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Determinants of Target Dividend Payout Ratio: A Panel Autoregressive Distributed Lag Analysis

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ABSTRACT

The aim of this study is to find out the determinants of target dividend payout ratio (TDPR) of BIST - listed firms operating in the non-metallic products (cement) manufacturing industry in the period of 2002-2012. Through this aim, the short and long-run effects of factors related to profitability, liquidity, growth, risk, market expectations and taxation on TDPR is analyzed via panel autoregressive distributed lag analysis methodology. Empirical findings indicate that in the long-run, factors related to profitability, growth and corporate taxation significantly affect TDPR negatively; while factors related to risk and market expectations have statistically significant and positive effects on TDPR. Additionally, in the short-run only profitability seems to have statistically significant and positive effect on the dependent variable.

Keywords: Target Dividend Payout Ratio, Dividend Payout Policy, Panel Autoregressive Distributed Lag Analysis
JEL Classifications: C33, G35, L61

1. INTRODUCTION

It can be said that the modern theory of dividend policy evolves with Lintner (1956)'s classic work. His work suggests a model theorizing how a publicly-traded company sets its dividend policy, stating that the mentioned policy is related both to a target long-term payout ratio and to the speed of adjustment of change in dividends. According to Lintner (1956), dividends are sticky, tied to long-term sustainable earnings, -mostly- paid by mature companies, and smoothed from year to year (Brav et al., 2005. p. 484). Additionally, his classic work also reveals that growth prospects of the industry and the firm, and cyclical variations of investments opportunities are other important factors affecting firms' dividend policies (Dempsey et al., 1993. p. 3).

Then, in their seminal - and better known - paper Miller and Modigliani (hereafter "MM") (1961) proved the theory of irrelevance of dividend policy. Their financial theory states that the market value of firm is determined by its earning power and the risk of its underlying assets, and is independent of the way the firm chooses to finance its investments or distribute dividends. MM (1961) base their theory upon idealistic assumptions of perfect capital markets and rational investors. These assumptions can be summarized as follows: (1) no differences between taxes on dividends and capital gains; (2) no transaction and flotation costs incurred when securities are traded; (3) all market participants have free and equal access to the same information (symmetrical and costless information); (4) no conflicts of interests between managers and security holders (no agency problem); and (5) all participants in the market are price takers (Brigham and Gapenski, 1996. p. 10; Holder et al., 1998. p. 73, 74; Al-Malkawi et al., 2010. p. 174). Clearly, all these conditions are not true and valid in any real-world scenario and the existence of market imperfections is inevitable. So it is possible to say that MM (1961)'s model is static, whereas the real world probably follows a dynamic equilibrium where deviations from the model are commonly observed intraday variability of prices (Cheremushkin, 2011. p. 153).

Though a group of financial theorists as Black and Scholes (1974); Miller and Scholes (1982); Miller (1986) and Martin et al. (1991) defend the theory of irrelevance of dividend policy; several theories (of Farrar and Selwyn, 1967; Brennan, 1970; Stapleton, 1972; Jensen and Meckling, 1976; Ross, 1977; McCabe, 1979; Bhattacharya, 1979; 1980; Rozeff, 1982; Easterbrook, 1984; Myers, 1984; John

and Williams, 1985; Ofer and Thakor, 1987; Jensen et al., 1992) have emerged explaining dividend policy from different perspectives by relaxing its assumptions and focusing on market imperfections. These imperfections have led a widespread recognition that dividend policy in practice is surrounded by much controversy and not well understood (Dempsey et al., 1993. p. 3; Baker and Powell, 1999. p. 1; Amidu and Abor, 2006. p. 136). While in his well-known classical paper Black (1976) emphasizes that "the harder we look at the dividend picture, the more it seems like puzzle, with pieces that just do not fit together;" Brealey and Myers (1991. p. 918) sees this puzzle among "10 unresolved problems in finance."

The struggle to solve dividend policy puzzle has brought forth studies related to dividend policy an important subject of debate in financial literature. The focus of previous empirical studies has mainly been on developed countries. However, this study examines dividend policy puzzle from the perspective of a developing country aiming to find out the determinants of target dividend payout ratio (TDPR). The dividend policy, in the context of this study, is about the payout policy that managers should follow in determining amount and pattern of cash distribution to shareholders over time. The remainder of the study proceeds as follows. The Section 2 gives a brief theoretical background. In the Section 3 literature review is presented. Section 4 and 5 are about the methodology and empirical results of the study, respectively. Finally, some conclusions are drawn in Section 6.

2. THEORETICAL BACKGROUND

As mentioned before, MM (1961) have proved their theory in a world of no taxes and transaction costs and where all investors are fully informed about the distribution of the firm's uncertain future cash flows. Though -according to them- any dividend policy does not matter anything; for a world in which their assumptions do not hold, it does indeed. Therefore, some researchers have developed various theories related to the dividend policy of firms including bird-in-the-hand, signaling, tax preference, agency costs and free cash flow theories.

Bird-in-the-hand theory is an alternative and relatively old theory about dividend policy suggesting that dividend payments increase firm value. This theory states that investors prefer the "bird-in-the-hand" of cash dividends rather than the "two-in-the-bush" of future capital gains. So increasing dividend payments may then be associated with increases in firm value. As a higher current dividend reduces uncertainty about future cash flows, a high payout ratio will reduce the cost of capital, and hence increase firm value (Al-Malkawi et al., 2010. p. 176, 177). Though studies of Gordon and Shapiro (1956), Gordon (1959; 1963), Lintner (1962), and Walter (1963) support the theory; MM (1961) and Bhattacharya (1979) point out the fallacies of it. According to MM (1961) the firm's risk is determined by the riskiness of its operating cash flows, not by the way it distributes its earnings. Moreover Bhattacharya (1979) tries to underline the fallacy by pointing out that the riskiness of a firm's cash flow influences its dividend payments, but increases in dividends will not reduce the risk of the firm and eventually increase firm value as well (Jensen et al., 1992).

Signaling theory developed by Ross (1977) and then improved via different models by Bhattacharya (1979; 1980), Asquith and Mullins (1983), John and Williams (1985), Miller and Rock (1985), Ofer and Thakor (1987) and Rodriguez (1992) posit a positive relationship among firms' dividend policy changes, equity values, and subsequent performances. These models suggest that dividend announcements encompass and convey information about managements' assessments of the firms' future prospects that cannot be communicated by any other means. And investors may use these announcements for assessing firms' stock prices, because changes in dividends reduce the information asymmetry between managers and outside investors (Pettit, 1972; 1976; Aharony and Swary, 1980; Bajaj and Vijh, 1990; Michaely et al., 1995; Impson, 1997). However, contrary to the theory some empirical evidence do not support this suggestion (Lang and Litzenberger, 1989; Benartzi et al., 1997; Conroy et al., 2000; Chen et al., 2002; Abeyratna and Power, 2002). This is because, in some circumstances the stock prices may quickly react to announcements of unexpected dividend change and move in the same direction as the revised payments (Baker and Powell, 1999. p. 3).

According to MM (1961) - as any possible tax effect is excluded in their assumptions of perfect capital markets, there is no differential in tax treatment between dividends and capital gains. However, in the real world taxes exist and sometimes may have significant effects on dividend policy and consequently on firm value. And there is often a differential in tax treatment between dividends and capital gains. Tax preference theory first developed by Brennan (1970) and then extended by Litzenberger and Ramaswamy (1979) and Gordon and Bradford (1980) is based on an optimal dividend policy considering this differential. Some groups of shareholders such as non-taxable institutions, individuals and other corporate shareholders with low marginal tax rates (in brief, "low-tax clientele") may prefer dividends to capital gains because: (1) dividends provide cash flow and, (2) there is little or no tax advantage from capital gains for them. These shareholders, of course, will prefer stocks with relatively high dividend payout ratios compared to shareholders with higher marginal tax rates preferring stocks with low payout ratios. The empirical evidence regarding tax preference theory is inconclusive like the other dividend policy theories. Studies that find clientele effects include Pettit (1977), Gordon and Bradford (1980) and Baker et al. (2002); while studies providing contradictory evidence include Brennan (1970); Long (1978); Litzenberger and Ramaswamy (1979); Hess (1982); Poterba and Summers (1984); Blume and Friend (1987); and Kalay and Michaely (2000).

Another assumption of MM (1961) on perfect capital markets is that there are no conflicts of interests between managers and shareholders. However, this assumption may not be valid in existence of any separation of ownership and control. In these cases managers act as imperfect agents of shareholders. This is because managers' interests are not necessarily the same as shareholders' interests, and they might conduct actions that may conflict with the interests of shareholders. Agency theory of Jensen and Meckling (1976) seeks to explain capital structure of firms considering the costs associated with this confliction. In this perspective, dividend payments may provide a mechanism to align the interests and mitigate the agency problems between managers

and shareholders (Easterbrook, 1984; Jensen, 1986; Born and Rimbey, 1993), because they reduce the agency cost of free cash flow by reducing the amount of cash available for spending in the interests of managers. Moreover, according to the agency theory, dividend payments increase the need for external financing for investments leading to reduction in the possibility of suboptimal investments. Thus, they may be regarded as means of monitoring managers' performance. Studies of Kalay (1982), Rozeff (1982), Crutchley and Hansen (1989), Dempsey and Laber (1992), Jensen et al. (1992), Alli et al. (1993), Moh'd et al. (1995) and Holder et al. (1998) provide evidence consistent with the agency theory.

Jensen (1986)'s free cash flow theory discusses the classical agency cost theory from a coherent, but a little bit different perspective stating that funds remaining after financing all acceptable projects may also cause conflicts of interests between managers and shareholders. Consistent with the agency theory, this theory - implying the interrelationship between dividend policy and investment decision - considers dividend payments as a solution of over-investment problem. Empirical studies regarding with free cash flow theory are less in number with mixed results (e.g. Lang and Litzenberger, 1989; Lie, 2000).

3. LITERATURE REVIEW

There exists an extant literature on corporate dividend policy. However, it does not provide a universally accepted explanation for the level of dividend payment adequate for the primary objective of corporate finance, that is, firm value maximization. In previous empirical studies, a number of factors related with dividend policy theories including firm profitability, liquidity, growth, risk (earnings stability), market-to-book value, corporate tax, etc., have been identified.

Profitability has long been regarded as the primary indicator of a firm's capacity to pay dividends (Anil and Kapoor, 2008). According to Lintner (1956)'s survey study on 28 selected companies in USA, major changes in earnings with existing dividend rates are the most important determinants of dividend policy. The empirical findings of his survey has also been supported by the following studies of Fama and Babiak (1968), Ryan (1974), Shevlin (1982) and Allen (1992). Similar findings have been obtained in studies by Baker et al. (1985), Pruitt and Gitman (1991) and Baker and Powell (1999) indicating that the major determinants of dividend payments are the anticipated level of future earnings and the pattern of past dividends; and dividend payments are influenced by the current and the past years' earnings, the year-to-year variability of earnings and the growth of earnings, respectively. Nissim and Ziv (2001), Amidu (2007), Howatt et al. (2009), Ajanthan (2013) and Leon and Putra (2014) also empirically indicate a positive and significant relationship between profitability and dividend policy. However, findings of Farsio et al. (2004) and John and Muthusamy (2010) conflict with these results. Farsio et al. (2004) argue that there is no significant relationship between dividends and earnings in the long-run, and previous studies supporting this relationship are based on short periods and therefore misleading to potential investors. Because firms paying high dividends without considering investment needs may therefore experience lower future earnings. And according to John and Muthusamy (2010), profitability (return on assets) is negatively related to dividend payout ratio. While firms with larger profits tend to pay more dividends, ones facing uncertainty about (expected) future profits adopt lower dividend payments.

Another determinant of dividend policy of firms is liquidity (requirement), also discussed in terms of firms' free cash flows. Alli et al. (1993) and Mahapatra and Sahu (1993) arguing that dividend payments depend more on cash flows than on current earnings, and Amidu and Abor (2006), Afza and Mirza (2010), and Thanatawee (2013) find out that there exists a positive relationship between cash flow and dividend payout ratio. This is because relatively liquid firms with stable cash flows tend to pay higher dividends as compared to firms with unstable cash flows. However, Barclay et al. (1995) find negative relationship between liquidity and payout ratio suggesting that increase in payout ratio reduces firm's liquidity level, therefore lowering dividend payments. Ahmed and Javid (2008) confirm the same finding; while Adedeji (1998) does not find any relationship between liquidity and dividend policy.

Growth (in net sales) is another determinant of dividend policy. Higgins (1972) points out that there is a negative relationship between dividend payout ratio and firm's need for funds to finance growth opportunities. Later then studies of Rozeff (1982), Lloyd et al. (1985), Collins et al. (1996), Amidu and Abor (2006), and Gill et al. (2010) all indicate a negative relationship between dividend payout ratio and sales' growth. This is because firms either experiencing or expecting higher growth rates may need to keep dividend payouts lower to avoid the costs of external financing. This explanation may be so rational, but findings of Arnott and Asness (2003) surprisingly conflicts with usual, pointing a positive relationship between dividend payout ratio and growth. Gwilym et al. (2006), Ping and Ruland (2006) and Vivian (2006) also support further evidence to findings of Arnott and Asness (2003). The confliction here may be due to choice of growth variable and sample, and empirical methodology undertaken.

In empirical studies searching for the determinants of corporate dividend policy, variability of earnings, equity beta coefficient and leverage ratio have been used as indicators of risk. Pruitt and Gitman (1991) reveal that risk in terms of year-to-year of earnings is also a determinant of dividend payout ratio. Firms with stable earnings tend to pay out a higher amounts of dividend than firms with unstable earnings, because their future earnings are more predictable. Estimating betas for 307 US firms, Beaver et al. (1970) find significant correlation between beta and dividend payout ratio. Then Rozeff (1982), Lloyd et al. (1985) and Collins et al. (1996), again using beta coefficient to proxy for risk, point out that firms with relatively high betas will pay out lower amounts of dividend. Studies of D'Souza and Saxena (1999), and Al-Najjar (2009) argue that leverage affect dividend payout ratio negatively and firms with higher debt tend to reduce their dividend payments.

Market-to-book value ratio indicates the value that the market places on the common equity or net assets of a firm (Lee and Makhija, 2009) and is a reflection of the ability of firm managers to use assets effectively and to grow the firm. Omran and Pointon

(2004) points out its importance as a determinant of dividend payout policy. Agyei and Marfo-Yiadom (2011), Gul et al. (2012) and Priya and Nimalathasan (2013) conclude that there exists a positive relationship between dividend policy and shareholders' wealth (firm value). They find out that firms paying higher dividends consequently increase the wealth of their shareholders. Contrary to their findings, D'Souza and Saxena (1999), and Amidu and Abor (2006) posit a negative relationship between market-to-book value and dividend payout ratios.

Several studies find supporting evidence for the effect of tax on dividend policy. Studying on the clientele effect of dividends, Pettit (1977) concludes that retired investors and pension funds tend to prefer cash income and may therefore want the firm to pay out a high percentage of its earnings. A model proposed by Allen et al. (2000) indicates that dividends attract institutional investors as they taxed less than retail investors. Studies of Frankfurter and Lane (1992), Dhaliwal et al. (1999) and Seida (2001) also find similar empirical evidence supporting the existence of the tax preference theory. However, contrary to these findings, other studies - especially on institutional investors - fail to find support for the theory. Grinstein and Michaely (2005) find no evidence that institutional investors really favor dividend paying firms. A recent study of Barclay et al. (2009) also present similar conclusion.

4. METHODOLOGY

4.1. Data and Variables

In this study, a panel data set including 17 Borsa Istanbul (BIST) listed firms all operating in the non-metallic mineral products (mostly cement) manufacturing industry in the period of 2002-2012 is used. The reason for selecting these firms is that mentioned industry firms make relatively regular dividend payments compared to other manufacturing industry firms (BIST Annual Factbook 2002-2012). The data is semi-annually and obtained from BIST. Definitions and symbols of variables used in the study is briefly shown in Table 1.

4.2. Model

In the model of the study, TDPR is described as a function of profitability, risk, growth, market-to-book value, corporate tax and liquidity. Accordingly, the empirical model is specified as given:

$$TDPR_{it} = \alpha_{0i} + \alpha_{1i}PROF_{it} + \alpha_{2i}CASH_{it} + \alpha_{3i}GROW_{it} + \alpha_{4i}RISK_{it} + \alpha_{5i}MBVR_{it} + \alpha_{6i}CTAX_{it} + u_{it}; i = 1,\ldots,N; t = 1,\ldots T \quad (1)$$

Table 1: Variable definitions

Variables	Definitions	Symbols
Target dividend payout ratio	Cash dividends (net) to profit (net) ratio	TDPR
Profitability	Earnings before interest and taxes to total assets ratio	PROF
Liquidity	Log of net cash flow	CASH
Growth	Growth in sales	GROW
Risk	Variability in profit	RISK
Market-to-book value	Market-to-book value ratio	MBVR
Corporate tax	Corporate tax to net profit before tax ratio	CTAX

Though the model used in this study is similar in terms of independent variables used to those by D'Souza and Saxena (1999), and Amidu and Abor (2006), there exist two remarkable differences. Firstly, the dependent variable of this study is TDPR; while their models use dividend payout ratio. TDPR here is calculated by dividing cash dividends (net) to profit (net); while dividend payout ratio is the ratio of dividend per share to earnings per share for the firm. TDPR focuses on creating the ideal balance between the percentages of collected revenue set aside for paying dividends to investors, as well as creating an allocation process ensuring that target or goal is met consistently. As TDPR is, in fact, a goal, there is always possibility of not meeting it. Therefore, determining an achievable target payout ratio requires very careful consideration of firm managers. When a firm with a stable TDPR over time changes this ratio, investors may believe that management is announcing a change in the expected future profitability of the firm. This explicit signal to investors about dividend policy indicates that firm managers and board of directors truly believe that things are better than stock price reflections (Van Horne, 2002. p. 316). Studies about explicitly defined dividend policies of firms, i.e. their target payout ratios are few in number and mostly use survey method (Brav et al., 2005; Baker et al., 2007; Brunzell et al., 2014). The contribution of this study to the literature is at this juncture. The second difference between this study and D'Souza and Saxena (1999)'s, and Amidu and Abor (2006)'s is that this study aims to find out determinants of target payout ratio by applying a recent and advanced technique of dynamic panel estimation based on the autoregressive distributed lag (ARDL) model, a cointegration technique introduced by Pesaran and Shin (1999) and Pesaran et al. (2001) which is consistent to correct the heterogeneity bias of traditional panel data estimation.

5. EMPIRICAL RESULTS

5.1. Panel Unit Root Tests

Before the panel data analysis, stationarity of the variables has to be tested to avoid a spurious regression problem and it is needed to determine the order of integration before using co-integration techniques. For this, Fisher - Augmented Dickey-Fuller (ADF) test by Maddala and Wu (1999), Levin-Lin-Chu (LLC) test by Levin et al. (2002) and Im-Pesaran-Shin (IPS) test by Im et al. (2003) are utilized as panel unit root tests.

Fisher-ADF test combines the *P* values from unit root tests for each cross section *i*. As a non-parametric test, it has a Chi-square distribution with 2*n* degrees of freedom, where *n* is the number of firms in the panel. The test statistics is as given below:

$$\lambda = -2\sum_{i=1}^{n} log_e(\rho_i) \quad (2)$$

Where, ρ_i is the p-value from the ADF unit root test for unit *i*.

The basic regression model used in both LLC and IPS tests are the same as given below:

$$\Delta y_{it} = \mu_i + \rho y_{it-1} + \sum_{j=1}^{m} \alpha_j \Delta y_{it-j} + \delta_{it} + \theta_t + \varepsilon_{it} \quad (3)$$

Where Δ is the first difference operator, m is the length of lag, μ_i and θ_t are unit-specific fixed and time effects, respectively. Also null hypothesis that $\rho_i = 0$ for all i, i.e. all time series are independent random walks, is the same in both tests and tested against the alternative hypothesis of $\rho_i < 0$ for all *i*.

LLC and IPS tests differ only in the underlying hypothesis specification. LLC, assuming that there is a common unit root process across the cross-sections, specify a homogenous alternative, where all ρ_i are equal and significantly negative, that is all time series are stationary. However, IPS -similar to Fisher-ADF - assuming that there are individual unit root process across the cross-sections, test less restrictive heterogeneous alternative, where ρ_i may differ and only a significant proportion of all-time series is stationary.

The results of the Fisher-ADF, LLC and IPS panel unit root tests for each variable are presented in Table 2. The dependent variable of the model, TDPR, is stationary at level in only intercept and trend model according to the LLC panel unit root test; while the results of Fisher-ADF and IPS panel unit root tests indicate TDPR is non-stationery at level. Therefore, in order to make series stationary, their first differences are taken and the mentioned tests are performed again. Results indicate that TDPR, PROF and CASH are stationary in their first differences, or integrated of order one (*I*(1)); while other variables of the model, RISK, GROW, MBVR and CTAX are stationary at level (*I*(0)).

5.2. PMG and MG Estimators and Panel ARDL Methodology

After testing for the presence of unit root, recently developed dynamic panel data methodology is specified. As known, when all variables are stationary, fixed effects or random effects models are estimated. In case all variables are stationary in their first differences, panel fully modified ordinary least squares and panel dynamic ordinary least squares must be employed (Erdem et al., 2014. p. 412). However, as the variables in the empirical model of this study is a mix of *I*(0) and *I*(1) series, panel ARDL modelling approach is employed. The main advantage of this approach is the flexibility that it can be employed when the variables are of different order of integration. Another advantages are that the model takes sufficient numbers of lags to capture the data generating process in a general-to-specific modelling framework (Laurenceson and Chai, 2003), and that a dynamic error correction model can be derived from ARDL through a simple linear transformation (Banerjee et al., 1993).

Pesaran et al. (1999) suggest two estimators for the ARDL model, the mean group estimator (MGE) and pooled (MGE and PMGE, respectively). MGE seems to be more consistent under the assumption that both slope and intercepts are allowed to vary across country (in this study, firm); while PMGE is consistent under the assumption of a long-run slope homogeneity (Ndambendia and Njoupouognigni, 2010). Pesaran et al. (1999)'s PMGE assumes that the error terms are serially uncorrelated and are distributed independently of the regressors; there is a long-run relationship between the dependent variable and the explanatory variables; and the long-run parameters are the same across countries. Besides, it is flexible enough to allow for a long-run coefficient homogeneity over a single subset of regressor and/or countries (Simones, 2011). Here, the homogeneity test for long-run parameters can be performed by employing the test suggested by Hausman (1978). Under the long-run homogeneity assumption, both MGE and PMGE are consistent estimators, but only PMGE is the efficient estimator.

In panel ARDL form, the TDPR equation can be as given below:

$$TDPR_{it} = \alpha_i + \sum_{j=1}^{pi}\beta_{ij}TDPR_{i,t-j} + \sum_{j=0}^{qi}\delta_{ij}PROF_{i,t-j} + \sum_{j=0}^{ki}\theta_{ij}CASH_{i,t-j} + \sum_{j=0}^{li}\gamma_{ij}GROW_{i,t-j} + \sum_{j=0}^{mi}\lambda_{ij}RISK_{i,t-j} + \sum_{j=0}^{ni}\omega_{ij}MBVR_{i,t-j} + \sum_{j=0}^{si}\Phi_{ij}CTAX_{i,t-j} + \varepsilon_{it} \quad (4)$$

As argued by Pesaran et al. (1999), equation (4) can be reformulated as given below:

$$\Delta TDPR_{it} = \alpha_i + \varphi_i TDPR_{i,t-1} + \delta_i^* PROF_{it} + \theta_i^* CASH_{it} + \gamma_i^* GROW_{it} + \lambda_i^* RISK_{it} + \omega_i^* MBVR + \Phi_i^* CTAX_{it} + \sum_{j=1}^{pi-1}\beta_{ij}^{**}\Delta TDPR_{i,t-j} + \sum_{j=0}^{qi}\delta_{ij}^{**}PROF_{i,t-j} + \sum_{j=0}^{ki}\theta_{ij}^{**}CASH_{i,t-j} + \sum_{j=0}^{li}\gamma_{ij}^{**}GROW_{i,t-j} + \sum_{j=0}^{mi}\lambda_{ij}^{**}RISK_{i,t-j} + \sum_{j=0}^{ni}\omega_{ij}^{**}MBVR_{i,t-j} + \sum_{j=0}^{si}\Phi_{ij}^{**}CTAX_{i,t-j} + \mu_{it}$$

Table 2: Results of panel unit root tests

Variable	Fisher-ADF		LLC		IPS	
	Intercept	Intercept and trend	Intercept	Intercept and trend	Intercept	Intercept and trend
TDRP	21.030 (0.960)	33.976 (0468)	−0.347 (0.364)	−7.188 (0.000)	0.489 (0.687)	−0.130 (0.448)
Δ*TDRP*	132.311 (0.000)	92.624 (0.000)	−12.257 (0.000)	−13.068 (0.000)	−7.879 (0.000)	−3.004 (0.001)
PROF	51.661 (0.026)	50.869 (0.031)	−5.330 (0.000)	−6.508 (0.000)	−2.375 (0.008)	−0.941 (0.173)
Δ*PROF*	107.883 (0.000)	85.493 (0.000)	−10.493 (0.000)	−11.907 (0.000)	−6.010 (0.000)	−2.814 (0.002)
CASH	77.349 (0.000)	40.146 (0.219)	−9.053 (0.000)	−6.624 (0.000)	−4.497 (0.000)	−0.355 (0.361)
Δ*CASH*	68.634 (0.000)	67.526 (0.000)	−7.262 (0.000)	−8.584 (0.000)	−3.429 (0.000)	−1.982 (0.023)
GROW	62.514 (0.000)	77.988 (0.000)	−7.553 (0.000)	−11.688 (0.000)	−3.300 (0.000)	−3.149 (0.000)
RISK	103.493 (0.000)	103.595 (0.000)	−42.940 (0.000)	−35.226 (0.000)	−13.967 (0.000)	−8.727 (0.000)
MBVR	68.720 (0.000)	50.873 (0.031)	−6.870 (0.000)	−9.520 (0.000)	−3.608 (0.000)	−1.549 (0.060)
CTAX	62.969 (0.001)	62.554 (0.002)	−5.101 (0.000)	−21.914 (0.000)	−3.033 (0.002)	−3.825 (0.000)

Numbers in parentheses are probability values andΔis the first-difference operator. Newey-Best bandwith selection with Barlett kernel is used for both LLC tests. The optimal lag lengths are selected by minimum SBC (Schwartz Bayesian Criterion) value. ADF: Augmented Dickey-Fuller

(5)

where $i = 1, 2, 3,\ldots, 17$, $t = 2002,\ldots, 2012$ and ε_{it} is error term assumed to be independently distributed across i and over t. The terms $\delta_i^*, \theta_i^*, \gamma_i^*, \lambda_i^*, \omega_i^*, \Phi_i^*$ and $\beta_{ij}^*, \delta_{ij}^{**}, \theta_{ij}^{**}, \gamma_{ij}^{**}, \lambda_{ij}^{**}, \omega_{ij}^{**}, \Phi_{ij}^{**}$ represent the long-run and the short-run coefficients, respectively. Besides,

$$\varphi_i = -\left(1-\sum_{j=i}^{pi}\beta_{ij}\right), \delta_i^* = \sum_{j=0}^{qi}\delta_{ij}, \theta_i^* = \sum_{j=0}^{ki}\theta_{ij}, \gamma_i^* = \sum_{j=0}^{li}\gamma_{ij}, \lambda_i^* = \sum_{j=0}^{mi}\lambda_{ij}, \omega_i^* = \sum_{j=0}^{ni}\omega_{ij}, \Phi_i^* = \sum_{j=0}^{si}\Phi_{ij} \quad (6)$$

Where the term ϕ_i represents error correction coefficient which is expected to be negative and statistically significant.

Results of MGE and PMGE are given in Table 3.

The Hausman test statistics with the null hypothesis that there is homogeneity and enables to make a choice between the estimators of Pesaran et al. (1999). For the model in this study, the appropriate estimator is PMGE, because the null hypothesis cannot be rejected. Negative and statistically significant ϕ_i -as expected- indicates that error correction mechanism works pointing out the presence of cointegration among variables. As the maximum lag length is 1 for variable PROF, while it is 0 for all other variables (model 1, 1, 0, 0, 0, 0, 0); only short-run coefficient of PROF is to be calculated. This coefficient indicates a statistically significant and positive relationship between PROF and TDPR.

According to the long-run coefficients, PROF, CASH, GROW and CTAX affect TDPR negatively; while RISK and MBVR affect positively. The direction and level of affection of all these variables, except CASH is statistically significant.

6. CONCLUSION

Dividend policy is one of the most difficult challenges that financial economists and firm managers face. Though this topic has been studied for a long time and a large body of theoretical and empirical research has been produced, it still remains as an unsolved puzzle. This study tries to contribute to the solution of dividend policy puzzle by basically focusing on the determinants of dividend policy with reference to a developing country stock market (Borsa Istanbul). The econometric analyses are performed by using panel data derived from financial statements of Borsa Istanbul listed firms during the period of 2002-2012. Panel ARDL methodology is used to estimate the regression equation.

The empirical results indicate statistically significant and negative relationships between TDPR and profitability, growth and corporate tax in the long-run. However, the other independent variables, corporate risk and market-to-book value ratio have statistically significant and positive effects on TDPR in the long-run. More clearly, while any increases in profitability, growth and tax paid reduce TDPRs; any increases in firm's risk and market-to-book value ratios cause rises in TDPRs. Additionally, in the short-run only profitability seems to have statistically significant and positive effect on TDPR.

The results point out that the effect of profitability on dividend policy may differ over time. While profitable firms tend to pay high dividends in the short-run, they may be reluctant to sustain these payments in the long-run. Another finding is that high-growth firms which are in need of more funds to finance their growth may prefer self-financing by retaining greater proportion of their earnings, therefore lowering their dividend payments. Corporate tax is another independent variable that has adverse effects on dividend payments. This finding may be explained with the fact that the amount of tax paid lessens the amount of earnings, leading to decrease in proportion of these earnings to be distributed as dividend payments.

The empirical results also show that risk and market-to-book value ratio affect TDPR positively. Firms experiencing risks may consider dividend payments as an alternative to eliminate and/or minimize these risks, and such firms may therefore pay more dividends to attract new investors. Similarly, as higher market-to-book value ratio is perceived as a good investment opportunity, firms with high market-to-book value ratios may increase their dividend payments to attract new investors.

Table 3: Results of MGE and PMGE

Variable	MGE	PMGE	Hausman test statistics	Hausman test statistics p-value
Long-run coefficients				
PROF	−0.229** (0.103)	−0.311*** (0.033)	0.71	0.40
CASH	−0.220 (1.463)	−0.320 (0.210)	0.01	0.95
GROW	−6.321** (3.859)	−1.410*** (0.228)	1.62	0.20
RISK	0.608* (0.352)	0.179*** (0.034)	1.49	0.22
MBVR	0.073 (0.047)	0.065*** (0.006)	0.03	0.86
CTAX	−0.576 (0.521)	−0.537*** (0.169)	0.01	0.94
Error correction coefficient				
φ_i	−1.018***	−0.512***		
Short-run coefficients				
Δ*PROF*	−0.040*, −0.032	0.112**, 0.043		
Constant	−0.102*, 0.062	−0.026***, 0.006		

Optimal lag lengths are selected via Akaike's Information Criterion (AIC) (Akaike, 1973). The MGEs are used as initial estimates of the long-run parameters for the pooled maximum likelihood estimation. The PMGEs are computed by back-substitution algorithm. *, **, *** 1%, 5% and 10% levels of significance, respectively. Standard errors are shown in parenthesis. MGE: Mean group estimator, PMGE: Pooled mean group estimator

As studies on dividend policy determinants are mainly on developed countries, future research should investigate generalization on developing countries. Besides, the explanatory power of this model is found low through the econometric results in the short-run, implying further future studies on the determinants of dividend policy.

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