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DIVIDEND PAYMENT AFFECT ON STOCK PRICES: A PANEL REGRESSION ANALYSIS ON BIST30 EQUITES

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ABSTRACT

Since the main purpose of a firm is maximizing its value in modern sense, dividend payment ratio and retained earnings should be optimized in terms of benefits of investors and the firms themselves which is really hard to do. This study investigates the relationship between the stock price with dividend payout and retained earnings for BIST30 index stocks in Turkey via *a panel regression analysis. Because of the existence of heteroscedasticity and autocorrelation problems, panel EGLS method for regression is conducted in order to investigate the relation. According to the results, retained earnings of the firms have an effect on the stock price but dividend payout have not.*

Keywords: *Panel Regression, Stock Price, Dividend Policy, BIST 30.*

TEMETTÜ ÖDEMESİNİN HİSSE SENEDİ FİYATI ÜZERİNE ETKİSİ: BIST 30 HİSSLERİNE BİR PANEL REGRESYON ANALİZİ

ÖZET

Güncel anlamda bir firmanın ana amacı firma değerini maksimize etmek olduğundan, yatırımcıların yararları ve firmaların kendileri açısından gerçekten zor olan temettü oranı ve otofinansman miktarlarını optimize etmeleridir. Bu çalışma, Türkiye'de BIST30 endeks hisseleri için temettü ve dağıtılmayan karlar ile hisse senedi fiyatı arasındaki ilişkiyi panel regresyon analiziyle incelemektedir. Değişen varyans ve otokorelasyon problemlerinin varlığından dolayı, ilişkiyi araştırmak amacıyla regresyon için panel EGLS yöntemi kullanılmıştır. Elde edilen sonuçlara göre, firmaların dağıtılmayan karları hisse senedi üzerinde etkili olurken, dağıtılan temettülerin bir etkisi gözlenmemiştir.

Anahtar Kelimeler: *Panel Regresyon, Hisse Senedi Fiyatı, Kar Dağıtım Politikası, BIST 30.*

1. Introduction

In modern sense, the main purpose of a firm is maximizing the firm value which is related to lots of factors, such as firm management, dividend policy etc. The firm's dividend payout policy which can be accepted so important for the valuation of firms is really complex and hard to determinate. Since dividend payment ratio and retained earnings should be optimized in terms of benefits of owners, partners and investors, and also the firms themselves. Some investors may expect high dividend payment, some may not, according to their investment quantity or/and tax policies of the country with respect to the controversial dividend payout theories, as firms need to have enough cash that wouldn't cause financial problems or not conduct it to position of paying high interest rates (Albayrak & Pekkaya, 2008).

In related literature, some of the studies use survey data applied to relevant participants about the dividend payout policy. Some studies use regression models, to investigate the determinants of dividend payout ratio/quantity in terms of financial ratios, or investigates the determinants of stocks' market prices in terms of dividend payout ratio/quantity, financial ratios, retained earnings, etc. This study investigates the model of stocks' market prices in terms of dividend payout quantity and retained earnings. The scarcity of such empirical studies which uses regression is not surprising, maybe because of controversy results and inferences that vary with respect to time interval, sector, country, and even sometimes for the same data. So, "The dividend puzzle" named by Black in 1976 can be accepted as reasonable. This study is original since it uses panel regression to determine the model for relationship between dividend payout and stock price for BIST30 index.

The purpose of this study is to investigate the relationship between the stock price with dividend payout and retained earnings. In order to carry out this purpose, panel regression models are tested for BIST30 index stocks in Turkey for the period of 2005-2015 and 29 stock as crossection data.

2. Relation between Dividend Policy and Stock Price

Three main counter parts exists on dividend policy. Miller and Modigliani (1961) defend "irrelevance theory" which can be explained via irrelevance between a firm stock price and its payout value in the atmosphere of assumptions which states effective market, rational behavior and definiteness. Brigham (1986:535) states that, irrelevance theory can be rationally accepted but it may not be valid under real world conditions. However, "bird in hand theory" and "theory of information content or signaling" advocate dividend payout policy which is accepted by especially small investors. The earning must be used primarily by firm necessities as stated by "residual dividend theory" and also "tax differential theory" advocate less dividend payments. As big investors usually prefer less quantity of payout because of especially tax differentials and reinforcement of firm cash position, small investors and second largest shareholders may prefer to receive dividend payouts. Firm managers

should take into account these varying expectations, otherwise they may be penalized via a relatively lower stock price. Legal regulations, inflation, tax ratios, liquidity position and new investment plans, regularity of profits, sector of the firm, size, indebtedness of firm etc. may have also an effect in determination of dividend policy. According to related literacy, Black (1976) states that when you concentrate on dividend payout, it is pictured as a kind of puzzle. Then, dividend payout determination by managers is really becomes delicate and hard to decide (Albayrak & Pekkaya, 2008; Pekkaya, 2006). Al-Malkawi et al. (2010) states that no general consensus has yet declared after several decades of investigation, and scholars can often disagree even about the same empirical evidence, moreover their study reaches at a conclusion of Fisher Black's -1976- views about the dividend payouts.

Friend & Puckett (1964) stated that "Despite these theoretical conclusions, empirical findings indicate that, when stock price are related to current dividends and retained earnings, higher dividend payout is usually associated with higher price-earnings ratios… Probably the earliest and best-known observation of this "dividend effect" was made a generation ago by Graham and Dodd -1934-, who went so far as to assert that a dollar of dividends has four times the average impact on price as does a dollar of retained earnings." On the other respect, as Gryglewicz, (2004) found that investors may get abnormal return during the declaration period and Frank & Jagannathan (1998) reveals that the decline in average stock price is less than the value of the dividend after declaration, but according to Chou et al. (2007) no significant return observed in post-declaration for the long-term period.

In recent years, some studies, such as Nezir et al. (2010) and Asghar et al. (2011) for Karachi stock market, Hashemijoo et al. (2012) for Malaysian stock market, focus on investigating the relationship between the stock price volatility with dividend policies, and found evidences for this relationship.

Determination of stock's market price is really hard, and so many factors has an effect on market price of an stock. Aktar and Rashid (2015) declares price to book ratio and price to sales ratio have positive, while price to cash flow ratio and price to earnings ratio have a negative relationship with stock returns. Ghasemi & Sarhadi (2014) found significant positive correlation between accounting profit and stock prices. Oyinlola et al. (2014) states that firm's dividend policy is seen as a major determinant for a firms' performance. According to results of Güvercin & Demir (2015), panel data analysis provide evidence about changes in earning announcements which results changes in firm value. Oyinlola & Ajeigbe (2014) found that both dividend payout and retained earnings are significantly relevant to the stock prices. According to the study of Pekkaya (2006), some of the stock's market prices have been affected by dividend payout or/and retained earnings. That relation may change for each stock. Albayrak &Pekkaya (2006) states that both of variables have an effect on market prices of stocks, but dividend payout has more effect than retained earnings like findings of Graham and Dodd. In our study, dividend payout and retained earnings are take into account for determiners of the market prices of stocks.

3. A Panel Regression Analysis on BIST30 Equites

3.1. Data and Model

The purpose of this study is to investigate the relationship between the stock price with dividend payout and retained earnings. For this purpose, the yearly data set of stock prices and dividend payouts and retained earnings of stock that covers the period of 2005 and 2015 which are obtained from finance.yahoo.com, www.kap.gov.tr and www.borsaistanbul.com web sites. There are some missing data in the data set for some firms that have not revealed profit, and for some firms which were counted in BIST30 Index afterwards. Explanations and abbreviations about the variables are presented in Table 1.

Table 1. Information about the Variables Used in the Study

Variable	Description	Symbol
Stock Price: (Price of equity)	Average market price of the firm per share for the first six months of the current year.	SP
Dividend payout /share	Total dividend payout per share in the current year,	DIV
Retained Earnings /share	Retained earnings per share calculated by the firm's net profit per share of the previous year minus DIV	RE

Accordingly, the dividend payouts and retained earnings are taken into account as explanatory variables in the model. The model of the relationship between dividend payout and equity stock prices is as follows (Friend & Puckett, 1964:660; Copeland & Weston, 1992:588; Pekkaya, 2006).

$$\boldsymbol{SP}_{it} = \beta_0 + \beta_1 \boldsymbol{DIV}_{it} + \beta_2 \boldsymbol{RE}_{it} + \varepsilon it \quad (1)$$

Where, *i* denotes firms (cross-section dimension) ranging from 1 to 29 and *t* denotes years (time series dimension) ranging from 2005-2015. *SP* is the market price/value of an stock (TL per a stock) for the current year, *DIV* is the stock's dividend payout (TL per a stock) for the current year and *RE* is the retained earnings of stock (TL per a stock) calculated by the previous year's profit per a stock minus *DIV*.

To obtain more valid results for the market of BIST30, simultaneously usage of the cross sectional and time series data that is defined as panel data /panel regression model is preferred. Panel data analysis can be defined as a method of analysis that attempts to predict the relationships between the variables using the time series and cross-sectional data with together (Greene, 2003).

3.2. Panel Unit Root Tests

Existing Unit root in the series of variables is an important problem for researchers to obtain accurate results from analysis. If the series has unit root or is not stationary, results of analysis will not be reliable. So that, many of different models and related tests have been

developed to determine whether the series of variables are stationary or not. Panel unit root tests used for panel data sets can be analyzed in two groups. One of these groups unit root tests are proposed by Levin, Lin and Chu (LLC) (2002), Breitung (2000) and Hadri (2000) as and expressed as common unit root tests.

Besides the common unit root tests, some other important tests have been developed which are called individual unit root tests of Maddala and Wu (1999), and Im-Pesaran-Shin (IPS) (2003), Moon, Perron and Phillips (2005). In this study, as a consequence of the characteristics of the data set, unbalanced panel data, individual unit root models and tests of IPS and ADF-Fisher are used. The results of these tests are given in Table 2.

Table 2. Results of Level of Unit Root Tests for Variables of the Model

Variable		Intercept		Intercept and Trend	
		Im, Pesaran and Shin W-stat	ADF - Fisher Chi-Square	Im, Pesaran and Shin W-stat	ADF - Fisher Chi-Square
D(SP)	Stat.	-10.212	156.163	-3.219	144.509
	Prob.	0.000**	0.000**	0.000**	0.000**
D(DIV)	Stat.	-7.882	176.871	-2.806	132.545
	Prob.	0.000**	0.000**	0.002**	0.000**
RE	Stat.	-2.188	92.324	-1.712	99.895
	Prob.	0.014**	0.003**	0.043*	0.000**

Note: The lag lengths are determined automaticly by Schwarz Info Criterion. "D" mark indicates that the series of variables are at the level of first difference. "*" mark indicates the significance level of 5%, "**" mark indicates the significance level of 1%.

3.3. Other Tests for Assumptions and Model Selection

However, the presence of the multicollinearity between the variables used in models is another significant problem that prevents to obtain significant and accurate results from the analyses. Therefore, the variables that causes this problem should be identified and removed from the model if necessary. In this study, multicollinearity problem has been investigated by the analysis of correlations between the variables and the Variance Inflation Factor (VIF) values (Acikgoz et al., 2015). For the correlation coefficient, the range of values from 0.68 to 1 is considered which was specified by Taylor in 1990 and accepted by many researchers as an indicator of the strong correlation between the variables (Taylor, 1990). The correlation coefficients are given in Table 3.

Table 3. Correlations between Variables

Variables	SP	DIV
DIV	0.593* (12.413)	
RE	0.461* (8.776)	0.10849 (1.839)

Note: The t-statistics are in parenthesis. * is for 0.05 significance.

Table 4. Variance Inflation Factor (VIF) Values of Independent Variables

Variables	R^2	VIF Value
D(DIV)	0.070	1.075
RE	0.070	1.075

Note: VIF value is calculated by using the formula $[1/(1- R^2)]$. R^2 values are obtained from the estimated regression models that each of independent variable is used respectively as the dependent variable and the others are independent. If the VIF value is equal to or greater than 4, it can be said that there is a multicollinearity problem depending on the dependent variables of the model.

For the VIF value there are some suggestions; 4, 5 and 10 are accepted by the most researchers as indicators of upper limit that there is no multicollinearity problem for the variables (O'Brien, 2007). We decided out the value of "4" for this study. The statistical values that show the correlation relations between the independent variables are given in Table 4.

According to the results, none of the existing independent variables cause correlation and multicollinearity problems. After analyzing for the stationarity and multicollinearity problems the model given in equation 1 is reconstructed as follows:

$$\boldsymbol{D(SP_{it})} = \beta_0 + \beta_1 \boldsymbol{D(DIV_{it})} + \beta_2 \boldsymbol{RE}_{it} + \varepsilon_{it} \quad (2)$$

According to the aim of the study it may be useful to work with pooled data set to achieve meaningful results. But sometimes the properties of the data set may not allow this. It must be determined whether the data may be pooled or not by the F test which can identify the presence of fixed effects (Hsiao, 2003). The null hypothesis F test (H_0;$\mu_1=\mu_2=\ldots\ldots=\mu_{N-1}=0$) refers that the constant term is the same for all units. Null hypothesis (H_0) will be rejected when the calculated F test statistic is bigger than the F table value ($p<0.05$). Then we can decide that the data set cannot be pooled (Greene, 2003; Baltagi, 2005). In this study, "Redundant Fixed Effects" F test is applied to the model to determine the existence of the fixed effects. The statistical results of the test are given inTable 5.

Table 5. Results of Redundant Fixed Effects Test

Cross Section Tests	Statistic	d.f.	Prob.
Cross-section F	2.167	(28,226)	0.001
Cross-section Chi-Square	61.139	28	0.000

The results of the test suggests that there is a presence of fixed effects at a significance level of 1%. The existence of fixed effects means that pooled data set is not suitable to use. Consequently, it is decided to use panel data set for this study.

To gain reliable and significant results it is important to estimate the models by efficient estimators. In this study Hausman test is applied to determine which estimator is more efficient (Greene, 2003). The statistical test results are presented in Table 6.

Table 6. Results of Hausman Random Effects Test

Cross Section Tests	Chi-Square Statistic	Chi-Square d.f.	Prob.
Cross Section Random	4.908	2	0.085

According to test statistics in the table, the probability value (0.085) shows that the null hypothesis is rejected and the random effects estimator is respectively and concurrently more efficient for the model. Thus, the model will be estimated on the assumption that there is random effects in cross section, and named as unilateral random effects model.

Another problem encountered in empirical studies is the existence of heteroscedasticity and/or autocorrelation in models. Meaningful results can be obtained if it is able to overcome such problems.

Lagrange Multiplier (LM) test is generally used to investigate whether there is a heteroscedasticity problem or not in models. The test hypothesis are as H_0: $\sigma_\mu^2 = \sigma_\lambda^2 = 0$, there is constant variance and H_1: $\sigma_\mu^2 \neq \sigma_\lambda^2 \neq 0$, there is heteroscedasticity (Baltagi, 2011). The results of the applied LM test for the model are given in Table 7.

Table 7. Results of Breusch-Pagan Langrange Multiplier (LM) Test

Heteroscedasticity Test Hypothesis	Test Results
Test: Var(u) = 0	Chi-Square(1) = 193.47 (P value: 0.000)

Probability value for the model is obtained as $p<0.05$. This value show that there is a heteroscedasticity problem in the model.

There are many tests to determine the existence of linear serial correlation among the series in panel data models. Wooldridge (2002) Serial Correlation Test is one of them. The aim of this test is to analyze the error terms that are associated with its own deferred value (Drucker, 2003). In the analysis process, the parameters belonging to the residual deferred value is tested if they are equal to -0.05 or not (Wooldridge, 2002). According to the applied serial correlation test results, if the F statistic probability values are significant ($p<0.05$), H_0 hypothesis (there is no serial correlation) is rejected; otherwise H_0 hypothesis is accepted. The result of this test are given in Table 8.

Table 8. Results of Wooldridge Serial Correlation Test

Serial Correlation Test Hypothesis	Test Results
H0: No first order serial correlation	F(1, 28) = 60.647, (P value: 0.000)

As a result of Wooldridge test Prob>F value is obtained as 0.000<0.05 for the model. This value shows that null hypothesis (H_0) (is that "there is no serial correlation among the serials belong to variables within the model") is rejected, and there is a serial correlation problem exist in the series at 1% significant level. After deducing that there are heteroscedasticity and serial correlation problems the model is estimated by Panel EGLS method.

3.4. Panel Model Regression Results

When there are heteroscedasticity and serial correlation problems, for the sake of robust regression, the model is estimated by Panel EGLS method. The results of estimation are given in Table 9. Panel FGRS method also conducted, but the results are not reported since they have similar results as EGLS method have.

Table 9. Estimating Results of the Model

Variable	Coeffic.	Std. Error	t-statistic	Prob.
C	0.816	0.544	1.499	0.135
D(DIV)	-0.133	1.136	-0.117	0.906
RE	1.418	0.687	2.062	0.040

Note: R-Squared value of 0.040 shows the percentage of variation occurring in the dependent variable that can be explained by the independent variables, p<0.01 indicates the level of 1%, p<0.05 indicates the level of 5% relationships between the dependent and each independent variables, the P (F-statistic=5.317, p value: 0.005) value indicates that at which level the model is significant (p=0.000 indicates 1% significance level). White period method is used to estimate model with robust estimators. This method assumes that the errors for a cross-section are heteroskedastic and serially correlated (Wooldridge, 2002).

According to the results of estimation given in the Table 9, probability value [p(F-statistic)=0.000] of the model is significant at 1% level. R-squared value [R^2=0.040] shows that the dependent variable can be clarified by the independent variables at a rate of 4.0%. Regarding to the results, it can be said that the independent variable RE interacts with the dependent variable SP. The interaction between these two variables is in the same direction and at a significance level of %5.

4. Conclusion

The purpose of our study is to investigate the relationship between the stock price with dividend payout and retained earnings of BIST30 index firms in Turkey. Various of separately and uniquely panel regression models are applied with dummy variables to test the relationships, for stock of industrial, financial, services indexes. The best result is obtained by without taking into consideration of sector differences. According to the results of regression estimation, only dependent variable SP is affected by the independent variable RE, the interaction between these variables is in the same direction.

This result presents the evidence irrelevance theory of Miller and Modigliani (1961), since the dividend payouts does not affect the market value of the stocks. This regression

results also presents the evidence for the "residual dividend theory" and "tax differential theory" which advocate less dividend payments since retained earnings coefficient is statistically significant at 0.05 level. In sum, the investors who have the majority in volume of investments for BIST30 that means they have the power in the market, have a tendency of preferring retained earnings instead of dividend payouts.

There are also some restrictions/problems encountered in our analysis. Since all the equites does not participate BIST at the same time and some firms in BIST30 does not pay out any dividend in long period of time, our model is worked in the condition of unbalanced panel and irregular dividend payments. This study will be experienced for other controlling variables with sector dummies in following studies in order to investigate whether the results can be changeable.

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