TESTING PARTIAL ADJUSTMENT DIVIDEND BEHAVIORAL MODELS IN EMERGING MARKETS: EVIDENCE FROM PRE AND POST MARKET REFORMS IN BANGLADESH

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ABSTRACT

A number of studies examine dividend policy and security price behavior in emerging markets but none on the stock market of Bangladesh. Partial adjustments are made to dividend behavior models that are then tested on the Dhaka Stock Exchange using data over the period of 1988-2003 in order to identify the dividend policy and security price behavior of the emerging Stock Market of Bangladesh. The empirical results suggest that dividend decisions are primarily governed by current profitability and lagged dividends. The empirical results identified cash flow as the better measure of the company's ability to pay dividends.

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INTRODUCTION

Dividend behavior among emerging financial markets is assumed to be quite different from developed markets. Several studies have been published on dividend policy and security price behavior regarding developed markets but very few of these studies have examined this issue in emerging markets. However, because of the financial reform in Asia in 1997/98 and a great deal of speculation, the Dhaka stock market crashed in 1998 with many other markets in Asia. No study focused on the situation of the post market reform either in Asian or Latin American emerging markets. Despite the evidence in the emerging markets on dividend behavior, no recognized study was conducted on the partial adjusted dividend behavioral models.

The primary purpose of this study is to identify the dividend policy and security price behavior of the emerging Bangladesh market. Partial adjustment models are tested on the Dhaka Stock Exchange data over the period of 1988-2003 to identify the dividend policy and stock price behavior of this emerging market. This study also distinguishes the behavioral difference in the pre (1988-1997) and post (1999-2003) market reform. The sample for this study is unique in the sense that key market characteristics are taken into consideration of an emerging market such as sect oral representation, size, product diversity, activity, consistency of payment, and payout ratio, etc.

The empirical results suggest that Brittain's (1966) dividend behavior model offers an adequate explanation of dividend behavior of the listed companies on the Dhaka Stock Exchange. Further, the findings also suggest that dividend decisions are primarily governed by the magnitude of current profitability. This appears to be the major variable for determining the capacity of the companies to pay dividends as well as dividends paid in the previous years, (i.e., lagged dividends). Nevertheless, the empirical results also identified cash flow as the better measure of the company's ability to pay dividends. The remainder of this paper is divided into four sections. A brief review of the theoretical background of partial adjustment models in section two. Section three contains the description of data and sample of the empirical analysis. The empirical results are reported in section four. The summary and concluding remarks are incorporated in section five.

THEORETICAL BACKGROUND

This section contains the brief review of the partial adjustment dividend behavioral models. Also included in this section is the identification of the key variables that identify the unique dividend policy and behavior of an emerging financial market. Finally, this section identifies the best-fitted partial adjustment dividend behavioral model of an emerging market.

Lintner's (1956) partial adjustment model: In the pioneering study of 1956, Professor John Lintner investigated dividend behavior over an extended period. He viewed dividend payout as a function of net current earnings post tax as well as the dividend payout in the previous years (lagged dividends). Changes in the dividend payout ratio $\{\Delta DPR = (Dividend / Sales)_t - (Dividend / Sales)_{t-1}\}$ are considered as the dependent variable of the model. Current profitability (Net Profit Post Tax / Sales), and the lag of the dividend payout ratio are considered as the independent variables of the model. It is worth mentioning that the considered variables are scaled (deflated) by common size (sales) to remove heteroskedasticity and outlier problems.

Darling's (1957) Partial Adjustment Model: In this model, Paul Darling modified Lintner's formulation to include expectations and liquidity in the determination of dividend policy. Darling, in essence, proposed a more complete explanation of dividend behavior without Lintner's principal emphasis. Darling hypothesized that dividends are a function of current investment, current use of external funds, as well as past dividends and current earnings. However, he concludes that lagged profits would offer a better explanation than the current level of dividends. In addition, he added depreciation and amortization recoveries as a source of funds and changes in sales as a working capital requirement. Changes in the dividend payout ratio $\{\Delta DPR = (Dividend / Sales)_t - (Dividend / Sales)_{t-1}\}$ is considered as the dependent variable of the model. Current profitability (Net Profit Post Tax / Sales), lag of profitability, amortization (Depreciation and Amortization / Sales), and growth (changes in sales) are considered as the explanatory variables of the model.

Brittain's (1966) Partial Adjustment Model: The effort by John Brittain from the Brookings Institution, could arguably be the most far reaching of the macro time-series studies on dividend behavior. Brittain's model suggests that cash flow is the better measure of the company's ability to pay dividends. Changes in the dividend payout ratio $\{\Delta DPR = (Dividend / Sales)_t - (Dividend / Sales)_{t-1}\}$ is considered as the dependent variable. Cash flow (Net Profit Post Tax + Depreciation/ Sales), and the lag of the dividend payout ratio are considered as the explanatory variables in Brittain's model.

Fama and Babiak's (1968) Partial Adjustment Model: Fama and Babiak (1968) offered their work on the partial adjusted model of Lintner (1956 and 1963) and the extended work by Brittain (1964 and 1966). They examined the dividend policy of 392 industrial firms over a period of 19 years (1946-64). Fama and Babiak tested behavioral models on individual firm data, ran simulations, and predicted the best-fit behavioral model. The empirical results provided consistent evidence on dividend models for individual firms. They found that the two variable Lintner model including a constant term, current earnings 'E_t', and lagged dividend 'D_{t-1}', perform well relative to other models. They also observed that net income seems to provide a better measure of profits than either cash flow or net income or depreciation when included as separate variables in the model. The dependent and the explanatory variables are considered the same as Lintner's model. However, as Fama and Babiak tested their models on individual firm data, similar results to the Lintner study were found.

In conclusion, Lintner (1956) was the first who introduced a partial adjustment dividend behavioral model and his empirical work is the best and the most recognized empirical investigation on dividend behavior to date. Moreover, Darling (1957) extended and Brittain (1966) modified Lintner's basic behavioral

model by altering and adding different parameters. In addition, Fama and Babiak (1968) tested Lintner and Brittain's developed partial adjusted dividend behavior models on individual firm's data rather than aggregate data and identified Lintner's model as the best partial adjustment model.

Garg *et al.* 1996, Mishra and Narender, 1996, applied Lintner's (1956) partial adjustment model on Indian data, identified that as the best-fit model, and concluded that dividend policy is primarily determined by the current profit post tax and dividends paid in the previous years, i.e., lagged dividends. However, Goergen et al. 2004 applied Lintner's (1956) partial adjustment model using German data and concluded that German firms do not base their dividend decisions on published earnings, but on cash flows.

The empirical part of this study tested the partial adjustment dividend behavioral models on the Dhaka Stock Exchange data in order to investigate the dividend policy and behavior in an emerging market. This study also tries to identify the best-fit dividend behavioral model in an emerging market of Bangladesh context through empirical investigation.

DATA AND METHODOLOGY

Data

All of the listed non-financial companies on the Dhaka Stock Exchange are considered as the population of this study for the period of 1988-2003. Financial sector companies are excluded from the study because the reporting system of financial sector companies is quite different from non-financial sector companies. However, because of the financial reform in Asia in 1997/98 and a great deal of speculation, the Dhaka stock market crashed in 1998. Following the market crash, an automated trading system replaced the traditional out cry trading system on the Dhaka Stock Exchange. In addition, the government reformed Security Exchange Commission (SEC) regulations to protect general investors and to ensure transparency in the securities market of Bangladesh. Therefore, this study focused on the pre (1988-1997) and post (1999-2003) market reforms in the stock market of Bangladesh. Companies selected for this study are considered based on their non-negative profits (net profit post tax), and their regularity of paying dividends. It is worth mentioning that researchers always take different company and market characteristics into consideration in selecting sample for testing behavioral models. First, 83 non-financial companies are taken into account post screening out irregular dividend distributions and companies with negative profits. Companies are then screened by considering the regularity of dividend payments for at least eight years among the sample period (1988-2003).

In addition, other characteristics such as: the selected sample should represent all sectors (incorporation of companies from all non-financial sectors), different sizes (large, medium, and small), product diversity (single product and multiple products), activity (active and inactive), consistency of dividend payments (companies paying dividends consistently versus companies paying dividends inconsistently), and the pay-out ratio (high, medium and low) are considered for selecting the final sample. The final sample is then reduced to 51 companies based on the above characteristics. The selected sample of 51 Dhaka Stock Exchange listed companies represents all sectors (12 companies are from Engineering, 7 are from Food and Allied Products, 8 are from Jute and Textile, 10 are from Pharmaceuticals, and 14 are from the Miscellaneous Sector). The sample also consists of 8 high dividend payout companies (payment of dividends of 50% and more), 9 low dividend pay-out companies (payment of dividends of 5% or less) and 34 medium dividend pay-out companies (payment of dividends between 5% and 50%). In addition, the sample represents 14 large companies (market capitalization of 1000 million Taka and more), 7 small companies (market capitalization of 5 million Taka or less), and 30 medium companies (market capitalization is between 110-150 million Taka). Moreover, the sample consists of 41 actively traded companies and 10 inactively traded companies on the Dhaka Stock Exchange. The sample also comprises

40 companies having single product and 11 companies having diversified product. In addition, the sample also represents 15 companies, which have paid regular dividends for all 10 years in the pre-reform sample and 5 years in the post-reform sample plus 36 companies that paid dividends over 5-9 years in the pre-reform sample and 3-5 years in the post-reform sample.

The required data for empirical investigation were collected from the published annual reports of the selected companies. In order to compare and justify the results of the selected sample we also analyzed all non-financial company (153) data for the same objective. In addition, for testing Fama-Babiak's behavioral model, the study was carried out only on the regular dividend paying companies (15) individually. The empirical analysis section gives particular attention to the selected sample of 51 companies and all non-financial sector companies (153) and both pre and post reform period of the same sample.

Models

Based on the Lintner's (1956) Partial Adjustment Model, the Null Hypothesis is defined as:

H_0: *Changes in dividend payout ratio (ΔDPR) is not a function of net current earnings post tax (PROFIT) and dividend paid in previous years (lagged dividends) (LDPR).*

The Model considered is as follows:

$$\Delta DPR_t = \alpha + \beta_1 PROFIT_t + \beta_2 DPR_{t-1}(LDPR) + \varepsilon_t \quad (1)$$

Where, ΔDPR_t and DPR_{t-1} = changes in the dividend pay-out ratio and lagged dividend pay-out ratio respectively, $PROFIT_t$ = the ratio of net profit post tax to sales in period 't', α = constant term, $\beta_1 = c_i r_i$ (where c_i is the 'speed-of-adjustment coefficient' and r_i is the firm's 'target ratio' of dividends to profits), $\beta_2 = - c_i$ (where c_i is the 'speed-of-adjustment coefficient for the lagged dividend), and ε_t = error term.

Based on the Darling's (1957) Partial Adjustment Model, The Null Hypothesis is defined as:

H_0: *Changes in dividend pay-out ratio (ΔDPR) is not a function of net current earnings post tax (PROFIT), lag profits (LPROFIT), amortization (AMORTISE), and sales growth (GROWTH).*

The Model is designed as follows:

$$\Delta DPR_t = \alpha + \beta_1 PROFIT_t + \beta_2 PROFIT_{t-1}(LPROFIT) + \beta_3 AMORTISE_t + \beta_4 GROWTH_t + \varepsilon_t \quad (2)$$

Where, ΔDPR_t = changes in the dividend pay-out ratio, $PROFIT_t$ and $PROFIT_{t-1}$ = the current profitability and lagged profitability respectively, $AMORTISE_t$ = the ratio of depreciation and amortization to sales, $GROWTH_t$ = the sales growth $((Sales_t - Sales_{t-1}) / Sales_{t-1})$, α = constant term, $\beta_1 = c_i r_i$ (where c_i is the 'speed-of-adjustment coefficient' and r_i is the firm's 'target ratio' of dividends to profits), $\beta_2 = - c_i$ (where c_i is the 'speed-of-adjustment coefficient' for lagged profits), β_3, and β_4 = the coefficients of amortization and sales growth respectively, and ε_t = error term.

Based on Brittain's (1966) Partial Adjustment Model, the Null Hypothesis is defined as:

H_0: Changes in dividend payout ratio (ΔDPR) is not a function of cash flow (CFLOW) and dividend paid in previous years (lagged dividends) (LDPR).

The Model is designed as follows:

$$\Delta DPR_t = \alpha + \beta_1 CFLOW_t + \beta_2 DPR_{t-1}(LDPR) + \varepsilon_t \quad (3)$$

Where, ΔDPR_t and DPR_{t-1} = the changes in dividend pay-out ratio and lagged dividend pay-out ratio respectively, $CFLOW_t$ = the ratio of cash flow (net profit post tax + depreciation) to sales in period 't', α = constant term, $\beta_1 = c_i r_i$ (where c_i is the 'speed-of-adjustment coefficient' and r_i is the firm's 'target ratio' of dividends to cash flow), $\beta_2 = - c_i$ (where c_i is the 'speed-of-adjustment coefficient' for lagged dividend), and ε_t = error term.

Fama and Babiak's (1968) Partial Adjustment Model: It is important to note that Fama and Babiak's (1968) model is tested on individual company data rather than aggregate data but the hypothesis, the model, and the variables are as same as Lintner's (1956) model. Thus, The Null Hypothesis is defined as:

H_0: Changes in dividend payout ratio (ΔDPR) is not a function of net current earnings post tax (PROFIT) and dividend paid in previous years (lagged dividends) (LDPR).

The Model is designed as follows:

$$\Delta DPR_t = \alpha + \beta_1 PROFIT_t + \beta_2 DPR_{t-1}(LDPR) + \varepsilon_t \quad (4)$$

Where, ΔDPR_t and DPR_{t-1} = changes in dividend pay-out ratio and lagged dividend pay-out ratio respectively, $PROFIT_t$ = the ratio of net profit post tax to sales in period 't', α = constant term, $\beta_1 = c_i r_i$ (where c_i is the 'speed-of-adjustment coefficient' and r_i is the firm's 'target ratio' of dividends to profits), $\beta_2 = - c_i$ (where c_i is the 'speed-of-adjustment coefficient' for lagged dividend), and ε_t = error term.

EMPIRICAL RESULTS

Descriptive Statistics

The changes in the dividend pay-out ratio over the pre-reform period (1988-97) is .051% and .32% for the post-reform period (1999-03) for the selected sample and .064% and .67% for all companies pre and post market reform in Bangladesh. The profitability is 7.0% in the pre-reform selected sample but that figure significantly increased in the post-reform period (36.88%) whereas the figures in the pre and post reform period for all companies are 8.66% and 18.20%. However, the growth rate of sales, depreciation and amortization recoveries are 11.56% and 4% while the average cash flow is 9.1% in the pre-reform selected sample but a significant change of those figures occur in the post-reform sample (6.66%, 19.69%, and 30.83%) and a noticeable difference in the pre-reform sample (16.57%, 8.11%, and 13.97%) and post-reform sample (-4.79%, 16.50%, and 18%) occur when we consider all companies.

These results indicate a higher level of change in the dividend payout ratio and a higher level of working capital requirements for the listed companies on the Dhaka Stock Exchange. However, the working capital requirements are greater than the available sources of funds, i.e., depreciation and amortization recoveries. Nevertheless, even though the level of profitability and cash flow vary largely, the figures indicate that cash flow is 2.1% more than the current earnings of the regular dividend paying companies in the stock market of Bangladesh (Table 1).

Table 1: Descriptive Statistics

Selected Sample: 51 Companies								
Variables	**Pre-reform Sample: 1988-1997**				**Post-reform Sample: 1999-2003**			
	Mean	**Standard Deviation**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**	**Minimum**	**Maximum**
ΔDPR	0.0005	0.0260	.15	.15	0.0032	0.1280	-0.6950	0.6759
PROFIT	0.0700	0.0684	.00	.52	0.3687	1.1042	0.00	9.8725
LDPR	0.0310	0.0332	.00	.23	0.1644	0.4737	0.00	4.8045
LPROFIT	0.0700	0.0684	.00	.52	0.3279	1.1166	0.00	9.8725
AMORTIZE	0.0400	0.0376	-.03	.23	0.1968	0.6789	0.00	6.8446
GROWTH	0.1156	0.4089	-.99	3.03	0.0665	1.0818	-1.00	9.5460
CFLOW	0.0910	0.0922	-.26	.53	0.3083	0.6816	-0.003	6.3077
All Companies (153 Companies)								
Variables	**Pre-reform Sample: 1988-1997**				**Post-reform Sample: 1999-2003**			
	Mean	**Standard Deviation**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**	**Minimum**	**Maximum**
ΔDPR	0.0006	0.0231	-0.2640	0.2398	0.0067	0.2688	-2.9548	3.9711
PROFIT	0.0866	0.1229	0.00	2.2512	0.1802	0.5346	-0.0043	5.9355
LDPR	0.0250	0.0326	0.00	0.4662	0.1195	0.6243	-0.0767	13.9752
LPROFIT	0.0866	0.1229	0.00	2.2512	0.1801	0.5346	-0.0053	5.9355
AMORTIZE	0.0811	0.2034	-0.0346	5.8902	0.1649	0.5689	0	6.8446
GROWTH	0.1657	0.5171	-1.00	6.2716	-0.0479	0.6422	-1.00	5.6780
CFLOW	0.1397	0.1619	-0.0031	2.4865	0.1799	0.5904	-6.2964	6.3077

Pearson's Correlation Matrix

Despite a few exceptions, the Pearson correlation matrix shows the expected relationship of all the independent variables with the dependent variable in the pre and post reform period for the selected sample. However, the situation improved slightly in post-reform for the all companies sample (see table 2). Nonetheless, the correlation matrix shows that the correlation between the explanatory variables is of either low or moderate degree, which suggests the absence of multicolinearity between independent variables. As suggested by Bryman and Cramer (1997), Pearson's *r* between each pair of independent variables should not exceed 0.80; otherwise, independent variables with a coefficient in excess of 0.80 may be suspected of exhibiting *multicolinearity.*

Multicolinearity is usually regarded as a problem because it means those regression coefficients may be unstable (Bryman and Cramer, 1997). Several scholars including Mendenhall and Sincich (1989), Hair *et al.* (1995), and Freund and Wilson (1998), state that multicolinearity can be quite difficult to detect where there are more than two independent variables. Moreover, the colinearity diagnostics provided by SPSS including colinearity statistics (Tolerance and VIF), condition index, and variance proportion, support the Pearson's correlation coefficients and document no proof of the multicolinearity problem in the regression models.

Table 2: Correlation Matrix: Pearson Indices

Selected Sample: 51 Companies										
	Pre-reform Sample: 1988-97					**Post-reform Sample: 1999-03**				
	Lintner's Model					**Lintner's Model**				
Variables	ΔDPR	PROFIT	LDPR			ΔDPR	PROFIT	LDPR		
ΔDPR	1.000					1.000				
PROFIT	.089	1.000				-.131**	1.000			
LDPR	-.399***	.384***	1.000			-.178***	.499***	1.000		
	Darling's Model					**Darling's Model**				
Variables	ΔDPR	PROFIT	LPROFIT	AMORTIZE	GROWTH	ΔDPR	PROFIT	LPROFIT	AMORTIZE	GROWTH
ΔDPR	1.000					1.000				
PROFIT	.089	1.000				-.131***	1.000			
LPROFIT	.018	.786***	1.000			-.169***	.259***	1.000		
AMORTIZE	-.107**	.157***	.183***	1.000		-.163***	.753***	.521***	1.000	
GROWTH	-.010	-.070	-.071	-.069	1.000	-.158***	-.055	-.073	-.056	1.000
	Brittain's Model					**Brittain's Model**				
Variables	ΔDPR	CFLOW	LDPR			ΔDPR	CFLOW	LDPR		
ΔDPR	1.000					1.000				
CFLOW	.115**	1.000				-.035	1.000			
LDPR	-.399***	.431***	1.000			-.178***	.312***	1.000		
All Companies: 153 Companies										
	Pre-reform Sample: 1988-97					**Post-reform Sample: 1999-03**				
	Lintner's Model					**Lintner's Model**				
Variables	ΔDPR	PROFIT	LDPR			ΔDPR	PROFIT	LDPR		
ΔDPR	1.000					1.000				
PROFIT	0.038	1.000				.573***	1.000			
LDPR	-0.358***	.102**	1.000			-.628***	.220***	1.000		
	Darling's Model					**Darling's Model**				
Variables	ΔDPR	PROFIT	LPROFIT	AMORTIZE	GROWTH	ΔDPR	PROFIT	LPROFIT	AMORTIZE	GROWTH
ΔDPR	1.000					1.000				
PROFIT	0.038	1.000				.573***	1.000			
LPROFIT	-0.043	.547***	1.000			-.553***	.302***	1.000		
AMORTIZE	-0.001	.163***	.134***	1.000		.139***	.316***	.015	1.000	
GROWTH	0.124***	-.013	.042	-.054**	1.000	-.126***	-.007	.282***	-.004	1.000
	Brittain's Model					**Brittain's Model**				
Variables	ΔDPR	CFLOW	LDPR			ΔDPR	CFLOW	LDPR		
ΔDPR	1.000					1.000				
CFLOW	0.038	1.000				.395***	1.000			
LDPR	-0.358***	.108***	1.000			-.628***	.117***	1.000		

****Significant at 1% level **Significant at 5% level *Significant at 10% level*

Regression Results

The cross-section and pooled Ordinary Least Square (OLS) regression models were run over the pre and post reform period for the selected samples as well as the all companies sample to identify the dividend policy and behavior in an emerging market. For the pooled regression models, nine (10-1) and four (5-1) year dummies are considered for pre (1988-97) and post (1999-03) reform period. However, no significance is found in the coefficients of the dummy variables, which indicates no impact of time on the

models. As time does not have any impact on the model, incorporation of year dummies has resulted in less overall significance of the regression models. Ramsey's RESET tests (Ramsey, 1969) and White's test (White, 1980) is employed for checking the heteroskedasticity problem of the partial adjustment dividend behavioral models. Both the tests are unable to reject the hypothesis of homoskedasticity for each and every model. Therefore, the residuals of all the behavioral models are homoskedastic. The Durbin-Watson is close to 2 in all the regression models, which also indicates no sign of an autocorrelation problem in the regression models.

Lintner's (1956) Partial Adjustment Model: The overall Fscore = 57.267 and 10.649 for cross-sectional and pooled regression models respectively and these scores are significant at 1% level (p<.000) in the pre-reform period. However, the Fscore is dramatically reduced (4.445 and 2.177) in the post-reform period of the selected sample of 51 companies. The adjusted R^2 = 0.220 and 0.210 for cross-sectional and pooled regression models in the pre-reform period of the selected sample of 51 companies but the situation significantly deteriorates in the post-reform period (adjusted R^2 = 0.026 and 0.027 for cross-sectional and pooled models). Nonetheless, while considering all companies as the sample, the Fscore in the pre-reform period are 11.022 and 21.714 and in the post-reform period but those Fscores significantly increased to 5418.718 and 14.5599 in the post reform for the all companies sample and the values are significant at the 1% level (p<.000). Despite some discrepancies in the post-reform selected sample, the standardised beta coefficients of the profitability and lagged dividend (LDPR) variables are in the predicted direction and are highly significant (p<.000). The empirical results suggest that profitability and lagged dividend have a significant influence on dividend changes in the listed companies of the Dhaka Stock Exchange. This is likely due to the fact that the listed non-financial sector (regular dividend paying) companies basically follow a stable dividend policy based on dividend per share (DPS). As the companies pay stable dividends, e.g., 15% (DPS) on the face value, the managers are reluctant to cut the dividend even though they may incur a loss in a certain year. However, managers may change the pay-out policy every few years depending on profitability. If the companies incur increased profits, then they certainly change the dividend payment rate, e.g., 15% to 20% and keep that level for a certain extended time period. In contrast, the basic assumption of the partial adjustment dividend behavior model is the relation of the target ratio of dividends to profits. The empirical findings of this study are quite acceptable as because dividend changes of the Dhaka Stock Exchange listed companies basically depend on the lagged profits. However, increased or decreased profitability encourage the firms to change dividends, i.e., speed of adjustment works in case of increasing or decreasing profitability. Therefore, the empirical results suggest that Lintner's dividend behavioral model is adequate for the Dhaka Stock Exchange (Tables 3).

Table 3: Lintner's Model Summary[a, b]

Panel A: Selected Sample: 51 Companies

Refined Constructs	**Pre-reform Sample: 1988-97**				**Post-reform Sample: 1999-03**			
	Cross-sectional Model		**Pooled Model**		**Cross-sectional Model**		**Pooled Model**	
	Coefficient	**T-Value**	**Coefficient**	**T-Value**	**Coefficient**	**T-Value**	**Coefficient**	**T-Value**
Constant	0.0070	3.830***	0.0087	2.209**	0.012	1.445	-0.018	-0.996
PROFIT	0.110	5.897***	0.108	5.684***	-0.007	-0.785	-0.008	-0.941
LDPR	-0.393	-10.509***	-0.393	-10.381***	-0.041	-2.101**	-0.035	-1.778*
F – ratio Value		57.267***		10.649***		4.445**		
R^2		.223		.231		0.034		0.050
Adjusted R^2		.220		.210		0.026		0.027
N		51		510		51		255

Panel: All 153 Companies

Refined Constructs	Pre-reform Sample: 1988-97				Post-reform Sample: 1999-03			
	Cross-sectional Model		Pooled Model		Cross-sectional Model		Pooled Model	
	Coefficient	T-Value	Coefficient	T-Value	Coefficient	T-Value	Coefficient	T-Value
Constant	0.006	7.606***	0.017	1.092	-0.095	-2.601***	-0.008	-0.402
PROFIT	0.014	3.152***	0.014	3.162***	0.846	78.859***	0.134	7.575***
LDPR	-0.259	-15.280***	-0.262	-15.354***	-0.993	-83.630***	-0.096	-6.328***
F – ratio Value		11.022***		21.714***		5418.718***		14.5599***
R^2		.134		.147		.925		.102
Adjusted R^2		.133		.140		.925		.096
N		153		1530		153		765

*a. Dependent Variable: Changes in Dividend Payout Ratio (ΔDPR) b. All Requested Variables Entered ***Significant at 1% level **Significant at 5% level *Significant at 10% level*

Darling's (1957) Partial Adjustment Model: A poor overall F_{score} (1.569 and 0.832 for pre reform and 4.559 and 2.872 for post reform) was found for both the pre and post reform period of the selected sample. Also, the performance of the all companies sample (F_{score} = 9.375 and 3.924 for pre reform and 3078.238 and 23.028 for post reform) is better while testing Darling's behavioral model. Nevertheless, the adjusted R^2 in the post-reform period of the all companies sample performs excellent (0.933 and 0.187). The standardized beta coefficients of the profitability and lagged profitability (LPROFIT), amortization, and growth variables are in the predicted direction except depreciation and amortization recoveries, which are not highly significant with few exceptions.

While lagged profitability coefficients are not significant, both the profitability and lagged profitability coefficients are quite consistent with Lintner's model. The main reason for this is that the companies follow stable dividend policy based on dividend per share rather than target payout ratios (as mentioned earlier). However, as depreciation and amortization recovery is insufficient to fulfill the investment demand, the amortization variable does not influence the dividend policy significantly. In addition, as we have already mentioned, the companies are mostly determined not to change the dividend policy very often, and as a result, investment opportunities are not affecting a large change in dividend policy. Therefore, the empirical results suggest that Darling's model does not work very well on the Dhaka Stock Exchange (Tables 4).

Table 4: Darling's Model Summary[a, b]

Panel A: Selected Sample: 51 Companies

Refined Constructs	Pre-reform Sample: 1988-97				Post-reform Sample: 1999-03			
	Cross-sectional Model		Pooled Model		Cross-sectional Model		Pooled Model	
	Coefficient	T-Value	Coefficient	T-Value	Coefficient	T-Value	Coefficient	T-Value
Constant	0.0011	0.440	0.0012	0.245	0.015	1.719*	0.021	1.154
PROFIT	0.0710	2.122**	0.0650	1.899*	-0.008	-0.690	-0.007	-0.603
LPROFIT	-0.0400	-1.201	-0.0330	-0.988	-0.016	-1.865*-	-0.013	-1.526
AMORTIZE	-0.0480	-1.166	-0.0470	-1.123	-0.010	-0.480	-0.013	-0.653
GROWTH	-0.0019	-0.523	-0.0031	-0.834	-0.021	-2.852***	-0.021	-2.874***
F – ratio Value	1.569		.832		4.559***		2.872	
R^2	.017		.030		0.068		0.085	
Adjusted R^2	.006		-.006		.053		0.056	
N	51		510		51		255	

Panel B: All Companies: 153 Companies

Refined Constructs	Pre-reform Sample: 1988-97				Post-reform Sample: 1999-03			
	Cross-sectional Model		Pooled Model		Cross-sectional Model		Pooled Model	
	Coefficient	T-Value	Coefficient	T-Value	Coefficient	T-Value	Coefficient	T-Value
Constant	0.000	-0.327	0.009	0.581	-0.004	-0.102	-0.013	-0.661
PROFIT	0.018	3.085***	0.018	3.182***	0.983	89.302***	0.118	5.928***
LPROFIT	-0.019	-3.301***	-0.019	-3.375***	-0.959	-88.118***	-0.183	-10.064***
AMORTIZE	0.000	0.164	0.000	-0.096	-0.101	-13.234***	0.118	6.453***
GROWTH	0.006	5.119***	0.005	4.810***	0.007	13.009***	-0.024	-1.748***
F – ratio Value		9.375***		3.924***		3078.238***		23.028***
R^2		.024		.035		.933		.196
Adjusted R^2		.021		.026		.933		.187
N		153		1530		153		765

a. Dependent Variable: Changes in Dividend Payout Ratio (ΔDPR) b. All Requested Variables Entered ***Significant at 1% level **Significant at 5% level *Significant at 10% level

Brittain's (1966) Partial Adjustment Model: The overall *F* score in the pre and post reform period of the selected samples (77.424 and 14.282 for pre reform and 4.190 and 2.023 for post reform) and the Fscore for the all companies sample (Fscore = 118.350 and 21.817 for pre reform period and 464.631 and 10.490 for post reform period) are extremely significant at the 1% level (p<.000). Nevertheless, the adjusted R^2 of the models are not very high but the standardized beta coefficients of the cash flow and lagged dividend (LDPR) variables are in the predicted direction and highly significant at the 1% level (p<.000).

However, as cash flow incorporates depreciation as the source of funds with regular profits, cash flow also encourages companies to change their dividend policy at a point in time even though they are not highly motivated to change the payout policy often. Therefore, cash flow provides a better explanation of the ability of the companies to pay dividends. Finally, the empirical results suggest Brittain's partial adjustment dividend behavioral model as the best-fit model on the Dhaka Stock Exchange (Tables 5).

Fama and Babiak's (1968) Partial Adjustment Model: The standardised beta coefficients of the profitability and lagged dividend (LDPR) variables show the predicted sign and are significant at a higher level in the regular dividend paying companies. The adjusted R^2 of the models for the individual companies in the pre and post reform sample are very high indeed, suggesting that dividend decisions are primarily governed by the magnitude of current profitability as well as dividends paid in the previous years, (i.e., lagged dividends). (Table 6).

Table 5: Brittain's Model Summary [a, b]

Panel A: Selected Sample: 51 Companies

Refined Constructs	Pre-reform Sample: 1988-97				Post-reform Sample: 1999-03			
	Cross-sectional Model		Pooled Model		Cross-sectional Model		Pooled Model	
	Coefficient	T-Value	Coefficient	T-Value	Coefficient	T-Value	Coefficient	T-Value
Constant	0.0051	3.077***	0.006	1.667*	0.010	1.144	0.029	1.563
CFLOW	.0103	7.756***	0.102	7.566***	0.004	0.347	0.001	0.060
LDPR	-0.440	-12.125***	-0.438	-11.924***	-0.050	-2.838***	-0.044	-2.474**
F – ratio Value		7.424***		14.282***		4.190***		2.023**
R^2		.260		.267		0.032		0.047
Adjusted R^2		.257		.247		0.024		0.024
N		51		510		51		255

Panel B: All 153 Companies

Refined Constructs	*Pre-reform Sample: 1988-97*				*Post-reform Sample: 1999-03*			
	Cross-sectional Model		**Pooled Model**		**Cross-sectional Model**		**Pooled Model**	
	Coefficient	**T-Value**	**Coefficient**	**T-Value**	**Coefficient**	**T-Value**	**Coefficient**	**T-Value**
Constant	0.006	6.845***	0.016	1.080	0.048	0.381	-0.002	-0.107
CFLOW	0.011	3.241***	0.011	3.327***	0.280	18.330***	0.094	5.816***
LDPR	-0.260	-15.302***	-0.263	-15.389***	-0.860	-26.339***	-0.087	-5.689***
F – ratio Value		118.350***		21.817***		464.631***		10.490***
R^2		.134		.147		.619		.077
Adjusted R^2		.133		.141		.618		.069
N		153		1530		153		765

*a. Dependent Variable: Changes in Dividend Payout Ratio (ΔDPR) b. All Requested Variables Entered ***Significant at 1% level **Significant at 5% level *Significant at 10% level*

The empirical results of the Fama and Babiak's partial adjustment model are quite consistent among the companies. However, the coefficient of lagged profitability is more significant than profitability. As mentioned earlier, the main reason is that the Dhaka Stock Exchange listed non-financial sector firms paying regular dividends tend to follow stable dividend policies based on dividend per share (DPS) rather than a target payout ratio. However, current earnings encourage companies to change the payout policy every few years and they usually are consistent with current policy for the next few years. Therefore, the empirical findings explain the practice of the companies under consideration, i.e., dividend change depends on the lagged dividends, but profitability encourages the firms to change dividend policy, i.e., the speed of adjustment works to help make increasing or decreasing decisions given a stable dividend policy.

The average company size of this sample is 391 million Taka (Bangladesh Currency) whereas the average company size of the non-financial sector companies is almost 70 million Taka. Moreover, the institutional shareholdings for this sample are 12.44%, which is a bit higher than the average market institutional ownership. In addition, the insider ownership for this sample is 23.31%, which is lower than the average insider ownership of the non-financial sector companies. However, insiders are still the major shareholders of the regular dividend paying companies in Dhaka Stock Exchange. Presumably, solely insider controlled firms have lower levels of outsider protection in the stock market of Bangladesh. However, as we have mentioned earlier, the regular dividend paying companies follow a stable dividend policy based on the dividend per share, hence, pay-out policy does not adjust properly with the level of profitability. Therefore, as regular dividend paying companies do not properly adjust payment policy with the level of earnings, insiders have greater opportunity to expropriate funds from their controlled larger firms.

Table 6: Regression Results of Fama and Babiak's Partial Adjustment Model: Testing on Regular Dividend Paying Companies Individually

Company	*Pre-reform Sample: 1988-97*					*Post-reform Sample: 1999-03*				
	N	**α_0 Coefficient (T-Value)**	**β_1 Coefficient (T-Value)**	**β_2 Coefficient (T-Value)**	**Adj. R^2**	**N**	**α_0 Coefficient (T-Value)**	**β_1 Coefficient (T-Value)**	**β_2 Coefficient (T-Value)**	**Adj. R^2**
1	1	0.0008	0.483	-0.805	0.887	5	0.000	-0.055	-0.713	1.000
	0	(0.183)	(7.794***)	(-7.096***)			(1.664)	(-33.625***)	(-242.027***)	
2	1	0.0009	0.250	-0.447	0.757	5	0.005	1.388	-1.236	0.993
	0	(0.335)	(3.557*)	(-4.133***)			(1.104)	(3.346*)	(-8.110*)	
3	1	-0.0015	0.638	-0.867	0.866	5	-0.003	1.174	-0.560	0.984
	0	(-1.073)	(6.754***)	(-5.318***)			(-2.880)	(11.167***)	(-5.074**)	
4	1	-0.0017	0.628	-0.785	0.738	5	0.305	0.389	-0.507	0.992
	0	(-0.622)	(4.505***)	(-4.389***)			(0.979)	(21.821***)	(-15.774***)	
5	1	0.029	0.846	-0.821	0.480	5	0.023	-0.153	-0.997	1.000
	0	(-1.100)	(2.674**)	(-2.374*)			(5.988**)	(-2.491)	(-1210.493***)	
6	1	0.0048	0.805	-0.859	0.878	5	-0.010	0.491	-0.971	0.996
	0	(0.998)	(6.831***)	(-6.829***)			(-0.922)	(15.665***)	(-14.810***)	
7	1	0.0039	0.328	-1.066	0.584	5	0.015	0.404	-0.916	0.988
	0	(0.324)	(2.669**)	(-3.740***)			(3.215*)	(2.603)	(-16.324***)	
8	1	-0.0013	0.516	-0.619	0.922	5	-0.100	0.299	-0.051	0.986
	0	(-0.274)	(4.969***)	(-5.531***)			(-1.191)	(16.164***)	(-0.823)	
9	1	-0.042	0.602	-0.466	0.994	5	0.006	0.219	-1.068	0.993
	0	(-4.641**)	(19.064***)	(-8.734**)			(0.631)	(16.576***)	(-17.852***)	
10	1	-0.0022	0.820	-1.626	0.994	5	0.003	0.625	-1.009	0.999
	0	(-1.087)	(19.884***)	(-25.247***)			(1.138)	(61.093***)	(-61.689***)	
11	1	0.010	1.171	-1.948	0.862	5	0.000	0.873	-1.003	1.000
	0	(1.083)	(3.856**)	(-5.749***)			(0.455)	(73.164***)	(-73.384***)	
12	1	-0.047	1.248	-0.863	0.977	5	0.000	0.045	0.086	0.994
	0	(-2.220*)	(8.014***)	(-17.099***)			(0.542)	(20.872***)	(19.995***)	
13	1	0.0054	0.700	-1.085	0.916	5	0.001	0.467	-1.023	1.000
	0	(0.549)	(5.741***)	(-6.352***)			(0.128)	(4.335**)	(-101.130***)	
14	1	0.0046	0.362	-1.092	0.583	5	-0.001	0.165	-0.986	1.000
	0	(1.059)	(2.783**)	(-3.424***)			(-1.845)	(2.691)	(-6333.947***)	
15	1	-0.0009	0.814	-1.351	0.632	5	0.141	-1.027	-1.293	0.983
	0	(-0.030)	(2.292*)	(-3.371**)			(10.412***)	(-5.083**)	(-14.295***)	

*Note: a. Dependent Variable: Changes in Dividend Payout Ratio (ΔDPR) b. All Requested Variables Entered c. ***Significant at 1% level **Significant at 5% level *Significant at 10% level d. α_0 is the Coefficient for constant, β_1 is the Coefficient Profitability, and β_2 is the Coefficient for Lag Dividend Pay-out Ratio.*

Finally, our empirical results support Lintner's (1956) view that dividend policy is primarily governed by current earnings and lagged dividends but find Brittain's (1966) dividend behavioral model as the best-fit partial adjustment dividend behavior model in this emerging market. Nevertheless, the empirical studies mentioned identify cash flow as the better measure of the company's ability to pay dividends because cash flow encourages the companies to change their dividend policy at a given point even though they are not highly motivated to change the payout policy often.

CONCLUSION

Dividend behavior of emerging markets is quite different from developed markets due to various characteristics. Partial adjustment models are tested on the Dhaka Stock Exchange for listed non-financial sector companies over the period of 1988-2003. The empirical results support Lintner's (1956) view of a partial adjustment model but find Brittain's (1966) model as the better-fit partial adjustment model in this emerging market. While the empirical results show a very high degree of relationship between dividend change, current earnings, and lagged dividends, in practice dividend policy is primarily governed by lagged dividends because the regular dividend paying companies follow stable dividend policy and the pay-out policy does not adjust perfectly with the level of current earnings. Moreover, as cash flow incorporates depreciation as a source of funds with regular profits, cash flow encourages the companies to change their dividend policy at a given point in time even though they are not highly motivated to change

the pay-out policy often. However, the empirical studies also identify cash flow as the better measure of the company's ability to pay dividends.

Finally, the empirical results indicate some connection with the firm size and the ownership structure, which are the major influential factors in an emerging market. Even though the empirical results indicate that the regular dividend paying firms are comparatively larger sized firms on the Dhaka Stock Exchange, insiders also solely control these firms. Therefore, insider controlled firms presumably has a much lower level of outsider protection. However, as mentioned earlier, the regular dividend paying companies follow a stable dividend policy based on the dividend per share. Hence, the dividend policy does not reflect the level of earnings properly. Because of the company's choice to pursue a stable dividend policy, insiders tend to enjoy many opportunities to expropriate funds on the Dhaka Stock Exchange. Despite the findings, that dividend policy is primarily governed by current earnings and lagged dividends in the emerging markets, this study failed to incorporate the key determinants of dividend policy like size, leverage, ownership structure, etc. Therefore, it is suggested that future studies examine these variables to build up dividend behavioral models in the emerging financial markets.

REFERENCES

Brittain, JA (1964), "The tax structure and corporate dividend policy", *American Economic Review*, Vol. 54, p. 272-287.

Brittain, JA (1966), "*Corporate dividend policy*", Washington, D. C.: The Brooking Institution.

Bryman, A and D Cramer (1997), "*Quantitative data analysis for social scientists*", London: Routledge.

Darling, PG (1957), "The influence of expectations and liquidity on dividend policy", *Journal of Political Economy*, Vol. 65, p. 209-224.

Fama, EF and H Babiak (1968), "Dividend policy: an empirical analysis", *Journal of the American Statistical Association*, Vol. 63, p. 1132-1161.
Freund, RJ and WJ Wilson (1998), "*Regression analysis: statistical modelling of response variable*", London: Academic Press.

Garg, MC, HL Verma, and S Gulati (1996), "Determinants of dividend policy in developing countries - a study on Indian textile industry", *Finance India*, Vol. 10, p. 967-986.

Goergen, M., L Renneboog, and L C da Silva (2004), "Dividend policy of German firms. A dynamic panel data analysis of partial adjustment models", Finance working paper no. 45/2004. *ECGI working paper series in Finance*.

Hair, JP, RE Anderson, RL Tatham and WC Black (1995), "*Multivariate data analysis*". Fourth Edition, Engle Wood Cliffs, New Jersey: Printice Hall.

Lintner, J (1956), "Distribution of incomes of corporations among dividends, retained earnings, and taxes", *American Economic Review*, Vol. 61, p. 97-113.

Lintner, J (1963), "The determinants of corporate savings", in *Savings in the Modern Economy*, edited by W. W. Heller (Minneapolis: University of Minnesota Press), p. 230-55.

Mendenhall, W and T Sincich (1989), "*A second course in business statistics: regression analysis*", Third Edition, San Francisco: Dellen Publishing Company.

Mishra, CS and V Narender (1996), "Dividend policy of SOEs in india – an analysis", *Finance India*, Vol. 10, p. 633-45.

Ramsey, JB (1969), "Tests of specification errors in classical linear least square regression analysis", *Journal of Royal Statistical Society (Series B),* Vol. 31, p. 350-371.

White, H (1980), "A heteroskedasticity covariance matrix estimator and a direct test for heteroskedasticity", *Econometrica*, Vol. 48, p. 817-838.

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