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Determinants of Dividend Payout Decisions: A Dynamic Panel Data Analysis of Turkish Stock Market

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Abstract: This study analyzes the firm-specific factors affecting the dividend payout decisions of the companies whose shares are traded on the Borsa Istanbul stock exchange. To this end, the dynamic panel regression is applied to 853 observations of yearly average of 106 companies listed on the Borsa Istanbul between 2009 and 2015. According to results from the Arellano–Bover/Blunder–Bond two-step system generalized method of moments, a statistically significant positive effect on dividend payout was found in the relationship between the dividend payout of the previous year, the company's return on equity and the market value/book value ratio, liquidity and the company's size. The demonstration of a positive relationship between dividend payout and return on equity supports the free cash flow hypothesis and the positive relationship with the previous year's dividend payout ratio supports the dividend smoothing hypothesis for Turkey.

Keywords: dividend; free cash flow hypothesis; dividend smoothing hypothesis; dividend irrelevance hypothesis; dynamic panel; Borsa Istanbul

JEL Classification: G10; G30; G35; G38

1. Introduction

Until the middle of the 20th century it was unchallenged and generally accepted that dividend payout had a positive effect on a company's value. The “irrelevance hypothesis” developed by [Miller and Modigliani \(1961\)](#) shook up this established confidence. According to the irrelevance hypothesis, the profit generated by a company, under conditions of a fully competitive market, must not have a positive effect on the company's value. A company's value can be increased only if the company invests its retained earnings into projects which provide higher yield. Therefore, there is no relationship between the company's value and dividend payout. However, contrary to the irrelevance hypothesis, in the real-world investors continue to request dividend payout with the expectation that it will add positively to the company's value. Companies' dividend payout decisions are one of the most studied subjects in the field of finance.

After the work of [Miller and Modigliani \(1961\)](#), many hypotheses and theories were developed to explain the factors determining dividend payout decisions and the relationship between dividend payout decisions and a company's worth. It is not possible to discuss one existing common result of these academic studies. [Black \(1976\)](#) identified this situation as the ‘dividend puzzle’, and [Brealey and Myers \(2002\)](#) counted this puzzle among the top ten unsolved problems of finance.

Efforts are still being made to solve the aforementioned enigma regarding the dividend payout with the aim of reaching more precise results using different methodologies and data. These studies are

predominantly related to developed markets, although studies using data from developing markets and international comparative studies are becoming more common.

In Turkey, being a candidate for the EU, many regulations including corporate governance principals on companies and capital markets are put into practice so as to reduce gap Turkey and EU. In 2003 corporate governance principals have entered in Turkey with the “comply or explain” approach by imitating principals or codes from UK and OECD. In 2012 the “comply or explain” approach turned in to the compliance rules. Similarly, many regulations from developed market including dividend policy of corporation are amended in the Turkish Commercial Code of 2012. Given the importance of new regulations in Turkey which are mainly adopted from developed market, it should be investigated as to whether the empirical results are in line with developed market.

Although, dividend smoothing hypothesis [Lintner \(1956\)](#) is quoted widely by studies in this field. There are very few studies which empirically test the hypothesis in the literature. To test the effect of previous year's dividend payout on the current year's dividend payout requires an advanced econometric analysis technique like dynamic panel regression that this study is utilized. By using 7 years of data from companies whose shares were traded on the Borsa Istanbul between 2009 and 2015, the company specific factors are analyzed which affects dividend payout decisions of listed companies between 2010 and 2016. The size of the company, profitability, liquidity, age, shareholder structure, debt ratio, market value to book value ratio and previous year's dividend payout were taken as the explanatory variables in the analysis. As in similar studies, dividend payout per share is used as a dependent variable representing the dividend payout decision. However, this study also considers dividend paid out as shares (stock dividends) alongside dividend paid out as cash when calculating dividend payout per share; the first time, as far as we know, that this has been done in a study of dividend payout decisions in Turkey. The second original aspect of this work is related to the methodology used: the coefficients of the independent variables are estimated by Arellano–Bover/Blundell–Bond, one of the dynamic panel data methods, two-step system generalized method of moments (GMM) as it also used by [Ahmed and Javid \(2008\)](#); [Maldajian and Khoury \(2014\)](#) and [Patra et al. \(2012\)](#).

According to the results of the two-step dynamic panel regression; the previous year's dividend payout per share, the company's return on equity and the market value to book value ratio, size in terms of market capitalization and the liquidity has positive effect on dividend payout; while no statistically significant effect on dividend payout detected from age, family control or debt ratio. The results show that the determinant of the dividend payout in Turkish stock market is not different from developed markets. Therefore, the theories and the model are applicable for Turkey as an example of emerging markets.

The emergence of a positive relationship between dividend payout and return on equity supports the free cash flow hypothesis and the positive relationship with the previous year's dividend payout ratio supports the dividend smoothing hypothesis.

The next section of this study is a summary of the literature, the third section is an explanation of the data set and methods, and the fourth section explains the empirical results. The fifth and final section consists of conclusions and recommendations.

2. Literature Review

Before [Miller and Modigliani \(1961\)](#)'s paper, many economists thought that a company's value increases as dividend payout increases. Almost everyone agreed that a company must pay out dividends for existential reasons and that the shares of high dividend companies should be sold at a high price ([Frankfurter and Wood 1997](#)). The basis of this thinking depended on the assumption that the current value of the company is a discounted form of the company's future profits. Contrary to this assumption, [Miller and Modigliani \(1961\)](#), suggest that the value of the company is not affected by dividend payout; deciding to give the profit only as dividends or leave it within the company as determined by the company's investments with no change in investment policy has no effect on

its own. [Miller and Modigliani \(1961\)](#)'s model's result forms the basis of the discussions/study of dividends over the past 50 years in the finance literature ([Al-Malkawi et al. 2010](#)).

Models and theories developed after that of [Miller and Modigliani \(1961\)](#), either implicitly or explicitly, removing or relaxing the assumptions of the their model. Empirical and theoretic works on the subject, for the most part, have tried to explain the reasons for the market imperfection related to dividend payout that appeared due to asymmetric information, taxes, and transaction costs.

The first sets of asymmetric information-based models are the agency hypothesis, the pecking order hypothesis and the signaling hypothesis. The basics of the relationship between the agency problem and dividend payout is based on the work of [Easterbrook \(1984\)](#) and [Jensen \(1986\)](#). According to [Easterbrook \(1984\)](#), dividend payout reduces the agency cost. Because dividend payout forces company managers to provide cash from the market, it means that the market actors must keep a close eye on the company. The pecking order hypothesis, whose approach is the antithesis of the agency hypothesis, is based on work by [Donaldson \(1961\)](#) and [Myers and Majluf \(1984\)](#). According to this hypothesis, managers first prefer the internal sources, if the internal financing is not sufficient, then managers would have to move to the external sources. To access the external funds, they will issue debt. If issuing more debt is no longer practical to raise the funds, then issuing the equity is the final option. The signaling hypothesis assumes that dividend payout decision has the effect of a signal sent out from within the company when information is asymmetric. According to the signaling hypothesis developed by [Bhattacharya \(1979\)](#), managers have more knowledge of the company's investments than those shareholders who are outside the company and use the company's dividend payout decisions as a means to convey this information to the outsider. In works that came after [Bhattacharya \(1979\)](#), which see dividend payout as a means of providing information from inside the company to the outside ([John and Williams 1985](#); [Miller and Rock 1985](#)), the view is that the managers on the inside have more information about the company's future cash flow than outside investors or partners and reflect this information in dividend payout decisions.

A second group of models emerge when the assumption, "there are no tax differentials either between distributed and undistributed profits or between dividend and capital gain", is removed from the model by [Miller and Modigliani \(1961, p. 412\)](#). Indeed, dividend earnings are usually taxed more than capital gains. It can be assumed that investors who faced with different tax rates would prefer to reduce their tax burdens as much as possible. For example, according to the clientele effect hypothesis, if the dividend yield is taxed more, investors who do not need cash tend to prefer companies that do not pay out dividends rather than those that do, suggesting that investors in the other case tend to prefer cash dividend paying companies. Hence, this explains the market response to changes in dividend payout: when the dividend payout decision is changed, those investors who wish to reduce their tax burden will rearrange their portfolios.

The third group of models have arisen with the loosening of the zero cost assumption of the [Miller and Modigliani \(1961\)](#) model which assumes that shareholders do not make a distinction between cash dividend and capital gain because they can obtain cash when they need it by selling the shares they hold, on the market without any cost. However, trading on the market is not cost-free, shareholders face concealed or unconcealed costs when they are trading. Transaction costs are the expenses incurred during the purchase or sale of shares (commission fees, etc.). In some cases, a lack of depth/liquidity in the market has the effect of lowering the price of large quantity sales ([Papadopoulos and Charalambidis 2007](#)).

Another area where transaction costs affect the dividend payout is the cost of the issuing of new shares to meet the company's financing needs. If the cost of providing external financing for companies is high, they have a higher tendency to leave their earnings within the company. In this case there will be a negative relationship between dividend payout and transaction costs. However, in practice, companies often pay out dividends on the one hand, while on the other hand issuing new shares and borrowing because other factors affecting dividend payout are dominant ([Al-Malkawi et al. 2010](#)).

On the other hand, [Easterbrook \(1984\)](#) argues that if the company's cash position is insufficient for cash dividend, the need for cash will be met from the market, which will be reflected as an extra cost to the company paying out dividends. Even if there is no transaction cost for shareholders, cash dividend payout comes at a cost to the company. Since this cost will reduce the amount of profit and therefore, negatively affect the value of share, the effect of the transaction costs on the dividend is not clear. In empirical studies, it has been shown that transaction costs have little effect on dividend decisions ([DeAngelo et al. 2009](#)).

According to the [Lintner \(1956\)](#) model, which accepted as the first empirical study on dividend payout, managers are reluctant to change the level of dividend payout, and unwilling to increase their dividend payout ratios even if the profit performance is very high. They only increased the dividend payout ratio if they think this ratio to be sustainable in the future. Future profit forecasts are currently one of the most effective factors for dividend payout decisions. Similarly, managers are extremely reluctant to reduce dividend payout and will only reduce the dividend payout if they think the unfavorable conditions will only be very short term.

In the [Lintner \(1956\)](#) model, the dividend payments are a function of current period profit, past dividend payments, the target dividend payout ratio of the company, and the rate of approach of the current dividend payments to the target dividend amount. According to this model, the past dividend payout ratio along with the current period's profit are the most important determiners of the dividend payout ratio. [Lintner \(1956\)](#) observed that companies increased their dividend payout ratios and were reluctant to reduce them when they predicted a sustainable growth in future cash flows. This is called the "dividend smoothing hypothesis" ([Baker 2009](#)).

According to the bird in hand theory laid out in the background of [Gordon \(1959, 1963\)](#) and [Walter \(1963\)](#)'s work, in a world of uncertainty and information asymmetry investors prefer the present earnings (bird in hand), dividend payments, to future earnings (two birds in the bush), capital gains. For this reason, when everything else is constant, more dividend payout increases the market price of the company, in other words, it increases the value of the company. The high dividend payout share today reduces the cost of the capital, thereby reducing the uncertainty about the future and thus increases the value of the share. The current high dividend payout removes uncertainty about future cash flows, reduces cost of capital and increases the value of the company ([Al-Malkawi et al. 2010](#)).

[Miller and Modigliani \(1961\)](#) criticize this approach, suggesting that the company is fundamentally driven by its cash flows, not by the way it distributes its earnings. [Bhattacharya \(1979\)](#) describes the bird in hand theory as an illusion and suggests that a company's cash flow risk will affect that company's dividend payments but not decrease the risk by increasing dividend payments. A company's cash flows are reflected to its dividend payments. Increasing dividend payments alone cannot reduce the company's risk. As the company's risk increases, dividend payouts can be expected to decline. Increasing the dividend payouts does not have a diminishing effect on a company's risk.

[Grullon et al. \(2002\)](#) developed the "maturity hypothesis" which argues that as companies mature, their investment/growth opportunities diminish, and as a result the expectations for return on their investments will fall. As the expected of return declines, companies distribute cash from their previous investments to their shareholders as dividends rather than turning them into new investments. Therefore, a feature of mature companies is a higher rate of dividend payout. According to this hypothesis, dividend payout yields two pieces of information: First, the systematic risk of the company is reduced. Second, the company's investment opportunities have narrowed, and in the future, it cannot make high investments. If the market shows a positive response to the dividend news, it means that the market prefers reduced risk to reduced profit.

The study of [Javakhadze et al. \(2014\)](#) show that [Lintner \(1956\)](#) dividend smoothing model works internationally, but with cross-sectional differences. [Andres et al. \(2015\)](#) also found partial adjustment in dividend is valid in both dividends and total payouts. Notwithstanding the small number of empirical studies which support the irrelevance hypothesis ([Bernstein 1996](#); [Black and Scholes 1974](#);

Miller and Rock 1985), there are a number of studies showing that the dividend payout decisions of the company are influential on share prices (Al-Malkawi et al. 2010; Kadioglu et al. 2015).

In testing signaling hypothesis, Benartzi et al. (1997) did not come across any meaningful evidence that changes in the dividends provided any information related to future profitability. Kadioglu and Öcal (2016), working in Turkey, reached a similar result. Pettit (1977) and Baker and Wurgler (2004)'s studies reached results which support the clientele effect hypothesis. In Lasfer (1996)'s analysis he found that companies that pay out more cash dividends are preferred by investors in the lower income group.

Apart from theoretical studies, there are several empirical studies that generally investigate the factors affecting dividend payout at the company level.

Table 1 below summarizes results of some empirical studies which aim to find out effect of internal factors on dividend payout. The +/− signs in the table shows positive or negative effect of the internal factor like debt, liquidity, shareholder structure (controlled by a family or not), maturity (age), market value/book value ratio, profitability, size, the previous year's dividend payout and current dividend payout.

Table 1. Effect of Internal Factors on Dividend Payout (Empirical Studies).

Study	Debt Ratio	Liquid.	Ownership		Mat. (Age)	MV/BV Ratio	Pre. Div.	Prof.	Size
			Fam.	Non-Fam.					
Ahmed and Javid (2008)—Pakistan	-	+						+	
Al-Ajmi and Hussain (2011)—S. Arabia		+					+	+	
Alam and Hossain (2012)						+		+	
Al-Kuwari (2009)—Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and UAE	-							+	+
Al-Malkawi et al. (2010)—Jordan	-				+			+	+
Al-Shubiri (2011)—Oman	-	+						+	
Amidu and Abor (2006)—Ghana		+				-		+	
Brawn and Šević (2018)—US					+				+
Denis and Osobov (2008)—USA, Canada, UK, Germany, France and Japan								+	
Duygun et al. (2018)—Indonesia			-						
Griffin (2010)—International		-							
Kumar and Waheed (2014)—UAE		+							
Maldajian and Khoury (2014)—Lebanon							+	-	+
Agyei and Marfo-Yiadom (2011)—Ghana					-			+	
Nnadi et al. (2013)—29 African Countries				-					
Papadopoulos and Charalambidis (2007)—Greece		+							
Patra et al. (2012)—Greece	-	+						+	+
Rehman and Takumi (2012)—Pakistan						+		+	
Vo and Nguyen (2014)—Vietnam	-								

As seen from Table 1, empirical studies found a negative relationship between dividend payout and level of debt. Firms that have higher debts, payout lower dividend since earnings paid for debt servicing. The profitability, liquidity and size mainly affect the dividend payout positively. Firms that have higher profits, liquidity and bigger size, payout more dividends. Some of the studies found that family-owned companies pay lower dividend and previous years' dividend payout positively influence current dividend payout.

The studies on Turkish stock market takes in to account only cash dividend and many of them used data of companies which are prepared their financial statements according to Turkish accounting standards and data of regulated period (listed companies must distribute a fraction of their earnings as a dividend up to 2008). Adaoglu (2008) analyzed whether dividend payout is declining over time and the effect of the size on dividend payout using the data containing period of 1986–2007. He found that dividend payout decreased over time and bigger firm distributes more dividends. Ersoy and Çetenak (2015) investigated the impact of ownership concentration on the dividend payout policy by using data set data for the period from 2004 to 2009 and found the higher debt financing and market value to book value ratio effect the dividend payout negatively, whereas the higher profit lead the higher dividend payout. Kuzucu (2015) and Yıldız et al. (2014) analyzed the firm-specific factors affecting the dividend decisions and they both used panel data for the period from 2006 to 2013

and from 2003 to 2010 respectively by utilizing panel regression. His finding confirms the result of Duygun et al. (2018) and Al-Najjar and Kilincarslan (2016), and he also found the size and age positively affect the dividend payout. Yıldız et al. (2014) found liquidity, size and profitability have a positive impact on the dividend payout.

3. Data and Methodology

3.1. Data

The data from 2009 to 2015 was used to analyze the dividend payout decisions of companies whose shares were traded on the Borsa Istanbul stock exchange between 2010 and 2016. Since the financial statements of the listed companies in Borsa Istanbul are fully compatible with IFRS after 2009, the sample covering period from 2009 to 2015 is selected to be compatible with other international studies, besides, mandatory dividend regulations abolished by Turkish capital market authority starting from 2009. The following variables, which are considered to affect dividend payout decisions, have been obtained from the companies' yearly financial statements prepared via independent auditing in accordance with the IFRS (dated December 31st) and acquired with the help of the Finnet Financial Analysis program. The data related to the companies, which was not included in the financial statements (i.e., year founded, ownership structure, etc.), was taken from the Public Disclosure Platform (www.kap.org.tr) and the companies' websites; while the information related to dividend payout amounts made in the form of cash and shares was retrieved from Is Yatirim Menkul Degerler A.S. (www.isyatirim.com.tr).

The average number of companies whose shares were listed on the Borsa Istanbul between 2010 and 2016 is 389. Just as in previous similar work (Adaoglu 2008; Al-Najjar and Kilincarslan 2016; Sayilgan et al. 2006), financial institutions (banks, insurance companies, factoring and leasing companies, brokerage houses, securities investment trusts) whose investment and dividend payout decisions are subject to different regulatory provisions from other companies. Additionally, companies that have paid out dividends for less than three years in whole period have been excluded from the sample. After these exclusions, the remaining sample sets of the observations consist of 94 companies for 2009, 96 for 2010, 100 for 2011, 103 for 2012, 111 for 2013, 117 for 2014, 117 for 2015 and 115 for 2016. There is a total of 853 (an average of 106) companies observed during the years in question.

3.2. Variables and Descriptive Statistics

The dividend payout per share is used as a dependent variable in the study to represent the dividend payout decision.

When calculating the dividend payout ratio in previous studies, it seems that dividend payout only as cash was considered. In this study, taking dividend payout as cash into account along with cash increase through stock dividend (the following dependent variable was calculated¹):

$$\text{Dividend Payout (Cash + Stock) Per Share} = \frac{\text{Cash Div.} + \text{Stock Div.} * \text{Price of Share}}{\text{Paid in Capital}}$$

¹ Price of share in the formula 1 is the market price at the dividend payment date.

In our study, there are eight factors which were considered to affect the dividend payout and constitute the independent variables in the model. The independent variable data is calculated as:

$$\text{Size (RCAP)}^2 = 1 \text{ Billion} \times (\text{Market Capitalization})^{-1}$$

$$\text{Profitability (PRO)} = \text{Net Profit/Equity}$$

$$\text{Liquidity (LIQU)} = \text{Liquid Assets/Short Term Liabilities}$$

$$\text{Maturity (AGE)} = \text{Year of Financial Report} - \text{Year of Founding of Company}$$

$$\text{Equity Structure} = \text{If the company is under family control}^3 \text{ FAM} = 1, \text{ If not FAM} = 0$$

$$\text{Debt (DEBT)} = \text{Short and Long-Term Liabilities/Total Assets}$$

$$\text{MV/BV (MV)} = \text{Market Value/Book Value calculated as of 31/12}$$

$$\text{Pre. Div. Payout (DPS}_{t-1}) = \text{The previous year's dividend payout per share}$$

The variable related summary descriptive statistics that will be used in this study are shown on Table 2 below.

Table 2. Descriptive Statistics of Variables.

Variable	N	Average	St. Dev.	Minimum	Maximum
DPS	853	1.8162	12.1190	0.0000	288.7700
RCAP	853	2.0755	4.8134	0.0018	44.9644
PRO	853	0.1281	0.1302	−0.5970	0.8944
LIQU	853	2.3043	12.3775	0.0003	259.3688
AGE	853	36.3939	16.3584	2.0000	105.0000
FAM	853	0.5393	0.4987	0.0000	1.0000
DEBT	853	0.4008	0.2190	0.0028	0.9091
MV	853	1.8855	2.2522	0.2319	22.3732

To see the magnitude of co-movement between variables, the correlation matrix is established in Table 3 below.

Table 3. Correlation Matrix between Variables.

Variable	DPS	RCAP	PRO	LIQU	AGE	FAM	DEBT	MV
DPS	1							
RCAP	−0.0564	1						
PRO	0.0821	−0.2185	1					
LIQU	−0.0156	−0.0185	−0.036	1				
AGE	0.0177	−0.2493	−0.0228	−0.0404	1			
FAM	−0.0031	0.1092	0.027	0.0893	−0.1623	1		
DEBT	0.0089	−0.004	−0.0056	−0.2642	−0.0461	0.0883	1	
MV	0.0741	−0.1237	0.3696	−0.0471	0.0254	−0.0214	0.1238	1

As seen from Table 3, the correlation coefficients between the variables are low. It appears that the maximum correlation is between the MV variable and the PRO variable (0.37).

³ Family control is defined as a family having a control over the company (through majority of the share or privileged shares which confer control) either directly or indirectly (through other companies).

² In order to improve the regression's appearance and to facilitate interpretation, the mathematical inverse of the market capitalization variable used to represent the sizes of the companies was taken and multiplied by one billion as in studies by Okumuş (2002) and Günel and Çelik (2004). Therefore, the results of this variable should be interpreted accordingly.

3.3. Methodology

The following equation is applied to analyze the factors affecting the dividend payout decisions of companies. It aims to estimate the independent variables' effect on dividend payout per share as cash along with dividend payout in the form of shares (*DPS*).

$$DPS_{i,t} = \alpha + \beta_1 DPS_{i,t-1} + \beta_2 RCAP_{i,t} + \beta_3 PRO_{i,t} + \beta_4 LIQU_{i,t} + \beta_5 AGE_{i,t} + \beta_6 FAM_i + \beta_7 DEBT_{i,t} + \beta_8 MV_{i,t} + \eta_i + \varepsilon_{i,t} \quad (1)$$

The dependent variable $DPS_{i,t}$ of the equation shows the cash per share + stock dividend payout per share in year t of firm i . $RCAP_{i,t}$ shows the mathematical inverse of firm i 's market capitalization in year t , $PRO_{i,t}$ shows firm i 's return on equity in year t , $LIQU_{i,t}$ shows firm i 's liquidity ratio in year t , $AGE_{i,t}$ shows firm i 's age in year t , FAM_i represents a dummy variable indicating whether the firm i is controlled by a family, $DEBT_{i,t}$ shows firm i 's debt ratio in year t , $MV_{i,t}$ shows firm i 's market value/book value in year t , η_i shows unobservable firm effects, $\varepsilon_{i,t}$ shows the effect of unobservable cross section variables changing over time.

As in the above equation, models in which a lagged dependent variable ($DPS_{i,t-1}$) is included as an independent variable are called dynamic models and these models are generally expressed in the form of the following equation (Güngör and Kaygın 2015):

$$\begin{aligned} Y_{i,t} &= dY_{i,t-1} + \beta X'_{i,t} + u_{i,t} \\ i &= 1, \dots, N \quad t = 1, \dots, T \\ u_{i,t} &= v_{i,t} + \mu_i \end{aligned} \quad (2)$$

In this model μ_i for the i^{th} observation, since it is independent from t as a constant (or in other words since μ_i doesn't change over time) is included in the model both as the dependent variable ($Y_{i,t}$) as well as the model's the explanatory variable which is the lagged value ($Y_{i,t-1}$), is a function of μ_i . Because of the correlation between the lagged dependent variable and the error term, the least square estimates are biased (Greene 2003).

Dynamic panel data models are divided into two types (Greene 2003; Tatoğlu 2013): autoregressive panel data models in which the lagged values of the dependent variable are included as independent variables, and distributed lag panel data models in which the lagged values of the independent variables are included as independent variables. Arellano and Bond (1991) developed the Difference GMM method of dynamic panel estimation in order to solve the problems in auto-regressive models (Ari and Özcan 2011). Since the lagged values of the independent variables are used as an instrumental variable by taking the first differences of the variables in the development of this method, it's called the Difference GMM (Dökmen 2012). However, in the case of unbalanced panel data or when T is small, there is data loss in the first difference transformation. For example, if there is no data for Y_{it} , the data for ΔY_{it} and ΔY_{it-1} will be lost in the first difference transformation. Because of these problems, Arellano and Bover (1995)'s Difference GMM, an effective instrumental variable estimator, was developed using the Orthogonal Deviations Method. With this method, the difference between the current period and the previous period is not counted; instead the average of the future values of the variable is used. In this way, the data loss caused by the Difference GMM, especially in data sets which are especially unbalanced, is minimized. This method, which establishes equality between an original system and a transformed system and estimates them as one system together, is known as System GMM (Tatoğlu 2013). System GMM is based on combining the difference equation and the level equation and it has been proven that it has a proportionally higher estimation ability than the GMM (Dökmen 2012).

The estimation method of Arellano–Bover/Blundell–Bond, one of the system's GMM methods, two-step system GMM estimator for estimation in our equation is used. Considering that the panel data set is unbalanced and that T is low with the algorithm developed by Roodman (2006).

4. Empirical Results

In econometric analyses, the time series, the average and variance of which do not change over time, and also the covariance of which depends on the distance between the two periods only and not on the period of calculation, are called stationary series. In the System GMM Estimator, analysis is done under the assumption that the data are stationary. However, it is known that sometimes the data, including the panel data, are not stationary. If data is not stationary, the regression results may be spurious. In some cases, even dependent and independent variable are unrelated, it is possible to find a relationship between dependent and independent variables with high R^2 . For this reason, in order to understand the series' tendency, it is necessary to find the regression with the values of the previous period in the value of every series. One of the best known and most commonly used unit root tests is Dickey–Fuller test (Dickey and Fuller 1979). It is grounded on the model of the first-order autoregressive process (Box and Jenkins 1970):

$$y_t = \phi_1 y_{t-1} + \varepsilon_t \quad t = 1, \dots, T \quad (3)$$

where ϕ_1 is the autoregression parameter, ε_t is the non-systematic component of the model that meets the characteristics of the random walk process. The null hypothesis is $H_0 : \phi_1 = 1$ which means that that the process contains a unit root and consequently it is non-stationary, alternative hypothesis is $H_0 : |\phi_1| < 1$ which means that the process does not contain a unit root and is stationary.

After the model was established it was determined that all panel variables were stationary with the ADF-Fisher Chi-Square (Dickey and Fuller 1979); Im, Pesaran and Shin W (Im et al. 2003); Levin, Lin and Chu (Levin et al. 2002) and PP-Fisher Chi-Square (Phillips and Perron 1988) tests. Table 4 shows the results of the unit root tests applied to the variables at once.

Table 4. Results of Unit Root Tests Applied to the Variables.

	Levin, Lin & Chu t		Im, Pesaran and Shin W		ADF-Fisher Chi-Square		PP-Fisher Chi Square	
	Stat.	Prob.	Stat.	Prob.	Stat.	Prob.	Stat.	Prob.
<i>DPS</i>	−32.5045	0.000	−12.6831	0.000	522.653	0.000	643.941	0.000
<i>RCAP</i>	−65.2300	0.000	−20.1040	0.000	598.048	0.000	468.869	0.000
<i>PRO</i>	−35.8009	0.000	−8.73764	0.000	413.820	0.000	445.834	0.000
<i>LIQU</i>	−30.5018	0.000	−8.52122	0.000	424.381	0.000	430.383	0.000
<i>DEBT</i>	−48.8429	0.000	−6.68839	0.000	348.622	0.000	344.175	0.000
<i>MV</i>	−25.8335	0.000	−6.72648	0.000	384.629	0.000	401.920	0.000

Note: If the probability value is less than 10%, “ H_0 : variable has unit root” is rejected. In other words, the variable is stationary.

As seen from Table 4, according to the four different unit root test statistics results, all of the variables used in the study are stationary. Therefore, according to these results, the stationary assumption required for the regression analysis is not violated.

As seen in the model, one of the explanatory variables ($DPS_{i,t-1}$) which is the lagged of the dependent variable ($DPS_{i,t}$). Many studies including Baltagi (2008), Greene (2003) and Anderson and Hsiao (1981) argue that dynamic panel data analysis should be utilized if the lagged of the dependent variable used as an explanatory variable in the model in order to estimate unbiased and consistent estimators.

Taking into consideration the arguments of Baltagi (2008), Greene (2003) and Anderson and Hsiao (1981) a dynamic panel estimation is used⁴. The results of the regression

⁴ Although this paper mainly focused on dynamic panel regression, pooled Ordinary Least Square (OLS) regression is carried out additionally. According to OLS regression results, the model is insignificant overall. The results of Maximum Likelihood

using Arellano–Bover/Blundell–Bond two-step system GMM Estimator and the results are presented in the table below.

In Table 5, the test results provide information about consistency of the dynamic panel regression estimates. The Wald test is used to test the overall explanatory power of independent variables on the dependent variable, the Sargan and the Hansen tests reveal whether the instrumental variables are valid, and the Arellano–Bond (AB) test is applied to detect the presence of the autocorrelation problem in the model.

Table 5. Two Step System GMM Dynamic Panel Regression Results.

Variable	Coefficient	St. Dev.	z
DPS_{t-1}	0.0162 ***	0.0010	15.39
<i>RCAP</i>	−3.2348 **	1.4464	−2.24
<i>PRO</i>	18.9507 ***	1.5120	12.53
<i>LIQU</i>	0.1227 *	0.0689	1.78
<i>AGE</i>	0.0060	0.0285	0.21
<i>FAM</i>	0.1501	2.4267	0.06
<i>DEBT</i>	−5.6688	3.5416	−1.60
<i>MV</i>	0.3810 ***	0.0592	6.44
Wald-Statistics		chi2(8) = 1164.79	P > chi2 = 0.000
Arellano–Bond test AR(1)		z = −1.19	P > z = 0.236
Arellano–Bond test AR(2)		z = 0.06	P > z = 0.951
Instrumentals for First Difference Equality: D. (PRO. LIQU)			
Sargan test of overid. restrictions		chi2(21) = 25.72	P > chi2 = 0.217
Hansen test of overid. restrictions		chi2(21) = 21.83	P > chi2 = 0.410
GMM Instrument Levels			
Hansen test excluding group		chi2(15) = 16.15	P > chi2 = 0.372
Difference (H_0 = exogenous)		chi2(6) = 5.68	P > chi2 = 0.460
iv (PRO LIQU)			
Hansen test excluding group		chi2(19) = 20.57	P > chi2 = 0.361
Difference (H_0 = exogenous)		chi2(2) = 1.26	P > chi2 = 0.534

Note: *** shows 1% significance level, ** shows 5% significance level and * shows 10% significance level.

The Wald test's hypotheses are:

H_0 = The independent variable has no explanatory power for the dependent variable.

H_1 = The independent variable has explanatory power for the dependent variable.

The H_0 hypothesis was rejected by Wald statistic's ($p < 0.05$), so the independent variables have explanatory power for the dependent variables and the whole model was concluded to be significant.

The Arellano–Bond test is employed to detect the autocorrelation problem in two-step system GMM regressions.

The Arellano–Bond test's hypotheses are:

H_0 = There is no autocorrelation.

H_1 = There is autocorrelation.

The presence of 1st degree and 2nd degree autocorrelation was tested: The AR(1) test came out statistically negative and insignificant, the AR(2) test came out positive and insignificant. Therefore,

LR test results propose the pooled OLS regression over panel regression. The results of the pooled OLS regression show that estimation model is not correct. Additionally, Hausman test is applied to two-step system GMM and the test also favored two-step system GMM estimation over OLS.

the H_0 hypothesis cannot be rejected for either equation. According to these findings, the conclusion was reached that there is no first- or second-degree autocorrelation. For the Generalized Moments Estimator to be effective, it is sufficient that there be no second degree autocorrelation (Tatoğlu 2013).

In the two-step system GMM dynamic panel regression, the Sargan (not robust) and Hansen (robust) tests as well as the over identifying restrictions validity test were performed to evaluate the validity of the instrumental variables. These Sargan test's hypotheses are:

H_0 = The over identifying restrictions are valid for the instrumental variable.

H_1 = The over identifying restrictions are invalid for the instrumental variable.

The robust Difference-Hansen test's hypotheses are:

H_0 = The instrumental variables are exogenous.

H_1 = The instrumental variables are not exogenous.

According to both the Sargan (not robust) and the Hansen (robust) tests in the regression, the H_0 hypothesis cannot be rejected. Therefore, the over identifying restrictions are valid. Again according to the robust Difference-Hansen test results, the instrumental variables used as instrumentals are valid and the H_0 hypothesis level and GMM equalities cannot be rejected (Tatoğlu 2013).

As a result, the regressions that reveal the elements affecting the dividend payout decisions provide for the entirety of the conditions related to general significance, autocorrelation, and the instrumental variables.

When the dynamic panel regression results shown in Table 5 are examined on the basis of the independent variable the previous year's dividend payout (DPS_{t-1}), the company's size ($RCAP$), the return on equity (PRO), the liquidity ($LIQU$), and the market value/book value ratio (MV) are observed to have statistically significant with regards to their effect on the dependent variable included in the equation as DPS , cash/bonus dividend payout per share while the variables AGE , FAM , and $DEBT$ were not observed to have any statistically significant effect on dividend payout when shares given as a dividend were taken into account.

In our regression equation, the size of the company ($RCAP$) is represented by the mathematical inverse of market capitalization [$(1 \text{ billion} \times \text{Market Capitalization})^{-1}$]. If there is a positive relationship between company size and dividend payout, it is expected that the correlation will be negative in the regression results as the indicator is its mathematical inverse. According to the regression results in Table 5, since the coefficient is observed to have a negative sign, therefore there is a 5% positive correlation between company size and the dividend payout. According to the results, the one-tailed null hypothesis formulated as " H_0 = there is no positive relationship between company size and dividend payout" is rejected since the z-statistic value (-2.24) is smaller than critical z value (-1.645) for $\alpha = 0.05$, and therefore the hypothesis H_1 is accepted. As a result, the size of company has a positive effect on the dividend payout. The conclusion reached is in line with previous works (Adaoglu 2008; Al-Kuwari 2009; Al-Malkawi et al. 2010; Denis and Osobov 2008; Fama and French 2001; Jensen et al. 1992; Kuzucu 2015; Yıldız et al. 2014) which conclude that there is a positive relationship between size of company and dividend payout.

In the regression equation, the variable indicating return on equity shown as PRO is positive as expected. The company's return on equity has a significant effect on the dividend payout at the 1% significance level. According to these results, as the return on the equity increases, the dividends paid out by the companies also increase. This finding supports the free cash flow hypothesis developed by Jensen (1986) and is consistent with other studies in the literature (Ahmed and Javid 2008; Al-Ajmi and Hussain 2011; Al-Kuwari 2009; Al-Shubiri 2011; Ersoy and Çetenak 2015; Marfo-Yiadom and Agyei 2011; Patra et al. 2012) that found a positive relationship between profitability and dividend payout.

The company's liquidity was represented by the ratio of Liquid Assets/Short-Term Liabilities. In the regression equation, the independent variable indicating liquidity shown by *LIQU* is positive as expected, and the relationship between the dependent variable and the independent variable has a 10% level of statistical significance. In other words, the result that the liquidity has a positive effect on the dividend payout ratio is in line with the study conducted by Yildiz et al. (2014) on the companies listed on the Borsa Istanbul.

The company's age, shown in the regression equations as *AGE* was not shown to have a statistically significant effect in relation to the dividend payout. For this reason, it is concluded that the company's age does not influence the dividend payout. The dummy variable *FAM* is used to test the hypothesis developed about the shareholder structure of the company and has a value of 1 if the company is controlled by a family, and 0 if not. According to the regression results in Table 5, the shareholder structure of the company has no effect on dividend payout.

Even though the coefficient of the independent variable shown as *DEBT* in the regression equation is negative, the effect of the company's debt ratio on dividend payout is not statistically significant. The market value/book value ratio, shown as *MV*, which represents growth opportunities of a company, has a positive significant effect on dividend payout at the 1% significance level.

In the regression, the coefficient of the previous year's dividend payout variable, as shown as DPS_{t-1} , is positive, as expected, and has a 1% statistically significant effect. According to the result, the one-tailed null hypothesis formulated as " $H_0 = \text{there is no positive relationship between current period dividend payout and the previous year's dividend payout}$ " is rejected because the z-statistic value (15.34) is greater than the critical z value (2.33) for ($\alpha = 0.01$), and therefore the alternative hypothesis is accepted. In other words, as the previous year's dividend payout per share increases, the company's current period dividend payout as cash and/or bonus also increases. This conclusion supports Lintner (1956)'s hypothesis and is in line with studies (Al-Ajmi and Hussain 2011; Al-Najjar and Kilincarslan 2017; Al-Najjar 2009; Maldajian and Khoury 2014; Omet 2004) showing that the previous year's dividend payout ratio has a positive effect on the current period's ratio.

5. Conclusions

It can be said that decisions about how much of the end-of-period profit will be retained in the company and how much will be paid out to the shareholders have been made for about 400 years, since chartered companies emerged at the beginning of the 17th century. However, until the mid-20th century, there was general consensus that high ratio dividend had a positive impact on the value of the company (Frankfurter and Wood 1997). Miller and Modigliani (1961), with some simplifying assumptions, proposed that the value of the company (the share price) is not affected by the dividend payout decision or paying out more dividend will not necessarily increase the value of the company. Besides theoretical studies on dividend payout and empirical test of the hypotheses, many studies examine the factors affecting dividend payout at the company level.

In this study, 7 years of company data (2009–2015) was used to analyze the firm-specific factors affecting the dividend payout decisions of companies whose shares were traded on the Borsa Istanbul stock exchange between 2010 and 2016. The size of the company, profitability, liquidity, age, shareholder structure, debt ratio, market value to book value ratio and the previous year's dividend payout are taken as explanatory variables in the analysis. As a dependent variable, dividend paid out as shares (stock dividends) alongside dividend paid out as a cash are used jointly when calculating dividend payout per share.

According to the results of the dynamic panel regression; while the previous year's dividend payout per share (cash + stock dividend), return on equity, the market value to book value ratio, size (market capitalization), and the liquidity has a significant positive effect on dividend payout; there is no statistically significant relationship between the dividend payout and age, family control or debt ratio.

Looking at the results of the regression, dividends paid out as cash and/or stocks are observed to be affected by the previous year's dividend payout. This situation shows that companies traded on the Borsa Istanbul have a target dividend payout ratio, like those on the New York Stock Exchange (Baker and Powell 2000), this rate hasn't changed much over the years, and they behave in a manner which support's Lintner (1956)'s dividend smoothing hypothesis.

In similar studies in the future, the development of different explanatory variables that may have an impact on dividend payout decisions, or the calculation of different proxies for variables which already exist in the literature, can help estimate of company's actions. In addition, the undertaking of similar studies using different samples from those used in this study (e.g., a sample including only banks and other financial institutions or companies that don't distribute any dividends at all) would contribute to the overall study of dividend payout decisions.

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