner. The results show that dividend payments are significantly affected by factors which are not taken into account in the Lintner’s

work. It is further evident that the status of a firm influences its dividend policy, as does the relative magnitude of its investment program, its state of indebtedness and its size.

Turnovsky (1967) shows that retained earnings are determined from the profit after the dividend has been paid out, where both changes in profit and current level determine the amount of retained earnings. Further, retained earnings are determined residually and investment decisions play a minor role in the allocation of the profit. Fama and Babiak (1968)` test the validity of various models which explain dividend behavior of individual firms. The research reveals that Lintner's model performs well relative to other models. The study further argued that by deleting constant and including the lagged profit variable will improve slightly the predictive power of the model. Hankansson (1969) shows that with a certain dividend stream the value of a firm depends only on the dividend stream itself and the set of future interest rates. The study further revealed that with uncertain dividend streams the value of the firm depends on the firm's own dividend stream, the set of future interest rates, risk attitudes of all individuals, the wealth level of all individuals and the dividend streams of all other firms with certain dividends even when these dividends are independent.

Pogue (1971) finds that a corporation's dividend payment is inversely related to its demand for funds for investment in fixed and working capital. The results also imply that given income and investment demand dividends decrease as the cost of external finance increases relative to the cost of internal finance. Further it is evident that cost of funds and investment demand account for statistically significant variation in the dividend payment. Higgins (1972) reports positive relation between dividend payout ratio and earnings and negative relationship between investment and dividend payout ratio. The study further reveal that differences in corporate dividends can be attributed largely to differences in profitability and investment needs. Black and Scholes (1973) suggests that empirically it is not possible that the expected returns on high yield common stocks is different from the expected return on low yield common stocks either before or after taxes. The research further argued that one cannot tell what effect a change in dividend policy will have on a corporation stock's price.

The inter-firm variation in dividend policy may be adequately explained by an extending the Lintner (1956) model with capital requirement and earnings risk variable (Rayan (1974). He also argues that equity valuation do depends upon the pursued dividend policy. Stapleton and Burke

(1975) generalize the imputation system of dividend taxation and explain that the personal tax disadvantage of debt financing which must be weighted against the corporate tax. Lee (1976) finds that dividend effect is not significantly different from the retained earnings effect when non-linear relationship has been determined among the stock prices, dividends and retained earnings. Lee and Forbes (1980) results suggest that some effects of dividend policy on the market value of equity exist in the property and liability non- life insurance industry. Smirlock and Marshall (1983) employees causality tests to examine the separation principle which states that investment decisions are not influenced by dividend decisions and find no causal relationship from dividend to investment. Mookerjee (1992) argue that Lintner's model explain the dividend behavior well in the Indian context and the explanatory power of the model is increased if external finance is included in the model as an explanatory variable. D'Souza (1999) results support the earlier findings of negative effects of agency cost and market risk on dividend payouts, but don't support the negative relationship between dividend policy and investment opportunities. The results show an insignificant relationship between dividend policy and investment opportunities.

Baker, Veit and Powel (2001)suggest that many managers of Nasdaq firms make decisions consistent with the Lintner's model. The results show significant difference between the manager responses of financial and non financial firms. Aivazian and Booth (2002) find country factors important in explaining dividend decisions and suggest that emerging market firms are affected by the asset mix which is due to their greater reliance on bank debt.

Bhaduri and Durai (2006) strongly rejects the Modigalini and Miller's separation Principle and show that under imperfect market the dividend and investment decisions of the firms is jointly determined. Anil and Kapoor (2008) document liquidity and risks the important determinants of dividend payment pattern in India. Mollah (2009) suggests that dividend decisions are primarily governed by current profitability and lagged dividends.

Thus in the light of the above mentioned literature it is clear that there is no single model to explain dividend behavior. Different factors determine dividend policy in different manner and the effects of all these factors are different in different industries. These previous empirical findings motivate to investigate in case of Pakistani manufacture firms in general and textile,

cement and energy in particular what are the factors that influence the dividend policy in the latest year.

3 Methodology and Data

The present study is based on the theoretical model setup by Lintner (1956) for the study of the determinants of dividend behavior of Pakistani firms. The Lintner Model states that dividend payout is a function of the current profit and the previous year dividend i.e.

$$D_t - D_{t-1} = \alpha_0 + K(D_t^* - D_{t-1}) \quad \textbf{(1)}$$

Where D_t^* is the target dividend which represents the dividend which the company would have paid in the current year if the dividends are based simply on a fixed target payout ratio (r) applied to current profits. Therefore, $D_t^* = rP_t$ where P_t is the profit after tax in the current year. The parameter K indicates the fraction of difference between the target dividend D_t^* and actual dividend paid in the preceding year D_{t-1}. Thus (K) is a positive fraction and is referred to it as a speed of adjustment, whereas (r) is the desired long run payout ratio. Substituting rP_t for D_t^* in the above equation (1), the following relationship is obtained:

$$D_t = \alpha_0 + \alpha_1 P_t + \alpha_2 D_{t-1} \; D_t - D_{t-1} = \alpha_0 + K(rP_t - D_{t-1}) + u_t$$

where $\alpha_1 = rK$ and $\alpha_2 = 1 - K$

Or $D_t = \alpha_0 + \alpha_1 P_t + \alpha_2 D_{t-1} + u_t$ (2)

The equation (2) suggests that speed of adjustment $K = 1 - \alpha_2$ and payout ratio $r = \alpha_1 / 1 - \alpha_2$ .The constant term a_0 is generally expected to be positive.

According to Brittain cash flow is a more appropriate variable as it reflects true earnings, therefore Brittain (1966) has used the cash flow version of the Lintner model. The model is as under:

$$D_t = \alpha_0 + \alpha_1 C_t + \alpha_2 D_{t-1} + u_t \quad (3)$$

Here C_t represents the total cash flow which is the sum of net profit after tax and depreciation. In this case $K = 1 - \alpha_2$ and $r = \alpha_1 / 1 - \alpha_2$. Brittain also include depreciation as a separate explanatory variable along with profit and lagged dividend. This is known as Brittain Explicit Depreciation model which is given as under,

$$D_t = \alpha_0 + \alpha_1 P_t + \alpha_2 D_{t-1} + \alpha_3 A_t + u_t \qquad (3)$$

Where (At) represents the allowance for Depreciation. In this case (K) = 1-a_2 and (r) =a_1/1-a_2

The present study will fit ordinary least square (OLS) regression to equation (1), (2) and equation (3) by using pooled time series data for the time period of 2007-2009. The analysis is based on Nerlov's Auto Regressive Partial Adjustment model. The explanatory power of the models will be judged by the adjusted R-square ($\bar{R}^2$). In order to check the autocorrelation, Durbon Watson Statistic has been calculated. Based on the adjusted R-square criteria we will select one model which best explain the dividend behavior of the sample companies. After selecting one best model, some explanatory variables are added to see their influence on the dividend policies of the sample companies, these variables include stock prices, investment, liquidity...debt, interest payment

3.3 Extended Lintner Model

3.3.1 Lintner Model with Investment Demand:

Increase investment in plant and machinery, other fixed assets and inventories may decrease the dividend payout ratio. Investment demand is expected to be negatively related to dividend payment decisions. This determinant has been studied by Dhrymes and Kurz (1964), Lintner (1956), Pogue (1971), Higgins (1972) etc. Investment demand is measured as changes in the fixed assets and inventories over the previous year. Thus

$$ID = \Delta NFA + \Delta IN_t \; ; \; \Delta NFA_t = NFAt\text{-}NFA_{t-1}; \; \Delta IN_t = IN_t\text{-}IN_{t-1}$$

Where , NFA_t and NFA_{t-1} are net fixed assets in time 't' and 't-1' while IN_t and IN_{t-1} are inventory in the period't' and 't-1' respectively.

The model becomes:

$$D_t - D_{t-1} = \alpha_0 + K(D_t^* - D_{t-1}) + \beta ID_t \qquad (3)$$

3.3.2 Lintner Model with Flow of Debt:

Flow of net debt or external finance is positively related to the dividend payment. This variable has received emphasis in the work of Dhrymes and Kurz (1964), Rao (1975) etc. Flow of net debt is measured as; $FND_t = ND_t - ND_{t-1}$; $ND_t = TL_t - CA_t$, Where FND_t = Flow of net debt in period't', Dt and ND_{t-1} are net debt in period't' and period't-1'.

TL_t= Total liabilities in period't'; CA_t = current assets in period't'.

The model is written as:

$$D_t - D_{t-1} = \alpha_0 + K(D_t^* - D_{t-1}) + \gamma TL_t \quad (4)$$

3.3.3 Lintner Model with Interest Payment:

Most of the previous studies (Brittain, 1966) describe a negative relationship between the amount of interest payment and dividend. It is very common that a rise in interest payment by a company would depress its dividend payments. It is measured as the annual interest payment by a company. The extended model is:

$$D_t - D_{t-1} = \alpha_0 + K(D_t^* - D_{t-1}) + \delta INT_t \quad (5)$$

3.3.4 Lintner Model with Liquidity:

The liquidity position of a company is expected to have a positive relationship with dividend payment. This variable was emphasized in the empirical work of Darling (1957), Manos (2002), Anil and kapoor (2008), etc. Liquidity in the present study is measured by using the current ratio. The model is written as

$$D_t - D_{t-1} = \alpha_0 + K(D_t^* - D_{t-1}) + \phi LIQ_t \quad (6)$$

3.3.6 Lintner Model with Share Price Behaviour:

Previous studies like, Harkavy (1956), Puckett (1964), Rayon (1974), Lee and Forbes (1980) etc have attempted to find out the impact of dividend policy over the share price. Negative relationship is expected between the dividend payment and the share price. It is so because the unfavorable share price would tend to increase the payment of dividend. In the present study the share price in a particular year is measured as a ratio of the average of the preceding two years.

Thus; $SP_t^* = ASP_t / (ASP_{t-1} - ASP_{t-2})^2$, where, SP_t^* = Share price in period 't'. ASP_t, ASP_{t-1}, ASP_{t-2} are average share price in period't','t-1' and 't-2' respectively.

$$D_t - D_{t-1} = \alpha_0 + K(D_t^* - D_{t-1}) + \lambda \Pr ice_t \quad (7)$$

3.3.7 Lintner Extended Version with Mutifactors:

The previous empirical literature motivates to test the Lintner model with different determinates, the model takes the following form**:**

$$D_t - D_{t-1} = \alpha_0 + K(D_t^* - D_{t-1}) + \beta ID_t + \gamma TL_t + \delta INT_t + \phi LIQ_t + \lambda \Pr ice_t + u_t \quad (8)$$

3.4 Estimation Technique

The present study contributes to existing literature by testing Lintner (1956) and Braittan model and their extended version on overall manufacturing sector as well as on different sectors for example textile, energy etc. The OLS and pooling time series cross-section estimation techniques are applied. The approach followed is specific to general adding the variables one by one, reason being the sensitivity of dividend to different policy variables. The study undertakes the most recent time span for analysis which was not undertaken as yet. The analysis is based on Nerlov's Auto Regressive Partial Adjustment model. The explanatory power of the models will be judged by the adjusted R-square ($\bar{R}^2$). In order to check the autocorrelation, Durbon Watson Statistic has been calculated. Based on the adjusted R-square criteria we will select one model which best explain the dividend behavior of the sample companies.

3.5 Data

The data used in this study was obtained from the annual reports of the public companies, which are listed, on Karachi Stock Exchange covering the most recent time span of three years from 2007 to 2009.The following four sectors i.e. Textile, Chemical, Cement and Energy were selected for the sample. Depend on the availability of the data the final sample confines to 39 non- financial firms which belong from the above four sectors.

4 Results and Discussion

4.1 Results of Lintner Model

The results of Linter Model have been shown in Table.1. The coefficient of determination adjusted for degree of freedom ($\bar{R}^2$) is very high and statistical significant in all sampled companies. It ranges from 0.77 to 0.850. The regression coefficients of both the explanatory variables-net earnings after tax (Pt) and dividend paid in the previous years bears positive expected signs in case of overall sectors, textile sectors and energy sector and are statistically significant. Lagged dividend has expected positive sign but statistically insignificant in case of chemical sector. The Durbin Watson statistic shows no autocorrelation between the explanatory variables. Except in chemical sector dividend policy is governed by lagged dividends because these regular dividend paying companies follow stable dividend policy and the payout policy does not adjust perfectly with the level of current earnings. Thus net profit and dividend paid in the previous year are important determinants of dividend policy. Our results are in line with Mollah (2009), Fama and Babiak (1968), Darling (1958) and Lintner (1956).

Table.1: Regression Results of Lintner Dividend Model

Industry Groups	a_0	a_1	a_2	$\bar{R}^2$	F-Value	DW Statistics
General	-112.11	0.523**	0.221**	0.818	260.38*	1.58
Textile	20.81	0.068*	0.191***	0.664	37.65*	1.68
Chemicals	-240.37	0.776*	0.069	0.850	80.67*	1.31
Energy	-163.37	0.523*	0.221***	0.775	39.04*	1.59

*significance at 1% level, ** significance at 5% level, *** significance at 10% level.

4.2 Results of Brittain Cash flow Model

Table.2 shows the regression results of the Brittain Cash flow Model. The coefficient of determination adjusted for degree of freedom ($\bar{R}^2$) is statistical significant in our sampled industries. It ranges from 0.78 to 0.80. Explanatory variables- cash flow and dividend paid in the previous years incurs both expected positive signs and are statistically significant. It is evident that cash flow incorporate depreciation as a source of fund, with regular profits cash flow encourages the companies to change their dividend policy at a given point of time even though they are not highly motivated to change the payout policy often. This Model is appropriate in explaining dividend behavior of our sampled companies but its explanatory power is less than

that of the Lintner model. The results are in line with results of Mollah (2009) and Darling (1957).

Table.2: Regression Results of Brittain Cash flow Model

Industry Groups	a_0	a_1	a_2	$\bar{R}^2$	F-Value	DW Statistics
General	-38	0.486*	0.229*	0.805	188*	1.58
Textile	3.86	0.067*	0.346*	0.762	60.48*	1.54
Chemicals	-176.79	1.54**	0.504*	0.542	17.59*	1.75
Energy	-609.	0.507*	0.211***	0.784	41.13*	1.62

*significance at 1% level, ** significance at 5% level, *** significance at 10% level.

4.3 Results of Brittain Explicit Depreciation Model

The results are shown in Table 3. Brittain adds depreciation as an additional explanatory variable in original Lintner model. The coefficient of determination adjusted for degree of freedom is very high and statistically significant in all our sampled industries. It ranges from 0.77 to 0.81. All the explanatory variables- net profit, dividend paid in the previous year and depreciation bears expected positive signs and are statistical significant for overall industry and energy sector. Only in textile sector dividend paid in the previous year gets unexpected negative significant result. The depreciation variable bears unexpected statistical significant results in case of chemical industry while it shows expected positive sign and statistical significant in case of general, textile and energy sector. It is clear now that all the above mentioned models explain dividend behavior of our sampled industries. On the basis of adjusted R-square criteria Brittain Explicit Depreciation Model's explanatory power is very high as compared to aforementioned models. The time span covered in this study is very recessionary. Depreciation contains a portion of the net profit and it is a source of fund. Because of liberal allowances granted to depreciation during this period increases the explanatory power of this model.

Table.3: Regression Results of Brittain Explicit Depreciation Model

Industry Groups	a_0	a_1	a_2	a_3	$\bar{R}^2$	F-Value	DW Statistics
General	-399.14	0.504*	0.197*	0.576***	0.819	138.72*	1.53
Textile	-4.29	0.060*	-0.359*	0.097*	0.747	37.47*	1.39
Chemicals	8.31	1.01*	0.504*	-1.18*	0.881	70.09*	1.57
Energy	-1204.25	0.507*	0.196	0.812*	0.775	26.37*	1.55

*significance at 1% level, ** significance at 5% level, *** significance at 10% level.

Our results are consistent with the empirical work of Mollah (2009), Brittain (1966) and Darling (1957).

4.4 Analysis of other Determinants

It is clear that Brittain Extended Depreciation Model is the model of good fit in all our three sampled industries. Using this model we add some more explanatory variables. These explanatory variables are: investment demand, interest payment, flow of net debt, liquidity and share price behavior.

4.4.1 Interest Payment

As it is clear from the Table 4 that inclusion of interest as an additional explanatory variable bears expected negative signs except in the chemical sector and is statistically insignificant. It is because in the textile and energy sector due to recession growth was low due to which loans were not granted in huge amount. As a result the charge in the form of interest is not so much high. It explains the insignificant impact of interest payment on the dividend policy. In case of chemical sector the sign is positive and insignificant. One possible explanation for this positive relation is interest is a tax –deductible expense. The amount saved as tax shield is used for the dividend payment. Over all interest is not an important determinant of dividend policy. Our results are not in line with Hankenson (1969).

Table .4: Regression Results of Brittain Explicit Depreciation Model Along with Interest

Industry Groups	a_0	a_1	a_2	a_3	a_4	$\bar{R}^2$	F-Value	DW Statistics

General	-320.78	0.50*	0.201*	0.645***	-0.245	0.817	103.16*	1.55
Textile	-4.11	0.060*	-0.357**	0.099**	-0.002	0.739	27.28*	1.39
Chemicals	8.82	1.003*	0.019	-1.274**	0.177	0.876	50.82*	1.66
Energy	-1198.57	0.507*	0.196	0.813	-0.006	0.763	18.73*	1.55

*significance at 1% level, ** significance at 5% level, *** significance at 10% level.

4.4.2 Investment Demand

The results of the explanatory variable, i.e. investment demand have been shown in the Table 5. It shows that investment demand bears expected negative sign in all three sectors. However it is only statistically significant in case of the chemical sector. It shows that investment demand was very high due to high growth in the chemical sector. Large portion of chemical products was used by textile and leather industry. Also export of chemical products increased and because of this reason it has significant result. Since the time span is very recessionary that is why the investment demand in the rest of the sectors is not so much high. This results into the insignificant impact of this variable in these industries. Our results are in line with Higgins (1972), Darling (1957) while it contradicts with the results of D' Souza (1999).

Table .5: Regression Results of Brittain Explicit Depreciation Model along with Investment Demand

Industry Groups	a_0	a_1	a_2	a_3	a_4	$\bar{R}^2$	F-Value	DW Statistics
General	-357.62	0.50*	0.197*	0.613***	-0.028	0.817	103.16*	1.55
Textile	-4.306	0.060*	-0.361*	0.098*	-0.0007	0.739	27.29*	1.39
Chemicals	-56.51	1.03*	-0.047	-0.697***	-0.065*	0.911	72.83*	1.71

Energy	-1177.89	0.507*	0.196	0.813	-0.0039	0.763	18.74*	1.55

*significance at 1% level, ** significance at 5% level, *** significance at 10% level.

4.4.3 Liquidity

As shown in Table 6, the coefficient of liquidity factor is positive and significant in case of overall sectors and energy sector. Inclusion of Liquidity factor increases ($\bar{R}^2$) from 0.819 to 0.826 of the general sector while it increases ($\bar{R}^2$)from 0.775 to 0.935 in energy sector. The coefficient of liquidity factor is negative and insignificant in chemical and textile sector. It implies that liquidity factor explain dividend behavior in case of overall sectors and energy sector in the present study. Overall the corporations earning have increased in the year 2009. This increase is contributed by improvement in banks and oil and marketing companies. Our results are in agreement with the results of Darling (1957).

Table .6: Regression Results of Brittain Explicit Depreciation Model Along with Liquidity

Industry Groups	a_0	a_1	a_2	a_3	a_4	$\bar{R}^2$	F-Value	DW Statistics
General	-1095.29	0.458*	0.205*	0.633***	789.13*	0.826	63.11*	1.51
Textile	8.99	0.061*	-0.377*	0.099**	-14.13	0.741	27.50*	1.40
Chemicals	152.20	1.01*	0.015	-1.22*	-59.36	0.879	52.15*	1.62
Energy	-8154.98	0.162**	0.221*	0.709	916.17*	0.935	81.32*	2.06

*significance at 1% level, ** significance at 5% level, *** significance at 10% level.

4.4.5 Flow of Net debt

The coefficient of debt carries expected positive signs and is statistically insignificant in case of general and energy sector while in case of textile and chemical sector it bears unexpected negative signs and are statistically insignificant. The time span is recessionary and that is why either fund is not available easily or their financial costs are very high. Due to this reason the impact of this variable is insignificant. One possible explanation for negative sign is that since funds are expensive to rise and there is uncertainty therefore financial institutions make it sure that either dividends are abstained completely or to pay it in very low portion. Our results are not in line with Dhrymes and Kurz (1964) and Rayon (1975).

Table .7: Regression Results of Brittain Explicit Depreciation Model Along with Debt

Industry Groups	a_0	a_1	a_2	a_3	a_4	$\bar{R}^2$	F-Value	DW Statistics
General	-372.91	0.508*	0.197*	0.483	0.031	0.818	103.40*	1.56
Textile	-6.8	0.062*	-0.425*	0.104*	-0.0021	0.751	28.99*	1.68
Chemicals	-25.08	1.008*	0.00095	-0.995*	-0.021	0.879	52.05*	1.61
Energy	-1502	0.547*	0.188	0.252	0.247	0.775	20.04*	1.76

*significance at 1% level, ** significance at 5% level, *** significance at 10% level.

4.4.6 Share Price Behavior

The coefficient of share price behavior bears expected positive signs and are statistically insignificant in all the sampled industries. It means that share price behavior is not a significant determinant of the dividend policy in the current study. Our results are contrary to that of Harkavy (1957), Lee and Forbes (1980) while it is in agreement with the results of Black and Scholes (1974).

Table .5: Regression Results of Brittain Explicit Depreciation Model Along with Share price.

Industry Groups	a_0	a_1	a_2	a_3	a_4	$\bar{R}^2$	F-Value	DW Statistics
General	-476.26	0.505*	0.196*	0.59***	15034.93	0.817	102.99*	1.53

Textile	-7.82	0.060*	-0.377**	0.101**	766.95	0.741	27.49*	1.44
Chemicals	-41.88	1.01*	0.012	-1.16**	5610.90	0.879	52.05*	1.61
Energy	-1282.74	0.509*	0.194	0.812	28054.53	0.763	18.74*	1.55

*significance at 1% level, ** significance at 5% level, *** significance at 10% level.

4.5.7 Overall Depreciation and Liquidity

After excluding all insignificant variables, we include depreciation and liquidity as extra explanatory variables in the original Lintner model. It increases the adjusted R-square ($\bar{R}^2$) value from 0.818 to 0.829. Both variables bears expected positive signs and are statistically significant in case of the overall sampled industries. Since the time span is very recessionary and companies grant liberal amounts of funds to depreciation. Depreciation acts here as a source of funds. That is why it has significant impact over the dividend policy. Also the liquidity position of the company is very important. If a company liquidity position is good i.e. it has enough cash on hand than it pays dividend otherwise it will retain earnings. In this recessionary period companies are very precautionary and that is why liquidity position has significant impact over the dividend policy. Our results are in agreement with the results of Darling (1957), Brittain (1964) and Brittain (1966).

Table .8: Regression Results of Brittain Explicit Depreciation Model Along with Liquidity

Industry Groups	a_0	a_1	a_2	a_3	a_4	R-2	F-Value	DW Statistics
General	-1232.01	0.472*	0.198*	0.634**	605.79	0.829	111.40*	1.50

*significance at 1% level, ** significance at 5% level, *** significance at 10% level.

Conclusion

This study examines the determinants of dividend policy by the use of some known models proposed by Lintner (1956) and Brittainn (1966) to examine their relative significance in the Pakistani context. The analysis reveals that Lintner model is better than other models examined in the study. When depreciation as an extra variable is included it increases the explanatory power of the lintner model. Depreciation acts here as a source of funds and because of liberal allowances granted it has significant impact over the dividend policy. As a result it implied that in the current study dividend decisions of firms is governed by net profit, dividend paid by the company in the previous year and depreciation allowances. Inclusion of cash flow variable does not increase the explanatory power of the Lintner model. Among other determinants tried the impact of investment demand, interest rate, share price behavior and debt is found insignificant. Only the impact of liquidity factor is found positive and significant in case of overall sectors and energy sector. Interest payment bears positive expected sign in overall sectors and energy sector and is statistically insignificant. Investment demand has negative sign with insignificant results in all sampled industries. The impact of debt is positive and insignificant in case of overall and energy sector while its impact is negative and insignificant in case of textile and chemical sector. Share price behavior turns out to be positive and insignificant in all sampled industries. The Implication that comes out from the study is that for dividend decision past dividends, profits and depreciation matters and Lintner model fits the data well in case of manufacturing sector of Pakistan.

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