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# The Determınants of Capıtal Structure: an Empırıcal Study of The Lısted Fırms on Bıst (Borsa Istanbul) Servıce Sector

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**ABSTRACT:** This research investigates the determinants of the capital structure of firms listed service sector on BIST(Borsa Istanbul) and the adjustment process towards this target. The econometric analysis employs the Generalized Method of Moments estimators (GMM-Sys, GMM difference) techniques that controls for unobserved firm-specific effects and the endogeneity problem. The findings of the paper suggest that firms have target leverage ratios and they adjust to them relatively fast. Consistent with the predictions of capital structure theories and the findings of the empirical literature, the results of this paper suggest that size, assets tangibility, profitability, growth opportunity except earnings volatility have significant effects on the capital structure choice of hotels and restaurants.The capital structure or leverage is measured by total debt ratio. Analysis results indicates that firms with high profits, sizable, high fixed assets ratio and high total sales and more growth opportunities tend to have relatively less debt in their capital structures.

**Key words:** *Dynamic capital structure, Turkish Stock Market, GMM Estimation*

## I. INTRODUCTION

A company's capital structure is determined by the assumptions of debt and equity capital used in financing the company's assets. The financial manager should seek that capital structure which maximizes the value of the firm (the optimal capital structure). A company with a lot of debt in its capital structure is said to be highly levered. A firm with no debt is said to be unlevered (Al Ani and Al Amri, 2015:160). There is little empirical evidence of a relation between changes in capital structure and firm value. In the best known test of an optimal capital structure model, Miller-Modigliani (1958) reported evidence of a positive relation- ship between firm value and leverage which they attributed to a debt tax shield effect. Their results are suspect, however, because of statistical problems they encountered when attempting to adjust for differences in the firms' asset structures. Since only regulated firms were examined, there is also some concern that their empirical findings were caused by the regulatory environment in which these firms operate.

A company financing from the debt capital has a legal binding to pay interest on the debt at the predetermined rate and this liability cannot be eliminated until the withdrawal of the debt capital. But, the investors in the share capital are rewarded by dividend for their investment only if the company earns enough profit from the operation. Increasing use of debt in the capital structure also increases financial risk and bankruptcy cost to the shareholders. Therefore within these two conflicting legal bindings, the management of the company has to pay more attention on the maximization of shareholders' wealth because the survival of the company and its managements is dependent on the satisfaction of the shareholders. Thus the management of the company should consider how financing of required funds affect the shareholder risk, return and value of the firm (Ishari and Abeyrathna, 2016:100).

As Myers (1977) points out, changes in capital structure are costly to implement. Hence, the observed leverage ratio at any point in time may substantially differ from its optimal level. Furthermore, Myers and Majluf (1984) suggest that the observed leverage ratio may differ from the optimal level predicted by the trade-off between the costs and benefits of debt. However, the common approach has been to study the determinants of optimal leverage by examining the relationship between the observed leverage ratio and a set of explanatory variables using non-dynamic models. Non-dynamic models have shortcomings.The empirical analysis, being non dynamic, is unable to shed any light on the nature of the dynamic aspect of the capital structure of firms. This research contributes to the capital structure

literature in the following ways.We estimate the empirical models by employing an econometric procedure that is more sophisticated than those used in most previous research – the System Generalized Method of Moments estimator (GMM-Sys) dynamic panel estimator (Blundell and Bond, 1998). The GMM-Sys procedure allows us to explore the panel structure of our dataset to address important and frequently ignored methodological concerns that are common to corporate finance studies, such as dynamic endogeneity.

This paper is organized as follows. Section 2 and section 3 give a review of the extant literature on capital structure theories. Section 4 describes the data, justifies the choice of the variables used in the analysis. Section 5, the model used in the analysis is then estimated compared to other models. The subsequent section presents and discusses the results of the empirical analysis. Finally, the last section summarizes the findings of the research and also concludes the discussion.

## II. CAPITAL STRUCTURE THEORIES

Following Modigliani-Miller (1958) a large number of research papers and theoretical approches, models namely based on tax considerations (Miller, 1977), bankruptcy (Stiglitz, 1972; Titman, 1984)and financial distress costs, agency costs (Jensen and Meckling 1976; Myers, 1977) and symmetric information issues (Myers, 1984) identify many firm-specific factors that may affect a firm's optimal capital structure (Frydenberg, 2004:3). Various Capital structure approaches gather around two basic theories: Trade off and Pecking Order Theories. Underlying these theories are the assumptions of the irrelevance theorem of Miller and Modigliani.

### 2.1. Trade Off Theory

The trade-off theory postulates that firms choose leverage by balancing the benefits and costs of using debt (Rajan & Zingales,1995; Titman & Wessels, 1988), and its key features are taxation (Fama & French, 1998) and bankruptcy costs (Opler & Titman, 1994) (Castro, Tascon and Tapia, 2015:460). According to the trade-off theory of capital structure, the optimal debt level balances the benefits of debt against the costs of debt (Gu, 1993). The tax benefits of debt dominate up to a certain Debt ratio, resulting in higher return on equity, but the benefit would be less than the cost after the level of debt ratio. In other words, the more a company uses debt, the less income tax the company pays, but the greater its financial risk. Most studies of capital structure used a basic assumption of the trade-off theory. Once firms find a certain optimal combination of financing sources, that is, the mix of debt and equity sources that balance the benefits of the tax shield provided by debt with the increased costs of financial distress to the firm's equity holders, firms should maintain this target capital structure. This theory claims that a firm's optimal debt ratio is determined by a trade-off between the losses and gains of borrowing, holding the firm's assets and investment plans constant. The firm substitutes debt for equity, or equity for debt until the value of the firm is maximized (Bai and Buvanesvaran, 2015:57).

The gain of debt is primarily the tax-shelter effect, which arises when paid interest on debt is deductible on the profit and loss account. The costs of debt are mainly direct and indirect bankruptcy costs. The original static trade-off theory is actually a sub theory of the general theory of capital structure because there are only two assumptions that are broken here, the no tax incentive assumption and the no bankruptcy cost assumption. In the more general tradeoff theory several other arguments are used for why firms might try to adjust their capital structure to some target. Leverage also depends on restrictions in the debt-contracts, takeover possibilities and the reputation of management. A negative correlation between debt and monitoring costs is proposed by Harris and Raviv (1990). Diamond (1989) suggest that vintage firms with a long history of credits will have relatively low default probability and lower agency costs using debt financing than newly established firms. A common factor for all these firm characteristics are that they are proxies meant to measure some form of costs related to a principal-agent problem. There may simultaneously be several principal-agent problems between the different classes of securities in the firm or between stockholders and managers in the firm (Frydenberg, 2004:8). A construction of a positive theory of debt financing, builds on arguments on the advantages and disadvantages of debt.

Recent papers, however, suggest that the tradeoff theory predictions on profitability are more complex than those based on static models. In a dynamic tradeoff model, leverage will appear to be negatively related to profitability in the data.

The pecking order theory argues that firms prefer internal finance over external funds. If investments and dividends are fixed, then more profitable firms will become less levered over time (Frank and Goyal, 2009:11). Unlike the static trade-off version, which posts that the optimal leverage ratio is determined by a single period trade-off between the tax benefits of debt and the expected costs of bankruptcy, dynamic trade-off models (e.g., Fischer, Heinkel and Zechner,

1989; Ju et al., 2005; Strebulaev, 2007) incorporate additional factors, such as optimality of financing choice in subsequent periods, transaction costs and asymmetries in taxation (Lambrinoudakis, 2016:2).

According to predictions of the tradeoff theory;

1.Older firms with better reputations in debt markets face lower debt-related agency costs. Thus, the larger, more mature firms have relatively less debt.

2.Growing firms place a greater value on stakeholder co-investment. Thus, growth reduces leverage.

3. In a dynamic tradeoff model, leverage will appear to be negatively related to profitability in the data.

4. The lower expected costs of distress and fewer debt-related agency problems predict a positive relation between tangibility and leverage.

5. The tradeoff theory predicts that to take advantage of higher interest tax shields, firms will issue more debt when tax rates are higher.

6. Firms with more volatile cash flows face higher expected costs of financial distress and should use less debt. More volatile cash flows reduce the probability that tax shields will be fully utilized. Risk is detrimental for stakeholder co-investment. Thus higher risk should result in less debt under the tradeoff theory.

**2.2. Pecking Order Theory**

The pecking order theory has long roots in the descriptive literature (Donaldson, 1961) and it was clearly articulated by Myers and Majluf (1984). In contrast to the trade-off theory, the pecking order theory of capital structure states that firms have a preferred hierarchy for financing decisions. The highest preference is to use internal financing such as retained earning, before resorting to any form of external funding. If a firm uses external funding, the order of preference is debt, convertible securities, preferred stock, and common stock (Myers, 1984:9). Less profitable companies issue debt because they lack adequate internal funds to finance investment and because debt financing is first in the order of choices of external financing (Castro, Tascon and Tapia, 2015:460). The modified pecking order theory recognizes both asymmetric information and costs of financial distress. Thus the firm faces two increasing costs as it climbs up the pecking order: it faces higher odds of incurring costs of financial distress and also higher odds that future positive—Net Present Value projects will be passed by because the firm will be unwilling to finance them by issuing common stock or other risky securities. The firm, choose to reduce these costs by issuing stock now even if new equity is not needed immediately to finance real investment, just to move the firm down the pecking order. This order reflects the motivation of a financial manager to reduce the agency costs of equity, retain control of the firm, and avoid the seemingly inevitable negative market reaction to an announcement of a new equity issue (Hawawini & Viallet, 1999). However, the pecking order theory also has some limitations. It does not explain the influence of taxes, financial distress, security issuance costs or the set of investment opportunities available to a firm in that firm's actual capital structure. In reality, it is impossible to explain real situations with one or two theories (Bai and Buvanesvaran, 2015:57).

Firms can use three sources of funds; retained earnings, debt and equity. Equity has serious adverse selection, debt has only minor adverse selection and retained earnings avoid the problem. From the point of view of an outside investor, equity is strictly riskier than debt. Both have an adverse selection risk premium, but the premium is larger on equity. An outside investor will therefore demand a higher return on equity than on debt. From the perspective of those inside the firm, retained earnings are a better source of funds than outside financing. Retained earnings are used when possible. If retained earnings are inadequate, debt financing will be used. Equity is used only as a last resort. This is a theory of leverage in which there is no notion of an optimal leverage ratio.

Market timing, a relatively old idea (Myers, 1984) is having a renewed surge of popularity in the academic literature. In surveys Lucas ve McDonald (1990) analyze a dynamic adverse selection model that combines elements of the pecking order with the market timing idea. The basic idea is that managers look at current conditions in both debt and equity markets. If they need financing, they use whichever market currently looks more favorable. If neither market looks favorable, they may defer issuances. Alternatively, if current conditions look unusually favorable, funds may be raised even if the firm has no need for funds currently (Frank and Goyal, 2009:9). According to Welch (2004) firms do not re-balance capital structure changes caused by stock price shocks and therefore stock returns are "considerably more important in explaining debt-equity ratios than all previously identified proxies together."Time-varying adverse selection could also result in a negative relation between stock prices and leverage (Frank and Goyal, 2009:16). If market timing drives capital structure decisions, higher market-to-book ratio should reduce leverage as firms exploit equity mispricing through equity issuances.

The pecking order theory argues;

1. Firms prefer internal finance over external funds. If investments and dividends are fixed, then more profitable firms will become less levered over time.

2. There is an inverse relation between leverage and firm size and between leverage and firm age. Large firms should be able to more easily issue equity relative to small firms where adverse selection problems are severe. prediction for firm size is ambiguous.
3. Firms with more investments-holding profitability fixed - should accumulate more debt over time. Thus, growth opportunities and leverage are positively related under this theory.
4. Low information asymmetry associated with tangible assets makes equity issuances less costly. Thus, leverage ratios should be lower for firms with higher tangibility.However,if adverse selection is about assets in place,tangibility increases adverse selection and results in higher debt.
5. Non-debt tax shield proxies i.e. net operating loss carryforwards, depreciation expense, and investment tax credits – should be negatively related to leverage.
6. Firms with volatile stocks to be those about which beliefs are quite volatile and such firms suffer more from adverse selection. If so, we might expect that riskier firms have higher leverage.
Following *Table 1* shows predicted sign of variables effecting leverage by capital structure theories.

*Table 1*. Predicted Sign of Variables Effecting Leverage by Capital Structure Theories

| *Variable* | *Positive effect* | *Negative effect* |
|---|---|---|
| Profitability | Trade off and Signalling Theory | Pecking Order Theory |
| Growth | Pecking Order and Signalling Theory | Pecking Order and Trade Off |
| Size | Trade off and Signalling Theory | Pecking Order Theory |
| Tangible assets | Agency and Trade Off Theory | Agency Theory |
| Earning Volatility | Signalling Theory | Trade Off Theory |

## III. LITERATURE REVIEW

Myer's (1984) well known paper "The Capital Structure Puzzle" starts by asking "How do firms choose their capital structures?" and answers "We don't know", reminds you of Fischer Black's well—known note on "The Dividend Puzzle," which he closed by saying, "What should the corporation do about dividend policy?"

The relationship between capital structure and firm value has been the subject of considerable debate. Throughout the literature, debate has centered on whether there is an optimal capital structure for an individual firm or whether the proportion of debt usage is irrelevant to the individual firm's value. The capital structure of a firm concerns the mix of debt and equity the firm uses in its operation. Brealey and Myers (2003) contend that the choice of capital structure is fundamentally a marketing problem (Abor, 2005:439).

According to previous studies, financial leverage affects cost of capital, ultimately influencing firms' profitability and stock prices (Higgins, 1977; Miller, 1977; Myers, 1984; Sheel, 1994). Also, several researchers have studied firms' debt use and suggested the determinants of financial leverage by reporting that firm's debt-equity decision is generally based on a trade off between interest tax shields and the costs of financial stress (Kim, 1997; Sheel, 1994; Sunder and Myers, 1999; Titman and Wessles, 1988; Upneja and Dalbor, 2001) (Bai and Buvanesvaran, 2015:6).

The paper by Masulis (1983) analyzed the sample of EOs (exchange offers and recapitalizations), consists of all the common stock listed on the NYSE and the ASE on the announcement date during the period 1963-78. That paper studied the valuation effects of leverage altering capital structure changes. Issuer exchange offers and recapitalizations were analyzed because they do not involve simultaneous asset structure changes (in the form of cash inflows/ outflows). A linear model was developed to estimate firm valuation effects from stock announcement returns and actual capital structure changes, and then was estimated using ordinary least squares. The result was a statistically significant regression equation having parameter estimates consistent with model predictions and explaining more than half the cross-sectional variation in stock announce- ment returns. This evidence was shown to be consistent with tax based models of optimal capital structure and leverage induced wealth transfers across security classes as well as with information effects concerning firm value which are positively related to changes in firm debt level (Masulis, 1983:108,125).

Ata and Ağ (2010) conducted a study about the effects of company characteristics on capital structures of the companies that are active in the main metal industry and metal goods sector, machinery and tool manufacturing sector

within Istanbul Stock Exchange. For this purpose, the annual data of the 42 companies listed on the Istanbul Stock Exchange between the years 2003 and 2007. In this study, Panel Data Analysis was applied. As a result of the study, it was determined that only the company size affected the capital structure positively, and all the other variables affected it negatively. It was also concluded that the results of the study showed parallelism with the trade-off theory (Ata and Ağ, 2010: 46). Abor (2005), investigated the relationship between capital structure and profitability of listed firms on the Ghana Stock Exchange (GSE) during a five-year period. Regression analysis is used in the estimation of functions relating the return on equity (ROE) with measures of capital structure. The results reveal a significantly positive relation between the ratio of short-term debt to total assets and ROE. However, a negative relationship between the ratio of long-term debt to total assets and ROE was found. With regard to the relationship between total debt and return rates, the results show a significantly positive association between the ratio of total debt to total assets and return on equity. The research suggests that profitable firms depend more on debt as their main financing option (Abor, 2005:438).

Acemoglu and Johnson (2005) suggest that poor-quality contracting institutions could result in more debt rather than equity because debt contracts are cheaper to enforce. Conversely, La Porta et al. (1997), (1998) and Levine (1999) maintain that in an inferior contracting environment, debt holders are likely to increase the price of debt and decrease its quantity. Jameel (2004) found out that the value of the firm is dependent on financial leverage, and this finding is consistent with the traditional view and identified that there is no significant differences among the means of results for different sectors. Also, Ronald (1983), Jameel (2004), Wippern (1966) identified that there is a positive relationship between the value of the firm and the financial leverage (Ishari and Abeyrathna, 2016:101). Frank and Goyal (2009) studied publicly traded American firms over the period 1950 to 2003 to determine which factors have a reliable relation to leverage. Starting from a large set of factors that have been used in previous studies,they report that the impact of firm size, market-to-book ratio, and inflation is not reliable. Rajan and Zingales (1995) examine the Group of 7 (G-7, comprising Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States) countries and report that the dominant factors are market-to-book ratio, tangibility, profits, and firm size. What is not known is whether the results from major industrial countries extend to a much larger panel of countries.

Bai and Buvanesvaran (2015), in their study present an empirical insight into the relationship between return on equity (ROE), financial leverage and size of firms in the United States. The restaurant firms used for the analysis are sixty two for the period 1998 to 2003. The OLS regression results suggest that at least during the test period firm size had a more dominant effect on ROE of restaurant firms than debt use, larger firms earning significantly higher equity returns. Results also suggest that regardless of having lower financial leverage, smaller restaurant firms were significantly more risky than larger firms. As such, the dominance of size effect in the ROE-financial leverage relationship within the Restaurant industry is better understood.

Danis et. al (2014) find that at times when firms are at or close to their optimal level of leverage, the cross-sectional correlation between profitability and leverage is positive. At other times, it is negative. These results are consistent with dynamic trade-off models in which infrequent capital structure rebalancing is optimal. The time series of market leverage and profitability in the quarters prior to rebalancing events match the patterns predicted by these models. Results are not driven by investment layouts, market timing, payout or mechanical mean reversion of leverage (Danis ,2014:424).

Gulner (2008) found out that equity returns increase in leverage for some risk classes and decrease in leverage for others. He further explained that firms in industries such as Utilities, that MM employ in their tests, have abnormal returns that increase in leverage. Firms in most industries experience abnormal returns that increase I leverage. Firms in most other industries experience most abnormal returns that decrease in leverage, which result supports more resent the findings of authors using mixed samples of firms. For most risk classes, abnormal returns increase as the average leverage level increases. Utilities is one risk class in which there is a high concentration and in which firm leverage levels are close to industry leverage levels (Ishari and Abeyrathna, 2016:101). In another research Elgonemy (2002) mentioned that hotel investors must consider four elements debt-financing: business risk, the need for financial flexibility, the degree of ownerships' risk aversion, and tax considerations.

Ishari ve Abeyrathna (2016) tried to identify the relationship between the financial leverage and the value of the firm. This study used the 10 listed companies' data of 5 year periods in manufacturing sector listed on the Colombo Stock Exchange (CSE). The ampirical findings indicate a correlation forthe market. However an inverse relationship exists between financial leverage and firm value. However the research proves that the financial leverage not higher impact on the firm's value, it can be understand by the values taken by the analysis. Furthermore, in the long term the relationship between debt equity ratios and ROA was statistically significant. By evaluating these results it can be say that listed manufacturing companies in Sri Lanka have not focus their attention on debt financing for the purpose of the company growth.

Eunju and Soocheong (2005) studied the relationship between profitability, financial leverage and size of the firm in restaurant industry. He took study period from 1998 to 2003 by using ordinary least square method. The aim of this study was to analyze the association between financial leverage and restaurants firm profitability and risk. For the sake of the achievement of objective of this study, he made three hypotheses. The first hypothesis was restaurant firms using a lower level of financial leverage have higher profitability. If a restaurant firm has a higher level of financial leverage than it has to spend large amount as interest expense despite the business situation. Second hypothesis was; firms with a higher level of financial leverage are riskier than those with a lower level of financial leverage. In his study he applied return on equity as a measure of profitability and financial leverage as a ratio of long term debt to total assets and total assets as firm size. Results of the study suggested that the restaurant firms having large assets were more profitable than small firms and the sign of financial leverage variable was negative which indicated that firms with higher debt rates were less profitable (Ahmed, Salman and Shamsi, 2015:76).

As to Demirhan's study (2009), examined the factors the capital structure of the companies that were active in the Istanbul Stock Exchange service sector. The data belonging to the 20 companies for the period between 2003 and 2006 were analyzed. As a result of the study, it was determined that the most significant variables affecting debt levels of companies were the profitability, the company size, the structure of assets and the liquidity level.

Graham and Leary (2011) argued that the trade-off and the pecking order theory define the following as strategic elements for the capital structure: profitability, research and development (R&D), age, risk, growth, size and tangible assets.That is,certain characteristics are important for distinguishing between the life cycle stages of the company and defining the capital structure (Castro, Tascon and Amor-Tapia, 2015:459).

## IV. MEASUREMENT OF VARIABLES AND THE EMPIRICAL ANALYSIS

### 4.1. Dataset and variables

Our research is based on an panel for the period from 2007 to 2016, focus on sample of restaurants and hotels listed on BIST (Borsa Istanbul) in the service sector. In this sub sector, 12 companies are listed on total, two companies were excluded due to unavailability of data in selected sample year. The data used for the purpose of research consisted of ten years annual data of the variables. This dataset has information on the following balance sheet and income statement items; current assets, tangibles, long-term liabilities, short term liabilities, total assets, total sales, earnings before interest and tax.

*Variables*

**1. Financial Leverage**

This study measures financial leverage as total debt divided by total assets. We use this measurement for the purpose of being consistent, since the measure for leverage is used by most of the previous studies.

Financial Leverage = Total debt / Total assets

**2. Profitability**

Capital structure theories have different views on the relationship between leverage and profitability. The pecking order theory suggests that more profitable firms have less leverage, and thus rely more on internal finance. It is suggested that the observed capital structure of firms reflects the cumulative requirement for external financing. We use the ratio of operating income before taxes to total assets as our indicator of profitability. It is a comprehensive indicator of a firm's performance because it provides information as to how well company is using its total assets to generate profits.

Profitability = Operating income before taxes / total assets

**3. Size**

Large firms, which are more diverse, have more stable cash flows and better established operating and credithistories to sustain more debt compared to small firms (Titman and Wessels, 1988). These factors provide large firms with greater access to alternative sources of finance in times of financial distress. Furthermore, it is argued that larger firms may have lower agency costs associated with asset substitutions and under investment problems, which may encourage them to take on relatively high debt burdens. Based on these arguments, a positive relationship between firm size and leverage ratio is expected. In agreement with other studies in this field (e.g., Titman and Wessels, 1988; Rajan and Zingales, 1995; and Bevan and Danbolt, 2000), we use the natural logarithm of total sales as a proxy for the size of firms

Size = natural logarithm of total sales

**4. Tangibility**

Firms that have more tangible assets tend to have higher leverage. These firms potentially have lower financial distress costs and/or lower agency costs of debt. In addition, tangibility possibly reflects adverse-selection costs related to assets in place. If smaller firms and firms with fewer tangible assets are more prone to adverse-selection costs, they should carry more debt in their capital structures. Alternatively, if adverse selection is about assets in place, tangibility may increase adverse-selection costs and result in higher debt (Frank and Goyal (2009)). Therefore, the effect of tangibility on adverse-selection costs is ambiguous. We use the ratio of fixed assets to total assets as a measure of tangibility.

Tangibility= Fixed assets / total assets

**5. Growth**

The agency theory predicts a negative relationship between growth and leverage. Myers' (1997) under-investment problem suggests a negative relationship between profitable investment opportunities and debt. The argument is that a firm's growth opportunities lie in its intangible assets instead of tangible assets; the cost of financial distress which is associated with high leverage may affect a firm's ability to finance its future growth. So managers of firms with valuable growth opportunities would choose low leverage. As suggested by the pecking order theory (Myers and Majluf, 1984), if firms require external finance they prefer debt relative to external equity. This causes the debt to go up and thereby the leverage ratio. Furthermore, Ross (1977) signaling theory assumes that managers know the true distribution of a firm's returns, but investors do not. It argues that investors interpret larger levels of leverage as a signal of higher quality. Consistent with empirical studies (e.g., Titman and Wessels, 1988; Chung, 1993; and Barclay, Smith and Watts, 1995), we use the percentage change of total assets as an indicator of growth opportunities.

$$\text{Growth}= \frac{sales_t - sales_{t-1}}{sales_{t-1}}$$

**6. Earning Volatility**

In general, firms with high earnings volatility have a greater chance of being unable to meet their debt commitments, thereby incurring a higher cost of financial distress. Accordingly, earnings volatility should be negatively related to leverage. However, the agency theory suggests otherwise. A positive relationship between earnings volatility and leverage is because higher earnings encourage greater reliance on debt since large gains accrue primarily to stockholders while large losses are shared by both stockholders and debt holders (Maghyereh, 2005:11). In this paper, we measure earnings volatility by the standard deviation of earnings before taxes and interest for the 3-year period centered on the year of observation scaled by the mean of earnings before taxes and interest for the same 3-year period.

*Table 2.* Proxies for Leverage and Potential Determinants of Capital Structure

| *Code* | *Variable* | *Operating Definition* |
|---|---|---|
| ***Lev*** | ***Financial Leverage*** | $\frac{current\ liabilities + long\ term\ liabilities}{total\ assets}$ |
| ***Tang*** | ***Asset Tangibility*** | $\frac{fixed\ assets}{total\ assets}$ |
| ***Size*** | ***Firm Size*** | *Natural logarithm of total sales* |
| ***Growth*** | ***Firm Growth*** | $\frac{sales_t - sales_{t-1}}{sales_{t-1}}$ |
| ***Prof*** | ***Profitability*** | $\frac{operating\ income\ before\ taxes\ and\ interest}{total\ assets}$ |

| Sc | Earning Volatility | $\frac{\text{Standart deviation of operating income before taxes and interest for 3 y}}{\text{mean of operating income before taxes and interestfor same 3 year}}$ |
|---|---|---|

**4.2.Empirical Analysis**

The classical linear estimators OLS and 2SLS can be thought of in several ways, the most intuitive being suggested by the estimators' names. OLS minimizes the sum of the squared errors. 2SLS can be implemented via OLS regressions in two stages. There are many reasons for this which include the possible correlation between unobserved firm-specific effects and other explanatory variables, the potential correlation between the lagged endogenous variable and residuals, and the possibility that the explanatory variables are not exogenous. In panel data estimation, consistent estimates of the coefficients depend on the stochastic properties of the model. If the error term is orthogonal to the right-hand side variables, an OLS estimator will be consistent (Maghyereh,2005:12).

Many economic relationships are dynamic in nature and one of the advantages of panel data is that they allow the researcher to better understand the dynamics of adjustment (Baltagi, 2005:135). Because of some missing observations in our panel dataset the panel is unbalanced. Testing for estimation of AR(1) disturbances in time-series regressions with missing observations has been studied by Wansbeek and Kapteyn (1985), Baltagi and Chang (1994), Shively (1993), Robinson (1985), Dufour and Dagenais (1985), and Savin and White (1978) (Baltagi and Wu, 1999:815). However, none of these studies consider the problem of serial correlation with unequally spaced panels. Panel data, by blending the inter-individual differences and intra-individual dynamics have several advantages over cross-sectional or time-series data: More accurate inference of model parameters. Panel data usually contain more degrees of freedom and more sample variability than cross-sectional data which may be viewed as a panel with T = 1, or time series data which is a panel with N = 1, hence improving the efficiency of econometric estimates (e.g. Hsiao, Mountain and Ho-Illman (1995) controlling the impact of omitted variables. Dynamic relationship is characterized by the presence of a lagged dependent variable among the regressors, i.e.(Baltagi,2005:135).

$$yi\ t = \delta yi,t-1 + x'i\ t\beta + ui\ t \qquad i = 1, \ldots, N; \quad t = 1, \ldots, T \qquad (1)$$

where δ is a scalar, $x'i\ t$ is $1 \times K$ and β is $K \times 1$.We will assume that the $ui\ t$ follow a one-way error component model

$$ui\ t = \mu i + \nu i\ t \qquad (2)$$

where $\mu i \sim IID(0,\sigma^2\mu)$ and $\nu i\ t \sim IID(0,\sigma^2\nu)$ independent of each other and among themselves.

The dynamic panel data regression described in (1) and (2) is characterized by two sources of persistence over time. Autocorrelation due to the presence of a lagged dependent variable among the regressors and individual effects characterizing the heterogeneity among the individuals.

It is frequently argued that the real reason one finds (or does not find) certain effects is due to ignoring the effects of certain variables in one's model specification which are correlated with the included explanatory variables. Panel data contain information on both the intertemporal dynamics and the individuality of the entities may allow one to control the effects of missing or unobserved variables.

When the regressors of a linear model contains lagged dependent variables, the form turns into dynamic panel models (e.g. Balestra and Nerlove (1966)) The Generalized Method of Moment (GMM) procedure was introduced into the econometrics literature by Hansen (1982). Hall (1993) contains an excellent survey where GMM is motivated via IV(instrumental variables) estimation. GMM based estimation is a technique for instrumental variable estimation and has several advantages over conventional IV estimators (2SLS). The conventional IV estimator is inefficient in the presence of heteroskedasticity. GMM makes use of the orthogonality conditions to allow for efficient estimation in the presence of heteroskedasticity of unknown form. This analysis applies GMM-based Arellano-Bond dynamic panel estimation (Holtz Eakin et al., 1990; Arellano and Bond, 1991; Arellano and Bover, 1995) commonly referred as a difference GMM estimator and Arellano Bover/ Brundell and Bond- System GMM with robust standard errors. We used two-step estimators in both. A two-step estimator is more efficient, but the standard error might be downwardly biased for small samples (Arellano and Bond, 1991), as is the case here.

The regressions are based on the dynamic linear model depicted by equation :

$$Financial\ Lev_{i,t} = a\text{Financial } Lev_{i,t-1} + \beta_1 Tang_{i,t} + \beta_2 Sizelog_{i,t} + \beta_3 Growth_{i,t} + \beta_4\ Profitability_{i,t} + \beta Sc_{i,t} + \mu_i + \varepsilon_{i,t} \quad (3)$$

where $\varepsilon$ is the error term, $\mu i$ represents the i-th firm's time invariant unobserved features that might influence its debt/equity decision.

$\varepsilon_{i,t} \sim I.I.D\ (0, o^2_{\varepsilon})$ and $\mu_i \sim I.I.D\ (0, o^2_{\mu})$, $E(Y_{i,t-1}\ \varepsilon_{i,t}) \neq 0$ *Where OLS biased and inconsistent*

$$\operatorname*{plim}_{N\to\infty} \frac{1}{NT}\, y_{-1} N_{\mu} \varepsilon \neq 0 \quad (4)$$

## V. GMM DYNAMIC PANEL ESTIMATION METHODOLOGY

This study controls the endogeneity problem and avoids significant bias in estimates by employing a more advanced method of generalised method of moments (GMM) (Arellano-Bond 1991; Baltagi, 2005; Wooldridge, 2007). We apply first difference namely Arellano and Bond esitmation; the system GMM in panel data, outlined by Arellano and Bover (1995) and fully developed by Blundell and Bond (1998). Panel data increase the degrees of freedom due to the availability of a large number of observations and reduce collinearity among explanatory factors, which leads to a more efficient estimation. Moreover, according to Hsiao (2003), the efficiency of GMM improves by adding new non-linear functions of the exogenous variables to the instruments (even in the homoscedasticity hypothesis). Arellano and Bover (1995) proposed the use of instruments in first differences for equations in levels and instruments in levels for equations in first differences. Blundell and Bond (1998) supported the efficiency of the Arellano and Bover (1995) estimator, especially for short sample periods and persistent data. Our data covers short sample periods, so System GMM estimator is more suitable for our data but at the end of the analysis we found that Arellano and Bond esitmation results are more significant for our data.

The specification tests for the GMM estimator are the Hansen test, the test of lack of residual serial correlation and the Wald test (Castro et.al,2015:465). Specifically, we apply the two-step GMM estimator, included in the xtabond2 Stata routine written by Roodman (2009), which uses one-step residuals to construct the asymptotically optimal weighting matrix and addresses the heterogeneity and endogeneity problems. This estimator could be more efficient because it may control the correlation of errors overtime as well as the heteroscedasticity across firms and the measurement errors, due to the utilisation of the orthogonality conditions on the variance-covariance matrix.

### 5.1. Arellano and Bond Estimator (1991)

Arellano–Bond estimation starts by transforming all regressors, usually by differencing, and uses the generalized method of moments (GMM) (Hansen 1982), and is called difference GMM (Roodman, 2009:86).

GMM estimators and substantially smaller variances indicate negligible finite sample biases in than those associated with simpler instrumental variables estimators of the kind introduced by Anderson and Hsiao (1981). The distributions of the serial-correlation tests are well-approximated by their asymptotic counterparts (Arellano and Bond, 1991:293). Difference GMM exhibits the least bias and variance in estimating the parameter of interest, although in their tests the Anderson– Hsiao levels estimator does nearly as well for most parameter choices. But there are many degrees of freedom in designing such tests. As Blundell and Bond (1998) demonstrate in separate simulations, if y is close to a random walk, then difference GMM performs poorly because past levels convey little information about future changes, so untransformed lags are weak instruments for transformed variables (Roodman, 2009:114). This method can only control the weak forms of endogeneity since it assumes these variables are weakly exogenous, which means that is they could be affected by dependent variables but are not correlated with the error term. Validity of this assumption can be tested using the Sargan test of overidentifying restrictions, which tests the overall validity of the instruments and the second-order serial correlation test that hypothesizing the error term is not serially correlated (Arellano and Bond, 1991; Arellano and Bover, 1995; Blundell and Bond, 1998).

where $W'$ is instrumental variable,

$$W'\Delta Y = W'\Delta Y_{-1}Y + W'\Delta\times\beta + W'\Delta\vartheta \quad (5)$$

$$\check{Y}_{GMM} = \Delta\times' W (W' I_N \Theta\varepsilon) W)^{-1} W'\Delta\times)^{-1} \quad (6)$$

$\tilde{Y}_{GMM} = \Delta x' W (W'(I_N \Theta \varepsilon) W)^{-1} W' \Delta Y$ (7)

$W'(I_N \Theta \varepsilon) W$ = VN matrix

$VN = \sum_{i=1}^{N} W_i \Phi Wi$ One step GMM (8)

$\tilde{V}N = \sum_{i=1}^{N} W_i' \Delta \dot{\varepsilon} \Delta \dot{\varepsilon} Wi$ Two step GMM (9)

Two step GMM is more efficient with smaller variance than one step GMM. To increase efficiency, under an additional assumption, Blundell and Bond develop an approach outlined in Arellano and Bover (1995), pursuing the second strategy against dynamic panel bias.

**5.2. Arellano -Bover (1995) and Blundell - Bond (1998) Estimator**

The Arellano–Bover/Blundell–Bond estimator unifying Arellano–Bond GMM framework for looking at efficient IV estimators for dynamic panel data models by making an additional assumption that first differences of instrument variables are uncorrelated with the fixed effects. This allows the introduction of more instruments and can dramatically improve efficiency (Baltagi, 2005:142).

$$yit = x'it\beta + Z'i\gamma + uit \quad (10)$$

where β is K ×1 and γ is g×1. The Zi are time-invariant variables whereas the xit vary over individuals and time. In vector form, (10) can be written as

$$yi = Wi\eta + ui \quad (11)$$

with the disturbances following a one-way error component model

$$ui = \mu i\iota_T + vi \quad (12)$$

where $y_i = (y_{i1},...,y_{iT})'$, $u_i = (u_{i1},...,u_{iT})'$, $\eta' = (\beta',\gamma')$, $Wi = [X_i, \iota_T Z'_i]$, $X_i = (x_{i1},..., x_{iT})'$ and $\iota_T$ is a vector of ones of dimension T. In general, $E(u_i u'_i / w_i)$ will be unrestricted depending on $w_i = (x'_i, Z'_i)'$ where $x_i = (x'_{i1},...,x'_{iT})'$. Arellano and Bover transform the system of T equations using the nonsingular transformation. Therefore, a valid IV matrix for the complete transformed system and the moment conditions are given by defining $W = (W'_1,...,W'_N)'$, $y = (y'_1,...,y'_N)'$, $M = (M'_1,...,M'_N)'$, $\overline{H} = IN \otimes H$ and $\overline{\Omega} = IN \otimes \Omega$, and premultiplying (11) in vector form by $M'\overline{H}$ one gets

$$M'\overline{H}\, y = M'\overline{H}\, W\eta + M'\overline{H}\, u \quad (13)$$

Performing GLS on (13) one gets the Arellano and Bover (1995) estimator

$$\hat{\eta} = [W'\overline{H}'M(M'\overline{H}\ \overline{\Omega}\ \overline{H}'M)^{-1}M'\overline{H}\, W]^{-1} W'\overline{H}'M(M'\overline{H}\ \overline{\Omega}\ \overline{H}'M)^{-1}M'\overline{H}\, y \quad (14)$$

It builds a system of two equations—the original equation and the transformed one (Roodman, 2009:87). The gains of the System-GMM estimator (Arellano and Bover, 1995) relative to the traditional GMM estimator (Arellano and Bond, 1991) are more pronounced when the panel units (countries in your case) are large and the time periods (annual or monthly periods) are moderately small (anything up to 20/25 ). The standard GMM estimator is known to be a consistent estimator of as N (the size of the units) approaches infinity. However, this standard GMM estimator has been found to have poor finite sample properties (bias) in the case in which the series are highly persistent (see Blundell and Bond, 1998). In these circumstances the lagged levels of the series are only weakly correlated with subsequent first differences, thus leading to weak instruments for the first-differenced equations. Arellano and Bover (1995) and Blundell and Bond (1998) demonstrate that the SYS-GMM approach - by adding additional moment restrictions - permits lagged first differences to be used as instruments in the levels equations, and this corrects for any bias that would emerge using the standard GMM estimator. Going beyond the builtin xtabond command in STATA, xtabond2 command implemented SYS-GMM. It made the Windmeijer (2005) finite-sample correction to the reported standard errors in two-step estimation, without which those standard errors tend to be severely downward biased. It introduced finer control over the instrument matrix. And in later versions, it offered automatic difference-in-Sargan/Hansen testing for the validity of instrument subsets; support for observation weights; and the forward orthogonal deviations transform, an alternative to differencing proposed by Arellano and Bover (1995) that preserves sample size in panels with gaps.

While using SYS-GMM we checked out a proliferation of instruments that may overfit endogenous variables and found without doubt the model passes both the test for instrument validity (Sargan/Hansen) and the test for second-order serial correlation.

## VI. THE EMPRICAL RESULTS

We present the results under the 2SLS, GMM-difference and SYS-GMM estimations, respectively. As can be seen from columns (1) and (3), there is strong evidence that the 2SLS and System GMM specifications are inappropriate to estimate our model. We also know that the GMM-system is more appropriate to estimate our dynamic capital structure model but GMM-difference two step results are more significant and consistent. The main findings of our paper can be summarized as follows. Table 3 shows results derived from panel 2SLS methods, GMM first difference and GMM System. For all GMM type estimates (in level, difference and system) we present only two-step GMM estimates, since they are more efficient than one-step estimates, and since the Sargan test of overidentifying restrictions is heteroscedasticity-consistent only if based on the two-step estimates. All models include (t − 1) period dummy control variables to account for fixed time specific effects. To assess the validity of instruments we performed the Sargan test as well as the test for second-order serial correlation. Sargan Test's prob (j statistic) 0.9521 and 0.983 respectively, that means instrumental variables are valid. The results show that we can't reject null hypothesis. Second-order serial correlation results (*AR(2)*0.3065 and 0.873) are appropriate and the results credible. The instruments are appropriate and the results credible.

We rely on the results of GMM-difference (Arellano and Bond) estimate in the analysis of the coefficients for our dynamic model. The estimated coefficients are significant and have the expected signs except tangibility and size and also remarkably consistent with those reported by empirical studies in this field. The coefficient of lagged leverage is significant and is greater than zero. The coefficient estimate of size (as proxied by the logarithm of total sales) and also tangibility, measured by the ratio of fixed assets to total assets are negatively related to the leverage ratio. The size of the company (Sizelog) has a negative impact on the capital structure (Lev). This means that the sizable firms tend to use more equity and less debt. Also tangibility of assets has a negative impact on the capital structure in the hotels and restaurants. This means that the high fixed assets ratio firms tend to use more equity and less debt.

***Table 3.*** Dynamic Capital Structure Estimates

| **Dependent Variable:$Y_{it}$** | | | |
|---|---|---|---|
| Independent Variables | **2 SLS Regression** | **GMM -2step Arellono/Bond** | **GMM -2step System** |
| Constant | 0.3176<br>(1.10)<br>[0.271] | - | - |
| Lev (-1) | 1.0211***<br>(7.90)<br>[0.000] | 2.0987***<br>(3.24)<br>[0.001] | 0.789<br>(1.27)<br>[0.203] |
| Tang | 0.0633<br>(0.41)<br>[0.681] | -0.4472*<br>(-2.06 )<br>[0.040] | 0.2296<br>(1.11)<br>[0.266] |
| Size log | -.00362<br>(-0.74)<br>[0.461] | -0.2689***<br>(-4.56)<br>[0.000] | -0.0213<br>(-0.28)<br>[0.778] |
| Growth | -0.0043<br>(-0.06)<br>[0.950] | -0.2489**<br>(-2.03)<br>[0.043] | 0.0108<br>(0.10)<br>[0.922] |
| Prof | -0.4616<br>(-3.27)<br>[0.001] | -0.6854***<br>(-4.09)<br>[0.000] | -0.6439***<br>(-2.94)<br>[0.003] |
| Sc(Earning Vol.) | -1.31e-08**<br>(-2.16)<br>[0.031] | -6.02e<br>(-1.28)<br>[0.201] | -1.37e**<br>-2.41<br>[0.016] |
| 1st Order Serial Correlation | - | 0.0011 | 0.324 |

| | | | |
|---|---|---|---|
| 2nd Order Serial Correlation | - | 0.3065 | 0.873 |
| Wald Test | 0.0000 | 0.0000 | 0.000 |
| Sargan Test | - | 0.9521 | 0.983 |
| Durbin *p* | 0.1887 | - | - |
| Wu-Hausman *p* | 0.2467 | - | - |
| $R^2$ | **0.841** | **-** | **-** |

**Notes:** Lev = $\Phi_0+\gamma_0 Lev_{it-1}+ \gamma_1 tang_{it}+ \gamma_2 sizelog_{it} +\gamma_3 growth_{it}+ \gamma_4 prof_{it}+ \gamma_5 sc_{it}+\eta_i+\eta_t+\upsilon_{it}$ where $\eta_i$ is an unobserved firm-specific effect and $\eta_t$ captures any common period specific effects. $\upsilon_{it}$ is the error term, which represents measurement errors in the independent variable and other explanatoy variables that have been omitted. It is assumed to be independently identical normally distributed with zero mean and constant variance $\upsilon_{it} \approx$ i.i.d. $N(0,\sigma^2_\Sigma)$. Numbers in parentheses are z-statistics. The numbers in brackets are p values. All models are estimated using the STATA program. ***, ** and * indicate the coefficient is significance at the 1%, 5% and 10% levels, respectively.

According to analysis results, the growth opportunity (provided by the percentage change in total assets) is significantly and negatively related to the leverage ratio.The inverse relationship between these two variables is consistent with our expectations and the findings reported by Titman and Wessels (1988) and Rajan and Zingales (1995). The inverse relationship supports the view that the cost of financial distress of high growth firms is relatively high and the agency cost of debt is considerable. Because of the high cost of debt (lenders' demand for higher rate of interest when the information asymmetry is higher) managers would be reluctant to raise debt capital causing the lower leverage ratio.

The variable profits over total assets which is used as a proxy for a firm's profitability is negatively and significantly related to leverage. A relatively large negative coefficient of profitability. That means hotels and restaurants whose managers are said to have a strategic advantage over the information by creditors, use a possessed hierarchy of alternative financial strategies, due to the information asymmetry in line with the pecking order theory. These firms retain a relatively larger proportion of earnings and hence the need for external finance is reduced. Maybe, this could be due to the relatively weaker protection of investors and creditors in Turkey, implying difficulty in raising external capital and forcing firms to rely on internal equity. Finally, inconsistent with Titman and Wessels (1988) findings, the results show that the earnings volatility of firms exerts a negative influence on firms' ability to obtain debt. The negative sign of volatility is consistent with the financial distress theory that firms with high earnings volatility have a greater chance of being unable to meet their debt commitments, thereby incurring costs of financial distress as like results of Bradley, Jarrell and Kim's study (1984) and Maghyereh's (2005).

## VII. CONCLUSION

This study represents one of the limited number of studies that attempts to examine empirically the capital structure choice using data from an emerging market like Turkey and in this market sub-sector of service. The study uses a dynamic model which allows us to shed light on the nature of the dynamic capital structure adjustment process of firms. The study employs a panel data analysis and GMM estimation techniques which allow us to control for unobserved firm-specific effects and the endogeneity problem. The present study has some limitations. Due to available information about the companies listed on BIST sub sector of service determinants only five independent variables were considered and examined for a sample of 12 firms. 2 firms' data weren't avaliable for some years so 10 firms could be anaylzed. The annual reports for only ten years (2007–2016) were analyzed because only those reports are presented on the websites of these companies, BIST and KAP website.

The findings of this paper suggest that hotels and restaurants have target leverage ratios and they adjust to these ratios relatively fast. This indicates that the cost of being away from their optimal leverage ratios and the costs of adjustments are both important for hotels and restaurants. Furthermore, the results of this paper support the view that debt ratios are affected by profitability, growth opportunity, and earnings volatility. More specifically, firms with high profits, high earnings volatility and more growth opportunities tend to have relatively less debt in their capital structures.

Further research would be required in testing other determinants in the other sectors in Turkey. Another research area of interest is exploring the possible reasons explaining the differences between sectors concerning the determinants of capital structure. If the financial leverage ratio is measured by using market value, it would be more interesting.

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