Testing the validity of capital structure theories with the dynamic panel data analysis: the case of Borsa Istanbul

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Abstract

In this study, factors affecting capital structure are investigated and the validity of capital structure theories is tested within the scope of these factors. In the study, the data of the enterprises included in the BIST DIVIDEND (XTMTU) index between the years 2010-2019 were tested with dynamic panel data analys The study uses the leverage ratio as the dependent variable; whereas it uses the tangible fixed asset structure ratio, asset profitability, tax level, size, current ratio, liquid ratio, and non-debt tax shield as independent variables. At the end of the study, it has been determined that there is a negative and significant relationship between leverage ratio and tangible fixed asset structure, current ratio, and return on assets. On the other hand, it has been observed that there is a positive and significant relationship between leverage ratio and size and liquid ratio. In addition, it has been determined that there is no significant relationship between the leverage ratio and the tax level or the non-debt tax shield. Finally, the findings obtained in the study are evaluated within the scope of capital structure theories.

Keywords: Capital Structure, Capital Structure Theories, BIST, Dynamic Panel Data Analysis;

1. Introduction

It is a highly controversial issue in the finance literature whether an optimal capital structure can be achieved by changing the capital structure decisions and thus the average capital costs of the enterprises and the market value of the enterprises.

As it is known, businesses need funds while they continue their activities. The needed funds can be obtained in two different ways. These are through the use of equity and foreign resources. In addition, businesses can meet their fund needs by issuing share certificates. It may be possible to obtain the funds needed by the enterprises from their own resources. However, if the company's own resources are insufficient, businesses can meet their funding needs by using foreign resources (borrowing). Although the use of foreign resources imposes some costs on businesses such as principal and interest payments, it provides a tax advantage (tax savings) of

debt.

In general, there are two basic approaches to capital structure. The first approach is how the degree of borrowing affects the firm's risk, the average cost of capital, and firm market value. The second approach is that capital structure decisions are independent of the enterprise's average cost of capital and the enterprise's market value.

More than one theory has been developed in the finance literature regarding the issue of capital structure. These theories are classified as classical capital theories and modern capital theories. There are the Traditional, Income, Net Operating Income, and Modigliani-Miller Approaches in classical capital theory. In modern capital theory, there are approaches such as Balancing, Financial Hierarchy, Asymmetric Information, and Representation Theories. These theories have a single focus. This point is about whether it is possible to change the enterprise's market value and enterprise's average cost of capital by changing the capital structure decisions made by the enterprise. Each theory differs from the others in their assumptions. Although the issue of capital structure has been discussed within the scope of theories, a complete view of capital structure has not been provided within the framework of the assumptions of a single theory.

There is more than one empirical research on the capital structure in Turkey. When the recent studies are examined, results supporting the balancing and financial hierarchy theories, which are among the capital structure theories, have been reached. In this study, the factors affecting the capital structure were investigated with dynamic panel data analysis. The leverage ratio variable was used as the dependent variable in the study. As the independent variables, return on assets, tangible asset structure, size, non-debt tax shield, tax level, current rate, and liquid rate were used. The findings obtained as a result of the analysis were associated with the capital structure theories and the results were reported and evaluated.

2. Theoretical Studies on Capital Structure

Businesses should have an appropriate capital structure while performing their activities. Every business aspires to achieve an optimal capital structure. The optimal capital structure is expressed as the combination in which the enterprise's market value is maximum and its average cost of capital is minimum. Although it is desired to determine an optimal capital structure for businesses, it is very difficult to catch this structure. Theories developed in this context have dragged the issue of capital structure to a debatable dimension.

In the finance literature, various theories about capital structure can be mentioned. The inspiration for most of these theories was the work of Modigliani and Miller (1958). The "non-correlation theory" put forward in this study is accepted as the beginning of the discussions on capital structure (Modigliani and Miller, 1958: 261-297).

The Modigliani Miller approach is an approach that expresses the relationship between the cost of capital and the capital structure. According to this approach; Regardless of the degree of financial leverage, it is argued that the capital cost of the enterprise is not affected by the capital structure decisions of the enterprise. This approach has similar characteristics with the net operating income approach.

The main point the theories argue is whether a firm's capital structure decisions affect its market value. According to the Net Income Approach, a business can reduce its cost of capital and increase its market value by changing its capital structure. On the contrary, the Net Operating Income Approach argues that the capital structure of an enterprise will not affect the average cost of capital and market value (Demirhan, 2009: 678). Another approach is the Traditional Approach. According to this view, there is only one optimal capital structure for businesses. The view that capital structure affects a business's market value and cost of capital is dominant (Ceylan and Korkmaz, 2018: 231).

The modern approach to capital structure consists of the Financial Hierarchy (Pecking Order), Trade-off, Agency, Asymmetric Information, and Signaling theories. In recent years, the theories that have come to the fore in the empirical studies on capital structure have been the balancing and financial hierarchy theories. In the balancing theory, in capital structure decisions, it is accepted that the target debt ratios can vary between

companies within the framework of hypothetical views, and the capital structure is based on establishing a balance between the costs of financial distress and the tax savings of debt (Brealey et al., 2007: 425).

The most important elements in balancing theory are agency costs and financial distress costs. Therefore, companies with high operating risk should prefer to borrow less. Therefore, the decrease in profits before interest and tax of such companies causes financial distress costs and it is stated that the expected values of financial distress costs in these companies will be higher. On the other hand, businesses with a very high operating profit may have the opportunity to hold more debt in their capital structure as they will benefit more from the tax advantage of interest. However, according to the balancing theory, many businesses that may have debt in their capital structure do not prefer to use foreign resources to raise funds. The balancing theory was insufficient to explain this situation (Aktaş et al.2017: 170). Another approach that emerged after the balancing theory is the financial hierarchy theory.

The financial hierarchy theory is a theory that states that if the internal resources of the enterprises are insufficient, they prefer to issue debt rather than issuance of stocks. This theory explains why the most profitable businesses borrow less. The reason for this is that profitable enterprises do not need external funds. Firms with fewer profits issue more debt. Because they do not have sufficient internal resources for the capital investments they will make, and according to the theory, debt is the first source of external financing (Brealey et al., 2007: 427).

According to the finance hierarchy theory, when businesses need funds, they first use retained earnings, then debt, and finally issuance of stocks. The basis of this theory is the asymmetric information problem between investors and business managers. Since investor assume that managers will issue shares because the stock is overpriced, they will borrow when it is low-priced. Businesses will not buy stocks without exhausting their debt capacity. Investors thus leave the business to follow the financial hierarchy theory (Gülşen & Ülkütaş, 2012: 50).

3. Literature Review

In the Modigliani-Miller (1958) study, a cross-section regression analysis was made with the data of 43 electricity companies between 1947-1953; the relationships between the average cost of capital, financial leverage, and cost of equity were analyzed; and the average cost of capital and market value of enterprises were found to be independent of the capitalization structure.

On the other hand, Gaud et al. (2005) investigated the determinants of the capital structure of the companies in question by examining the financial data of 104 companies registered on the Swiss stock exchange between 1991-2000 using the panel data method. He found a negative relationship between growth and profitability variables and leverage ratio, and a positive relationship between firm size and leverage ratio. It has been observed that the obtained results are compatible with the balancing theory and financial hierarchy theories.

Ege and Bayrakdaroğlu (2008) investigated the effect of capital structure on current value and productivity by examining the financial data of 6 companies operating in the BIST Insurance sector. As a result of testing the study data with multiple regression analysis, it has been determined that the relationship between the capital structure of insurance companies and the current value is meaningless. As another finding, the relationship between capital structure and operating efficiency was found to be negative.

Yıldız, Yalama, and Sevil (2009) tested the validity of capital structure theories for the BIST manufacturing sector. The enterprise data in the sample set between 1998 and 2006 were analyzed by panel regression method with three different models. As a result of the research, a positive relationship was found between capital structure and growth, and a negative relationship between capital structure and profitability. The positive relationship between size and capital structure is consistent with the balancing theory. In all models, tax and non-debt tax shields were statistically meaningless and as a result of the findings, it was seen that the capital structures of the enterprises supported the financial hierarchy theory.

Deari and Deari (2009) investigated the determinants of the capital structures of the relevant enterprises by

performing panel data analysis based on data of 32 enterprises covering the 2005-2007 period in the Macedonian stock exchange. As a result of the study, it was observed that the capital structures of the enterprises gave consistent results with the balancing and financial hierarchy theories.

Sayılgan and Uysal (2011) examined the factors affecting the capital structure using the panel data analysis method on the data of the CBRT sector balance sheets between 1996-2008. The leverage ratio, asset structure, size, growth, and non-debt tax shield variables were used in the study. As a result of the panel data analysis, a positive relationship was found between capital structure and profitability, growth, size, asset structure, and a negative relationship between capital structure and non-debt tax shield. It was emphasized that the findings were compatible with the balancing theory.

Öztürk and Şahin (2013), on the other hand, examined the data of the sports businesses for the period 2005-2011 with panel data analysis and investigated whether the factors affecting the capital structure of the sports businesses in question affect each other. As a result of the research, a negative relationship was observed between the asset structure and debt, and this relationship led to the proof that the capital structures of the enterprises were compatible with the financial hierarchy theory.

In their study, Kısakürek and Aydın (2013) examined the relationship between profitability and capital structure of 104 enterprises traded on the BIST within the scope of crisis years. The data of the sampled enterprises between 1992 and 2011 were analyzed with the least squares method. Using three different models in the study, the authors determined a directly proportional relationship between capital structure, return on assets, and profitability on sales. However, the authors concluded that there is an inversely proportional relationship between return on equity and capital structure. As a result of the findings, the capital structures of the companies in the sample showed compatibility with the financial hierarchy theory.

Narmandakh (2014) investigated the determinants of the capital structures of the enterprises in line with the data of 23 enterprises in Mongolia between the period of 2010-2013. In the study; leverage, liquidity, profitability, size, and asset structure variables were analyzed by regression method. As a result of the research, it was found that the capital structures of the enterprises support the financial hierarchy theory.

Bozkurt (2014) analyzed the validity of the balancing theory based on the seven-year data of 168 businesses registered in the BIST. A large number of stock returns, financial ratios, market value, and borrowing ratios of businesses were used. The study used the balanced panel regression analysis and created an effective bankruptcy model. Within the framework of the efficient model, businesses with and without bankruptcy risk are divided into two separate groups. With the unbalanced panel regression analysis, the relationship between the debt levels of the enterprises in the groups and their market values was examined. This relationship was found to be positive in both groups. As a result of the study, it was seen that the balancing theory was invalid for the sampled enterprises.

Abdioğlu and Deniz (2015) investigated the firm-specific determinants of capital structure. Dependent and independent variables were determined by using the financial data of the manufacturing industry enterprises registered in BIST between the years 2009-2013, and then the panel data analysis method was applied. The findings obtained as a result of the research were associated with different capital structure theories and it was concluded that the capital structures of the enterprises in the sample set were compatible with the financial hierarchy theory.

Burucu and Öndeş (2016), on the other hand, tried to determine the factors affecting the capital structure of the enterprises by examining the financial data of 50 companies in the manufacturing industry traded in the BIST between the years 1990-2014 with the dynamic panel data analysis. Factors affecting the capital structure of enterprises have been evaluated within the scope of balancing and financial hierarchy theories. Among the dependent variables in the study, it was observed that asset structure, business size, current ratio, and profitability have a negative effect on borrowing. At the end of the study, the borrowing attitudes of 50 companies in the manufacturing industry were found to be compatible with the financial hierarchy theory.

Demirci (2017), on the other hand, investigated the factors affecting the capital structures of enterprises in the manufacturing industry within the scope of financial hierarchy and balancing theories. Between 2001-2015,

the CBRT conducted a two-way panel data analysis with the data obtained from the sector balance sheets. As a result of the research, it has been determined that the borrowing behavior of the enterprises in the sample is close to the assumptions of the balancing theory and the financing hierarchy theory.

Ayaydın et al. (2017) investigated the determinants of capital structure by using the panel data analysis method based on the data of 40 high technology enterprises registered in BIST, covering the 2008-2015 periods. This study found a positive relationship between capital structure and business size, and a negative relationship between capital structure and non-debt tax shield. It was determined that the capital structures of the enterprises support the balancing and financial hierarchy theories.

Altuntaş (2017) examined the data of 192 companies operating in the BIST manufacturing sector between 2003 and 2015 with panel data analysis and investigated the macro and micro factors affecting the capital structures of these enterprises. As a result of the research, it was concluded that there is a negative relationship between the capital structures of the enterprises in the data set and the variables of asset structure, liquidity ratio, profitability, current account deficit and asset use efficiency, and a positive relationship with the nominal interest rate and business size.

4. Purpose of the Research

The aim of this study is to test the validity of these theories by investigating the factors affecting capital structure within the framework of balancing and financial hierarchy theories. The study was carried out on the financial data of the companies registered in the BIST Dividend (XTMTU) index for 2010-2019. The study's data was obtained from the financial statements of the enterprises and the Finnet system. Research data were analyzed by the dynamic panel data analysis method within the scope of econometric analysis.

4.1. Data Set of the Research

The research's dataset consists of businesses included in the BIST DIVIDEND (XTMTU) index. The financial institutions included in the BIST Dividend (XTMTU) index were excluded from the scope of the study, and the enterprises with uninterrupted data are listed in Table 1.

Table 1. Business Names and BIST Codes

BIST Codes	Business Names	BIST Codes	Business Names
ACSEL	Acıselsan Acıpayam Selüloz Sanayi ve Ticaret A.Ş.	INDES	İndeks Bilgisayar Sistemleri Mühendislik Sanayi ve Ticaret A.Ş.
ADANA	Adana Çimento Sanayii Türk A.Ş.	PSDTC	Pergamon Status Dış Ticaret A.Ş.
AKCNS	Akçansa Çimento Sanayi ve Ticaret A.Ş.	PETUN	Pınar Entegre Et ve Un Sanayii A.Ş.
AKSA	Aksa Akrilik Kimya Sanayii A.Ş.	PNSUT	Pınar Süt Mamulleri Sanayii A.Ş.
ALKA	Alkim Kağıt Sanayi ve Ticaret A.Ş.	POLHO	Polisan Holding A.Ş.
ALKIM	Alkim Alkali Kimya A.Ş.	ISDMR	İskenderun Demir ve Çelik A.Ş.
ANACM	Anadolu Cam Sanayii A.Ş.	JANTS	Jantsa Jant Sanayi ve Ticaret A.Ş.
ASELS	Aselsan Elektronik Sanayi ve Ticaret A.Ş.	KARTN	Kartonsan Karton Sanayi ve Ticaret A.Ş.
AYGAZ	Aygaz A.Ş.	KCHOL	Koç Holding A.Ş.
BAKAB	Bak Ambalaj Sanayi ve Ticaret A.Ş.	KORDS	Kordsa Teknik Tekstil A.Ş.
BIMAS	Bim Birleşik Mağazalar A.Ş.	LKMNH	Lokman Hekim Engürüsağ Sağlık, Turizm, Eğitim Hizmetleri ve İnşaat Taahhüt A.Ş.
BRSAN	Borusan Mannesmann Boru Sanayi ve Ticaret A.Ş.	NUHCM	Nuh Çimento Sanayi A.Ş.
BFREN	Bosch Fren Sistemleri Sanayi ve Ticaret A.Ş.	OTKAR	Otokar Otomotiv ve Savunma Sanayi A.Ş.
CLEBI	Çelebi Hava Servisi A.Ş.	OZRDN	Özerden Plastik Sanayi ve Ticaret A.Ş.
CELHA	Çelik Halat ve Tel Sanayii A.Ş.	SAHOL	Hacı Ömer Sabancı Holding A.Ş.

CEMTS	Çemtaş Çelik Makina Sanayi ve Ticaret A.Ş.	SANKO	Sanko Pazarlama İthalat İhracat A.Ş.
DOCO	Do & Co Aktıengesellschaft	SARKY	Sarkuysan Elektrolitik Bakır Sanayi ve Ticaret A.Ş.
ECILC	Eis Eczacıbaşı İlaç, Sınai ve Finansal Yatırımlar Sanayi ve Ticaret A.Ş.	SELEC	Selçuk Ecza Deposu Ticaret ve Sanayi A.Ş.
EGEEN	Ege Endüstri ve Ticaret A.Ş.	SODA	Soda Sanayii A.Ş.
EGGUB	Ege Gübre Sanayii A.Ş.	SISE	Türkiye Şişe ve Cam Fabrikaları A.Ş.
EGPRO	Ege Profil Ticaret ve Sanayi A.Ş.	TBORG	Türk Tuborg Bira ve Malt Sanayii A.Ş.
EGSER	Ege Seramik Sanayi ve Ticaret A.Ş.	TAVHL	Tav Havalimanları Holding A.Ş.
ENKAI	Enka İnşaat Ve Sanayi A.Ş.	TKFEN	Tekfen Holding A.Ş.
ERBOS	Erbosan Erciyas Boru Sanayii ve Ticaret A.Ş.	TOASO	Tofaş Türk Otomobil Fabrikası A.Ş.
EREGL	Ereğli Demir ve Çelik Fabrikaları T.A.Ş.	TRKCM	Trakya Cam Sanayii A.Ş.
FMIZP	Federal-Mogul İzmit Piston ve Pim Üretim Tesisleri A.Ş.	TCELL	Turkcell İletişim Hizmetleri A.Ş.
FROTO	Ford Otomotiv Sanayi A.Ş.	TUPRS	Tüpraş-Türkiye Petrol Rafinerileri A.Ş.
GENTS	Gentaş Dekoratif Yüzeyler Sanayi ve Ticaret A.Ş.	VERUS	Verusa Holding A.Ş.
GOODY	Goodyear Lastikleri T.A.Ş.	VESBE	Vestel Elektronik Sanayi ve Ticaret A.Ş.
GOLTS	Göltaş Göller Bölgesi Çimento Sanayi ve Ticaret A.Ş.		

The variables that measure the capital structures of the enterprises have been determined by an extensive literature review. In the study, leverage ratio (LR) is used as the dependent variable; whereas tangible asset structure (TAS), tax level (TL), return on assets (ROA), current ratio (CO), liquid ratio (LO), size (BYK), and non-debt tax shield (NDTS) are used as independent variables.

The variables that best explain the capital structures, the calculation formulas of these variables, and the studies in which the variables are used are given in Table 2.

Table 2. Table of Dependent and Independent Variables

The Dependent Variable			
Variable	**Abbreviation**	**Formula**	**Studies Used**
Leverage Ratio	LR	$\dfrac{Total\ Debt}{Active\ Total}$	Demirhan (2009), Sayılgan & Uysal (2011), Burucu & Öndeş (2016), Demirci (2017), Ayaydın et al. (2017),
Independent Variables			
Variable	**Abbreviation**	**Formula**	**Studies Used**
Asset Structure	TAS	$\dfrac{Tangible\ Fixed\ Assets}{Total\ Assets}$	Deesomsak et al. (2004), Deari and Deari (2009), Demirhan (2009), Yıldız et al. (2009), Sayılgan and Uysal (2011), Burucu & Öndeş (2016),
Active Profitability	ROA	$\dfrac{Net\ Profit}{Total\ Assets}$	Demirhan (2009), Yıldız et al. (2009), Burucu & Öndeş (2016), Ayaydın et al. (2017),

Current Rate	CO	$\dfrac{Current\ Assets}{Short-Term\ Liabilities}$	Demirhan (2009), Nhung et al. (2017), Alsu and Yarımbaş (2017), Ayaydın et al. (2017), Burucu & Öndeş (2016), Demirci (2017)
Liquid Ratio	LO	$\dfrac{Current\ Assets-Inventories}{Short-Term\ Liabilities}$	Korkmaz et al. (2009), Ata & Ağ (2010), Sarıoğlu et al. (2013), Abdioğlu and Devran (2015), Nhung et al. (2017)
Size	BYK	$\log(Active\ Total)$	Deesomsak et al..(2004), Demirhan (2009), Yıldız et al. (2009), Sayılgan & Uysal (2011), Pinková (2012), Burucu & Öndeş (2016), Ayaydın et al. (2017),
Non-Debt Tax Shield	NDTS	$\dfrac{Depreciation\ Expenses}{Total\ Assets}$	Deesomsak et al. (2004), Deari ve Deari (2009), Demirhan (2009), Yıldız et al. (2009), Sayılgan & Uysal (2011), Burucu & Öndeş (2016), Alsu & Yarımbaş (2017)

4.2. Model of the Research

In the study model, the leverage ratio is used as a dependent variable; asset structure, tax level, return on assets, current ratio, liquid ratio, and non-debt tax shield are used as independent variables. The model is created with dependent and independent variables is as follows.

$$\mathbf{LR_{it}} = \alpha + \beta_1(LR_{it-1})_{it} + \beta_2(TAS)_{it} + \beta_3(TL)_{it} + \beta_4(ROA)_{it} + \beta_5(CO)_{it} + \beta_6(LO)_{it} + \beta_7(BYK)_{it} + \beta_8(NDTS)_{it} + e_{it}$$

$$(1)$$

LR: Leverage Ratio
TAS: Tangible Asset Ratio
TL: Tax Level
ROA: Return On Assets
CO: Current Ratio
LO: Liquid Ratio
BYK: Size
NDTS: Non-Debt Tax Shield
α: Fixed
e_{it}: Error Term

The working model was analyzed with the two-stage System GME (Generalized Moments Estimator) estimator developed by Roodman (2006). The Stata package program was used during the implementation phase. In the analysis phase, the Wald Test, which tests the significance of the model, the Hansen Test, which tests the validity of the instrument variable set, and the AR(1) and AR(2) tests, which investigate the existence of first and second order autocorrelation, were performed and the test results are reported in Table 5.

Table 3. Descriptive Statistics

Variable	Average	Standard Deviation	The Smallest	The Biggest	Observation
LR	0.4653171	0.2108119	0.0629822	0.9765659	590
TAS	0.3012105	0.1624803	0.0001252	0.7250174	590
BYK	20.91587	2.022369	14.85257	26.64132	590
ROA	0.0870607	0.0789668	-0.0770939	0.5796841	590
TL	-0.2333222	5.387964	-90.89899	1.88834	590
CO	2.192103	1.916989	0.3882282	17.63553	590
LO	1.680125	1.69113	0.1083189	16.2685	590
NDTS	0.031182	0.0190646	0.0000504	0.0993881	590

As can be seen in Table 3, the variable of size (20,91587) has the highest mean. Average leverage ratio of other variables (0.4653171), return on assets (0.0870607), property, plant and equipment structure (0.3012105), tax level (-0.2333222), non-debt tax shield (0.031182), current ratio (2.192103), liquid ratio (1.680125) 'Stop. The variable with the highest standard deviation is the tax level. Descriptive statistics for other variables are as in Table 3.

Table 4. Correlation Matrix

	LR	TAS	BYK	TL	ROA	CO	LO	NDTS
LR	1.0000							
TAS	-0.2194	1.0000						
BYK	0.3084	-0.1064	1.0000					
TL	-0.0585	-0.0622	-0.0392	1.0000				
ROA	-0.4459	-0.0903	-0.1787	0.0441	1.0000			
CO	-0.6162	-0.1541	-0.3126	0.0394	0.4574	1.0000		
LO	-0.5425	-0.2245	-0.0767	0.0368	0.4664	0.9632	1.000	
NDTS	-0.3742	0.4089	-0.1850	0.0401	0.1251	-0.0601	-0.0687	1.000

When Table 4 is examined, it is observed that there is a positive correlation between leverage ratio and size variable, and a negative correlation between tangible fixed asset structure, tax level, return on assets, current ratio, liquid ratio, and non-debt tax shield. On the other hand, it is seen that there is a high correlation (0.9632) between the current ratio and the liquid ratio. The correlation relationship with other variables is shown in Table 4.

4.3. Analysis Method

In panel data analysis, one of the important steps in econometric research is obtaining variable data. Accurate data collection and obtaining data from reliable sources significantly affect the reliability of econometric forecasts. There are three types of data used in econometric analysis. These can be classified as cross-section, time series, and panel data.

Time series emerge as processes that change over time (Ihaka, 2005:1). It contains data showing the changes in the values of the variables according to time units such as day, month, year, and season. Cross-sectional data is data collected from different units at a given time, cross-sectional data. Here, examples of the unit can be an enterprise, sector, or an entire country (Tatoğlu, 2012:1-2).

The panel data is defined as bringing together the cross-sectional observations belonging to units such as countries, individuals, businesses, or households in a certain period (Baltagi, 2005:1). It is an econometric model widely used by developed and developing countries in the 2000s (Hsiao, 2003:1). Historically, panel data methodology in economics has been developed largely with labor economics practices. However, economic applications of panel data methods are not limited to labor economics problems, and the interpretation of panel data analysis is much broader. Panel data are also known as "longitudinal data" in the literature (Frees, 2004: 2).

Since economic behavior in a certain period can be significantly influenced by past experiences and old behavior patterns, it is important to consider the lagged values of the variables considered as explanatory factors when analyzing economic relations. Therefore, unlike static panel data models, dynamic panel data models can be modeled with delayed variables (Tatoğlu, 2018: 113).

Dynamic panel data models can be modeled as follows (Baltagi, 2005: 135):

$$y_{it} = \delta y_{it-1} + x'_{it-1}\beta + u_{it} \qquad i = 1,...,N; \ t = 1,...,T$$

(2)

$$u_{it} = \mu_i + v_{it}$$

(3)

Here the unit effect is μ_i, i. Both y_it and $y\_(it-1)$ are functions of this unit effect since they are constant for the unit over the entire time. Therefore, the lagged dependent variable $y\_(it-1)$ on the right side of Equation (2) is correlated with the error term.

Arellano-Bond (1991) and Arellano-Bover (1995) / Blundell-Bond (1998) dynamic panel estimators are becoming increasingly popular. Both are general estimators designed for T<N panels (Roodman, 2006: 1). On the other hand, another dynamic model estimator based on the GME method is the System GME approach developed by Arellana and Bover (1995). The approach in question is based on combining the difference equation and the level equations. Blundell and Bond (1998) and Blundell et al., (2000) found that the differential RME has a weak predictive power in a finite sample and the coefficient estimates are biased and that the predictive power of the system RME is higher (Dökmen, 2012: 46) . For this reason, since the lagged value of the leverage ratio was added as an independent variable in the study, an autoregressive dynamic panel structure was created and Roodman (2006)'s two-stage System GME estimator was used in the analysis phase, since the study data showed T<N feature.

5. Research Findings and Evaluation

The cross-sectional data in the study covers 59, and the data range covers the period of 2010-2019. The dynamic panel data analysis results obtained within the scope of the said data are shown in Table 5.

Table 5. Results of Dynamic Panel Data Analysis

Period	2010-2019		
Horizontal Section	59		
Number of Observations	531		
Estimator	Roodman (2006) Two Stage System GME Estimator		
Variable	**Coefficient**	**Z Value**	**Significance Level (p)**

L.LR	0.7057005	11.25	0.000*
TAS	-0.0792406	-1.84	0.065***
BYK	0.0108811	4.48	0.000*
TL	-0.0003796	-1.52	0.128
ROA	-0.3250475	-3.90	0.000*
CO	-0.0470321	-7.74	0.000*
LO	0.03603	3.65	0.000*
NDTS	0.130971	0.47	0.637
Wald Test	8360.57 (0.000)*		
Hansen Test	48.60 (0.257)		
AR(1)	-3.87 (0.000)*		
AR(2)	1.27 (0.206)		

Note: *,** and *** denote 1%, 5% and 10% significance levels, respectively.

When the two-stage System GME (Generalized Moments Estimator) estimation results are examined in Table 5, it is determined that the Wald test, which tests the significance of the model, is significant, as well as the lagged variable is significant in explaining the dependent variable. In the Hansen test reached for the two-stage System GME estimation method, the null hypothesis that assumes the instrument variables are valid (H0: Instrument variable set is valid.) is accepted, and the alternative hypothesis, which assumes that the instrument variables are not valid, (H1: Instrument variable set is not valid) is rejected. On the other hand, when Table 5 is considered, findings are obtained from AR(1) and AR(2) tests in order to test the existence of autocorrelation in the study model. The first-order autocorrelation problem is frequently encountered in dynamic panel data models. In the study, it is determined that there is a first-order autocorrelation problem in the model analyzed according to the AR(1) test result. When the AR(2) test result is examined, it is observed that there is no second-order autocorrelation problem in the study. The absence of a second-order autocorrelation problem in the study indicates the consistency of GME estimations.

It was determined that there is a negative and significant relationship between leverage ratio and return on assets variable at 1% significance level. This result is consistent with the studies of Demirhan (2009), Deari and Deari (2009), Burucu and Öndeş (2016), and Demirci (2017). The negative relationship between profitability and leverage ratios means that while operating profitability increases, the share of debt in total resources decreases. The primary use of undistributed profits in enterprise financing ensures a decrease in the debt ratio. This result is an indication that the financial hierarchy theory is valid for manufacturing industry enterprises registered in the BIST Dividend (XTMTU) index.

It has been determined that there is a negative and significant relationship at 10% significance level between leverage ratio and tangible asset structure. This result, Deari and Deari (2009), Yıldız et al. (2009) and Alsu and Yarımbaş (2017). The asset structure of the enterprises is an important factor in providing foreign resources for those who want to raise funds. In this direction, tangible fixed assets increase the liquidation value of the enterprise, while reducing the bankruptcy costs. It is important for businesses with high tangible assets to be relatively more secure in order to find loans easily. For this reason, while the balancing theory predicts the existence of a positive relationship between borrowing and the share of tangible fixed assets in assets, the

financing hierarchy theory cannot predict a clear relationship between the related variables (Abdioğlu and Deniz, 2015: 202).

It has been observed that there is a negative and significant relationship between the current ratio and the leverage ratio. This result was compatible with the study of Demirhan (2009) and Burucu and Öndeş (2016). Again, this result shows that the level of borrowing increases as the enterprise liquidity decreases by the theoretical expectations (Demirhan, 2009: 694). Therefore, this finding supports the financial hierarchy theory. It has been determined that there is a positive and significant relationship at 1% significance level between the liquid ratio and the leverage ratio. This finding is in line with the study of Ghasemi and Razak (2016). Based on this finding, it can be stated that businesses prefer more liquidity to debt financing, which supports the financial hierarchy theory. On the other hand, in the study of Ata and Ağ (2010) and Abdioğlu and Deniz (2015), it was seen that there is a negative and significant relationship between the liquid ratio and the leverage ratio.

A positive and significant relationship was observed between the size variable and the leverage ratio. This result Yıldız et al. (2009), Ata and Ağ (2010) and Narmandakh (2014). It can be said that as the size of the firm increases, the risk of bankruptcy and agency costs decrease, and the firm capacity to use debt increases. The aforementioned firm size variable yielded results consistent with the Balancing Theory. In addition, no significant relationship was found between the tax level and non-debt tax shield variables and the leverage ratio in the study.

6. Conclusion

Capital structure is defined as the combination of equity and foreign resources of enterprises. It is highly controversial whether the market value of the enterprise and the cost of capital will change by changing the capital structure decisions in a business. In particular, the work of Modigliani-Miller (1958) has inspired discussions of capital structure. Again regarding the issue of capital structure, it is desirable for businesses to have an optimal capital structure. The optimal capital structure is the point at which the market value of a business is maximum and its average cost of capital is minimum. Many researchers criticised the capital structure theories based on various assumptions. However, there is still no consensus on the capital structure. The study is handled within the scope of the assumptions of the balancing theory and financial hierarchy theories. The balancing theory claims that increasing the borrowing level of a business increases its market value to a certain level, and after this point, the business will assume financial risk and this risk will lead the business to financial failure. The focus of the balancing theory is the view that the business should determine the debt level at an optimal level and that the costs of financial distress, bankruptcy costs, and agency costs should be balanced. In the financial hierarchy theory, businesses primarily want to use their internal resources to finance investments. In case of insufficient internal resources, the company may go to outsourcing, that is, borrowing. Finally, it can meet its financing needs by issuing shares. In this context, the financial hierarchy theory suggests that businesses follow a certain hierarchy.

In this study, the factors affecting the capital structure were tried to be determined by dynamic panel data analysis by using the data of the companies listed in the BIST DIVIDEND (XTMTU) index between 2010-2019. Leverage ratio was used as the dependent variable in the research, tangible asset structure, return on assets, tax level, size, current ratio, liquid ratio, and non-debt tax shield ratios were considered as independent variables. The findings obtained as a result of dynamic panel data analysis are associated with the balancing and financial hierarchy theories, which are the focus of the study. When the analysis findings are examined, a negative and significant relationship was observed between leverage ratio and tangible asset structure, return on assets, and current ratio. On the other hand, a significant relationship was found between leverage ratio, liquid ratio, and size variable. As another finding, it was concluded that there was no significant relationship between the tax level and non-debt tax shield variables and the leverage ratio. The subject covered in this study has been researched for businesses in the BIST DIVIDENDS (XTMTU) index. However, in future studies, the factors affecting capital structure and the subjects that are investigated within the scope of capital structure

theories can be examined on the basis of different stock markets, sectors, and indices. Thus, presenting the findings can enrich the literature and make important contributions.

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