Capital Structure: Target Adjustment Model and a Mediation Moderation Model with Capital Structure as Mediator

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ABSTRACT

This study consists of two models. Model one is conducted to check if there is a target adjustment toward optimal capital structure, in the context of Turkish firm listed on the stock market, over the period 2003-2014.

Model 2 captures the interaction between firm size, profitability, market value and capital structure using the moderation mediation model.

The results of model 1 have shown that there is a partial adjustment of the capital structure to reach target levels. The results of model 2 have shown that profitably affects market value through two paths. The first one is direct while the other is indirect mediated by capital structure. All paths had significant firm size moderation effect. The magnitude of the direct was notably higher than indirect path.

Keywords: capital structure, mediation moderation, Turkish firms, profitability

ÖZ

Bu çalışma iki modelden oluşmaktadır. Birinci model 2003-2014 yılları arasında menkul kıymetler borsasında işlem gören Türk şirketlerinin hedeflenen ideal sermaye yapısına ulaşmak için gereken düzenlemelerin varlığı incelenmektedir.

İkinci modelde ise firma büyüklüğü, karlılık, piyasa değeri ve sermaye yapısı arasındaki etkileşim aracılık modelleriyle incelenmektedir.

Birinci modelde elde edilen sonuçlara göre ideal sermaye yapısına ulaşmak için kısımsal düzenlemeler olduğu görülmüştür. Ikinci modelde elde edilen sonuçlara göre karlılık piyasa değerini iki yolla etkilemektedir. Doğrudan etkinin yanında bir de sermaye yapısının aracı etkisiyle karlılığın piyasa değerini dolaylı olarak etkilediği gözlemlenmiştir. Bunun yanında tüm yollarda firma büyüklüğünün aracı etkisi kanıtlanmıştır. Doğrudan etkinin aracı etkiye göre daha yüksek olduğu gözlemlenmiştir.

Anahtar Kelimeler: Sermaye yapısı, aracılık modelleri, Türk firmaları, karlılık

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Chapter 1

INTRODUCTION

1.1 Problem Statement

Capital structure occupies a central position in corporate finance as a field of study. This is the case because of capital structure direct relation to one of the main questions of finance as a domain of inquiry, which is the question of how should corporations finance their operations that are necessary to generate needed income? The importance of capital structure is reflected in a lot of literature that has been written on this topic. Almost the whole literature has tried to answer three main questions. First, does capital structure really matter? In other words, does by changing the capital structure may have any effect on firm value? Second, if capital structure matters, does the optimal capital structure exist? If capital structure matters what are its determinants and how do corporations empirically reach their capital structure? In addition to their theoretical contribution, these questions are empirically valuable since they are directly related to firm value and its maximization, which is the main goal of any firm in the first place. However, like most questions in finance, answers are contingent on countries, type of firms under investigation and time span of the study in addition to other factors. One cannot find absolute answers to such questions. As a result, more than one theory does exist addressing these questions One of the first theories in the literature to address these questions is MM theory.

MM theory concludes that under certain assumptions like zero taxes, no bankruptcy cost, no agency cost and information asymmetry capital structure does not matter. However, empirical research showed that capital structure seems to matter. This result does not necessarily falsify the MM theory because an MM theory advocate can still argue that capital structure matters in practice as a result of violating one or more of the assumptions. Looking from this perspective MM theory gives possible reasons of the importance of capital structure. In other words, the assumptions of the theory act as possible determinants of capital structure. Building at this point, other theories have been developed to try to explain the importance of capital structure by concentrating on the effect of violation of one or more of the assumptions of MM theory. For example, tradeoff theory has shown the effect of having tax and bankruptcy cost while pecking order theory has concentrated on the effect of information asymmetry. These two theories, in addition to other theories will be discussed fully in the literature review. These theories gave us totally different mechanism and understanding of capital structure. For instance, in trade-off theory, there is optimal capital structure that can be achieved rationally by balancing between two sides. While in pecking order theory, capital structure is a result of firm history and it is a process that has no balancing. Moreover, Behavioral theories emphasize the role of manager's psychology in determining capital structure (Brealey, 2011).

It is obvious that there is no theoretical consent on what really matters most in determining capital structure and whether the optimal structure can be found. This disagreement leaves these questions open to further study and investigation.

1.2 Aim of Study

In the light of these theories, this thesis tries to answer more than one question with respect to listed Turkish firms in the Istanbul stock market. First part of this thesis will try to check if there is an optimal level of capital structure or not. In other words, do studied Turkish firms' capital structure moves towards optimal level? This question will be addressed empirically without assuming any method to find the optimal level; this means no theory will be applied to find the optimal level. Instead the optimal level will be defined as a historical mean of firms' corporate level. This will show if corporations on average have been adjusting their corporate level towards some historical level or not. The answer of this question in literature is mixed as mentioned before. In addition to investigating the first part, in the second part a model that captures the relation between firm value, capital structure, profitability and firm size of corporation of Turkish companies listed on the Istanbul stock market will be applied.

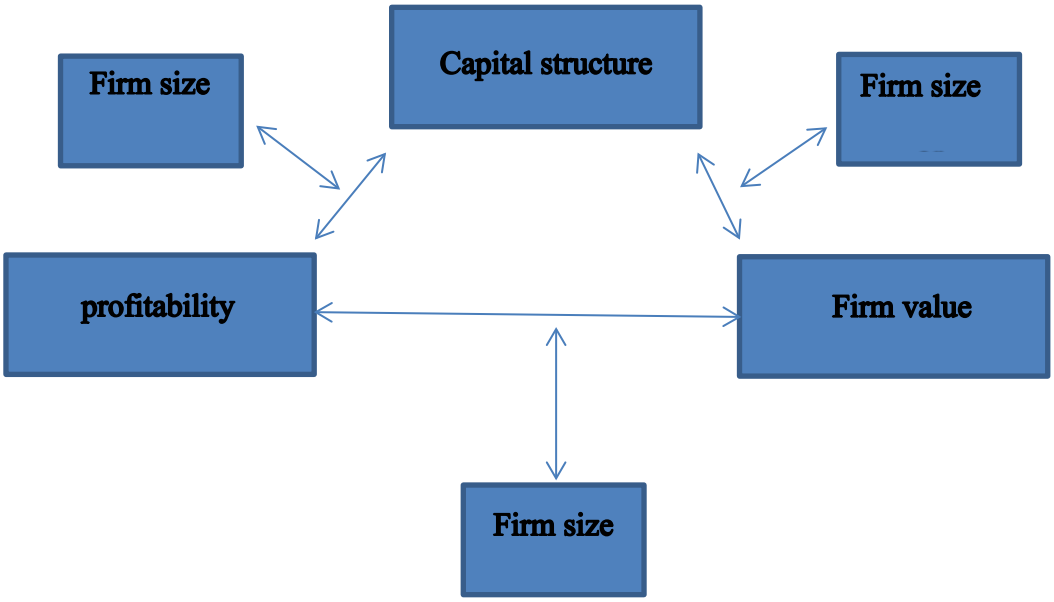

Figure 1: The Building Blocks of The Model

This model assumes that profitability affects firm value through two paths.one direct path and anther indirect path which is mediated by capital structure. Moreover, the magnitude of profitability effect on firm value through the two paths is affected by firm size which act as moderator.

The importance of this model lies in two points. First, this model can answer more than one question, like, does capital structure affect firm value? Does profitability affect the corporate structure? Does firm size affects capital structure? Does firm size affect the relation between profitability and firm value on one side and capital structure and firm value on the other side?

The second point of importance of this model is that this model, unlike a lot of empirical studies goes beyond finding the determinants of capital structure or firm value to find a process or mechanism that captures the interaction between capital structure and firm value in addition to its determinants. This model does not find a relation of one Dimension were some determinants affect one outcome like what classical OLS regression does. This model goes further to figure out a chain of actions and interactions. In other words, this model proposes more dynamic picture of corporate structure.

Like the first question that this thesis tries to address, there is no theoretical agreement on answers. Results will be compared to different theory's predictions. One can look at these results as an indirect way to check one theory versus another.

1.3 Research Methodology

For the first part of the thesis, OLS regression will be used. This regression will relate capital structure measured by debt to equity ratio as the dependent variable

with optimal capital structure as independent variable. This regression will be conducted on panel data of different corporations.

For the second part moderation mediation analysis will be conducted because the model combines mediation model with moderation models. To do such analysis more than one regression should be conducted following Baron, Kenny (1986) procedure. Then a Granger causality will be applied to search about possible causal relations between variables.

1.4 Structure of Thesis

This thesis involves seven chapters. The first chapter is the introduction. This chapter clarifies the questions of thesis in addition to its main methodology. Moreover, it explains the thesis main aim and its background in relation to the existing literature. The second chapter provides a review of the most important theories that try to explain the capital structure like tradeoff theory, pecking order theory, market timing theory. The third chapter reviews the latest empirical results and their relation to these theories. The fourth chapter is a statistical background that explains theoretically mediation moderation technique and its equations and different tests required to check its importance. In addition to the different alternatives available to conduct this analysis. The fifth chapter will present the data used and the methodology that was conducted in this thesis. The sixth chapter will present the results of the analysis and compared it to the expectations of different theories. Last but not least, chapter seven will conclude by summarizing the results and the questions of the study.

Chapter 2

THEORETICAL BACKGROUND

More than one theory has been developed to understand capital structure. This chapter will summarize the main theories, then compare theoretical predictions to the results of empirical studies.

2.1 MM Theory

The first theory to begin with is MM theory. It is also known as capital structure irrelevance principle and it is considered one of the main theories in corporate finance field. The theory proposes that capital structure does not affect firm value, assuming no taxes, agency cost, bankruptcy cost and asymmetric information. In other words, it makes no difference if the firm uses equity or debt to finance its activity. Moreover, the firm dividend policy does not matter (Brealey, 2011).

The theory consists of two main propositions. The first one can be summarized by stating that V_u=V_l (Where V_u is the value of the firm when all equity financed while V_l is the value of the firm consists of mix of debt and equity). This means that financing the firm totally by equity or by any possible mix of equity and debt will not change the firm value. Firm value is measured by the market value of the firm. This proposition holds because an investor can invest in the leveraged firm L or he can borrow the same amount that the firm borrowed and invest in all equity financed firm U. The two should give him the same return. However, for this argument to hold the investor should be able to borrow money with the same cost of the firm. This will be

true if the assumptions of the theory hold. For example, if information asymmetry exists the individual cannot borrow money in the market with the same cost of the firm (Brealey, 2011).

In addition to proposition 1 the theory has a second proposition which can be summarized by stating that a higher debt to equity ratio will increase the return on equity as a result of increasing risk. This does not contradict the first proposition because the increase in the return on equity is not free and comes only as a result of increasing risk (Brealey, 2011).

Other theories were developed mainly to study the effect of violations of MM theory assumptions on firm value. The first theory to study this is tradeoff theory.

2.2 Trade-off Theory

Trade-off theory predicts the existence of optimal capital structure as a result of balancing tax saving advantages of debt and financial stress costs. The debt has an advantage because interest paid on debt is tax deductible. So debt act as a tax shelter, by decreasing the amount of tax needed to be paid and ending with more income. However, increasing debt will increase the probability of bankruptcy, which has direct and indirect cost. Direct cost is like the legal fees for bankruptcy while indirect cost is like wasted investment opportunities because of suppliers and customers' unwillingness to engage with the firm out of fear of bankruptcy. According to this theory when the debt increase the tax advantage will increase the firm value while the bankruptcy cost is small but at some level the bankruptcy cost becomes large enough to counter the tax advantage reaching the point of equality. At this point

optimal capital structure occurred. This can be shown in the this figure (Brealey, 2011).

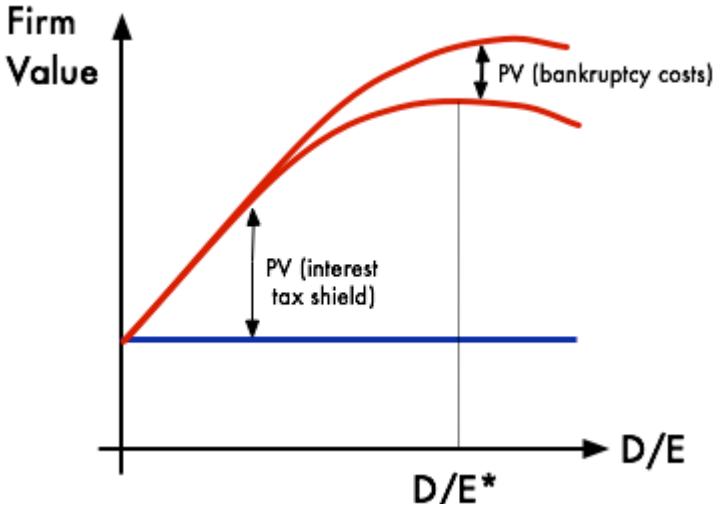

Figure 1: Trade-off Theory

It can be seen from the figure that firm value will increase with increasing debt to equity ratio till reaching a certain level then it will decrease. In other words, the theory predicts a nonlinear relationship between debt and firm value.it also proposes that firm should issue debt if it is below the optimal debt equity ratio in order to increase firm value to reach the optimal level while firm should issue stock if they above the optimal debt equity ratio in order to decrease debt to return back to optimal level. According to this theory firms will be always adjusting their debt to equity ratio to an optimal level. In addition to this main proposition, other relationships can be predicted depending on the main understanding of the theory. One of these relationships is the relationship between debt and profitability. The theory predicts a positive relationship between debt and profitability because the more profitable the firm is, the more tax advantage and the less bankruptcy cost is. The theory predicts too, that debt to equity ratio will be higher in a firm with tangible assets than firms

will small tangible assets. This is because tangible assets act as collateral in case of bankruptcy, which decreases the cost of bankruptcy since creditors and suppliers will be less worried about bankruptcy. This will increase the optimal debt level. Moreover, the theory predicts a positive relationship between firm size and capital structure because large firms are more diversified than small firms and the cost of financial distress is less than small firms (Brealey, 2011).

Another theory usually is presented as a competitor to tradeoff theory is pecking order theory.

2.3 Pecking Order Theory

Pecking order theory is concerned about information asymmetry. The theory predicts that the firms will always prefer to finance activities using internal finance. Then, if internal finance is not enough, they prefer debt than equity as last choice. This is because the cost of information asymmetry is higher when issuing new equity than debt, which itself has a higher information asymmetry cost than internal finance. The reason of this is that investors know that mangers knowledge about the firm is more than their knowledge. Investors know that there is an information asymmetry between them and between managers. Now when the firm issues new stocks, investors will think that mangers think that the stock are overvalued. This will lead investor to sell stocks which will end up in lower firm value. In case of debt, this is less severe since the movement in the bond market usually is less concerned with information asymmetry because investors in bond markets have obvious benchmarks to price the bonds which are not there in the stock market (Brealey, 2011).

It is obvious that this theory proposes a hierarchy as a result of this there is no optimal capital structure. The capital structure at any time will be just the result of accumulation of past choices. So capital structure depends on history and on the amount of internal finance in the firm. The firm does not balance between different factors like tradeoff theory. Like the pecking order theory can give predictions about different relationships depending on the main understanding of capital structure. For example, the theory predicts that profitability has a negative relationship to debt ratio. Because the higher the profitability the higher the internal finance and the less the need for debt (Brealey, 2011).

2.4 Market Timing Theory

Market timing theory is a theory of capital structure. It predicts that the firm will issue equity or debt depending on the cost of equity. The firm will issue equity when the cost of issuing equity is small while it will issue debt when the cost of equity is high. This means that firm will issue equity when the stock is overvalued and issue debt or repurchase equity when a stock is undervalued in the market hence the name market timing theory. This theory predicts no optimal capital structure and no obvious mechanism to choose between issuing equity or debt because there is no rational way to decide if the equity is undervalued or overvalued. This depends on managers and their point of view. There's no objective method to decide for sure if the stock is overvalued or undervalued in the stock market. As a result of this, this theory has a space for behavioral finance. In summary, the decision of issuing stocks or debt depends on the manager's point of view and the fact whether they are optimistic or pessimistic by nature (Brealey, 2011).

Chapter 3

LITERATURE REVIEW

3.1 Empirical Studies

A lot of empirical studies have concentrated on studying the determinants of capital structure. In general, different relationships and determinants were found depending on the context of study. Moreover, the empirical studies do not fully support any theory. That is the trade-off theory is successful in some context, but it fails in another context and so is pecking order theory which is the same case for the market timing theory. The next paragraphs will try to summarize different studies. First the literature related to variables used in our model will be discussed then previous research on turkey will be discussed in details. The first variable to be discussed is the profitability, then firm size.

3.1.1 Profitability

Profitability was used intensively in literature as independent variable affecting capital structure. The results were mixed depending on the country under study in addition to time span and other independent factors in the model. For example,the results of Wiwattanakantang (1999), Donaldson's (1961), Gaud (2005), Allen

(1991), Rajan (1995) and Chen (2003) found a negative relationship between profitability and capital structure which is predicted by pecking order theory.However, Ooi (1999) found no significant relationship between profitability and capital structure.in addition to this, Ozkan (2001) found an interesting result. Current profitability had negative correlation with capital structure while past profitability had positive relationship.

Another issue related to profitability is how it was measured in the literature. This was done using different proxies like the return on the assets ROA by Wiwattanakantang (1999). EBIT income before asset and depreciated over assets was used by Rajan and Zingales (1995), Ooi (1999), Ozkan (2001) and Gaud (2005). Moreover, Titman and Wessels (1988) used income over sales to measure profitability.

3.1.2 Firm Size

Like profitability, the results of the relationship between firm size and capital structure were mixed. Some studies found a positive relationship between firm size and capital structure like Rajan and Zingales (1995), Schulman (1996), Wiwattanakantang (1999), Boetang (2004), Padron (2005) and Gaud (2005). While others found a negative relationship, such as Marsh (1982), Titman and Wessels (1988), Ooi (1999) and Chen (2003). The positive relationship can be explained by the trade-off theory, while the negative relationship can be explained by the fact that small companies do not have easy access to the stock market so they rely heavily on debt to finance their operations. In addition to previous studies, Ferri and Jones (1989), Chung(1993), Ozkan(2001) and Rajan and Zingales (1995) found no relationship between firm size and capital structure.

Firm size was measured using different ratios. Logarithm of net sales was used by Titman and Wessels (1988), Rajan and Zingales (1995), Wiwattanakantang (1999), Graham (2000), Ozkan (2001) and Gaud (2005). Padron (2005) used the logarithm of total assets as measures of firm size. While the average value of total assets was used by Chung (1993) and Scott (1975) have used the book value of total assets. On the other hand, Graham (2000) used the market value of the firm to measure the firm size.

3.1.3 Empirical Studies on Turkish Firms

There are different studies that were conducted on the Turkish firms. The next paragraphs summarize some of them.

Güven (2003) has studied capital structure determinants in Turkey using panel data of 123 firms listed in the Turkish stock market over the period 1993 to 2002. As independent variables the study used

1- Firm size measured by log (net sales).
2- Profitability measured by earnings before interest, tax, and depreciation (EBIT) over total assets.
3- The growth rate in Plant, Property and Equipment measured by Percentage change in Plant, Property and Equipment.
4- The growth rate in Total Assets measured by Percentage change in Total Assets.
5- Non-debt Tax Shields measured by Annual Depreciation Expense over Total Assets.
6- Tangibility measured by Tangible Assets plus Inventories over Total Assets.

The study found a significant positive relationship between firm size and capital structure. It also found a negative relationship between profitability and capital

structure. Moreover, the relationship between growth rates in plant, property and equipment and capital structure was significantly negative while it was significantly positive between growth opportunities in total assets and capital structure. In addition to this, the relationship between non debt tax shields and tangibility in one hand and capital structure on another was negatively significant.

The result of this study does not comply totally to one theory. For example the profitability relationship was negative as predicted by pecking order theory while the firm size relationship was positive as predicted by tradeoff theory.

Köksal (2013) has studied non-financial firms in Turkey over a span of twenty years, which is a larger time span than previous studies. The new edition of this study of the literature was that this study takes into consideration private and public companies and is not restricted to listed companies in the stock market. This study uses three proxies for capital structure instead of one. The three are short term, long term and total debt over total assets. It also uses four different groups of independent variables. The first group is firm specific. The second is related to taxes. Third is industry specific while the fourth is macroeconomic factors. The Firm specific factors were firm size, profitability, tangibility, growth opportunities and business risk.

For tax related factors the study has used corporate tax and non-debt tax shield.For macroeconomic factors the study has used inflation, GDP growth and capital flows. For industry specific factors the study has used industry median value of capital structure as independent variable using two different categories manufacturing and non-manufacturing. The results of the study were that profitability had a negative relationship with capital structure measured by the three different ratios which is the

same result found by previous study. Size was positively correlated with the three measures of capital structure which is again the same result found by previous study. Tangibility was negatively correlated with capital structure measured by short term, but positively correlated with capital structure measured by long term and total. Growth opportunities have no significant relationship with capital structure while business risk has a negative relationship with long term but no effect on short term. Moreover, the study found a strong relationship between industry type and capital structure measured in three factors. It also found four macroeconomic factors that inflation is positively related with all measures. GDP growth had a negative effect on the long term and total but not on short term. Last but not least, capital flows were positively correlated with capital structure measured by the three ratios.

It can be concluded; some of the results are different than the previous study, although the two of them were conducted on Turkish firms. This can be explained by including different independent factors and taking private companies into consideration.In addition to longer time span. Furthermore, this study investigated the relationship between the previous factors and capital structure for manufacturing firms alone versus non-manufacturing firms alone. Moreover, it investigated the result of model for mature firms verses new firms and big firms versus small firms. This means that the study has conducted, the model first by taking manufacturing companies data only then by taking non-manufacturing firms only to compare the results. The same process was done for small companies versus big companies and new companies versus mature companies.The result of these comparisons concludes that manufacturing firms tend to have more debt, but most of independent factors affecting the capital structure of manufacturing companies have the same effect on non-manufacturing too.For example size, profitability, tangibility, tax-related factors,

and inflation were significant for both manufacturing firms and non-manufacturing firms and with the same sign.However, there were some differences. For example, while firm growth is positively correlated with long-term debt for manufacturing firms it is negatively correlated with short-term debt for non-manufacturing firms The result of this study can be predicted by tradeoff theory more than it can be predicted by pecking order theory. Although the profitability relationship is predicted by pecking order theory, firm size and tangibility positive relationships can be predicted by tradeoff theory. In addition to the positive relation between debt and GDP growth, which is predicted by tradeoff theory.

Ali (2013) has studied 242 Turkish companies listed in the stock market over the period 2000 to 2009. The study used three measures for capital structure long term, short term and total. The study found a positive relationship between firm size measured by the logarithm of total assets and capital structure. It also found a positive relationship between non debt tax shield measured by annual depreciation expenses over total assets and capital structure measured in the short term. However, in the long term non debt tax shield showed no significant effect on capital structure. The growth in GPD has a negative effect on capital structure and Inflation has a negative effect on capital structure while tax has positive structure. Again the results do not follow one theory.

George (2013) has studied 135 Turkish firms and 83 Moroccan companies over the period 2002 to 2011. The study found that firm size measured by the logarithm of sales is positively related to corporate structure which is the same results found by all the previous studies conducted on Turkish firms. The study found a negative relationship between tangibility and corporate structure. The result of profitability

measured by income over sales was negative like all previous studies on Turkish context.

Songul (2015) studied 73 manufactured firms listed in the Turkish stock market between 1993 to 2010. The study found that firm size has a negative effect on capital structure which is different than previous studies conducted on Turkish firms. Size was measured by the logarithm of total assets.Profitability and tangibility have negative effect ton capital structure which the same result found by other studies. Profitability was measured by income over sales while tangibility was measured by fixed assets ratio to total assets. This study has an addition to previous study; it studies determinants of capital structure in different sectors. The profitability negative relationship with capital structure was significant in all sectors food, textile, paper, chemical, nonmetallic products, basic metals and metal products. Size has a negative effect on all sectors except metal products. Firm size has a positive relationship with capital structure in the metal product sector.

Erdinc (2009) studied five lodging companies listed in the Turkish stock market. The special aspect of lodging companies is that these companies have high fixed assets. The study was conducted over the period 1994 to 2006. The study has used the following variables

1- Growth opportunities measured by market value divided by the book value of the firm.
2- Tangibility measured as the net fixed assets over by total assets.
3- Effective tax rates measured as the corporate tax divided by taxable income.
4- Non-debt tax shields measured as the depreciation divided by total assets.
5- Firm size measured as the net sales adjusted by the inflation rate.

6- The inflation rate is calculated as the annual percentage change in the wholesale price index.
7- Profitability (return on assets-ROA) calculated by dividing net profit by total assets.
8- Free cash flows computed by adding interest payments and depreciation to earnings before taxes.
9- Net commercial trade position (inter-enterprise debt) defined as the difference between commercial receivables and liabilities divided by total assets.

The results of the study indicate that tangibility, profitability and taxes were negatively correlated with capital structure. The taxes result is not as expected by tradeoff theory and it is different than previous studies. All other factors were insignificant. Firm size has no effect on lodging firms which is different than the previous studies which found that firm size had an effect on capital structure. This may be due to the nature of lodging companies.

3.2 Summary of Empirical Studies

The previous studies showed consistent results in terms of the effect of profitability on capital structure. This effect had the same sign, although each study had different sampled and used different measures. This reinforces the validity of the result that profitability in the Turkish context is negatively related to corporate structure. Firm size is positively correlated to a corporate structure in most of the study, but not Erdinc (2009) conducted on lodging companies. Tangibility is negatively correlated with capital structure in all studies.

Profitability negative relationship is predicted by pecking order theory because the more profitable the company is, the more internal finance it has and the less is the

need for external finance. Firm size positive relationship is predicted by tradeoff theory because the larger the company is, the more diversified the less the bankruptcy probability and the less the financial stress cost which means a higher optimal capital structure. The tangibility negative relationship is not predicted by tradeoff theory which predicts positive relationship because having more tangible assets will work as collateral which minimize the bankruptcy cost.

Chapter 4

STATISTICAL BACKGROUND

4.1 Introduction

As mentioned in the introduction, in this thesis two different models will be conducted. The first is an OLS regression model while the second is a mediation moderation model. It is assumed that OLS regression is familiar enough so the statistical background is not required. On the other hand, mediation moderation is

relatively less known so a statistical background will be explained before going ahead to explain data and methodology.

4.2 Mediation Moderation Models

As it can be inferred from the title mediation moderation models are models that mix mediation analysis with moderation analysis. The best method to explain the mediation moderation model is by beginning first by explaining mediation alone then moderation.

4.2.1 Mediation Models

Mediation models can be constructed in different ways, but the simplest model for mediation is shown in the figure below

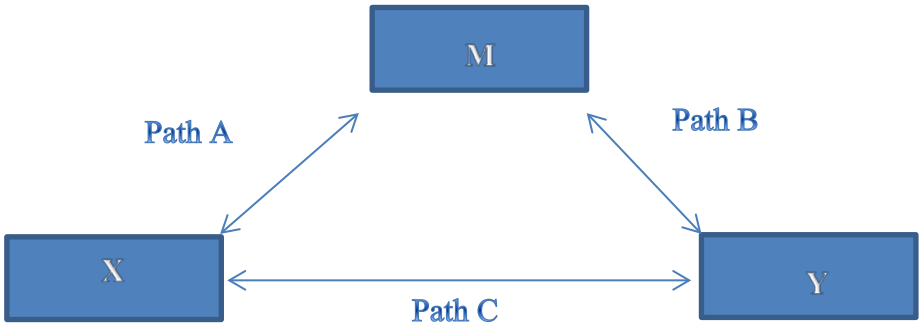

Figure 3: Mediation Model

This mediation model can be understood by stating that variable X effect variable Y through two different paths. One direct path, let's call it C. And an indirect path that

consists of two parts A and B. The indirect path is mediated by variable M hence the name mediation. This model works like this; when variable X is changed, two main outcomes will occur. First, you will be changed through path C. Second, M will be changed through path A and as a result of changing in M, Y will be changed too through path B. The total change of Y as a result of change in X, is simply the sum of changes through the two paths. That is it when X changes Y will be changed first because X has been changed and second because M has been changed. This change in M has occurred because X has been changed. As can be concluded, this model is different than OLS regression where X and M are independent variables and Y is dependent variables. OLS regression will show if there is a correlation between X and M in one hand and Y in another hand. This means that this regression will tell us that if we know the values of M and X we can infer values for Y because the three move together. This is the main idea of correlation and regression. It tells us that if we know the value of X we can know the value of Y. Mediation gives us process of change. It gives us mechanism. That if X is changed Y will be changed through another variable M. It is obvious that mediation has a stronger claim than OLS regression. However, we should know that in Econometrics stronger claims usually mean a higher probability of error. So caution must be taken. Mediation alone cannot prove a process it should be backed by theory. It is wrong to try to test the model on any variables. Theory and ınformal knowledge should first suggest variables to test, then mediation can support the results. In other words, the process in term of variables should be inferred externally and mediation should not be used alone (Hayes, 2013;Baron and Kenny, 1986).

After this general introduction to mediation, a mathematical explanation is needed. Mathematically mediation can be explained by three main equations

$$Y = b_0 + b_1 \times X + e_1 \quad (1)$$

$$M = a_0 + a_1 \times X + e_2. \quad (2)$$

$$y = c_0 + c_1 \times X + c_2 \times M + e_3 \quad (3)$$

The first regression is a simple regression of X on Y.it shows the total effect of X on Y. Second regression shows the effect of X on M which is labeled as path A in the figure. Then the last regression tells us if the two variables M and X predict Y. The mediation effect is simply $(b_1 - c_1)$. This is because b1 is the total effect of X on Y. From the first regression, we know that Y will be changed by b1 units in total for each changed unit of X. c1 is the effect of X on Y while controlling for M. So c1 is the effect of X on Y directly through path C in the figure. If X is changed by 1 unit Y will be changed by c1 units through the direct path. So $(b_1 - c_1)$ is the effect of X on Y through the indirect path. If X is changed by 1 unit Y will be changed by $(b_1 - c_1)$ units thorough the indirect path. The total change of Y if X is changed by 1 unit through the direct and indirect path is equal to the change through the direct path alone c1 plus the change through the indirect path $(b_1 - c_1)$. $c_1 + (b_1 - c_1)$=b1 which is the total change as we mentioned earlier. Moreover,$(b_1 - c_1)$ equals $(a_1 \times c_2)$. This is because if X is changed by 1 unit M will be changed by a1 units. In addition, if M is changed by 1 unit y will be changed by c2 unit. So if X is changed by 1 unit Y will be changed by $(a_1 \times c_2)$ units through the indirect path. So the effect through the indirect path can be expressed as $(b_1 - c_1)$ or $(a_1 \times c_2)$. They are equal. And the effect through the indirect path equals $(a_1 \times c_2)$. (Hayes, 2013; Baron and Kenny, 1986)

4.2.2 Mediation Moderation Models

Now, mediation moderation is basically the same as mediation, but with the addition of moderation effect. Moderation effect can be added at each path. Each path can be moderated with different variables and one path can be moderated by more than one path. However, for the sake of this thesis, we are going to use the same variable to moderate all paths like the figure below.

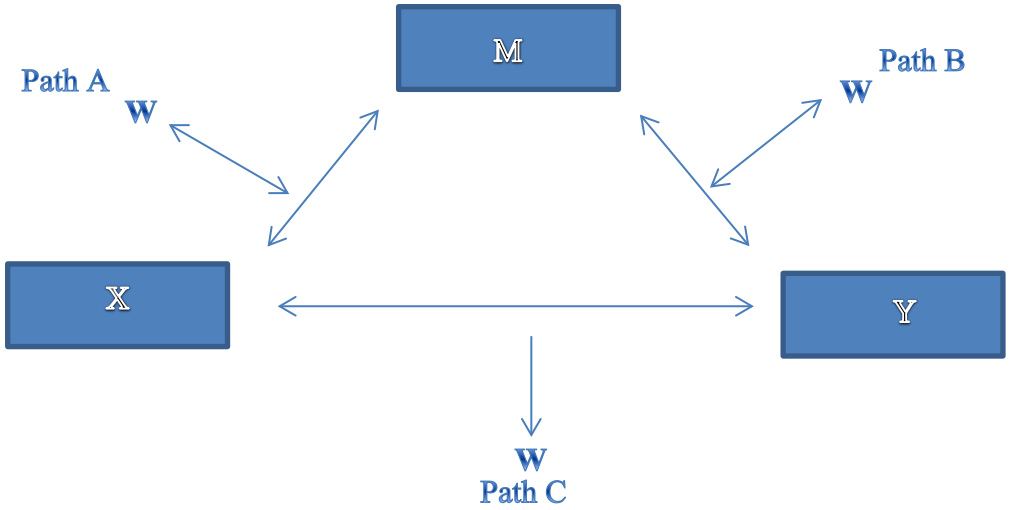

Figure 4: Mediation Moderation

As we can see, the only difference between this figure and the first one is the addition of W variable as a moderated factor on each path. Moderation means that the variable W affects the magnitude of the relation between the two variables at each path. For example, on path A, W does not affect M only or X only, but it affects the magnitude of the relation between them. This means that the effect of X on M will have different values at each value of W, when W is changed the coefficients of the regressions will change too. At some value of W, X will have a weak effect on M, but on other values of W, X will have a strong effect on M. The same reasoning

applies to other paths. One can think of W as tape that allows the relation of X to pass to M if it is fully open, but it will not allow the whole amount if it is not totally open.

Moderation can be mathematically expressed by adding interaction terms to each regression equation in the three previous equations so we got

$$Y = b_0 + b_1 \times X + b_2 \times W + b_3 \times X \times W + e_1 \quad (4)$$

$$M = a_0 + a_1 \times X + a_2 \times W + a_3 \times W \times X + e_2 \quad (5)$$

$$y = c_0 + c_1 \times X + c_2 \times M + c_3 \times W + c_4 \times W \times X + c_5 \times W \times M + e_3 \quad (6)$$

To understand why moderation is expressed mathematically as interaction term, we can take the second equation which is path A. The interaction will have a high effect if W and X are high, but if one of them is small the result of the interaction term will be small and so its effect on M. Which is the idea of moderation. The value of W effects how much X is going to affect M (Baron and Kenny, 1986).

Numerical values are assigned to the different coefficients. If w=2, b_1=3, c_1=1,$a_1 = 2$, c2=2.

These numbers can be interpreted as this. When W equals 2, if X changes by one unit, Y will be changed by 3 units. These 3 units are a result of 1 unit through path C and 2 units through the indirect path passing through M. If W changes all these values will change (Hayes, 2013).

4.2.3 Testing Mediation Moderation Models

After this theoretical explanation of mediation moderation, the question is how to conduct such technique empirically?

Mediation moderation can be conducted in three steps. First equation will be conducted if the coefficients are significant, one can move to the next equation. The difference $(b_1 - c_1)$ is interpreted as the mediation effect.

Chapter 5

DATA AND METHODOLOGY

5.1 Data

In the following paragraph, the data which were used and the different variables will be illustrated for the two models in this thesis.

The main data were taken from Thomson Reuters Data Stream.84 companies listed in the Turkish stock market were used to cover the period between the years 2003 to 2014. This creates 1008 annual observations. The firms belong to different sectors. However, financial firms and utilities were excluded because they are heavily regulated and their capital structure cannot be changed freely. All the variables for the two models were either taken from data stream or calculated.

5.2 Methodology

The methodology used for each model is totally different. In the following paragraphs the methodology used by model 1 will be explained followed by model 2 methodology.

5.2.1 Model 1 Methodology

First the methodology of model 1 will be explained then model 2.

5.2.1.1 Model Specification

As mentioned in previous chapters, the aim of this model is to find out if there is an optimal capital structure in the context of Turkish companies or not. In order to do so the following model was applied to panel data consists of the firms mentioned above. The model is expressed mathematically as follows

$$\Delta D_{it} = a + b(D_{it}^{*} - D_{i(t-1)}) + e$$

This model is called a target adjustment model.it has been used in literature like Lakshmi (1999) to check if there is an optimal capital structure or not. Before further explaining of the model the variables which were used will be explained first

5.2.1.2 Variables Used

Dependent variable: is the change in the debt level of each company at each year. Debt level is measured by total debt to total assets ratio, which is very common in literature. Other ratios used in literature are debt to equity ratio and the logarithm of the debt. In this study debt to assets ratio was used because it is easier to be comprehended and interpreted. In addition to the fact that previous literature has used different ratios and did not find any statistically consistent difference between the results found by using different ratios. This variable has been calculated simply by subtracting the debt ratio at each year from the previous one for each company in the sample. So at each year and at each company dependent variable will have different value than other years and companies.

Independent variable: is the difference between the target debt ratio D_{it}^{*} and debt ratio in the previous year $D_{i(t-1)}$. The debt ratio is calculated as total debt to total assets ratio. However, the target debt ratio cannot be observed directly. The proxy should be used, mean value of each company over the 12 years of study was used. This was calculated simply by adding all the debt to assets ratios for each company over the 12 years of study and then dividing by the number of years 12. As a result, each company will have a different target debt ratio, but this target debt ratio will be constant over all year for each company. In other words, D_{it}^{*} is equal to D_{i}^{*} . Target ratio is function of firms only. This target ratio was used by Lakshmi (1999). However, this is not the only way to measure the target debt ratio. Other alternatives

exist like three years, moving average for each company using the years before the year at which the target is calculated. For example, if we are going to calculate the target debt ratio for certain company at year 2010 we use three years, moving model for the years before 2010 (2002 to 2010). Another possible alternative to be used is five years moving average. In this study the simple average is used because Jalilvand and Harris (1984) has showed that there is no significant difference between the results found using three moving averages and simply average results. That is, using three years, moving average does not give different results than using simple average.

5.2.1.3 Explanation of the Model

After explaining how the variables were calculated and measured, in this paragraph the model will be explained. The model is trying to explain the changes in debt ratios at each year compared to the previous year by the difference between the debt ratio in the previous year and the target ratio. This will show if the company changes its debt ratio to achieve the target ratio or not. This model will be conducted using simple OLS regression by using Eviews software. If target adjustment really exists, b is expected to be more than 0. On the other hand, if it was close to 0 one can conclude that there is no evidence of any adjustments to target ratio. Moreover, b is expected to be less than 1 which means that the change in the debt ratio will be always less than the difference between the debt level and the target ratio. This is expected because there is a cost of adjusting. That is it adjustment toward target is partial (Lakshmi, 1999).

5.2.1.4 Data Analysis Techniques

Six steps will be taken in data analysis of this model. First stationarity of the data will be checked, then a correlation analysis will be conducted. After this, OLS

regression will be conducted. Then, the assumptions of OLS regression will be checked to make sure that the results are valid and can be interpreted.

1- Unit Root Tests of Panel Data

Checking for stationarity is an important step because it affects the choice of methodology of data analysis. If all data is stationary at the level I (0), then OLS regression can be conducted. However, if data is not stationary, OLS regression may give spurious results, in this case other techniques should be used.

There is more than one test for unit root. In this thesis three tests will be used

Augmented Dickey-Fuller (ADF) Fisher Chi-Square test

Phillips-Perron (pp) Fisher Chi-Square test

Levin, Lin, & Chu test

The null hypothesis of these three tests is that there is unit root. Which means the variables are not stationary. If the null hypothesis is rejected then stationary of the data can be concluded. The null hypothesis will be rejected.

2-Hausman Test

This test will be conducted to find out which model of OLS regression is more fitted to the data, Fixed effect or Random effect model. The null hypothesis is that the random effect model is more suitable. If the null hypothesis is rejected then fixed effect model should be used.

3-OLS regression

The fixed effect model will be conducted. This is because all variables are stationary at level and the null hypothesis of Hausman test was rejected.

4-Autocorrelation

A Q test and AC tests will be used to check for Autocorrelation problem. Autocorrelation affects the validity of the results because one of the assumptions of OLS regression is that the error terms are not correlated. The null hypothesis of Q and AC tests is that there is no Autocorrelation.

5-Heteroscedasticity

Breusch-Pagan-Godfrey test will be conducted to check if there is Heteroscedasticity Or not. One of the assumptions of OLS regression is that the variance of error is constant at all levels of independent variables which is known as homoscedasticity. Heteroscedasticity is the absence of homoscedasticity. The null hypothesis of this test is that there is no heteroscedasticity problem.

5.2.2 Model 2 Methodology

First the methodology of model 1 will be explained then model 2.

5.2.2.1 Variables used (Definitions)

1- Capital structure: total debt to total assets ratio was used like the Model 1.

2- Profitability: is defined as returns to assets ROA. This is not the only possible measure of profitability. But it is widely used by literature and since we are using debt to asset ratio to measure the capital structure, then it makes more sense to use assets to measure profitability too.

3- Firm size: is defined by log of total assets. The log is used to get the percentage effect to be easier to interpret since all other variables are ratios.

4- Market value: is defined as the log of the stock price at the end of each year.

5.2.2.2 Model specification

The model is a mediation moderation model. The blocks of this model are shown in the figure below.

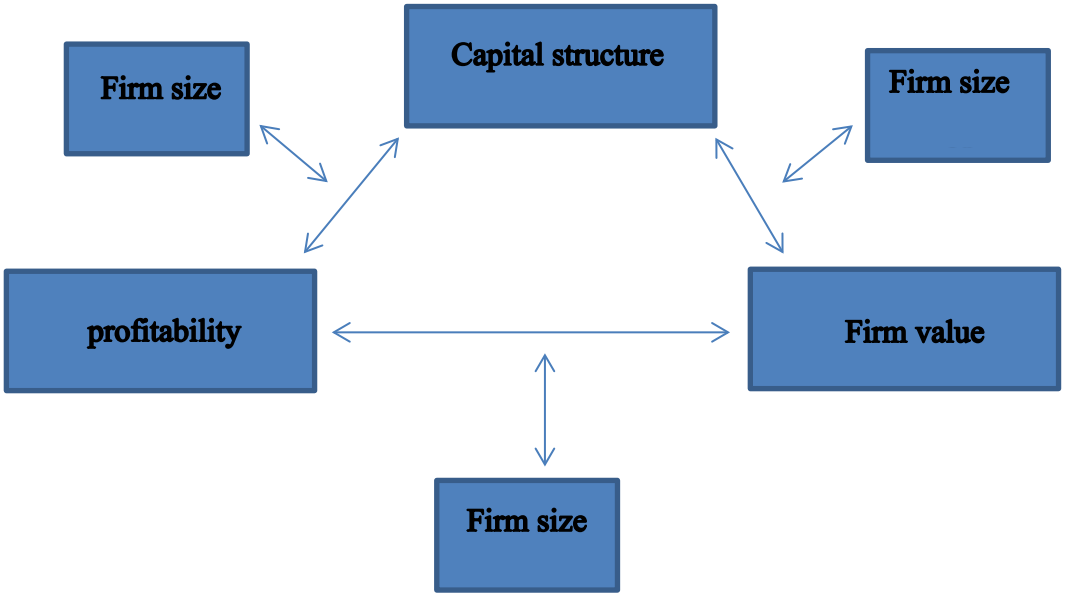

Figure 2: The Building Blocks Of The Model

As explained in chapter 4 this model can be conducted in three stages. Each stage is one equation.

$$.market\ value = b_0 + b_1 \times profitability + b_2 \times firm\ size + b_3 \times firm\ size \times profitability + e_1$$

7

$$capital\ structure = a_0 + a_1 \times profitability + a_2 \times firm\ size + a_3 \times firm\ size \times profitability + e_2$$

8

$$market\ value = c_0 + c_1 \times profitability + c_2 \times capital\ structure + c_3 \times firms\ size + c_4 \times firm\ size \times profitability + c_5 \times firm\ size \times capital\ structure + e_3$$

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5.2.1.4 Data Analysis Technique

For each equation the following steps will be conducted.

1-Unit root test

The same tests used for model 1 will be used for variables in model 2. The three tests will be done once to all variables in the three equations.

2-Cointegration

Cointegration will be conducted for each equation of the three equations that will be conducted. This is because all variables in model 2 are non-stationary at level, but stationary at first difference as it will be shown in the next chapter. Cointegration is used to check if there is a long run relationship between variables. In this case, can tests like DOLS or FMOLS regression can be conducted. In this thesis Engle-Granger test with Padroni approach will be used to test cointegration.

3-FMLOS regression

The fully modified OLS regression will be conducted three times. It will be conducted once for each equation in order to get estimates for the coefficients. This test can be used when the variables are I (1) in addition to the fact that cointegration between them exists.

5.2.2.2 Theoretical Justifications of the Model

As it was mentioned in statistical background mediation moderation should not be used without justification. This model was used first because this model was used by Chin (2011) and was applied to Taiwanese firms. Second, because the literature suggests that such model is plausible in the Turkish context. As discussed in the literature review chapter.Most of the literature conducted on Turkish firms has proved the relation between capital structure on one hand and profitability and firm size on another. Moreover, all literature has proved the relation between capital

structure and market value. The same is true in case of profitability and market value. Now this does not prove that this mediation moderation model will give significant result, but this justifies the use of such model. Moreover the direction of relations can be inferred from informal knowledge. Profitability affects market value not vice versa. One can still argue that market value affects profitability, but one cannot deny that the major effect is for profitability on market value. The same is true in regard of the effect between profitability, firm size of capital structure. It is firm size that affects the capital structure not vice versa. Companies do not become larger as a result of changing debt to equity ratio. However, the fact that the company is large or small will affect the debt equity ratio. This explains why capital structure is used as mediation variable instead of profitability or firm size. The same logic can be used to understand why firm size is used as moderated factor instead of profitability for example. Being small or large will affect how important is the profitability effect on capital structure not vice versa. This gives a good justification of using such model so results can be taken seriously.

5.3 Hypotheses of the study

5.3.1 Model 1

Model 1 one will check if the hypothesis that firms adjust their capital structure toward target ratio is true or not. Trade-off theory predicts that this hypothesis is true while pecking order theory and market timing theory in addition to behavioral theories predict that this hypothesis is not true.

5.3.2 Model 2

Unlike model 1, model 2 results will check more than one hypothesis. First this model will check the hypothesis that firm size and profitability have an effect on capital structure. Moreover, the model will check if the hypothesis of capital

structure effect on market value is true or not. In addition to this the model will check if profitability affects market value. Last but not least, the model will check if profitability affects market values mediated by capital structure and moderated by firm size. Literature conducted in Turkish companies predicts a negative relationship between profitability and capital structure. Firms' size was positively correlated with capital structure.

Chapter 6

RESULTS AND ANALYSIS

6.1 Model 1 results

6.1.1 Unit Root Results

The results of the three tests ADF, PP and LLC are shown. The lag length is found automatically by EVIEW 8 using Akaike criterion AIC. It is obvious that according to the three tests the null hypothesis is rejected and the variables are stationary at level.

Table 1: ADF Fisher, PP Fisher and LLC Tests for Unit Root

(Level)	ΔD_{it}	$D - D_{i(t-1)}$
τ_T (ADF)	118.241*	120.240*
τ_μ (ADF)	242.461*	150.643*
τ (ADF)	130.099*	79.543***
τ_T (PP)	203.961*	295.765*
τ_μ (PP)	310.453*	300.654*
τ (PP)	224.576*	145.654*

τT (LLC)	-7.434*	-3.783*
τμ (LLC)	-15.693*	-18.083*
τ (LLC)	10.423	28.410

τT indicates drift and trend; τμ indicates drift only, τ indicates no drift and no trend. *,**,*** means rejection of null hypothesis at 1%, 5%, 10% levels. D_{it}^{*} is the target debt ratio. $D_{i(t-1)}$ is the debt ratio in the previous year.

6.1.2 Hausman Test

Since all the variables are stationary at level OLS regression can be conducted, however, first Hausman test should be conducted to find out whether OLS fixed or random effect should be used. The null hypothesis of the test is rejected at the 5 % significance level.The fixed effect model is more suitable than the random effect model.

Table 2:Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	330.303132	4	0.0000

6.1.3 Fixed Effect Model Results

Table 3: Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005007	1.897315	24.69393	0.0000
X	0.410456	0.000794	516.947103	0.0000

Rsq=0.303, F statistic=26.2804, p value =0.0000, X is the difference between debt level and the target level. DW=1.95.

The constant and the independent variable are statistically significant. Rsq is 0.3 which means that 30% of the variation in the dependent variable is explained by the model.

6.1.4 Autocorrelation

Q and AC results failed to reject the null hypothesis. So we can conclude that there is no Autocorrlation problem. This is not surprising since we are dealing with variables that expressed as differences. And the differences are usually used as remedy for autocorrelation.

Table 4: AC, PAC and Q-stat for 10 lags

Lag	AC	PAC	Q-Stat	Prob.
1	0.032	0.032	0.0370	0.847
2	-0.011	-0.012	0.0415	0.979
3	-0.068	-0.067	0.2132	0.975
4	-0.044	-0.040	0.2867	0.991
5	-0.110	-0.110	0.7782	0.978
6	0.045	0.046	0.8626	0.990
7	0.004	-0.007	0.8633	0.997
8	-0.059	-0.076	1.0227	0.998
9	0.030	0.033	1.0665	0.999
10	-0.055	-0.070	1.2154	1.000

6.1.5 Heteroscedasticity

The result of the Breusch-Pagan-Godfrey test indicates the absence of heteroscedasticity problem. The null hypothesis is fail to be rejected.

Table 5: BP test

F-statistic	1.051862	Prob. F (1,1003)	0.3888
Obs*R-squared	4.261927	Prob. Chi-Square (1)	0.3717
Scaled explained SS	1.428287	Prob. Chi-Square (1)	0.8393

6.1.6 Results interpretation

The independent variable is statistically significant at 5 % significance level. This means that Turkish firms do adjust their capital structure towards a target. The coefficient of the independent variable is 0.41 which is more than 0 but still

considerably less than 1 which shows the adjustment costs or shows that the adjustments are not perfect. The constant is statically significant and equal 0.005. R squared is 0.3. This is interpreted as 30 percent of the change in the capital structure is explained by movements toward a target, although it is not a high percentage, but taken into consideration the simplicity of the model it is expected. These results show that other variables affect capital structure change in Turkish firms other than adjustment toward target. The numerical value of b can be interpreted as follows; when the debt ratio is 1% farther from the target capital structure, the firm will change the capital structure by 41%.the value of the constant is close to zero. The value of the constant equals the percentage change in capital structure when the capital structure is exactly on target.

These results are expected by tradeoff theory. However, caution must be taken. This model does not prove that tradeoff theory gives better predictions than other theories when conducted on Turkish firms. This is because other theories may have better predictions when it comes to predicting the effect of other variables on capital structure. For example, Pecking order theory can still have better predictions than tradeoff theory when it comes to profitability or firm size effect on capital structure. In order to conclude that tradeoff theory has better predictions than pecking order theory the two models should be conducted and then a test for statistical power should be conducted to find which is better to be used. For example, Lakshmi (1999) found that although tradeoff theory was better at expecting target adjustment behavior, pecking order theory had more statistical power. In addition to all this, the model shows that there is an adjustment to capital structure target, but it says nothing about how to calculate and find such target. So this target can be different than the target predicted by tradeoff theory. The only statement that can be concluded from

this model is that there is statistically significant evidence that Turkish firms listed on Istanbul exchange do adjust their capital structure toward a historical target.

6.2 Model 2 Results

6.2.1 Unit Root Test Results

The unit root result of variables at level showed that all of them are non-stationary at level. So the tests were done again at first difference. The results from the first difference show that the variables are stationary at first difference**.**

Table 6: Unit Root Tests Model 2. ADF Fisher, PP Fisher and LLC, Level

(Level)	Y	M	X	W	int_1	Int_2
τ_T (ADF)	1.063	34.876	34.674	63.564	4.087	4.897
τ_μ (ADF)	15.098	45.678	34.987	54.986	3.076	5.989
τ (ADF)	45.897	56.987	23.754	20.987	1.098	675.984
τ_T (PP)	56.965	40.765	5.098	14.098	25.076	33.786
τ_μ (PP)	34.065	45.897	8.098	16.789	39.065	35.967
τ (PP)	12.345	39.786	10.987	18.096	43.689	60.965
τ_T (LLC)	3.486	6.987	0.065	13.9867	2.076	20.087
τ_μ (LLC)	5.678	8.965	0.234	15.789	6.086	21.748
τ (LLC)	20.789	28.410	5.098	9.876	12.456	16.789

τ_T indicates drift and trend ; τ_μ indicates drift only, τ indicates no drift and no trend. *,**,*** means rejection of null hypothesis at 1%, 5%, 10% levels. Y is market value. X is profitability. M is capital structure. W is firm size. int_1 is the interaction term profitability ×firm size. Int_2 is capital structure × firm size.

Table 7: Stationary tests first difference

(first difference)	Y	M	X	W	int_1	int_2
τ_T (ADF)	820.117*	526.538*	716.9*	445.68*	276.6*	234.6*
τ_μ (ADF)	713.888*	577.608*	830.4*	245.6*	346.5*	345.6*
τ (ADF)	702.829*	998.471*	1225.3*	376.8*	546.5*	654.6*
τ_T (PP)	654.8*	130.5*	124.6*	237.5*	365.7*	265.8*
τ_μ (PP)	567.7*	145.6*	178.7*	230.6*	198.6*	390.6*
τ (PP)	343.9*	134.8*	165.4*	376.7*	187.9*	175.4*
τ_T (LLC)	-29.431*	-21.468*	-34.073*	-25.678*	-18.765*	-5.789*
τ_μ (LLC)	-26.413*	-22.572*	-34.789*	-26.786	-15.678*	-8.748*
τ (LLC)	-22.017*	-23.928*	-33.849*	-27.986	-16,789*	-7.896*

τ_T indicates drift and trend,τ_μ indicates drift only, τ indicates no drift and no trend. *,**,*** means rejection of null hypothesis at 1%, 5%,10% levels. Y is market

value. X is profitability. M is capital structure. W is firm size.int_1 is the interaction term profitability ×firm size. Int_2 capital structure × firm size.

6.2.2 Cointegration

The result of Padroni test shows that the variables are cointegrated in the three equations. This means that fully modified OLS regression can be used to get valid estimates for the coefficients for each equation. Moreover, this also shows that there is a statistically significant long run relationship between the variables in each equation. Although the variables are nonstationary, but a stationary linear combination of them do exist. The results of the three cointegration tests are shown in the appendix.

6.2.3 FMOLS Results

Equation 1

$market\ value = b_0 + b_1 \times profitability + b_2 \times firm\ size + b_3 \times firm\ size \times profitability + e_1$

10

Table 8: FMOLS first regression. Dependent variable: market value

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X	0.756440	0.090066	8.398691	0.0000
W	0.050678	0.027465	5.845367	0.0000
INT	0.284565	0.024496	7.261678	0.0000

R squared= 0.57, X is profitability, W is firm size, int is x*w,DW is 1.8

Profitability is significant at 5% and so is the interaction term. This means that the first step of mediation moderation is significant and we can move to the next stage.

Equation 2 results

$$capital\ structure = a_0 + a_1 \times profitability + a_2 \times firm\ size + a_3 \times firm\ size \times profitability + e_2$$

11

Table 9: FMOLS Second Regression,Dependant variable : capital structure

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X	-0.996395	0.050901	-7.091893	0.0000
W	8.333474	0.214386	5.662578	0.0000
INT	-0.420028	0.094022	-9.770934	0.0000

X is profitability, W is firm size, int is x*w, R squared=0.42, DW is 1.9

Profitability is statistically significant at 5 % so is the interaction term. Which means that second step for the mediation moderation term is established and we can move to the next step.

Equation 3 results

$$market\ value = c_0 + c_1 \times profitability + c_2 \times capital\ structure + c_3 \times firms\ size + c_4 \times firm\ size \times profitability + c_5 \times firm\ size \times capital\ structure + e_3$$

12

Table 10: FMOLS third Regression, Dependant variable: firm value

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X	0.694567	0.141203	4.918893	0.0000
W	4.656789	1.287480	3.616978	0.0000
Int1	0.430688	0.094022	6.808394	0.0000
M	-0.107698	0.012660	-8.506517	0.0000
Int2	0.025694	0.007197	3.569846	0.0000

X is profitability, M is capital structure, Y is market value, W is firm size, int1 is X*W, int2 is M*W, R squared=0. 65, DW is 1.7

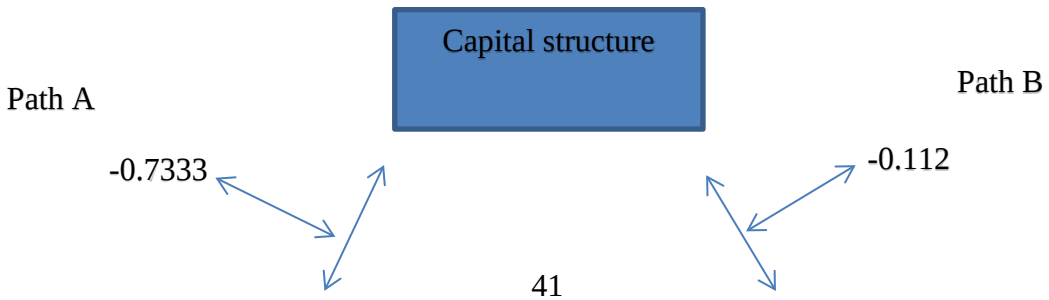
Profitability, capital structure and the two interaction terms are significant at 5% and we can move to analyzing the numerical value of the coefficients**.** Because of the

interaction terms, the effects of variables in the model vary with the firm size values. As a result of this the best way to show the results is to show them separately for two different values of firm size which are Small and large firms. Small size firm here is defined as a firm which has a size that is by one standard deviation below the mean of firm sizes, while large firm is defined as a firm that has a value that is one standard deviation above the mean value of firm sizes. It is important to mention that small and large are not ranges here. Smaller firm means that we can substitute a certain value for firm size in the regression and that this value is equal to the value that is less than the mean value by one standard deviation. So actually one can calculate different coefficients for different sizes. All the coefficients in the figures extract from the results above. The results are shown in the table below and then shown in the two figures.

Table 11: Model Coefficients

Firm size	Path A	Path B	Indirect effect	Direct effect	Total effect
large	-1.246	-0.091	0.105	0.941	1.046
small	-0.733	-0.112	0.082	0.412	0.494
Difference	0.513	0.021	0.023	0.529	0.552

The figure below shows the results for small firms.



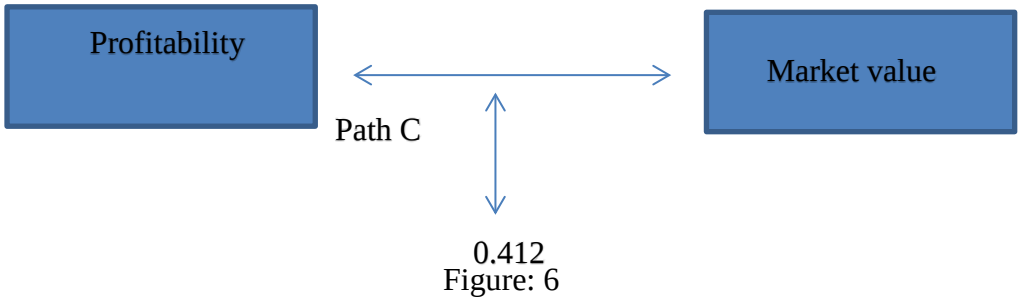


Figure: 6

The figure below shows the results for large firms

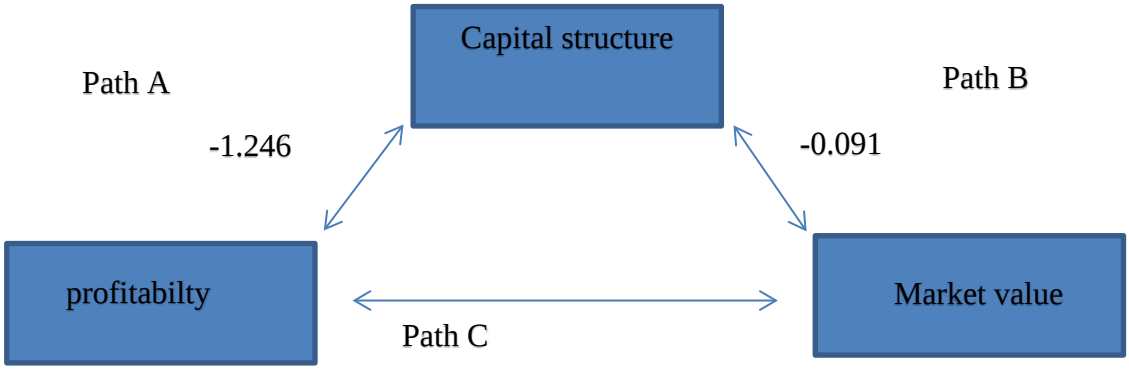


Figure: 7

These numerical results can be interpreted as the following. In small firms, When profitability increases by 1 % market value will increase by 0.494%, 0.412% of this increase in market value is due to the profitability direct effect while 0.082% of this increase is due to indirect path. Moreover, when profitability increases by 1% debt to assets ratio decreases by 0.733% and when capital structure decreases by 1% market value increases by 0.112%.

For large size firms, when profitability increases by 1% market value will increase by 1.046%. 0.941% of this increase in market value are due to the profitability direct effect while 0.105% of this increase is due to indirect path. Moreover, when profitability increases by 1% debt to assets ratio decreases by 1.246% and when capital structure decreases by 1% market value increases by 0.091%.

From the results above we can see that firm size as moderator has effect on all paths. Moreover, firm size moderation effect was positive in a sense that the absolute value of coefficients has increased with firm sizes on all of the paths except path b. Capital structure effect on market value for small firms was more than large firms. All other paths had more effect for large firms than small firms. One can conclude that the increase in firm size has increased the correlation strength between profitability and market value and profitability and capital while it has decreased the correlation between capital structure and market value. Moreover, the increase in firm size did not change the directions of the relations between variables and it did not change the signs of the coefficients.

Since the model is significant and the mediation effect exists, one can conclude that profitability affects market value through two paths, one is direct while the other is mediated by capital structure. The direct path has a positive effect and the indirect path as a total has positive effect too. This means that when the profitability is increased market value will be increased through the two paths. Although profitability has negative relation with capital structure while capital structure has a negative effect on market value. The overall effect of the indirect path is positive.

It is obvious that in all firms with the two different sizes the magnitude of the direct effect of profitability on market value is by far higher than the indirect effect. This shows that the income generated by the firm assets is more important than the source of financing those assets.

If we put the mediation moderation aside, the coefficient signs comply with previous literature. Profitability effect is predicted by pecking order theory in addition to literature conducted in Turkish context as explained in chapter 2 of this thesis. Moreover, the effect of profitability of market value and capital structure effect on market value complies with literature too.

Chapter 7

CONCLUSION

This thesis has investigated two main questions. First question: Is there an optimal capital structure? The second question: how do profitability, firm size, Capital structure and market value affect each other? These two questions were answered using data of 84 Turkish companies from 2003 to 2014.

To answer the first question a target adjustment model was applied. Target ratio was calculated as the historical mean for each company over 12 years. The results showed that target adjustment process does exist, but with considerable cost that makes the adjustment process not perfect. This result is predicted by tradeoff theory. However, this fact is not enough to conclude that tradeoff theory is better in the Turkish context.

To answer the second question a mediation moderation model was applied. It was found that profitability has a positive effect on firm market value. Moreover, this positive effect consists of two components. The first one is a direct one, where the market value is directly correlated with profitability. The second component is an indirect one, where profitability affects market value through corporate structure. The model also shows that when the firm size increases the strength of the effect on profitability of market value increases through the two components (direct and indirect).

The direct component of the profitability effect on market value is considerably stronger than the indirect effect. This shows that having profitable assets is more

important than deciding how to finance them. That is, investment decisions are more important than financial decisions, judging by market value criteria.

APPENDIX

Pedroni Resdiual Co-integration Test Equation 1

İndividual intercept

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	0.564564	0.3228	0.945641	0.2328
Panel rho-Statistic	-0.767564	0.2345	-0.801362	0.2458
Panel PP-Statistic	-29.615679	0.0000	-8.347565	0.0000
Panel ADF-Statistic	-9.345631	0.0000	-6.258865	0.0000

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	-0.005656	0.7588
Group PP-Statistic	-12.346715	0.0000
Group ADF-Statistic	-4.567967	0.0000

Individual intercept and individual trend

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-2.456567	0.6432	-0.916627	0.5632
Panel rho-Statistic	1.565468	0.5141	0.730904	0.5023
Panel PP-Statistic	-23.457856	0.0000	-9.568542	0.0000
Panel ADF-Statistic	-8.567867	0.0000	-7.567898	0.0000

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	1.182665	0.8815
Group PP-Statistic	-11.234568	0.0000
Group ADF-Statistic	-6.456769	0.0000

No trend and no intercept

Alternative hypothesis: common AR coefs. (within-dimension)					
				Weighted	
		Statistic	Prob.	Statistic	Prob.
Panel v-Statistic		0.025978	0.5674	0.416311	0.3386
Panel rho-Statistic		-0.965077	0.1673	-0.783724	0.2166
Panel PP-Statistic		-12.348565	0.0000	-1.786989	0.0000
Panel ADF-Statistic		-8.564331	0.0000	-1.923568	0.0000
Alternative hypothesis: individual AR coefs. (between-dimension)					
		Statistic	Prob.		
Group rho-Statistic		0.310832	0.6220		
Group PP-Statistic		-11.46898	0.0000		
Group ADF-Statistic		-5.434592	0.0000		

Cointegration Equation 2

Table Pedroni Resdiual Co-integration Test

İndividual intercept

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	0.986578	0.1234	1.005467	0.2346
Panel rho-Statistic	-0.85667	0.2345	-0.789876	0.3456
Panel PP-Statistic	-30.456756	0.0000	-11.234555	0.0000
Panel ADF-Statistic	-10.345892	0.0000	-7.567785	0.0000

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	-0.043548	0.5688
Group PP-Statistic	-15.456764	0.0000
Group ADF-Statistic	-5.678436	0.0000

Individual intercept and individual trend

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-1.345656	0.8006	-0.966894	0.5674
Panel rho-Statistic	0.665468	0.6141	0.789766	0.5676
Panel PP-Statistic	-20.345675	0.0000	-9.436774	0.0000
Panel ADF-Statistic	-9.659657	0.0000	-7.546063	0.0000

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	1.487674	0.7675
Group PP-Statistic	-20.345547	0.0000
Group ADF-Statistic	-9.455668	0.0000

No trend and no intercept

Alternative hypothesis: common AR coefs. (within-dimension)

			Weighted	
	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	0.564567	0.2345	0.675678	0.2548
Panel rho-Statistic	-0.76568	0.3456	-0.567894	0.4566
Panel PP-Statistic	-21.346405	0.0000	-1.886773	0.0000
Panel ADF-Statistic	-9.456767	0.0000	-2.567545	0.0000

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	0.567889	0.4567
Group PP-Statistic	-19.456743	0.0000
Group ADF-Statistic	-8.456548	0.0000

Cointegration Equation 3

Table Pedroni Resdiual Co-integration Test

İndividual intercept

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	0.796906	0.2128	1.113331	0.1328
Panel rho-Statistic	-0.901473	0.1837	-0.901362	0.1837
Panel PP-Statistic	-28.904898	0.0000	-9.428304	0.0000
Panel ADF-Statistic	-8.597140	0.0000	-5.149754	0.0000

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	-0.103548	0.4588
Group PP-Statistic	-11.268804	0.0000
Group ADF-Statistic	-4.958845	0.0000

Individual intercept and individual trend

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-1.007528	0.8432	-0.716627	0.7632
Panel rho-Statistic	0.565468	0.7141	0.530904	0.7023
Panel PP-Statistic	-25.647191	0.0000	-8.384963	0.0000
Panel ADF-Statistic	-7.448090	0.0000	-6.306064	0.0000

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	1.182665	0.8815
Group PP-Statistic	-11.026267	0.0000
Group ADF-Statistic	-5.024860	0.0000

No trend and no intercept

Alternative hypothesis: common AR coefs. (within-dimension)

			Weighted	
	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	0.323976	0.3730	0.416311	0.3386
Panel rho-Statistic	-0.965077	0.1673	-0.783724	0.2166
Panel PP-Statistic	-10.138403	0.0000	-0.996823	0.0000
Panel ADF-Statistic	-7.496067	0.0000	-1.802573	0.0000

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	0.310832	0.6220
Group PP-Statistic	-11.407017	0.0000
Group ADF-Statistic	-5.555653	0.0000

REFERENCES

Ali, B., İlhan, E., & Nusret, Y. (2013). A panel data analysis of capital structure determinants: empirical results from Turkish capital market. *International Journal of Economics and Finance, 5*(4), 131.

Allen, D.E. (1991). The determinants of the capital structure of listed Australian companies: the financial manager's perspective. *Australian Journal of Management, 16*(2), 103- 128.

Baron, K. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173-1182.

Boateng, A. (2004). Determinants of capital structure: evidence from international joint ventures in Ghana. *International Journal of Social Economics, 31*(1/2), 56-66.

Brealey, R. A., Myers, S. C., & Allen, F. (2011). *Corporate Finance,* 10th edition, McGraw-Hill Irwin.

Chen, J. J. (2003). Determinants of capital structure of Chinese-listed companies. *Journal of Business Research, 57*, 1341-1351.

Chung, K. H. (1993). Asset characteristics and corporate debt policy: an empirical test. *Journal of Business Finance and Accounting*, *20*(1), 83-98.

Donaldson, G. (1961). *Corporate Debt Capacity: A Study o f Corporate Debt Policy and the Determination of Corporate Debt Capacity*. Working Paper. Graduate School of Business Administration, Harvard University, Boston.

Erdinc, S., Yilmaz, K., Mehmet. B., & Yildirim, O. (2009). Determinants of capital structure: evidence from Turkish lodging companies. *International Journal of Contemporary Hospitality Management*, *21*(5), 594 – 609.

Ferri, M. G., & Jones, W. H. (1979). Determinants of financial structure: a new methodological approach. *The Journal of Finance*, *34*(3), 631-44.

Gaud, P., Jani, E., Hoesli, M., & Bender A. (2005). The capital structure of Swiss companies: an empirical analysis using dynamic panel data. *European Financial Management*, *11*(1), 51-69.

George, L., & Soufiane, Z. (2013). Capital structure in the MENA region: empirical evidence from Morocco and Turkey. *Investment Management and Financial Innovations*, *10*(1), 86 – 77.

Graham, J. R. (2000). How big are the tax benefits of debt? *The Journal of Finance*, *55*(5), 1901-1942.

Güven, S., & Hakan K. (2003). *The Firm-Specific Determinants of Corporate Capital Structure: Evidence From Turkish Panel Data*. Retrieved from http://www.baskent.edu.tr/~gurayk/kisiselcapstrpaper.pdf.

Hayes, F. (2013). *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*. New York, NY: The Guilford Press

Hayes, F. (2009). Beyond Baron and Kenny: statistical mediation analysis in the new millennium. *Communication Monographs, 76*(4), 408-420.

Köksal, B., & Orman, C. (2013). *Determinants of Capital Structure: Evidence from a Major Emerging Market Economy*. Retrieved from http://mpra.ub.uni-muenchen.de/48415/

Lakshmi, S., & Stewart, C. (1999). Testing static tradeoff against pecking order models of capital structure. *Journal of Financial Economics, 51*(2), 219-244.

Ooi, J. (1999). The determinants of capital structure: evidence on UK property companies. *Journal of Property Investment & Finance, 17*(5), 464-480.

Ozkan, A. (2001). Determinants of capital structure and adjustment to long run target: evidence from UK company panel data. *Journal of Business Finance and Accounting, 28*, 175-199.

Padron, Y. G., Apolinario, R., Santana, O., Conception, M., Martel V., & Sales L. (2005). Determinant factors of leverage: an empirical analysis of Spanish corporations. *Journal of Risk Finance, 6*(1), 60-68.

Preacher, K., & Hayes, F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, and Computers, 36*(4), 717-731.

Rajan, G., & Zingales, L. (1995). What do we know about capital structure? Some evidence from international data. *Journal of Finance, 50*(5), 1421-60.

Ross, S. (1977). The determination of financial structure: the incentive signaling approach. *Bell Journal of Economics, 8*(1), 23–40.

Schulman, C., Deborah T., Sellers, F., & Kennedy B. (1996). Effects of tax integration and capital gains tax on corporate leverage. *National Tax Journal, 49*(1), 31-54.

Scott D., & Martin, J. (1975). Industry influence on financial structure. *Financial Management, 4*(1), 67-73.

Songul, A. (2015). The determinants of capital structure: evidence from the Turkish manufacturing sector. *International Journal of Economics and Financial Issue, 5*(1), 158-171.

Titman, S., & Wessels, R. (1988). The determinants of capital structure choice. *Journal of Finance*, *43*(1), 1-19.

Wiwattanakantang, Y. (1999). An empirical study of the determinants of the capital structure of Thai firms. *Pacific-Basin Finance Journal*, *7*(3), 371-403.