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DETERMINANTS OF FIRM CAPITAL STRUCTURE IN THE TURKISH MANUFACTURING SECTOR: THE TEST OF PECKING ORDER AND MARKET TIMING THEORIES

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ÖZET

Determinants of Firm Capital Structure in the Turkish Manufacturing Sector: The Test of Pecking Order and Market Timing Theories

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Şirketin sermaye yapısı finans literatüründe genişçe incelenen konudur. Bu çalışma, 2004 ve 2007 yılları arasında İMKB'de kayıtlı imalat şirketlerin üzerinde tercih sırası ve piyasa zamanlama teorilerinin geçerliliğini test ederek, Türkiye'deki sermaye yapısı literatürüne katkıda bulunmayı amaçlamaktadır.

Diğer taraftan, bu çalışma büyümenin, vergi-dışı borç kalkanının, karlılığın, firma büyüklüğünün ve duran varlıkların borç kaldıracı ile ne yönde ilişkili olduğunu araştırarak, sermaye belirleyenlerini incelemektedir.

Ampirik bulgular ışığında, finansal hiyerarşinin tercih sırası hipotezi Türk imalat sektöründe geçerli olmadığı ortaya çıkmıştır. Ancak, piyasa zamanlama teorisine ilişkin istatistiksel olarak anlamlı ve büyük katsayılar gözlemlenerek güçlü bulgular elde edilmiştir. Son olarak, sermaye yapısı belirleyenlerin ampirik testleri, karlılığın, büyümenin ve duran varlıkların, sermaye yapısının oluşum sürecinde önemli olduğunu ortaya koymuştur.

Genel bulgular şu şekilde sıralanabilir, İMKB'de kayıtlı Türk imalat şirketleri sermayenin 10% değerlenmesi karşısında, yaklaşık olarak, 1.66% kadar borç finansmanlarını azaltmaktalar, finansal açığın 29,2%'si borç ile geri kalan kısmı özsermaye ile finanse edilmektedir, ayrıca tercih sırası teoriye karşıt olarak büyük firmalar daha fazla borç kullanmaktalar. Son olarak, elde edilen bulgular neticesinde, piyasa zamanlama teorinin geçerliliği büyük firmalarda daha belirgin olduğu ve bu firmaların piyasayı zamanlamaya daha yatkın oldukları ortaya çıkmıştır.

Anahtar Kelimeler: Tercih Sırası Teorisi, Zamanlama Teorisi, Sermaye Yapısı, İstanbul Menkul Kıymetler Borsası (IMKB), Özsermaye, Borç.

ABSTRACT

Determinants of Firm Capital Structure in the Turkish Manufacturing Sector: The Test of Pecking Order and Market Timing Theories

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Firm capital structure is a widely studied field in the literature of finance. This study aims to contribute to the ongoing capital structure debate in Turkey, by testing the validity of the pecking order and market timing theories for Turkish manufacturing firms listed in the ISE between 2004 and 2007.

On the other hand, this study examines determinants of firm capital structure by empirically observing how asset growth, non-debt-tax-shields, profitability, size and tangibility are correlated with firm leverage.

In the light of the empirical observations it has been found that pecking order hypothesis of the financing hierarchy is not valid in Turkish manufacturing sector. However, strong support has been observed for the existence of market timing behavior which was supported by statistically significant and big market timing coefficients. Finally, empirical tests for capital structure determinants showed that profitability, asset growth and tangibility are important in capital structure formation process.

General findings showed the following, Turkish manufacturing firms listed in the ISE reduce debt financing by approximately 1.66% per 10% overvaluation of equity, approximately 29,2% of the financial deficit is financed with debt and the rest with equity, in contrast to the pecking order hypothesis, big firms utilize more debt. Finally, findings have suggested that market timing hypothesis is more relevant for big firms which are more prone to time the market.

Key Words: Pecking Order, Market Timing, Capital Structure, Istanbul Stock Exchange (ISE), Equity, Debt.

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CHAPTER 1
INTRODUCTION

Capital structure research generally focuses on how firms choose between various sources to finance their assets. There are two types of sources, namely debt and equity, available to the corporate sector. It is also known that the proportion between those two sources may well be reflected on the value of firm as whole. The issue is, how firms choose their capital structure and what factors affect that process. The conditions under which firms determine their capital structure are different from the perspective of main capital structure theories. For example, trade-off theory says that capital structure is the outcome of balancing between various costs and benefits of debt and equity. Pecking Order says that firms follow hierarchy, where they firstly utilize internal sources, after they use debt and finally they issue equity. From the perspective of market timing theory, the portion of debt increases when equity markets are undervalued and decreases in the opposite case. There is also a number of corporate governance and tax based capital structure theories which also put their own propositions towards firm capital structure formation.

The aim of this study is to empirically test the validity of the pecking order and market timing theories for the Turkish manufacturing firms listed in the Istanbul Stock Exchange (ISE) between 2004 and 2007. The pecking order theory, put forth by Myers (1984) and Mayers and Majluf (1984), is based on the information asymmetry between investors and firm managers, which drives the hierarchy from internal to external sources of financing. Whereas, market timing, which have been studied by recent researchers such as Baker and Wurgler (2002), Huang and Ritter (2004), Kayhan and Titman (2004), Elliott et al. (2007), is also classified under asymmetric information based theories, but differently from pecking order, this theory proposes issuing and repurchase of the related securities (debt and equity) based on current firm value.

Additionally, this paper studies conventional capital structure determinants in Turkish manufacturing sector. Within the further analyses, this study takes into

consideration capital structure determinants such as asset growth, size, profitability, non-debt-tax-shields (NDTSH) and asset tangibility in the way as they were handled by Rajan and Zingales (1995). Findings have suggested that three of five capital structure determinants, profitability, asset growth and asset tangibility are important for the Turkish manufacturing sector in their process of capital structure formation.

Results have shown that, profitability has negative, and growth positive correlation with leverage which is in line with pecking order theory. However, tangibility has provided results contrary to the expectations, by generating negative correlation with leverage. But such a finding is in line with previous studies conducted for Turkey, such as Booth et al. (1999), Balsarı and Kırkulak (2008). The negative correlation of tangibility with short term debt and positive with long term debt reflects preference of Turkish manufacturing firms to finance their long term assets with long term debt.

On the other hand, direct tests of pecking order and market timing theories have generated contradicting results to the pecking order hypothesis. The pecking order hypothesis has been rejected for Turkish manufacturing firms, as deficit coefficients have been found far below the unity. However, analysis results have offered strong evidence in support of market timing behaviour of Turkish manufacturing firms, by estimating approximately 1.66%, 0.95%, 1.98% reduction in debt financing per 10% overvaluation of firm equity for overall, big and small firm samples respectively.

The study is organized as follows: Chapter 2 offers broad literature review for the main capital structure theories and mainstreams. Chapter 3 handles the issues of institutional differences by studying ongoing literature in depth. Chapter 4 describes sample, chapter 5 presents research design and empirical results. Finally, chapter 6 summarizes all findings and empirical implications of the study.

CHAPTER 2
CAPITAL STRUCTURE THEORIES, LITERATURE REVIEW

Financial literature on firm capital structure began its triumphal development with the pioneering work of Modigliani and Miller (1958) who proposed that decisions regarding capital structure mix do not alter the overall value of the firm. After their magnificent proposition, literature of finance developed into many branches and thus many models and hypotheses, some supporting and some contradicting each other, emerged. Actually, the capital structure study aims to explain the financial structure of the firm, namely the optimal proportion of debt to equity. Within this context, it is also important to recognize that debt and equity are the main sources of firms' assets and their proportion may affect activities of the firm, and as proposed by many theories, it also has an impact on the value of the firm. However, as stated by Myers (2001), there is no universal theory of capital structure and there is no reason to expect one. But there are some propositions which are advised by different theories. For example, pecking order theory states that corporate financing decisions are the outcomes of hierarchical approach. Because of asymmetric information, firms firstly use their internal sources. When internal sources are exhausted firms issue the safest source of financing, namely debt. Finally, as a last resort, firms issue equity. Just because of such assumption regarding the financing priority of investment projects, the pecking order theory predicts very low level of equity. On the other hand, trade off theory predicts that firms set target proportion of debt level which they try to maintain, and because of the tax deductibility of debt, trade-off theory predicts high debt proportions. The cash-flow theory predicts that debt increases firm value by mitigating various agency problems. As it is seen, different theories propose different predictions regarding debt levels.

In this section, the most important and widely accepted firm capital structure theories are going to be presented within the scope of ongoing firm capital structure literature. Actually, this section is important in several ways; firstly, it is necessary to grasp the propositions of different theories and different streams which they belong to, in order to broaden our vision of firm capital structure concept. On the other hand,

this section is important to understand where the hypothesis of this work stands and what idea it offers.

2.1 AGENCY COSTS AND CORPORATE GOVERNANCE BASED THEORIES

Agency Cost based theories have been recognized as important point in explaining firm capital structure formation. As it was defined by Jensen and Meckling (1976), Agency relationship is a contract under which one or more persons (the principal(s)) commit another person (agent) to perform some services on their behalf. Such a contract involves delegating decision making authority to the agent (Jensen and Meckling, 1976, P: 5). If we assume that each party is acting in order to maximize its own wealth, then agent will not always act perfectly on behalf of the principal. Based on this notion, agency cost arises from incentive based conflict between managers and share holders when managers do not perfectly act in line with value maximization criteria of shareholders (Jensen and Meckling, 1976). For this reason, it is possible to say that capital structure is being formed as a result of continuous interaction of interests between principals and agents. Those interactions aim to delineate the interests of each party and include various corporate governance tools. For example, in the model developed by Zwiebel (1996), capital structure arises as an optimal response of managers to simultaneous concerns of expanding and retaining control of their (Managers') empire (Zwiebel, 1996, P: 1209). From this perspective, it is important to understand the driving forces which are important in the firm capital structure formation process.

The most appealing and pioneering model in the sphere of agency theory was developed by Jensen and Meckling (1976). Their model is actually based on the conflicts between shareholders and managers, who should normally act on behalf of the firm owners.

It is assumed that owner-manager, firstly owning 100% of the company shares, will perfectly act in line with value maximization and no agency costs will arise. He will undertake only positive net present value (NPV) projects and pass up

negative ones, because he is the sole owner of all possible outcomes. However, when owner manager sells a portion of his shares to an outside shareholder, he will want to retain his previous wealth level and thus will be more prone to use non-pecuniary benefits by allocating extra resources into nonproductive areas, such as empire-buildings, plash offices, corporate jets, etc. For this reason, shareholders will exert extra effort to prevent agency problem such as shirking, non-pecuniary benefit consumption and overinvestment (Jensen and Meckling, 1976, P: 51). As a result, shareholders will engage in bonding and monitoring activities that will ensure managers to act on their behalf. However, these activities need a vast amount of resources for being implemented, and that is what actually composes agency costs and reduces company value.

Agency theory is generally concerned with resolving two problems that can occur in agency relationships. The first is the agency problem that arises when desires and goals of principals conflict, and when it is difficult or expensive to verify whether agent is acting properly on behalf of the principal. The second is the problem of risk sharing which arises when principal and agents have different attitudes towards investment risk (Eisenhardt, 1989, P: 58). For example, in Jensen and Meckling (1976) agency problems are mitigated by monitoring and bonding activities, which are not without cost and reduce overall firm value.

Many empirical researches have been done by taking zero-agency-cost-firm case of Jensen and Meckling (1976), where managers own 100 percent of stake, as a starting point. For example, James Ang et al (2005) had performed a research where they examined how agency costs vary with firm ownership structure by comparing the efficiency of the firms which are run by shareholders (owner-managers) with those firms which are managed by outsiders[1]. They found that agency costs are higher when firm is managed by outsiders and there is inverse relation between managers' ownership level and agency costs, but also they found that agency costs increase with a number of outside shareholders (Ang et al, 2005, P:104). Findings are highly consistent with the prediction of Jensen and Meckling (1976) propositions.

[1] Here "outsider" is referred to managers who do not own any firm shares and who were hired by owners (shareholders) to manage firm activities.

2.1.1 Free Cash Flow Theory (Jensen, 1986)

Free cash flow is a cash flow in excess of that required to fund all projects that have positive net present value when discounted at the relevant cost of capital (Jensen, 1986, P: 323). The agency cost of excess cash arises especially within firms that generate substantial amount of cash from their operating activities. In such firms, managers tend to undertake even negative NPV projects. Thus, by overinvesting, they aim to increase their esteem or they tend to increase the consumption of non-pecuniary benefits by, for example, building plash offices, baying corporate jets and by benefiting from increasing of their control over the company.

First time in the literature Michael Jensen (1986) suggested that free cash flow problem could be mitigated by means of debt. Debt creation, without retention of the proceeds of the issue, enables managers to efficiently bond their promise to pay out future cash flows (Jensen, 1986, P: 324). Thus, by means of debt, managers are entitled to regularly pay interest and principal and if they fail to meet such an obligation in timely manner, the possibility of bankruptcy will increase and possibly such managers will be fired. In the model developed by Jensen (1986), debt, as a corporate governance tool, is imposed by shareholders (owners), but in the model developed by Jeffery Zwiebel (1996), mangers voluntarily constraint themselves by debt commitments. The motivation for debt constraint arises from bankruptcy possibility that reduces managerial entrenchment. As a result, debt constrained managers voluntarily restrict their future investment activities in order to avoid undertaking negative NPV projects, (Zwiebel, 1996, P: 1198).

2.1.2 Theory of Transactions Costs

Another very important perspective in explaining capital structure in the corporate governance sphere is the theory of transaction costs (Balakrishnan and Fox, 1993). Both agency and transaction cost theories are based on market imperfections (Kochhar, 1996: 713). The most important determinant point of the firm capital structure in the transaction costs theory is the nature of assets (Balakrishnan and Fox, 1993, P: 14). Namely, firms that have more firm-specific assets use more equity, because such assets are not redeployable outside the firm. As

a result, firms with such assets face more difficulties in obtaining debt. Furthermore, in the case of bad management board of directors has greater power over the management in the firm with substantial amount of firm specific assets, and thus, probably will interfere by formulating another managerial structure. On the other hand, firms with low firm specific assets will utilize more debt because such assets are deployable outside the firm and can be used as collateral during raising debt. So in the case of bad management, debt holders will use their right to take the firm to the bankruptcy court and liquidate its assets, because debt holders are dominant in the financing structure of the firm.

As it was noted by Williamson (1988), debt and equity are not just the components of capital structure and sources of finance of assets, but they also have great impact on determination of alternative corporate governance structures which vary according to their power of control over the management and assets (Williamson, 1988, PP: 579-581). In the empirical work on 295 mining and manufacturing firms, Balakrishnan and Fox (1993) find that firms' asset specificity and its uniqueness have an important role in determining the variability of capital structure, these findings support the above outlined hypotheses proposed by transaction costs theory.

2.1.3 Asset Substitution Problem (Mayers, 1977)

Up to now, discussed theories took into account the agency problem that arises between managers (agents) and shareholders (principals). However, there is also another dimension of agency theory where the problem arises between shareholders and debt holders and this leads to what Myers (1977) implied as the asset substitution problem.

Actually, Jensen and Meckling (1976) also pointed on some problems related with agency cost of debt. According to them, agency problems associated with debt claims on firms' assets causes the rise of the costs associated with managers' incentive to engage in very risky projects. Such risky projects increase the possibility of bankruptcy and reduce the possibility of paying back debt commitments.

Furthermore, the monitoring costs associated with such incentives also rise, as a result the bankruptcy costs rise too. All these comprise the agency cost of debt (Jensen and Meckling 1976, PP: 40-51).

The proposition of Myers (1977) is, in some way, alike with the proposition of Jensen and Meckling (1976). But in contrast to Jensen et al. (1986), managers, in Myers' model, act perfectly on behalf of shareholders. Looking at the case from this point leaves only one possibility of conflict which may arise between shareholders and debt holders. So the problem arises because shareholders are concerned with all possible residual outcome which is left after repayment of debt obligations. On the other hand, debt holders receive only specified amount and nothing over it. However, this problem leads to the case where managers engage in risky projects which have high possibility of failure and which provide high returns in case of success. Assuming that such a risky project is succeeded, all the residual income which is left after paying down certain amount of interest is left to shareholders. This also means that, shareholders may engage in risky deals on the expense of debt holders and thus, gain substantial wealth. Such an issue in the finance literature is referred as the wealth expropriation from debt holders to share holders, which was pointed by Myers (1977) as asset substitution problem.

One other side effect of asset substitution problem may arise in the following way; debt holders who are aware of such a problem, charge higher prices for debt capital which in turn increases the cost of debt and overall cost of capital. This results a chain reaction effect; where the cost of capital becomes so high that mangers are forced to pass up projects even with positive NPV. Such phenomenon is also known as the underinvestment problem which was proposed by Myers (1977).

Ertuğrul E. and Hedge S. (2007) perform very interesting empirical work. They investigate the effects of equity based incentive compensations to directors, namely stock and stock option compensations, on the corporate bond yield. They build their hypothesis on the notion that equity based compensations help to align the incentives of managers with those of shareholders. However, such compensation

may magnify the conflict between shareholders and bondholders because of risk shifting incentives. For this reason, they test two main hypotheses the first is *monitoring hypothesis,* where equity based incentives to the board members help to reduce the agency costs and this leads to negative impact on corporate bond yield spread. The second is *risk shifting hypothesis* where equity compensations prompt directors to engage in risky projects. In this study authors suggest that stock and stock option compensations are negatively related to seasoned bond yield spreads which shows that monitoring incentives exceed risk-shifting incentives. This empirical work is consistent with the prediction of Jensen and Meckling (1977) and also shows that asset substitution problem really exists, and can be mitigated with corporate governance tools.

However, Graham and Harvey (2001) in their empirical survey of investment and financing decisions of 392 CFOs find little evidence in support of asset substitution problem. Furthermore, they find little evidence that short term debt is used to eliminate underinvestment problem and that CFOs use short term debt to mitigate asset substitution problem.

To sum up, in this section some key aspects of the agency theory have been outlined. It has also been attempted to describe the agency problems from the perspective of capital structure and its effects on the capital structure formation.

It is possible to say that almost all agency theories predict high or moderate levels of debt. The fact comes from the notion that debt is used as an agency problem mitigating tool, which was stressed by Jensen (1986). For example, as it was stated above, free cash flow theory predicts high level of debt for the firms that generate substantial amount of free cash flow and which do not have any significant investment prospects. On the other hand, transaction costs theory predicts different debt levels conditional on firm's asset specificity level, for example firms that have low assets specificity are expected to utilize more debt and those with high asset specificity are expected to utilize less. Asset substitution problem also predicts high debt level because in this theory, managers who are assumed to act perfectly on

behalf of shareholders, attempt to borrow more in order to engage in risky projects and gain high returns in case of their success.

As a result, agency theory provides very important information regarding capital formation and predictions are almost parallel in each sub-theory of agency problem literature.

2.2 ASYMMETRIC INFORMATION BASED THEORIES

The notion of Modigliani and Miller proposition, that financial decisions and capital structure choices do not affect firm value, is based on the assumption of frictionless capital markets where inside managers and outside investors are endowed with the same information set and where expectations are equal to the realizations. However, such approach is very far from realistic world. As it was proposed by Ross (1977), market participants value the perceived stream of returns of the company and thus the changes in the financial structure leads the possibility that the market perceptions will change accordingly, and underling valuations will change as well (Ross 1977, P: 25). In the finance literature there are a number of researches that replace the costless and frictionless market conditions with the possibility of information asymmetry, for example Ross (1977), Talmor (1981), Miller and Rock (1985), are the pioneering authors that implement information asymmetry in their models.

2.2.1 The Information Asymmetry

The information asymmetry may arise in a number of different ways. For instance, there may be difference in the information set between insiders (managers and directors) and outsiders (investors), public debt holders and private debt holders and all cases of information asymmetry may result in different signaling opportunities which in turn may effect the capital formation and value of the firm. For example, Leland and Pyle (1976) develop a model where entrepreneurs' choice of capital structure may signal an informational content to investors and change their expectations regarding future prospects of the company. In their model, it is assumed

that insiders know more about the real state of their project and if the project is really promising and the possibility of success is very high, entrepreneurs will tend to finance the lower portion of the project with debt and the rest they would hold as equity. Thus, entrepreneurs' willingness to invest more in their own projects will release a positive informational content to investors who, in turn, will revise their expectations about the projects return, the result of which will be reflected as a rise in the firm value.

In this section, signaling effects of dividend, financing and investment decisions, which were proposed by Merton Miller and Kevin Rock (1985), will be discussed in a brief content.

To better understand what information asymmetry is, it would be useful to present the model of Miller and Rock (1985) in a very simple form. As authors put, the information effect is the difference between realization and expectations (Miller and Rock 1985, PP: 1038). For example, in the frictionless world of financial interactions the expectations of investors truly meet realizations because investors fully comprehend the prospects of the company and in turn make needed adjustment in their investment actions. However, in the world where information asymmetry prevails, investors have different information set than that of what managers and directors (insiders) have. For this reason, the valuation of the company will differ from the point of both sides (outsiders and insiders). In other words, under information asymmetry market value and real (intrinsic) value of the company are two different entities (Talmor 1981, PP: 423).

According to Miler and Rock (1985) there are three different effects of firms' actions under asymmetric information conditions which are:

a. Earnings announcement effect
b. Dividend announcement effect
c. Financing announcement effect

So let assume that H^d and H^m are the information sets of directors and market participants respectively. Then, under the information asymmetry, information sets

take functional structure as follows; H^d= {X, I, D} and H^m = {I, D} where X represent earnings, I investments and D dividends (Miller and Rock, 1985, PP: 1040-1043).

2.2.1.1 Earning Announcement Effect

In the model developed by Merton and Rock (1985) it is assumed that value of the firm is the difference between earnings plus present value of cash flow generated by investments, it can be expressed as follows;

$$V_1 = X_1 - I_1 + \left[\frac{1}{(1+I)} * F(I_1) \right]$$

The value of the firm according to the formula would be right in the perfect frictionless world where there is no asymmetric information problem and expectations are the same with realization. Unfortunately, in the real world expectations almost never meet realizations because information set of mangers and investors is different. As a result, investors' valuations and thus expectations do not meet ex-post realized values. Thus, the difference between expected and realized values gives the earnings announcement effect, the bigger the difference the greater information asymmetry is. For example, McLaughlin and Saffieddine (2008) examine the effects of information asymmetry on seasoned equity offerings between regulated utilities and unregulated industrial firms. They test the mitigating affect of regulation on such firms and find that regulated utilities have superior changes in operating performance than other industrial firms, compared with the performance of pre to post-issues. And the announcement affect on returns is less negative for regulated utilities. Announcement effects were found to be more pronounced in small firms where information asymmetry is more severe and where regulation is expected to have grater affect (McLaughlin and Saffieddine, 2008, PP: 59).

2.2.1.2 Dividend Announcement Effect

The dividend announcement effect is also an outcome of an asymmetric information problem and so long has been studied in the literature of finance. Yet, the information effect of dividends has not been understood very well, but in the model of Merton and Miller (1985), dividend announcement effect was incorporated

in their proposed formula where the value of the firm is the difference between its earnings and investment plus present value of the future earnings. Here, future earnings are generated from investments. In their model net dividend effect has to be equal to the net cash flow that is the difference between earnings and investments.

$$D_1 = X_1 - I_1$$

Thus, under asymmetric information conditions the difference of actual and expected net dividends will be equal to ε_1.

$$D_1 - E(D_1) = X_1 - E(X_1) = \varepsilon_1$$

They then incorporate the dividend announcement effect into the formula where the effect of dividend disclosure imposes greater effect on the valuation perspectives of investors through the persistence parameter. Persistence parameter, in turn, measures the magnitude of surprise and can be formulated as follows:

$$V_1 - E(V_1) = D_1 - E(D_1) * [1+\gamma/(1+i)]$$

Where V is the value of the firm, D net dividends E(D) expected dividends γ persistence parameter. The surprise increases with the persistence parameter γ and persistence parameter increases with respect to the severity of information asymmetry between insiders and outside investors. As the value of the company in this model is measured with stock prices, stock prices will respond to dividend announcements. In other words, model developed by Merton and Millers hypothesize that, dividend surprise rises accordingly with the level of information asymmetry.

2.2.1.3 Financing Announcement Effect

The financing announcement effect has just the same specifications as in the dividend announcement effect but only with reversed sign (Miller and Rock 1985, PP: 1038). In other words, according to the model of Merton and Miller (1985) it is expected that the financing announcement effect will have reversed effect on stock price perturbations which is the opposite of dividend surprise effect.

2.2.2 Signaling, Underpricing and Separating Equilibrium

One of the most important aspects of information asymmetry based theories is the incentive of managers to convey a particular set of information to the investors by various financial decisions. This fact is called signaling in the finance literature. Many researches in the area of finance assume that markets share all available

information regarding return distributions of investment projects, in which case insiders and outsiders respond identically to the financial changes of the company. In such a world there is no need to convey any information to the market in order to show that certain firm is of a type other than it really is. However, under more realistic conditions of information asymmetry where markets' information is less accurate than insiders information is, any financial decision or plan will be indistinguishable to the market and thus, there will rise an important incentive for managers to choose one type of financial plan over the other, in order to use the signaling feature of financial decisions (Flannery 1986, P: 19). In other words, we can define signaling in the context of financial literature as the ability of any financial decision or financial package to transform or convey positive or negative information to the investors and thus affect their decision plans.

One of the leading works in the sphere of asymmetric information problem and signaling phenomena is the model developed by Leland and Pyle (1977). They develop a simple model where firms with good projects try to separate themselves from the firms with bad projects, by signaling their true situation. Again, the problem rises from the fact that insiders know more about the true quality of their projects than investors do. That is why the true state of the firm in the market is indistinguishable from the perspective of investors. For this reason, insiders attempt to signal good news by willingness of holding more shares of their own projects. This willingness to invest may serve as a signal to the lending market about the true quality of the projects; lenders will place a value on the project that reflects the information transferred by the signal (Leland and Pyle 1977, P: 371). As it is clearly seen, the signaling tool in this model is the insiders' amount of shares held in their own project which conveys good information to the market.

Grinblatt and Hwang (1989) generalize the model of Leland and Pyle (1977) by assuming that insiders have better information about their future cash flows. They actually investigate the pricing of the new issues under asymmetric market conditions. In their model, insiders convey information by two main tools first of which is similar to Leland and Pyle (1986) that is the fraction of shares held in the

project by insiders, and the second, which is very important, is the pricing of new securities. They argue that insiders convey positive information to the market by giving money away. That is, firm managers issue underpriced securities in order to show the quality of their company (Grinblatt and Hwang 1989, P: 394).

The propositions of Leland and Pyle (1977) are mainly supported by the empirical findings of Cai and Wei (1997). They investigate IPO activities for 180 Japanese companies listed in the Tokyo Stock Exchange between 1972-92 and find significant underperformance of Initial Public Offerings which are accompanied with a decrease in the shareholdings of directors by the median percentage of %14 one year prior to the initial public offerings (IPO) (Cai and Wei, 1997, P: 414). This is a sharp empirical example where negative information is signaled to the market by the decrease of insiders' share portion. Welch (1989) also builds a model based on signaling with underpricing initial offerings and supports the predictions of the model by preliminary findings. The model of Welch (1989) is also based on the willingness of good firms to separate themselves from bad ones by underpricing their securities and forcing bad firms to reveal their real situation. His model predicts important facts such as: firms issue substantial amount of claims in a seasoned offerings and that IPO returns increase when the value of the high-quality firms increase and that underpriced issues have low residual uncertainty (Welch 1989, PP: 440-441).

The best way to study underpricing phenomenon is to analyze Initial Public Offerings (IPO's) along with Seasoned Equity Offerings (SEO's), because, as proposed by theories, firms signal their quality by giving money away. If that is true, then every rational investor will be willing to buy such share because they expect that underpriced securities will provide positive returns in the future. As there will be a rush on such underpriced securities, prices will rise dramatically after the first day of issue. However, such security is expected to underperform in the long-run, by the time when the true state of the firm is realized. There are many researches that observe over and under performance of IPO's after first day issuance and in the long-run. For instance, Welch (1989), Cai and Wei (1987), Loughran and Ritter (1997),

Ritter and Welch (2002), Brav and Gompers (2000), Purnanandam and Swaminathan (2004) and many other authors document IPO underpricing phenomenon.

Although arguing that asymmetric information is not the primary determinant of fluctuations in the IPO activities, Ritter and Welch (2002) in their study of IPO activities for U.S., document an 18,8 percent of abnormal return above the prices at which companies sell shares. For investors buying the security at the first day closing price and holding them for three years, IPOs returned 22,6 percent and above the three years IPO underperformed the CRSP value-weighted market index by 23,4 percent (Ritter and Welch, 2002 P: 3). Actually, this is a sharp example of underpricing phenomenon but it is also consistent with the view that when firms' true state is observed by investors, shares lose value. However, Purnanandam and Swaminathan (2004) in their study of IPO activity between 1980 and 1997 document some contradictive evidence on IPO first day pricing. By using large cross-sectional data from SDC database and comparing the fair value of shares to the first day offer price they find a significant overvaluation of IPOs. Furthermore, they argue that overvalued IPOs have better returns than undervalued ones.

Relying on the outlined information above it is possible to classify the types of signaling as follows;

a.) The informational content of debt level and maturity

The seminal contribution in the area of signaling by issuing debt is the work of Ross (1977). In his model managers know the real distribution of firm returns but investors do not, and it is assumed that managers act in line with shareholders interests. Thus, managers are awarded if firm value increases. Otherwise, if firm goes bankrupt, they are penalized. As a result, investors perceive higher level of debt as good news because it indicates the quality of the firms since low quality firm have higher probability of bankruptcy for each dollar of debt, and are not expected to take large positions in debt securities.

On the other hand, if the bond market cannot distinguish among good and band firms then good ones will consider their long-term debt relatively underpriced

and therefore will issue less underpriced short-term debt, but on the other hand bad firms will issue overpriced long-term debt (Flannery, 1986 P: 35). In this case, debt maturity signals information about the quality of the firm.

The main empirical outcome in the model developed by Ross (1977) is that debt to equity level and firm value, are positively correlated (Ross, 1977, p: 37). Contrary to what has been documented by Ross (1977), Flannery (1986) finds that firm value is negatively correlated with debt to equity level.

b.) Signaling with insiders' equity fraction prior to IPO

Firms with good projects will hold bigger fraction of their own equity thus the insiders' fraction of equity signals the information about quality of the project

c.) Signaling with leaving money on the table, underpricing phenomenon

Good firms leave money on the table in order to signal their quality, and also firms may underprice IPO's to make some influential investors acquire shares immediately and which may create a cascade and make other investors buy shares too (Purananandam and Swaminathan, 2004 P: 846).

The informational content of IPO's well explained by Korajczk (1989). Firms generally tend to time the market and under assumption that managers act perfectly in line with shareholders wealth maximization, equity issuance is performed when it is believed to be overvalued. For this reason, equity issuance conveys negative information to the rational investors and overvalued stock price drops upon equity issue announcement (Korajczk, 1989 P: 4). With the same logic it is possible to infer that debt issuance conveys positive information to investors because firms are expected to issue debt only when they are undervalued.

The signaling and separating equilibrium are some of the very important outcomes of asymmetric information problem. The logic behind such behaviour is hidden in the notion that insiders and investors are not informed symmetrically. Thus under such conditions, every change in the financial structure or disclosure of accounting data or even IPO pricing activities convey informational value that affects investors behaviour. From this point of view, the change in the investors' perception

about firms' true state will have potential affect on its value. Surely, all these aspects will affect the capital structure of the company because managers, under such conditions, have incentives to adjust the firm capital structure that signals particular information to the investors.

2.2.3 Relation between Firm Size, Age and Degree of Asymmetric Information

Beginning with contributions of Ross (1977), Myers (1984) and other scholars, researchers developed many models based on asymmetric information. The existence of asymmetric information problem has been an important incentive for many academic essays to run empirical investigations for different economies. In the literature of finance the degree of asymmetric information is also important in determining the capital structure of the firm. For example if a company suffers from severe asymmetric information problem the equity issuance will be highly underpriced by investors. For example, Myers (1984) argues that under severe asymmetric information conditions between insiders and investors, equity will be underpriced to the extent that the company will be forced to forgo even positive Net Present Value (NPV) projects. For this reason, firm follows pecking order, which is going to be discussed in details later, in the financing process. In other words, the degree of information asymmetry is important because of its great effect on capital structure formation.

Capital structure literature offers many variables which are used for measuring severity of information asymmetry, among important ones, are size and age of the company. For Example, Titman and Wessels (1988), Rajan and Zingales (1995) use size as an explanatory variable in their models.

The notion of ''too big to fail'' explains much about the case, big companies with more tangible assets and financial power are assumed to be more reliable in the capital markets because of their transparency and operational efficiency. That is, big firms are generally engaged within a number of different sectors and are well diversified, which reduces their probability of bankruptcy. In the case of bankruptcy, firms that have more tangible assets have greater possibility that the liquidation value

of the collateral assets will cover the liabilities to debt-holders and share holders. Such big firms are also expected to use more debt in their capital structure (Titman and Wessels, 1988 P: 6). On the other hand, big companies are more reliable in the capital markets and face less asymmetric information problem. Theoretically, stock prices of big firms should be less underpriced. Rajan and Zingales (1995) in their investigation of capital structure among G7 countries find positive correlation between leverage and size for all G7 countries, as expected by the theory, except for Germany for which they attribute the result to its institutional structure.

The age of the firm may also play an important role as an explanatory variable for the degree of information asymmetry and as a determinant of capital structure. Companies which have long credit histories are more transparent and reliable by investors. From this perspective young firms are expected to have more volatile cash-flow and thus will be more underpriced by lenders.

2.2.4 Expected Correlation of Leverage and Free Cash Flow Variables under Symmetrically and Asymmetrically Informed Market Conditions

The capital structure literature suggests that firms are more concerned with underinvestment problems when there are asymmetrically informed market participants. When there is no problem such as information asymmetry, firms are generally engaged with overinvestment problems. Actually, under and overinvestment problems are the outcomes of two different theories namely free cash flow and pecking order. These two theories are based on different assumptions and under each condition the expected correlation of free cash flow variables changes.

In the first theory; shareholders are encouraged to mitigate overinvestment problems which are resulted by inefficient use of cash by managers to undertake projects with negative net present value. Free cash flow theory, that was first proposed by Jensen (1976), does not take into consideration market imperfections and is concentrated on the problem of aligning the interests of managers with those of share holders'. Looking at the issue from this angle, the aim of interest alignment

is realized by various corporate governance tools, among which the most important is debt. Debt is used as a mitigation tool that obliges managers to cover certain amount of principal and interest payments each period, thus creating a discipline which forces managers to use excess cash more efficiently. Here debt is used as a tool to prevent investment into the non-efficient areas what we actually call mitigating the overinvestment problem.

On the other hand, the pecking order is completely based on the notion of market imperfections where investors and managers are asymmetrically informed. Such conditions generate a number of problems where each financing decision reveals a certain type of signal to the market. Accordingly, market participants' asses the signal and revalue the issued security. According to the pecking order theory, equity is the most affected by the information asymmetry. This is because investors undervalue equity securities assuming that mangers issue equity only when it is overvalued. The undervaluation may reach such a magnitude where firms are forced to pass up even positive net present value projects. As a result, when there is an information asymmetry, firms are engaged with underinvestment problems and utilize relevant strategies in order to mitigate it. One of the most important strategies is the financing hierarchy advised by the pecking order theory. This strategy suggests that firms should firstly use up their internal sources. If there is still a need for financing, the firm should firstly issue safest security namely debt and as a last resort equity.

To sum up, when we asses the relation of free cash flow in each case outlined above it is possible to say that when there is no information asymmetry free cash flow variables are expected to have positive correlation with debt. The positive correlation is due to agency problems. However when there is a major problem of information asymmetry the correlation between free cash flow and debt is negative because firms use up internally generated sources in order to mitigate the undervaluation problem (Miguel and Pindado 2000, pp: 78-95).

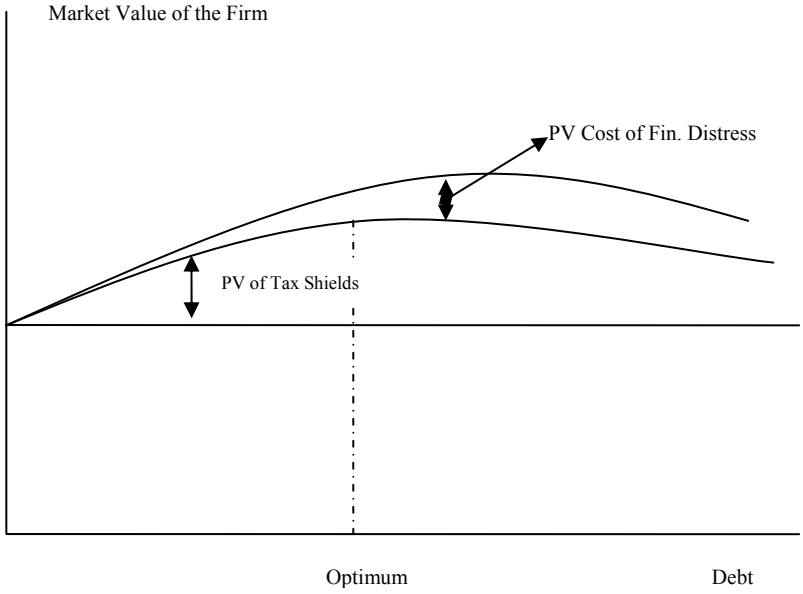
2.3 TRADE OFF RELATED THEORIES OF CORPORATE FINANCING DECISIONS

Trade-off related models are based on the logic that balances various costs and benefits of debt versus equity financing. Those costs are tax benefits of debt and financial distress costs resulted by issuing substantial amount of debt (Modigliani and Miller, 1963). As a result, if there are benefits and costs between particular amount of debt and equity then, based on the notion of optimization concept, there should be an optimal level of debt versus equity that would maximize the value of the firm. Thus, trade-off related models assume that firms have target debt level and partially adjust their capital structure in order to set the balance between debt and equity that would increase the value of the firm to its maximum. Robert Taggart (1977), by using market value of debt-equity ratio as the determinant of long term debt capacity and utilizing estimation techniques that accounts for balance-sheet interrelations develop and empirically test target adjustment model. Findings suggest that when debt-equity ratio is below the target level, firms issue more debt and less stock and when temporary capital, defined as long-term debt plus short-term debt minus liquid assets, is below target, firms draw down liquid assets and issue more short-term debt (Taggart, 1977 p: 1475).

As suggested by Myers (1984) there is a benefit of interest tax shields, and also after some point, there are various financial distress costs which are associated with bankruptcy procedures, contracting costs and etc.

In the figure 1, where market value of the firm is plotted against debt level, straight line represents firm value under all-equity finance and the convex lines represent the present value of tax shields and financial distress costs. It is seen that until the point where firm value maximizes, present value (PV) of tax shield is greater than PV of financial distress costs. For this reason each dollar of debt added, increases the firm value. However when the firm is excessively leveraged the PV of financial distress starts to exceed the PV of tax shields, as a result of which firm value reduces.

Figure: 1 Costs versus Benefits of Debt Financing



Source: Myers (1986), The Capital Structure Puzzle, p. 557

Although there is no theoretically and empirically justified certain optimal debt level, at which firms' value maximizes, according to trade-off related models firms tend to converge to their target debt level. However, some models predict that convergence may take a long time and deviations from target levels may be very big that is caused by various adjustment costs.

2.3.1 Partial Adjustment Models

The adjustment process of the firms' capital structure represents various costs and benefits resulted by debt financing. According to dynamic models of capital structure, Zechner (1989), Leland (1994), firms will periodically readjust their capital structures to their target debt level in order to reach optimum capital structure and maximize firms' value. Actually, in the world of Modigliani and Miller, where financing decisions do not affect value of the firm, companies would never adjust to the target debt levels. However, because of the real world imperfections there is a need for such adjustments.

There are many trade-off related models that provide an opportunity to empirically test and justify the existence of the adjustment process. In general, the idea behind the partial adjustment models is the same in many empirical studies but some models differ in terms of assumptions regarding the determination of the target

debt level. So if we assume that target debt level D^* is the function of some internal and external factors, then firms will adjust to their targets as follows:

$$D_{it} - D_{i,t-1} = \lambda(D^*_{it} - D_{i,t-1}) \quad 0< \lambda <1$$

Where D^* is the firms' target debt level, D actual and $D_{i,t-1}$ one period lagged debt level, λ represents adjustment coefficient and its' economic interpretation represents the magnitude of adjustment costs. According to the model, in each period company will adjust to its target debt level by portion λ that is between 0 and 1. So by transforming the equation into the fallowing linear model it becomes possible to estimate coefficient λ.

$$D_{it} = \lambda D^*_{it} + (1- \lambda) D_{i,t-1} + U_{it} \quad \text{(Özkan, 2001 pp:193-194).}$$

Where, U_{it}, is the white noise error term. In this model, if the estimated coefficient λ approaches to 1, it means that there are no transaction costs and firms adjust to their targets so quickly that the difference between target and actual debt level become equal to the difference of actual and previous years' debt level. On the other hand when λ approaches 0 the transaction costs increase and it takes more time for the firm to adjust to its target capital structures. Above outlined model, with different assumptions, is used by many authors such as, (Marsh (1982), Jalilvand and Harris (1984), Miguel (2000), Hovakimian et al (2001), Özkan (2001).

One of the recent empirical works that utilize the same logic outlined above and which shows how companies make a choice between equity and debt at a given point in time belongs to Marsh (1982). Marsh develops a descriptive logit model that utilizes 748 equity and debt issuances of UK based firms, between 1950 and 1979. The model is based on the following target adjustment model;

$$\Pr (Z_{it} =1) = \Pr (D^*_{it} - D_{i,\, t-1} <0)$$

Where $\Pr(Z_{it} =1)$ is the possibility of firm i to issue debt or equity at time t and where D^* and D are the firms' target and actual debt ratios respectively. This model assumes that firms' financing choice is the function of the current and the target debt ratios. Since target debt level is assumed to be unobservable, this static trade off model takes the target debt level as endogenously determined and as a linear function of firm size, operating risk and asset composition. Findings of the empirical study show that timing issues take an important place in determining financial decisions.

On the other hand during the process of choice of financing instruments firms behave as if they had target debt levels in their mind.

Jalilvand and Harris (1984) in their empirical investigation of corporate financing decision also utilize partial adjustment models where they use a panel data of U.S. based firms between 1966 and 1978. In their model they allow partial adjustment speeds to vary across firms and time and they find that speed of adjustment is affected by firm size, interest rates conditions and stock price level. Differently from Marsh (1982), Jalilvand and Harris (1984) take target capital structure as given and focus on determining the nature of partial adjustment to those targets. On the other hand, one other originality of their work is that they investigate not only the adjustment process to the target debt levels but also they analyze firm adjustment process to their target dividend, target liquid assets, target short term debt and finally target common and preferred stock levels. The results suggest that easy entrance to capital markets speeds up the adjustment process to the target capital structure levels. On the other hand, they find that adjustment to the target equity level is relatively slow compared to the adjustment process of other individual targets.

Miguel and Pindado (2000), also develop a target adjustment model for Spanish companies but differently from Jalilvand and Harris (1984) the target debt level is determined exogenously that is similar to Marsh (1982). However, the determinants of target debt level are different from Marsh (1982). Miguel and Pindado (2000) construct the target adjustment model where target leverage is the linear function of non debt tax shield (NDTSH), financial distress costs (FDC), investment (I), and cash flow (CF). They also incorporate into their model the effect of institutional difference on capital structure and find that firms bear transaction costs when they adjust to the target and that adjustment costs of Spanish firms are higher than that of US firms.

Based on the findings and suggestions of assumptions and model developed by Jalilvand and Harris (1984) it is possible to develop the following scheme where interactions of financial decisions are theoretically presented. Authors suggest that

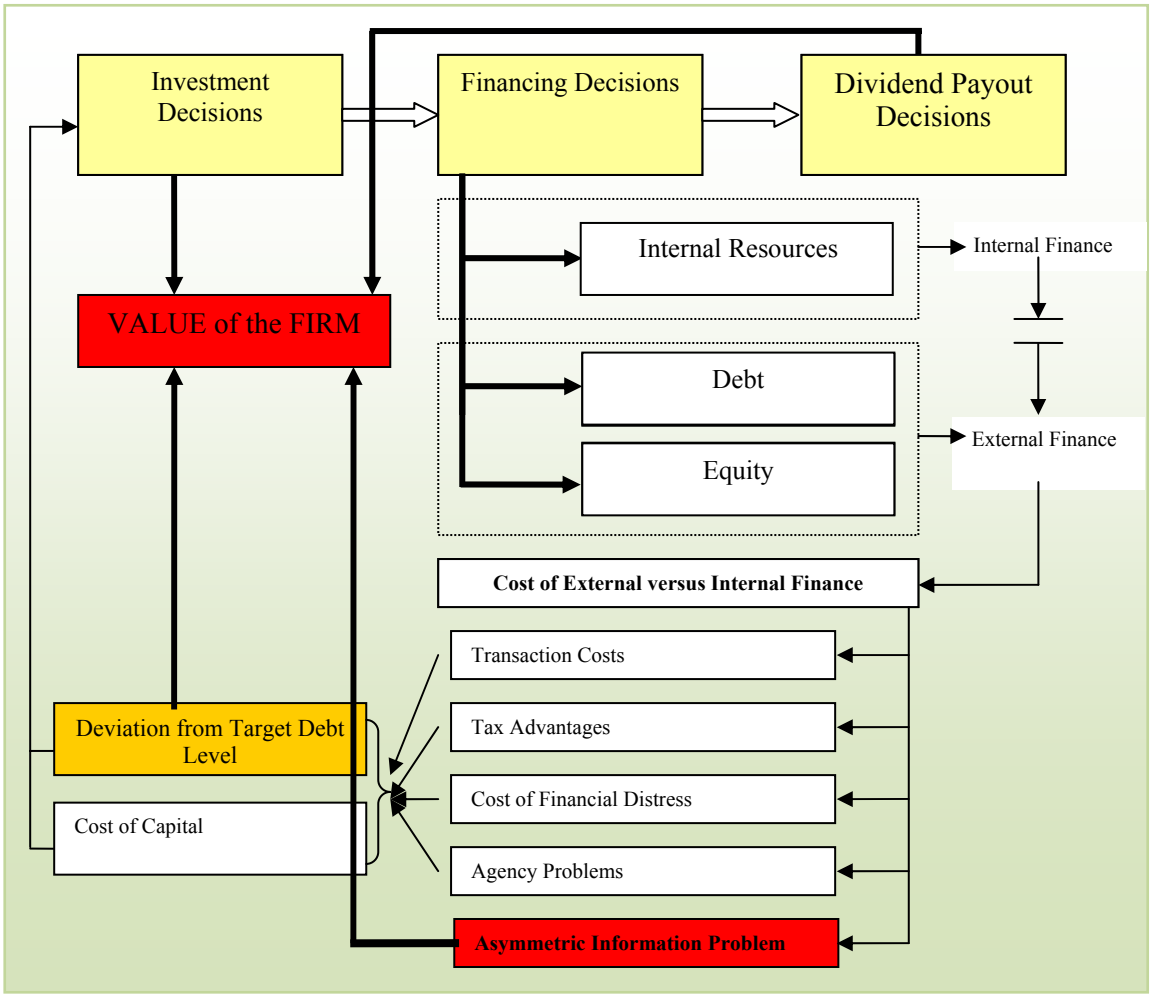
under perfect market assumptions the financial decisions like investment, financing and dividend do not have any impact on each other and thus can be analyzed separately.

However, when perfect market assumptions are relaxed each stage of financing decisions have an important impact on firm value, and each affects the decision process of the following financial decision. For example, authors emphasize that the existence of market imperfection implies that financing decisions may affect the value of the firm and that, as a result, firms may have long run target financial structures which are influenced by corporate and personal taxes, bankruptcy costs, and agency related costs (Jalilvand and Harris, 1984 p: 128).

In the figure 2 the stages of financial decisions are investment, financing and dividend payout. Financing decisions are composed of internal sources, debt and equity, Myers (1984). Under imperfect market conditions internal versus external financing decisions will generate some costs and advantages which are transaction costs, tax advantages, costs of financial distress, agency problems and the most important, asymmetric information problem (Fazzari 1988, P: 148). Such imperfections will make it costly to adjust towards target capital structure and thus, will result in a deviation from targets. On the other hand, the cost of capital will also be affected and that will exert an overall pressure on financing decisions through cost of capital. Cost of capital, in turn, will force companies to pass up positive NPV projects and costly adjustments will affect the composition of equity and debt in project financing. As a result, all these interactions will affect company value through security prices. On the other hand, the asymmetric information problem will directly affect the value of the firm which is supported by a number of researches. Finally, the dividend payout decisions will also exert some pressure on firm value.

Up to now, we have analyzed target adjustment models where target debt level does not change over time. However, some authors incorporate the assumption of changing target debt level in their models such as Hovakimian at al. (2001).

Figure: 2 Interactions of Financial Decisions under Imperfect Market conditions



They test the dynamic trade off model for U.S. based companies between 1979 and 1997. The target debt level in their model is a function of weights of asset in place and growth opportunities which, authors assume are the main components of the firm value. As the proportion of those driving determinants of firm value changes, the target debt level tends to change too. The estimation procedure in this empirical study consists of two stages; in the first stage, leverage is regressed on the conventional determinants of capital structure. In the second stage, a logit regression is employed, where actual debt level is regressed on the difference between actual and estimated debt. Additionally, authors argue that new equity issuances result in wealth transfer from equity holders to debt holders and that is the main impediment for the firms when they are moving towards target debt level. Finally, important findings of this paper are as follows: first, when firms either rise or retire significant

amount of new capital, such financing choices force them to move towards their target debt level often more than offsetting the effect of accumulated profits and looses. Second, the probability of issuing debt vis-à-vis equity reduces with market to book value.

Özkan (2001) investigates corporate borrowing behaviour of British companies. He utilizes partial adjustment model according to which firms adjust their capital structure towards long term target debt level. He also argues that market imperfections such as agency related costs, floatation costs, adjustment costs and other constraints prevent firms from adjusting efficiently to their targets (Özkan, 2001 p: 175). In the dynamic adjustment model, Özkan (2001) estimates target debt ratio by regressing debt on size, liquidity, non-debt-tax-shields, growth and profitability where it is assumed that those explanatory variables change across time and individual firms. As an estimation technique, Generalized Method of Moments is utilized.

Interestingly, contrary to Hovakimian and Opler (2001), Özkan (2001) finds that firms adjust to target debt levels relatively fast, that may be the main result of institutional differences among U.S. and British capital markets. In line with all of the above mentioned works, he finds that adjustment costs and market imperfections are all very important in the capital structure choice. Another important finding is that current liquidity and profitability exerts a negative impact on corporate borrowing decisions which is in line with the pecking order theory of corporate financing decisions.

Hovakimian et al (2003) analyze determinants of target adjustments, again for US based firms, but from a different perspective. They take into account dual issuers which are the firms that raise capital for financing by issuing both debt and equity at the same time. Their work also contributes to the ongoing debate whether the effect of operating and market performance of corporate financing decisions is due to trade-off or pecking order financing behaviour. The empirical test is performed by traditional leverage regression but with extra explanatory variables such as market

performance and profitability, as a proxy for market performance market-to-book ratio is employed and for profitability return on assets (ROA) is used. The main findings of this work can be summarized as follows; Importance of market-to-book ratio is due to negative relation of growth opportunities and target debt ratios, as predicted by trade-off theory. High market-to-book firms have large debt ratios and are more likely to issue equity. However, profitability has no impact on firms' post-dual issue leverage ratio. Finally, the probability of debt issuance increases with firms' profitability.

Flannery and Rangan (2004) also utilize a partial adjustment model to explain how firms choose their capital structure. While estimating partial adjustment models on the basis of dynamic panel data, they also jointly test the validity of the pecking order and market timing theories of corporate financing decisions. The dependent target debt ratio in the model is slightly different from above reported studies, they use market debt ratio (MDR) that is book value of total debt divided by total assets minus book value of equity plus market value of equity. In this study, as determinants of target debt level, authors utilize variables suggested by Rajan and Zingales (1995), Hovakimian et al (2003).

To sum up, Flannery and Rangan (2004) find that there is strong evidence of capital structure adjustment towards the target market debt level, which is in line with the studies presented above. Firms which are under or overvalued tend to adjust their capital structure toward target debt level because being away from optimal debt level is assumed to be costly according to the trade off theory.

In contrast to all above noted theories, Hennesy and Witted (2005) develop a dynamic trade off theory and come to the conclusion that firms do not have target debt levels. They argue that the capital structure formation is not the outcome of continuous adjustment process towards target debt level but it is the outcome of firm decision to distribute or invest internally generated excess funds. However, in the case when there is a need for an outside financing the capital structure is the outcome of decisions between internal, debt or equity financing. In their model they develop

optimal financing and investment policies rather than determining optimal capital structure. Moreover, by stimulation procedures they find that the leverage is path dependent and firms can be a net lender or heavily leveraged. Finally, as it was stated above, firms do not have target debt levels but they tend to choose between internal and external financing sources. To sum up, it can be said that the only weakness of the proposed theory is its assumption of perfect and frictionless world where there is no adjustment costs.

As a matter of the fact, literature on capital structure recognizes three main theories. Those theories are Trade-off, Market timing and Pecking order based explanations of capital structure. In this section it has been attempted to outline the main empirical studies and their findings in the sphere of trade-off related literature. Trade-off based theories are very important in the explanation of capital structure and its formation. Almost all above outlined studies share the idea that firms generally set target debt level and gradually adjust towards it. It is also the common idea that being away from target is costly for firms and adjustment speed depends on degree of adjustment costs, if such costs are high it takes more time for firms to adjust to the desired target debt level. One other common idea in the above presented articles is that capital structure formation is the outcome of continuous adjustments towards targets debt level along with value maximization through rebalancing various costs and benefits of debt versus equity financing.

2.4 CAPITAL STRUCTURE FROM THE PERSPECTIVE OF MARKET TIMING

Driving forces behind formation of the firm capital structure, as a central point of this academic work, have been presented from the perspective of different theories and mainstreams in the literature of the corporate finance. Up to this point, we have analyzed various empirical works which posited their views towards firm capital structure from different attitudes. For example, agency related explanations of capital structure argue that firm capital structure is the outcome of mitigation, by various financial tools, of interests of sides, namely debt holders and equity holders, owners and managers. On the other hand, market imperfection based explanations

that include trade-off, pecking order and market timing theories approach to the case with different assumptions and also these theories vary among themselves in terms of determinants of capital structure. Thus, according to the trade-off theory capital structure is the outcome of the continuous adjustments between costs and benefits of debt. Pecking order, in contrast, suggests that there is a financing hierarchy and firms follow it because of the reasons such as asymmetric information (Myers 1984).

In this section the firm capital structure formation will be presented with the help of theories that are based on market timing explanations which do not share the same view towards formation of firm capital structure with above presented theories. According to market timing view, firm capital structure is the cumulative outcome of attempts to time the market (Baker and Wurgler, 2002 p: 3). From this perspective the central point of the theory is not to decide whether to choose between debt or equity, preferred stock or common stock, short term debt or long term debt but to time the equity or debt market and maximize the gain from current undervaluation or overvaluation of the securities.

In the recent literature it has been widely argued that trade-off and pecking order related explanations of capital structure fail to explain corporate financing patterns and instead market timing related explanation were developed. There are several academic works that directly relate market timing to capital structure formation such as Baker and Wurgler (2002), Huang and Ritter (2004), Kayhan and Titman (2004), Elliott et. al. (2007)). On the other hand, there are a number of empirical papers and event studies that investigate the presence of equity market timing during the issuance of new equity or going public. Such works can be attributed to Lukas and Deborah (1990), LaPorta (1996), LaPorta, Lakonishok and Shleifer (1997), Subrahmanyam and Titman (1999), Ditmar (2007). These papers in general suggest that firms issue stock when cost of doing so is minimal. Otherwise they issue debt or finance projects with internally generated funds. They also suggested that mergers and acquisitions are more likely to happen when the cost of equity is relatively low. Taggart (1977), who made significant contribution to the development of target adjustment models, stated that market timing strategies may

speed up or postpone the adjustment process toward the capital structure. All those papers that will be analyzed more closely in this section put forward the hypothesis that market timing theory is quite plausible explanation to financing decisions as an alternative theory of firm capital structure.

2.4.1 Market Timing of Equity Issuances

To better grasp the idea behind market timing explanation of capital structure formation it is necessary to understand equity issuance patterns. Several works suggest that firm issue equity when it is overvalued and issue debt or utilize internally generated funds when equity is undervalued or issuing it is very costly for the firm. Deborah (1990) defines over and undervaluation as follows; if revelation of information about project financing causes stock prices to drop then equity is overvalued and if revelation causes stock prices to increase then such stocks are undervalued. The model developed by Deborah (1990) assumes that the undervalued firms will wait until undervaluation is corrected by the market and overvalued ones will do the opposite. Furthermore according to the model, it is expected that there will be a bunch of equity issuances following the market rise. For example Leary and Roberts (2005) in their empirical analysis of whether firms rebalance their capital structure or not, find that firms are generally inactive with respect to their financial policy. But when they decide to repurchase or issue equity or debt, they do it generally in clusters.

The predictions of the model proposed by Deborah (1990) give rise to the dispute whether stock market activity is generated by the general state of economy and the capital market conditions or by timing strategies. In the former case the stock returns are expected to be highly correlated with macroeconomic variables and in the latter case the stock returns are expected to be predictable.

Dittmar and Dittmar (2007) in their empirical study investigate market timing existence by concentrating on the patterns of stock repurchases, equity issuance and mergers and their relation to business cycles. They document that there is a significant correlation between GDP growth and repurchase activity and that economic expansion reduces equity costs relative to debt and induces firms to issue

equity. Thus, overall findings suggest that firm financing decisions are mostly driven by business cycles rather than by market valuations.

On the other hand, completely contradicting to the above findings, La Porta (1996) and La Porta, Lakonishok, Shleifer and Vishny (1997) argue that stock prices are predictable. These two papers propose an error-in-expectations hypothesis according to which investors make systematic errors and that errors are observable. Furthermore, investment strategies that utilize these errors in their stock selection analysis tend to outperform. It is also argued that predictability of growth rates is driven by errors in expected growth rates and by errors in return expectations. According to the findings of La Porta (1996) market timing of stock issuance is possible by utilizing those errors in portfolio analysis.

Huang and Ritter (2004), by examining time series patterns of external financing decisions and by utilizing the financing deficit model proposed by Shyam-Sunder and Myers (1999), find that many publicly traded US firms fund much of their financing deficit with equity, when expected risk premium of equity is relatively low. Finally, Graham and Harvey (2001) in their survey document that stock appreciation and degree of undervaluation are very important factors for CFO's while deciding for equity issuance. Relying on the support provided by a number empirical investigations it seems that market timing strategies may have a significant impact on determining and effecting the formation of firm capital structure, thus in the following section we will analyze empirical works that use market timing hypothesis in explaining capital structure choices.

2.4.2 Market Timing and Capital Structure

As it was already outlined, the logic behind market timing explanation of capital structure is very simple. In times when cost of equity is very high, firms finance their projects with debt and when cost of equity is relatively low firms issue equity. As a result, capital structure is continuously being formed as an outcome of timing security issuances.

One of the most important papers that analyze market timing consistency for capital structure explanations belongs to Baker and Wurgler (2002), who analyze short and long run effects of market timing on capital structure by traditional leverage regressions, where dependent variable is book or market leverage and explanatory variable is market-to-book ratio which is assumed to be a proxy for historical market valuations. The most controversial part of the paper is that proxy for equity market valuation is limited to market-to-book ratio, because this ratio may be affected by a number of other factors such as growth opportunities and general state of the economy. As a result, market-to-book based explanation of the market timing theory may provide very noisy results.

The econometric analysis in this study consist of three parts: the first part measures within-firm variation of valuation effects on leverage, both market and book, by which it is aimed to test whether stock valuation effects the capital structure or not. Second analysis aims to test in what way market valuations affect the deviation of leverage from its initial position. Finally, in the last test, book and market leverage is regressed on lagged market-to-book in order to see whether past valuations affect capital structure or not. It is found that even ten periods (years) lagged market to book ratio may have significant impact on current period leverage. General findings suggest that high market valuations reduce leverage in the short run, historically high market valuations are associated with lower leverage in the cross sections and finally historical valuations have large and persistent impacts on capital structure.

Kayhan and Titman (2004) although testing for the existence of trade-off patterns document that if the adjustment cost toward target capital structure is very high, historical variables that are cash flow, investment expenditures and past stock prices, should have very persistent affect on capital structure. This means that market timing becomes relevant in the financing activity only when adjustment to the target is very costly for the company. Finally, they conclude that there is a great impact of historical variables on capital structure but, however, the general idea of authors is in support of trade-off theory.

Performing empirical tests for the relevance of market timing in the explanation of firm capital structure is not possible without recognizing the valuation of underlying securities. Several above presented papers jointly test market timing along with under or overvaluation of securities that motivate firm managers to time equity issuances. Generally, for testing whether equity is overvalued or undervalued many papers use market-to-book ratio (Baker and Wurgler, 2000). However, this ratio is not the sole explanation for the equity undervaluation as it is also used as a proxy for growth opportunities and may result inconvenient explanation for capital structure formation through market timing.

The solution to such a problem is provided by the empirical work of Elliott et al (2007) who utilizes an earnings based fundamental valuation technique that is well known in the accounting literature as the residual income model. This is an original idea that completely resolves the dualism of market-to-book interpretation by providing a clean measurement technique for valuation of the security. The advantage of the test method proposed by Elliott et al (2007) is hidden in the notion that it overcomes the problem of interpretation of capital structure by indirect proxy variables. Their model, in contrast, provides direct measure of equity valuation. The measure of equity valuation in their work is performed by utilizing residual income model which is measured by discounting future abnormal returns and is also known as intrinsic value of the firm. They then divide the intrinsic value by current share prices and if the value exceeds 1, security is undervalued and if the value is less than 1 security is overvalued. Finally, this value is interacted with financing deficit variable in order to see the simultaneous impact of the market timing and financial deficit variables.

By such a method, authors determine which type of security is used to finance firm financing deficit in the cases of under or over valuation of the underlying equity. The general finding of the paper is in line with market timing explanations of capital structure. They find a strong positive relation between the degree of overvaluation and the proportion of equity by which firms finance their financing deficit. Authors also find a significant impact of time patterns on financing choice; specifically they

find that during 1990'es, period of highly active capital markets and overvalued equity, firms were more prone to finance their financing needs by issuing equity.

It is possible to say that Elliott et al. (2007) took their inspiration in this brilliant work from D'Mello and Shrof (2000) who utilized the residual income model in order to estimate economic value of the equity for the firms that repurchase issued shares. Findings suggest that 74% of the firms that decided to repurchase shares have undervalued equity which is in line with market timing hypothesis.

However, looking to the financial structure of the firm from the sole window provided by a certain theory may not explain patterns regarding firms' capital structure to its maximum extent. It would be better to mix the explanations of different theories and generate common and sensible explanations. For example, Yelena (2009) argues that market timing and trade-off theories may be interacted and interdependent in explanation of firms' financial system. She also argues that firms generally adjust to their capital structure but still utilize the chances by timing the market when possible and that timing ability of the firm is not the same with respect to the level of deviation from target capital structure, the hypotheses are supported by empirical results.

Consequently, firm capital structure, as a prominent area in the sphere of financial literature, has been a topic for many empirical and theoretical essays. The starting point of the capital structure debate was initialized by the trivial work of Modigliani and Millers' (1958) proposition of capital mix irrelevance with the firm value. However, according to the concern of many authors, the capital structure does affect firm value through various channels. As a result, based on the general proposition, financial literature derives another question; 'why firms choose a certain type of financing tool and what forces play the most important role in determining the ratio between debt and equity?

In this section capital structure phenomenon has been presented within the scope of the market timing theory, which puts forward the hypothesis that firms tend to issue equity when they are overvalued and debt when equity is undervalued.

Another hypothesis suggests that equity issuance, especially initial public offerings, are expected to realize in clusters, that is because equity valuation is correlated with general state of the economy. During the expansion periods of the capital markets, the most active firms are more prone to benefit from overvalued equity. Finally, capital structure within the context of market timing theory is the outcome of continuous attempts of the firms to time the market.

2.5 PECKING ORDER THEORY OF CORPORATE FINANCING DECISIONS

Up to this point, a corporate capital structure phenomenon has been presented from different perspectives and each explanation provided plausible facts in support of the proposed hypotheses. In this section we are going to present one other alternative which may be the most appealing explanation for the capital structure that was first proposed by Donaldson (1961) and further modified by Myers (1984) and Myers and Majluf (1984), the pecking order theory of firm financing decisions. The pecking order theory, which became an inspiration of this academic dissertation, offers quite logical and empirically testable explanations. On the other hand, its specific structure makes it possible to perform simultaneous tests along with trade-off and market timing theories. For such a reason, this section is devoted to theoretical foundations and background of the triumphal pecking order theory of capital structure.

2.5.1 The Proposition of Myers and Majluf (1984)

While trade-off theory is based on the agency problems such as bankruptcy risk and tax structures, market timing and pecking order theories are based on asymmetric information problems between managers and investors. Thus, according to the theory, financing hierarchy becomes significant when firm mangers are better informed than investors about the true state of the firm and its future value generating ability. However, investors are aware of this fact and assume that firms issue stock only when it is overvalued and will apparently underprice the equity to the extent that it will not be feasible to undertake even positive NPV projects. As a result, pecking order proposed by Myers and Majluf (1984) and which is going to be

presented theoretically below, predicts the financing path from internal to external sources.

Financing hierarchy, the existence of which was firstly mentioned by Donaldson (1961) and which was modified by Myers (1984) and Myers and Majluf (1984) is widely known in the finance literature as the pecking order theory of firm financing decisions. Myers (1984) proposed that firms prefer internal sources due to information asymmetry problems that result severe undervaluation of equity. He then stated that when investment outlays exceed the cash balance, the firm first uses up its marketable securities or cash and if financing need is still to be covered, the firm firstly issues the safest security, namely debt, and then convertible bonds and equity as a last resort. Myers and Majluf (1984) bring explanations to the previously mentioned hierarchy with a help of the following model that is based on the information asymmetry between managers and investors.

The theory proposed by Myers and Majluf (1984) is mainly based on the assumption that managers perfectly act in line with the goals of value maximization of existing shareholders. In other words, managers never want to dilute or give up the value of old shareholders to new ones, what they actually want is to transfer value from new shareholders. On the other hand, authors also assume that managers are better informed about firm prospects and investors, who are aware of the fact, rationally adjust prices of the newly issued shares. So let us assume that

N: external financial need

N_1: the real worth of the shares that is known only to managers

y: projects NPV

x: value of the firm in case it doesn't issue and passes up valuable projects

V': value of the shares held by new stockholders, (market value).

Because of information asymmetry only managers are informed about the true NPV of the future opportunity which is 'y' and what they are going to lose 'x' if they pass up that valuable project. Actually, the real gain of undertaking the project by issuing equity is y and, logically thinking, managers will issue if and only if the gain accedes undervaluation $y>\Delta N$, that is, if the NPV of the future opportunity exceeds the

amount by which investors undervalue the firm. Here, under or over valuation comes from the fact that $\Delta N=N_1-N$ where N_1 is the value of shares that should normally be, N is the value that investors assign at the date of issue. In case $\Delta N>0$ there is an unfavorable information about firms future prospects and when information becomes available to the market, investors rationally underprice issued equity. Oppositely, if ΔN 0 there is favorable information, or put it other way, the firm is undervalued. When managers decide to issue equity in order to raise capital for positive NPV projects, such a decision conveys bad news to the investors because they know that manager issue only when the firm is overvalued, or symbolically $y>\Delta N$. So managers will never be willing to raise finance through new share issuances because they are aware of the following fact presented by equation;

$$N_1 = \frac{N}{V'} \times (x + y + N)$$

Where the value that goes to the new shareholders is determined as the fraction of old share value N divided by the value of the new shareholders V' conditional on equity financing multiplied by overall value of the firm that is the sum of future project NPV, alternative cost 'x' and needed financing F. Here V' is the number of shares times by the latest share price. Put it other way, if firm issues a fraction of new shares (N/V') then the real value of new shareholders, is the value per unit share that is a multiplication of issued portion by expected NPV plus investment amount N. Thus, if the value of the firm represented by V' is share price times the issued amount, then the higher the price of new shares is, the less current wealth is relocated to new shareholders.

However, investors who know that managers issue only when shares are overvalued, will always demand discounts, or refuse to buy them at all. Consequently, firms which are not overvalued in fact will face such a dilution that $\Delta N=N_1-N$, which is the amount of undervaluation, will become greater than the NPV of the future investment opportunity y ΔN. As a result, because of asymmetric information, investors will always underprice newly issued shares to the extent that firms will pass up positive NPV projects in order not to dilute existing shareholders' value (Myers 1984, pp: 583-585).

Because of underinvestment problems and in order to prevent the value loss of old shareholders, Mayers and Majluf (1984) argue that managers will follow such a financing policy that will prevent dilution. According to this policy, managers, in order to finance valuable projects, should firstly use firms' internal sources; marketable securities or accumulated cash, if available. When internal sources are exhausted they should switch to debt financing, because it is least affected by the asymmetric information, and as a measure of last resort, when debt capacity is depleted, firm should issue equity. Actually, in the strong form pecking order the firm never issues equity rather it passes up positive NPV projects.

Finally, the model suggests that firm should issue the safest security first, the outcome of which is high debt and low dividend payout ratios, because firms try to create financial slack not to be forced to issue risky securities when there is a need for project financing in the future. On the other hand, when investors and managers are equally informed or, in other words, when there is no asymmetric information problem firms will never pass up positive NPV projects, because ΔN is equal to 0 and under such conditions, financing with equity will not create any undervaluation. Thus the proposition of pecking order theory regarding financing path becomes significant only under asymmetrically informed marked conditions.

2.5.2 Empirical Investigations and Predictions

Whether pecking order theory of corporate financing decisions provides plausible explanation to capital structure formation is a deep empirical issue and there is a voluminous literature regarding empirical tests of this theory. There are also joint tests of pecking order with trade-off and market timing theories, like the works of Shyam-Sunder and Myers (1999), Frank and Goyal (2002), Fama and French (2002) and Elliott et al. (2007). With such an aim, this section is going to be dedicated to the empirical researches performed in order to test the validity of the pecking order theory.

The financing hierarchy suggested by the pecking order has been widely discussed in the literature; some researches provided evidence in support, the others

in contrast to the suggestions of the theory. It would be right to begin with facts provided by Myers (2001). He documented that most of the U.S. nonfinancial corporations financed their gross investments mostly with retained earnings and that external financing, in most years, covered less than 20% of their total investments. Furthermore, most of the external financing constituted from debt and net shares issues were negative. On the other hand, one other evidence is that generally big U.S. firms in the oil or automotive sectors heavily rely on debt, while pharmaceutical companies on equity (Myers, 2001 P: 82). Some supportive findings were also provided by Fazzari (1988), who, by analyzing financing constraints and sources of finance between 1970-84, reports that majority of funds for all size classes of firms were generated by retained earnings, secondly by bank loans and lastly by equity, suggesting that, during the reported period, firms were mainly relying on internally generated funds for project financing activities.

Although facts presented are for U.S. corporations, they still provide an insight about the validity of the pecking order within developed debt and equity markets. However, results may change with respect to development level of the specific country and with model used to support the empirical research.

For example Rajan and Zingales (1995) investigating determinants of capital structure and impacts of institutional differences on leverage across wide range of companies from G-7 countries, report low levels of debt for Germany and United Kingdom while north American countries along with Japan, France and Italy heavily rely on debt financing (Rajan and Zingales 1995, P:1433). Actually these facts are just preliminary insights regarding the significance of the pecking order theory. However, everything may change on the ground of econometric analyses.

One of the most comprehensive empirical tests of the pecking order theory belongs to Shyam-Sunder and Myers (1999). In their analyses, they utilize time series data for 157 US. mature companies between 1971 and 1989. The study is original in several ways; firstly it hypothesizes that if pecking order theory is the actual financing policy that managers apply, then net financing needs should be

covered totally with an increase in the gross debt. Secondly, the study proposes an econometric model where the dependent variable is the change in the gross debt across time and firms and the explanatory variable is net financing deficit. So, under the pecking order conditions the increase of the independent variable, debt, by 1 unit should be followed by the increase of financing deficit coefficient by 1 unit or by the magnitude near to unity. Thirdly, authors perform robustness tests where they generate financial deficit and debt series both under pecking order and trade off conditions and nest the econometric models into the series in order to test their statistical robustness. As a result, they find that time series generated according to the pecking order are well nested into the trade off model and provide significant coefficients while series generated according to the trade off model are rejected by the pecking order, showing that model has high statistical power. One other important finding is regarding the coefficient of financial deficit variable, the magnitude of which is 0.75, meaning that 75% of financing needs is covered by incremental debt increases. Such a result, according to the authors, provides strong support for the pecking order theory at least for the sample firms and selected period.

However, Chirinko and Singha (1999) criticize the model by raising several questions. They argue that the validity of the model can be simply rejected by generating series where equity financing is not a last measure of finance but second, in which case the model provides significant results. On the other hand, they assume a situation where firms issue a fixed proportion of debt versus equity which is an indication of target existence in which case model again provides significant results. Based on these explanations Chriniko and Singha (1999) argue that the alternative models are needed to test the pecking order hypothesis.

Expecting pecking order to explain every aspect of capital structure is not reasonable, but distinguishing it into strong and weak forms would yield better results. In the strong form of the pecking order there is no place for equity finance, the slope of the financing deficit variable is strictly expected to be a unity, indicating that net external financing needs are financed only with debt, as suggested by the theory. However, many surveys provide evidence that firms issue equity along with

debt. For this reason, it is suggested that accepting more elastic assumptions would be more proper, for example under weak form pecking order the slope of financing deficit is not expected to be a unity, but close to it.

Frank and Goyal (2002) also utilize a model developed by Shyam-Sunder and Myers (1999) based on aggregation of flow of funds data, but differently from them, Frank and Goyal use cross sectional panel data for broad sample of U.S. firms between 1971 and 1998. This study, by utilizing various robustness tests, questions the validity of the pecking order. But the originality comes from the approach to the analyses. Besides direct test of the model proposed by Shyam-Sunder and Myers (1999), they also question to what extent the aggregation of funds flow data justifies the aggregation itself. For this reason, they run regression between leverage and financial deficit and hypothesize that in case aggregation is justified, a unit increase in the leverage should be followed by a unit increase in the coefficient of each component. As a result, they find relatively weak support for aggregation.

Their following test included conventional determinants of the capital structure theory. According to the hypothesis, if financing deficit is the sole explanation power of the leverage then its inclusion in the capital structure regression should wipe out the effects of other variables by sharply increasing the goodness of fit. However, including the financial deficit in the model did not wipe out the effects of other variables. Finally, general findings suggest that equity financing becomes more important relative to debt financing. It is also documented that equity issues track financing deficit better than debt issues does. One other important finding is that the magnitude of the financing deficit is lower than expected, 0.25, and contrary to expectations, pecking order theory better performs for large companies. The last finding contradicts to the main hypothesis of the theory in the way that large firms should be less affected from asymmetric information problems because of diversity of their business and high credibility in terms of past credit payout performances which should make larger firms more prone to issue equity. However findings suggest the opposite.

The results provided in Frank and Goyal (1999) may have been affected by several factors. For example, beginning of the nineties is generally associated with hyperactive equity markets when an influx of small firms became public (Frank and Goyal, 2003). For this reason, firms during that period could have been more desirous to cover financial needs by issuing equity rather than debt which, in turn, led to low financial deficit coefficients in the regression analyses. On the other hand, costs associated with equity issuance may have been too low making it more preferable for companies going public.

Haan and Hinloopen (1999), using ordered probit analysis for Dutch companies provide results very close to the pecking order financing hierarchy. In their analysis it was aimed to determine the order of financing choices, they found that Dutch firms follow the financing path beginning with internal sources, bank loan, equity and finally ending with bond issues. The only difference is that debt financing namely bond issues comes after equity issuance.

Fama and French (2002), are also some of the few authors that run the race between the pecking order and trade-off theories in terms of predictability of dividends and debt. Based on suggestions of Myers and Majluf (1984), authors classify the pecking order into simple and complex versions. The difference comes from the fact that simple pecking order doesn't take into account the expectations and under such conditions firms with high investment outlays should have more leverage. However, in the complex version, expectations are taken into account and firms with high expected investments have less leverage at time 0 in order not to deplete their debt limits at time 1 and to preserve ability to raise finance for valuable projects in the future. Additionally, complex pecking order allows for soft leverage targets. The general findings regarding dividends are in line with both the pecking order and the trade off. However, target leverage analyses suggest that there is a mean reversion of leverage that is in line with the trade off theory. Interestingly, in some cases pecking order beats trade off. For example, general leverage regressions suggest that profitability and investment are negatively correlated with leverage that is in support of the complex pecking order theory.

In this section, main propositions and empirical results for the pecking order theory, which were studied in the most famous articles, have been presented. The pecking order theory suggests that firm, because of asymmetric information problems, should firstly use its internally generated financial sources, when those sources are exhausted firm should use debt and as a last resort equity. The logic behind this hypothesis is hidden in the asymmetrically informed market conditions where managers are better informed than investors. It is argued that internal sources are not affected by asymmetric information problems at all. Debt is less affected by asymmetric information between managers and investors and finally, equity is affected the most. The outcomes of asymmetric information take place in the form of severe undervaluation of issued securities. For this reason, according to the theory, firms should apply financing hierarchy in order to avoid equity undervaluation.

However, empirical investigations do not provide precise information whether firms really follow financing hierarchy, proposed by the pecking order theory, or not. Some empirical works support but some contradict with the hypothesis. The results are mainly sensitive to empirical models and estimation procedures and to the investigated countries. According to the literature provided above, it seems that institutional differences also have an important impact on the validity of the pecking order theory. Empirical results may change in bank and market oriented economies, for this reason it is worth of examining this field. Within this aim, the next section is dedicated to the investigation of literature on capital structure from the perspective of institutional settings.

CHAPTER 3
THE AFFECTS OF INSTITUTIONAL SETTINGS ON FIRM CAPITAL STRUCTURE

In order to complete our understanding of the firm capital structure formation it is important to analyze how ongoing debate in the literature of finance handles the problem of institutional differences which have all necessary potentials to affect capital structure formation. Rajan and Zingales (1995) pointed to the problem by stating that the review of institutions is important because they may affect the within country cross sectional correlation between leverage and factors such as firm profitability and firm size (Rajan and Zingales, 1995, P: 1422).

In this section the impact of the institutional settings is going to be analyzed from the perspective of different academic works which investigate the impact of economic orientation on capital structure determinants. On the other hand, as this work is being done for Turkish firms listed in the ISE, it is important to understand the orientation of the Turkish economy and its capital market system. The issue of institutional differences is very important in capital structure studies because the type of economic and institutional base directly affect the availability and sources of funds to firms. Furthermore, some conventional capital structure theories may behave differently in developing countries which have different institutional base and economic dynamics.

3.1 RELATION BETWEEN INSTITUTIONAL FEATURES AND CAPITAL STRUCTURE DETERMINANTS, LITERATURE REVIEW

Considering the fact that all above outlined theories, including the trade off, market timing, pecking order and agency based explanations, were emerged in US which is highly developed country with sound capital market system, it is not hard to realize that the validity of the capital structure determinants, proposed by those theories, is questionable in other environments, such as developing countries. The factors that determine capital structure may vary not only among developed countries but also within countries with different institutional bases.

The current literature recognizes two different financial systems, namely the Anglo-Saxon capital markets model and the Continental-German-Japanese banking model. Both systems differ from each other in terms of main institutions that provide financing source to the firms. In the capital markets based system like US and UK equity markets are more functional which results in transparency and better shareholder rights protection. On the other hand, in the banking based economies banks are more powerful and have greater impact over the corporate control. Such a system results in less transparency and better investor rights protection, that is because bank-firm relations do not need a substantial revelation of the information to the markets[2].

Now it is obvious that both systems have direct impact on capital structure formation because they are the main sources of financing for the firms which are found in a certain type of economic orientation. In other words, understanding the implication of capital market oriented and bank oriented traditions regarding capital structure decision is important because they have direct impacts on the sources of funds available to the corporate sector. For example, it would be right to expect more debt for the firms in bank based systems and more equity for the firms based in the capital markets based systems (Yılmaz and Antoniou, 2008, p:2).

Unfortunately, the literature of capital structure is limited with researches that investigate the effects of bank based and market based traditions on capital structure formation and on the behaviour of its determinants. For example Yılmaz and Antoinius (2008) investigate the impact of institutional differences on capital structure for G-5 countries which practice different institutional orientations. They collect the data for United States, United Kingdom, France, Germany and Japan, where UK and US are market based economies with well developed capital markets system and Japan, Germany and France are bank oriented economies with powerfull banks.

[2] To get more information about the role of banks in Japanese corporate governance system as the most striking example of bank oriented economy, see for example **Hoshi (1991)**, **Weinstein and Yafeh (1998)** and **Mork and Nakamura (1999).**

Authors document that expectations regarding conventional capital structure determinants may change accordingly with institutional differences. For instance, according to the paper, tangibility is expected to be more relevant in bank based economies because the role of the collateral is more pronounced in traditional bank lending. On the other hand, earning volatility is expected to be more relevant in market based economies because of arm-length relation of investors with firms. However, in the bank based economies as lenders and barrowers have closer relations the importance of the earning volatility may not represent priority for lending criteria. For this reason, American and British firms are expected to be more concerned with earning volatility than their counterparts in Germany and France (Yılmaz and Antoinius, 2008, pp: 5-6).

The overall finding of the authors suggests that capital structure is not the only outcome of firm specific variables, there are very important institutional traditions which have great impact on firm leverage as well.

Levine (2002), in his cross country comparative analysis, whether market based or bank centered financial system better prompts economic growth, finds that neither banking nor market system is relevant in explaining economic growth. Their investigation was performed for 48 countries, including Turkey, between 1980 and 1995. The support for irrelevance of institutional base was strengthened by comparing the performance of countries with well developed banks but poorly developed equity markets and by comparing the opposite, namely those countries with well developed markets and less developed banking system. The conclusion is that in both cases there are no notable differences in the performance of countries with different economic orientations.

The work of Levine (2002) is important from the perspective of country classification, by various measures, according to their level of being bank or marked oriented. He uses the structure activity (activity of stock markets relative to that of banks), structure size (size of stock market relative to banks), structure efficiency (The efficiency of stock market relative to that of banks, represented by total value

traded), structure aggregate (the joint measure of size, efficiency and activity) and structure regulatory (the measure of restrictions on banking activities) as a measure of economic orientation.

Those measures also classify Turkeys' institutional position among other national economies. For example, structure activity measure identifies Turkish economy as very market based though its total value traded is much less than that of the US. According to the paper this is an indication of the evidence that Turkish banking sector is insufficiently developed compared to other bank oriented countries. The structure size truly identifies Turkey as bank oriented and US and UK as market oriented. On the other hand, according to the measure of structure efficiency Turkey stays relatively in the middle of the scale but near the Germany indicating that Turkey has approximately the same level of efficiency both for banking and market systems. Surprisingly, according to the structure regulatory variable Turkey has relatively more restrictions on banking activities compared to Germany which is conventionally accepted as baking oriented economy.

Although some of the above presented measures suggest contradictory results it is possible to say that Turkey is more bank oriented economy. The inconsistent results, as suggested by author, may have been generated either because of very developed market system and undeveloped banking system (Levine 2002, pp: 1-14).

Rajan and Zingales (1995) also investigated the impact of institutional differences on determinants of leverage for G-7 countries. They found that factors which determine the leverage in US are also valid and work in the same way in the highly industrialized G-7 countries. However, although those countries are very homogenous, some cross country impacts were found to be at work. Finally, authors document that the impact of institutional differences on capital structure is only one factor. Some other factors such as, tax code, bankruptcy law, state of development of bond markets and patterns of ownership are also important in explaining cross country differences.

One other work that investigates cross country institutional differences belongs to Booth et al. (1999). Their study is concentrated on the developing countries and attempts to answer the question whether factors that were found to be important as determinants of capital structure in developed countries are also relevant across developing countries.

Their sample consists of countries like India, Pakistan, Malaysia, Turkey, Zimbabwe, Mexico, Brazil, Jordan and Korea where Turkey is located among middle debt group countries with relatively limited equity market and less developed financial intermediaries. Authors also stress on the fact that Turkey has relatively low level of investor rights protection. The last finding clearly suggests that Turkey has better bank-firm relations and that banks has greater monitoring role in the firm as they are the biggest source of financing.

Gönenç (2003) also provided valuable information regarding Turkish institutional orientation. In his capital structure analysis for Turkish industrial firms he additionally investigates the hypothesis that ownership by managers, financial institutions, government and stock market activities may well determine capital structure. Within this regard he concluded that Turkey can be included in a bank-centered system with highly concentrated equity ownership and special role of banks.

According to the evidence presented by Gönenç (2003) Turkish firms have the following characteristics:

- Large shareholder concentration with minimum 50% equity under control,
- Turkish large firms are generally affiliated with each other within a business group,
- Family members occupy the management of board,
- Almost every private bank is a member of a particular business group and serves as the main financial source.

Gönenç (2003) also pointed to the fact that shareholders protection is much lower compared with creditors' legal protection (Gönenç, 2003 pp: 30-45).

General findings of the paper suggest that the factors which are important as determinants of leverage in developed countries are also important in developing countries. However, there are some country specific institutional differences that significantly affect the capital structure formation in developing countries.

All in all, capital structure study needs a broad view from different attitudes and up to this point it has been analyzed from the perspectives of different theories which are widely accepted in the literature of capital structure. Furthermore, within this section a new door has been opened to our understanding of capital structure from the point of current capital structure debate.

Nevertheless, according to the debate presented above we can clearly see the impact and importance of institutional settings on capital stricture formation. It is possible to conclude the following: firms that operate in bank centered economies are expected to have more debt and firms that operate in market based economies more equity in their capital structure mix. Additionally, while analyzing capital structure it is impossible not to take into account the effects of institutions of that specific country for which the research is being performed. But also it is important to consider that institutional difference is not only about bank centered and marked centered classification, it is also about country specific diversity which may create a great difference even among countries with identical institutional orientations.

Although relying on the information presented above it is not possible to clearly determine the position of Turkish market orientation. It is possible to say that current state of Turkish banking system and less developed capital markets, lead us to the conclusion that banks have great power in the monitoring and lending activities which, in turn, supports our view that Turkey is bank oriented economy.

CHAPTER 4
SAMPLE STATISTICS AND DATA

4.1 RESEARCH QUESTION

The empiric analyses within this study aim to answer three main questions. First of all, the study ones again examines the magnitude and direction of the correlation of conventional firm capital structure with firm leverage. Furthermore, first time in Turkish capital structure research, this study utilizes the model provided by Shyam-Sunder and Myers (1999) to test the validity of the pecking order theory in Turkish manufacturing firms. Finally, it is aimed to empirically test whether market timing theory of firm financing decisions is relevant for Turkish manufacturing firms.

The data for the analyses was gathered from ISE CD-Rom. In total there are 152 nonfinancial manufacturing firms continuously listed in the ISE between 2004 and 2007. The reason behind restriction of the time period lies in the notion that ISE began to deliver financial statements according to IFRS in 2005. Otherwise it would be necessary to adjust financial statements accordingly with accounting standards differences. Taking into consideration that some variables are calculated as the change from year 0 to year 1, time periods reduces to three.

Even though our analysis is strictly run only for manufacturing firms the rule of continuous survival between 2004 and 2007 was applied in order to construct balanced panel data. With such a restriction the sample reduced to 151 firms. It is also important to point that after removing outliers, sample size reduced to 147 firms in capital structure and to 143 firms in pecking order and market timing analyses.

It is also assumed that manufacturing sector is the most representative sample of the whole Turkish corporate sector. For this reason, it is expected that capital structure and pecking order analysis results will provide evidence for whole Turkish economy and financing patterns of Turkish firms.

Relying on the evidence presented in the table 1, it is possible to conclude that aggregate financial statement components have stable patterns for selected years. It is clearly seen that there have been no shocks related with general economic situation. Such stability provides convenient environment for running statistically sensible regression analyses.

Table-1 Common size balance sheet for Turkish manufacturing firms

This table presents average balance sheet data of Turkish industrial firms listed in Istanbul Stock Exchange for selected years. Financial firms and utilities are excluded. The values are calculated as the percentage of total assets for each firm and then averaged across years. Selected firms are the ones that have continuous balance sheet data from 2004 till 2007. There are 151manufacturing firms aggregated in the below common size balance sheet.

	2004	2005	2006	2007
Liquid Assets	0,47	0,47	0,50	0,50
Cash and cash equivalents	0,06	0,06	0,07	0,06
Stocks and bonds (net)	0,01	0,01	0,00	0,00
Trade credits (net)	0,14	0,15	0,16	0,16
Financial leasing credits (net)	0,00	0,00	0,00	0,00
Receivables from affiliates	0,05	0,05	0,06	0,05
Other Receivables (net)	0,00	0,01	0,01	0,01
Live assets (net)	0,00	0,00	0,00	0,00
Inventory (net)	0,17	0,17	0,17	0,18
Receivables from current construction contracts (net)	0,01	0,01	0,01	0,01
Deffered taxes	0,00	0,00	0,00	0,00
Other current receivables	0,02	0,02	0,02	0,02
Fixed Assets	0,53	0,53	0,50	0,50
Trade credits (net)	0,00	0,00	0,00	0,00
Financial leasing credits (net)	0,00	0,00	0,00	0,00
Receivables from affiliates	0,02	0,02	0,01	0,01
Other Receivables (net)	0,00	0,00	0,00	0,00
Financial assets (net)	0,06	0,05	0,06	0,06
Goodwill (net)	0,01	0,01	0,01	0,01
Property and plant for investment (net)	0,00	0,00	0,00	0,00
Property, plant and equipment (net)	0,42	0,41	0,39	0,38
Intangibles (net)	0,01	0,01	0,01	0,01
Deffered taxes	0,01	0,01	0,01	0,01
Other fixed assets	0,00	0,00	0,00	0,00
TOTAL ASSETS	1,00	1,00	1,00	1,00
LIABILITIES	0,44	0,45	0,49	0,48
Short Term Libilities	0,31	0,31	0,34	0,35
Financial liabilities (net)	0,08	0,08	0,09	0,09
Current portion of long term debt (net)	0,02	0,02	0,03	0,03
Liabilities from financial leasing transactions(net)	0,00	0,00	0,00	0,00
Other financial liabilities (net)	0,01	0,01	0,01	0,01
Trade credits (net)	0,10	0,10	0,12	0,11
Liabilities to affiliates	0,04	0,03	0,04	0,04

Advances	0,01	0,01	0,01	0,02
Current tax liabilities (net)	0,00	0,00	0,00	0,00
Liabilities from current construction contracts (net)	0,01	0,01	0,01	0,01
Debt allovances	0,01	0,02	0,02	0,02
Deffered tax liabilities	0,00	0,00	0,00	0,00
Other liabilities (net)	0,02	0,02	0,02	0,02
Long Term Liabilities	0,14	0,14	0,16	0,13
Financial liabilities (net)	0,08	0,08	0,10	0,08
Liabilities from financial leasing transactions(net)	0,00	0,00	0,00	0,00
Other financial liabilities (net)	0,00	0,00	0,00	0,00
Trade credits (net)	0,00	0,00	0,00	0,00
Liabilities to affiliates	0,00	0,01	0,01	0,00
Advances	0,00	0,00	0,00	0,00
Debt allovances	0,02	0,02	0,02	0,02
Deffered tax liabilities	0,02	0,02	0,01	0,01
Other liabilities (net)	0,00	0,00	0,00	0,00
MINORITY INTEREST	0,02	0,02	0,02	0,01
EQUITY Total	0,54	0,53	0,49	0,50
Equity Reserve	0,61	0,45	0,38	0,38
Profit Reserves	0,03	0,04	0,04	0,05
Net Income/looses	0,02	0,01	0,01	0,04
Income from previous years	-0,36	-0,24	-0,24	-0,30
TOTAL EQUITY and LIABILITIES	1,00	1,00	1,00	1,00
Source: Istanbul Stock Exchange Database				

In average, liquid assets constitute 49% as of total assets, 15% of which represents trade credits and 18% inventory. On the other hand, fixed assets represent 51% of total asset 40% of which is property plant and equipment.

The liability side of aggregate financial statement support the fact provided by Booth et al. (1999). They conclude that developing countries use more short term liabilities compared to developed countries. In average, total liabilities represent 47% as of total assets, 33% of which are the short term liabilities and only 14% long term liabilities. Furthermore, most of the short term liabilities are trade credits and financial liabilities.

These facts draw a clear picture of financing pattern for Turkish manufacturing firms that mostly use short term liabilities to finance long term projects. The fact can be supported with the evidence that there is 51% (in average) of fixed assets and only 14% of long term liabilities. This means that Turkish firms

are not able to find long term credits as a result of past financial crises that made financial sector more conservative.

Table 2 also provides some evidence regarding the usage of short term financial sources by firms in Turkey. According to the evidence presented above 39,4 % of the sample firms did not use long term financial credits, 78,9% had not utilized any long term trade credit. Both short term and long term capital leases are not widely used as a source of financing by Turkish firms.

Table-2 Exploitation Intensity of the Main Financing Components

The panel below outlines the number and portion of firms that did not use short-term, long-term, financial credits, trade credits, capital leases between 2004 and 2007. The percentage is calculated as the portion of investigated sample. The sample consists of 151 nonfinancial manufacturing firms continuously listed in the Istanbul Stock Exchange.

	ST Fin. Credit		LT Fin Credit		ST Trade Credits		LT Trade Credits		ST Cap. Leases		LT Cap. Leases	
YEAR	N/A	%of T. Sample	N/A	%of T. Sample	N/A	%of T. Sample	N/A	%of T. Sample	N/A	%of T. Sample	N/A	%of T. Sample
2007	23	15,5%	56	37,8%	1	0,7%	116	78,4%	90	60,8%	94	63,5%
2006	31	20,9%	56	37,8%	1	0,7%	113	76,4%	93	62,8%	101	68,2%
2005	27	18,2%	57	38,5%	2	1,4%	119	80,4%	102	68,9%	106	71,6%
2004	21	14,2%	64	43,2%	2	1,4%	119	80,4%	106	71,6%	113	76,4%
Average		17,2%		39,4%		1,0%		78,9%		66,0%		69,9%

Source: Istanbul Stock Exchange Database

One other important fact is presented in the table 3. The table above outlines the main components of total liabilities for analyzed sample. According to the table, the biggest portion that constitutes total liabilities is the short term trade credits which accounts for 26% of the total liabilities in average. It is preceded by short term liabilities 16% (as of total liabilities) and long term liabilities 14% (as of total liabilities). Unfortunately, long term and short term capital leases do not take significant portion among the financing menu of Turkish manufacturing firms.

Analyzing the sample statistics we have gained preliminary ideas regarding the financing preferences of Turkish manufacturing sector. Furthermore, the data above provided valuable information regarding the financial health of Turkish firms. In general, it is seen that Turkish firms use short term financing sources in order to materialize their investment projects. However, short term financing makes firms more vulnerable to the economic and financial instabilities which, in turn, provides great impediment for capital formation and development of powerful corporate sector in the economy.

Table-3 Main Components of Long-Term and Short-Term Debt

The panel below presents Standard Deviations, Means and Medians of the main components of Long-Term and Short-Term liabilities that account for the significant portion of financing sources. Financial Credits, Trade Credits and capital Leases are scaled by book value of Total Debt. Short-Term and Long-Term Debt are scaled by total assets. The overall sample contains 151 firms which were continously listed in the Istanbul Stock Echange from 2004 till 2007.

		2007	2006	2005	2004	Average
D/TA	S. DEV	0,38	0,37	0,29	0,30	
	MEAN	0,48	0,49	0,45	0,44	0,47
	MED	0,41	0,43	0,39	0,38	
Debt/Equity	S. DEV	3,42	4,84	14,01	8,24	
	MEAN	0,83	1,62	1,16	0,17	0,95
	MED	0,63	0,69	0,63	0,58	
Short-Term Debt/TA	S. DEV	0,30	0,25	0,22	0,23	
	MEAN	0,35	0,34	0,31	0,31	0,33
	MED	0,30	0,27	0,26	0,26	
Long-Term Debt/TA	S. DEV	0,16	0,19	0,16	0,16	
	MEAN	0,13	0,16	0,14	0,14	0,14
	MED	0,08	0,09	0,09	0,09	
ST Fin. Credit/TD	S. DEV	0,18	0,17	0,18	0,18	
	MEAN	0,16	0,15	0,16	0,16	0,16
	MED	0,08	0,08	0,11	0,10	
LT Fin Credit/TD	S. DEV	0,18	0,19	0,18	0,18	
	MEAN	0,14	0,16	0,14	0,13	0,14
	MED	0,07	0,08	0,07	0,01	
ST Trade Credits/TD	S. DEV	0,18	0,19	0,19	0,18	
	MEAN	0,27	0,27	0,26	0,26	0,26
	MED	0,22	0,23	0,22	0,23	
LT Trade Credits/TD	S. DEV	0,03	0,03	0,04	0,03	
	MEAN	0,01	0,01	0,01	0,01	0,01
	MED	0,00	0,00	0,00	0,00	
ST Cap. Leases/TD	S. DEV	0,0158	0,0067	0,0062	0,0052	
	MEAN	0,0040	0,0023	0,0020	0,0017	0,00
	MED	0,0000	0,0000	0,0000	0,0000	
LT Cap. Leases/TD	S. DEV	0,0185	0,0227	0,0249	0,0098	
	MEAN	0,0052	0,0052	0,0055	0,0023	0,00
	MED	0,0000	0,0000	0,0000	0,0000	

Source: Istanbul Stock Exchange Data Base

CHAPTER 5
RESEARCH DESIGN

5.1 CONVENTIONAL DETERMINANTS OF FIRM CAPITAL STRUCTURE

Before proceeding with direct tests of the central theory of this academic work it is necessary to see how each theory, investigated so far, works in Turkish corporate sector. For such a reason, this section is devoted to the theoretical base and empirical tests of the conventional capital structure determinants. Capital structure analysis is the right point to begin with, as the conventional determinants such as asset tangibility, growth opportunities, size and profitability (Rajan and Zingales, 1995., Harris and Raviv, 1991), which are believed to be the most representative factors of leverage, posses hypothetical explanation for many capital structure theories. For example, the correlation of profitability and leverage is differently predicted by the pecking order and trade off theories. From this perspective, analyzing capital structure determinants will provide valuable information regarding the validity of the trade off, pecking order and agency based theories. Furthermore, providing preliminary results regarding the working conditions of the pecking order theory will provide an extra opportunity to compare the results with direct tests, which are going to be preformed within the next section of this paper.

Literature of firm capital structure research is rich with an extant amount of papers that attempt to explain factors of leverage and their magnitudes. Among the most famous and the most cited works it is possible to mention researches of Titman and Wessels (1998), Rajan and Zingales (1995), Booth et al. (2001), Hovakimian (2003), etc. all of which analyze determinants of capital structure and their magnitudes. There is also a plenty of works that investigate capital structure determinants for Turkish listed companies, some of them are; Güloğlu and Bekçioğlu (2001), Gönenç (2003), Akyüz et al. (2004), Balsari and Kırkulak (2008).

As the ‘determinants of capital structure’ is widely analyzed area both for particular countries and across different countries, here it is decided to include into

analyses only the most used and empirically tested ones. Furthermore, in this paper it is not aimed to investigate firm capital structure determinants in depth, in contrast it is aimed to analyze how conventional capitals structure determinants, proposed by Titman and Wessels (1988), Rajan and Zingales (1995), appear to work for Turkish listed companies. Taking into consideration the data availability for Turkish listed companies it is possible to test how tangibility, firm size, profitability, tax shields and asset growth affect capital structure formation in Turkey.

The primary aim of the firm capital structure analysis is to measure which factors and to what extent affect firms' past financing decision. In other words, capital structure analysis attempts to find out how firms choose the certain type of financing mix. To answer such a question it is important to define the most representative measure of leverage that would correctly reflect firms past financing decisions. Rajan and Zingales (1995), in their analysis of firm capital structure across G7 countries, used market and book values of firm leverage which they defined as the ratio of total debt to capital and where the capital is defined as total debt plus equity. Hovakimian at al. (2004) also used a measure of leverage which is similar to that of Rajan and Zingales (1995). They defined leverage as short term debt plus long term debt over total assets.

5.1.1 Leverage

This study utilizes two types of leverage definitions; first one is as suggested by Rajan and Zingales (1995) and Hovakimian et al. (2004), total debt over total assets. Such a definition represents firms past financing decisions more precisely. The second measure of leverage is defined as the change of total debt from t_0 to t_1 over total assets at t_1 as suggested by Fama and French (2002). With such a measure of leverage it is aimed to test how conventional capital structure determinants affect incremental changes in total leverage amount.

As a result, our dependent variables are; $Lev1 = \frac{SHTD + LTD}{TA}$ and $Lev2 = \frac{D1 - D0}{TA}$ where SHTD stands for short term debt and LTD stands for Long term debt, and D represents total debt.

Although market values of leverage may have a potential impact on the signs of capital structure determinants, this study uses only book values because the data base does not provide sufficient data for calculation of the appropriate market values.

5.1.2 Size

Unfortunately, theories fail to provide a clear explanation to the relation between leverage and size. As proposed by the trade off theory, large firms are more diversified and expected to have more debt capacity. For this reason, trade off predicts positive correlation between leverage and size. Furthermore, agency based explanations (Jensen (1986)) propose that large firms should have more debt, as such firms are more prone to control managers' activities. As a result, agency based theories also predict positive correlation between leverage and size. On the other hand, pecking order theory predicts negative sign for size the reason for such a proposal is hidden in the notion that small firms are more exposed to asymmetric information problems which force such firms to finance their projects with less information sensitive sources like debt.

Kester (1986), Titman and Wessels (1988), find negative correlation between leverage and size which supports the predictions of the pecking order theory. In contrast to those studies, Marsh (1982), Rajan and Zingales (1995), Hovakimian et al. (2004), Flannery and Rangan (2006) find positive correlations in support of trade off and agency based theories.

Taking into consideration the main objective of this study, it is expected that firm size should be negatively correlated with leverage.

5.1.3 Tangibility

Pecking order, trade off and agency theories share common positive prediction regarding the effect of tangible assets on the firm leverage. Tangibility, defined as fixed assets over total assets, is important as the collateral value during the liquidation of the company. Higher portion of fixed assets provides higher debt capacity for the firm as it is the primary source for the banks against which they collateralize their credits to firms. Agency theories also predict positive correlation between tangibility and leverage. For example, asset specificity is found to be important in determining the proportion between debt and equity. The reason for this is that firms with less firm specific assets, which are not deployable outside the firm in the case of liquidation, tend to use more debt, (Balakrishnan and Fox, 1993). Based on this notion it is possible to say that firms with more tangible assets use more debt as tangibility reduces agency problem of debt (Titman and Wessels, 1988). Titman and Wessels (1988), Rajan and Zingales (1995), Jean Chen (2003), Hovakimian et al. (2004) all found positive signs between tangibility and leverage in their capital structure analyses. For this reason we expect significant estimates with positive correlation.

5.1.4 Non-Debt Tax Shields

One of the main motivations for the firms to use debt financing is based on the tax deductibility of interest expenses. But it is a fact that interest is not the sole factor which can be deducted from taxes. There are some other sources, such as depreciation expenses, depletion allowances and investment tax credits, which may be advantageous in terms of tax deductibility as well. DeAngelo and Masulis (1980), in their study on how non-debt-tax-shields affect optimal debt level, argue that non-debt-tax-shields reduce the advantage of debt financing. For example, Chang et al. (2007) and Durukan and Balsari (2006) found negative correlation between non-debt-tax-shields and leverage. Based on this logic and provided evidence, it is quite possible to hypothesize that firms with more non debt tax shield should use less debt.

5.1.5 Profitability

One other factor that is accepted, by broad literature, to have a significant effect on firm leverage is profitability. Profitability is the factor on which pecking order, trade off and agency based theories have a great dispute. From the perspective of the pecking order theory more profitable firms should have less debt. More profits mean more cash generated which, in turn, is primarily used for investments. As a result, profitable firms have less need to apply to debt markets in order to raise capital for investment projects. Rajan and Zingales (1995) have found consistent negative sign for profitability which is in line with the pecking order prediction. But there is one striking result that is provided by authors; they found that negative influence of profitability on the leverage becomes stronger with the firm size. For instance, according to the evidence provided by the paper, firms in the small quintile has a coefficient of -0.26 whereas firms in the large size quintile have the coefficient of -1.09 that is four times as much as the coefficient for the small firms. Unfortunately, current literature has not provided reasonable and sufficient explanation regarding the magnitude of profitability effect on firm leverage.

On the other hand, trade off and agency based theories predict that firms with higher profitability should be more leveraged. The trade off explains such a prediction with the help of tax deductibility of interest expenses. In line with the trade off theory, agency based explanations suggest that more profitable firms should use more debt in order to reduce free cash flow problems. Because debt is the main tool by which firm mangers are forced to use free cash available more effectively. Finally, in this study it is expected that profitability, which is defined as net income over total assets, will be negatively correlated with the firm leverage.

5.1.6 Asset Growth

Most studies use R&D over total assets and market-to-book variable as proxy for growth opportunities. However, this study does not utilize this variable because it is not reported for all firms in the sample. The data is also not sufficient to calculate consistent market-to-book values. For such a reason, this study uses percentage

change of the assets growth as a proxy for growth opportunities (Titman and Wessels, 1988).

Firms which are more dynamic in terms of investments have greater percentage change of total assets. Such high growth firms need more capital for investment, which they should raise either by internal or by external sources. It is also known that high growth firms are generally short of excess cash, as a result, they apply to capital markets. At this point, pecking order theory predicts that firms will firstly use debt as it is less information sensitive source of capital. To sum up, in this study it is expected that asset growth will be positively correlated with firm leverage.

5.2 EMPIRICAL TEST OF THE CONVENTIONAL FIRM CAPITAL STRUCTURE DETERMINANTS: THE MODEL

The main model which is widely used by many empirical studies for measuring the impacts of conventional capital structure determinants on firm leverage is constructed as follows:

$D_{it} = \alpha_0 + \beta_1 * GROWTH_{it} + \beta_2 * NDTSH_{it} + \beta_3 * ROA_{it} + \beta_4 * SIZE_{it} + \beta_5 * TNGB_{it} + \varepsilon_{it}$

where D_{it} represents leverage for firm i at time t, $GRWTH_{it}$ percentage change of total assets, $NDTSH_{it}$ none debt tax shields which is used to measure tax deductibility impact of factors other than interest expenses on firm leverage, ROA_{it} stands for return on assets and used as a proxy for profitability. $SIZE_{it}$ which is calculated as the natural logarithm of total assets is used to detect whether there is a relation between size and the financing preference of the firm. Finally, λ_{it} represents white noise error term which differs accordingly with coefficient estimation assumptions in the panel data regression models.

As the data set exploited in this study includes individual and cross section variables, the estimated model should comply with the data available, in order to estimate reasonable coefficients. On the other hand, the main objective of this section is to test cross sectional variation of the firm leverage which is hypothesized to be determined by five above presented capital structure determinants. To reach the aim, this study utilizes fixed effects and random effects estimation procedures.

A general model that is widely accepted by empirical researchers and which utilizes panel data can be constructed in the following manner:

$$y_{it} = \alpha + x_{it}\beta + u_{it}$$

Where α, β are 1x1 and Kx1 vectors of constants, respectively. X_{it} is the *it*th observation of the K explanatory variables, while U_{it} is the error term with mean zero and constant variance δ^2_u. In panel data regressions error term U_{it} is the sum of two components, $U_{it}=\mu_i+v_{it}$, where μ_i denotes unobservable firm specific effects and v_{it} represents the rest of the firm specific and time invariant effects (Baltagi, 2001).

Based on the assumption regarding the correlation between unobserved effects and explanatory variables, panel data regression analysis is classified into fixed effects and random effects. In the fixed effects method firm specific error term μ_i is assumed to be fixed across time and the remainder term v_{it} is assumed to be independent of X_{it}. Fixed effects method takes into consideration only individual-specific effects and assumes that time specific effects are constant through time. For this reason, such a method is appropriate for panel data with large cross sections and relatively few time variables. Within this study, as it is concerned with large firm sample, cross-sectional variation of firm specific characteristics is important, with such an aim utilizing fixed effects method is expected to generate more reasonable coefficients. But to have a reasonable point, the choice between fixed and random effects method should be done based on Hausman specification test.

On the other hand, random effects method considers μ_i, firm specific effects, to be randomly determined and independent of v_{it}. In other words, μ_i is assumed to be constant across individuals and vary across time. It would be right to remind that v_{it} accounts for time specific and firm specific effects which are miss-specified by the explanatory variables. Random effects method is an appropriate estimation technique for panel data sets constructed randomly from a general population and which has comparatively larger variables across time.

5.2.1 Regression Results and Implications

After presenting theoretical background for the estimated model it is time to analyze capital structure regression results. Tables below outline results for the conventional determinants of firm capital structure.

According to Harris and Raviv (1991), a general trend in the financial literature regarding leverage and factors correlated with it, is that leverage positively correlated with fixed assets, non-debt-tax-shields, size and negatively correlated with profitability. However, the evidence for Turkish manufacturing firms listed in the ISE provide some contradictory results to what is generally accepted by the mainstream literature.

According to the empirical findings presented in the table 4, four of the five factors, growth, profitability, non-debt-tax-shields and tangibility are significantly correlated with leverage in the overall sample, except for size which has no theoretical and statistical significance.

As it was expected, growth is positively correlated with leverage at 1% significance level. The results are same for fixed effects, GLS effects and for random effects methods. Based on the Hausman specification test, which is significant, it is possible to conclude that the fixed effects estimators should be preferred over the random effects results.

On the other hand, consistent with the pecking order prediction, profitability is negatively and significantly correlated with firm leverage for all estimation methods. Negative correlations reveal the fact that Turkish manufacturing firms follow the financing path suggested by the pecking order theory. According to the estimated coefficient, when firm profitability increases by one standard deviation, firm leverage reduces by 0,33 standard deviations. This means that profitable firms which are able to generate sufficient internal sources tend to use those sources before applying to debt markets. In other words, the estimated coefficient suggests that firms seem to follow a financing path from internal to external sources.

Even contradicting with the predictions of the pecking order theory, firm size has positive and significant at 5% level correlation with leverage only for the GLS random effects regression results, for other methods, size has no explanatory power. In general, pecking order theory explains negative sign for size from the perspective of the asymmetric information problems, according to which, big firms have less information asymmetry problems and are more desirous to issue equity. Moreover, it seems that result for estimated coefficient of the size is not driven by either agency or trade-off theories as well. Because, according to the agency theory, large firms are more prone to control managers' activities and trade off states that large firms are more diversified which is an advantage for obtaining more debt. For such a reason, there should be positive and significant correlation, which is not observed within the estimation results presented in table 4.

Non-debt-tax-shields has positive and significant impact on the overall leverage, suggesting that Turkish manufacturing firms do not consider tax advantages of the factors other than interest as important when selecting their financial mix.

Interestingly, in contrast to the expectations, negative and highly significant estimated results are observed for tangibility. As commonly proposed by the pecking order, trade off and agency theories, tangibility should have positive correlation with leverage because it is the main collateral value against which creditors lend to the firms. The more fixed assets company has the more it should be able to obtain debt. However, the results are negative and highly significant for all estimation methods. Possibly, the reason for such a result might be hidden in the country specific institutional features.

Table-4 Conventional Determinants of Firm Capital Structure: an Overall Sample

The table below illustrates estimated coefficients for the conventional determinants of firm capital structure. The regression analysis is perform ed by the fallowing model; $D_{it} = \alpha_0 + \beta_1 * GROWTH_{it} + \beta_2 * NDTSH_{it} + \beta_3 * ROA_{it} + \beta_4 * SIZE_{it} + \beta_5 * TNGB_{it} + \varepsilon_{it}$ where D is total debt over total assets, GROWTH, growth rate of total assets, ROA net income over total assets and TNGB stands for tangibility which is calculated as fixed assets over total assets. The sample contains 147 firms continuously listed in the Istanbul Stock Exchange between 2004 and 2007. The panel data regression analysis distinguishes between fixed and random effects in order to see how firm specific effects work. Table also presents GLS results for random effects with weighted periods and white cross-section coefficient covariance method. Random effects results are performed according to Wansbeek-Kepteyn random effects method. To decide between random effects and fixed effects methods Hausman Specification test is also presented. The variables are constructed from cash flow and financial statements of the manufacturing firms listed in the Istanbul Stock Exchange. Probability values are given in parentheses below each estimated coefficient.

Dependent Variable: D/TA, Total Debt over Total Assets

Dependent Variable	**Fixed Effects**	**Random Effects**	
D/TA	**No Weights**	**GLS**	
Constant	1,088	0,398**	0,795***
	(0.067)	(0.000)	(0.000)
Growth	0,077***	0,147***	0,075***
	(0.001)	(0.000)	(0.000)
NDTSH	0,085	-0,020	0,077
	(0.085)	(0.417)	(0.094)
ROA	-0,332***	-1,234***	-0,431***
	(0.000)	(0.000)	(0.000)
SIZE	-0,026	0,012**	-0,010
	(0.422)	(0.029)	(0.404)
TNGB	-0,325***	-0,304***	-0,319***
	(0.000)	(0.000)	(0.000)
R-squared	0,94	0,37	0,19
R-adjusted	**0,91**	**0,37**	**0,18**
Hausman test, Chi sq stat.	**43,11*** **	-	-
Prob	(0.000)	-	-
F-Test	28,58	-	21,2
Prob	(0.000)	-	(0.000)

***, **, *, Represents statistical significance at 1%, 5% and 10%, levels respectively

The negative impact of the tangibility on firm debt ratios can also be explained within the context of the Agency Theory provided by Grossman and Hart (1982). Grossman and Hart (1982) suggest that in highly leveraged firms bondholders are more inclined to monitor managers' activities as they tend to over-consume perquisites. Monitoring firm activities which have less collateralizable assets is more costly. As a result, firms with less collateralizable assets tend to use

more debt in order to restrict managers' excess consumption of generated funds in the non productive areas. For this reason, managers' tendency to over-consume perquisites may induce negative relation between tangibility and debt ratio.

Ferri and Jones (1979) also investigated the relation between firm operating leverage, which they define as fixed assets over total assets, and firms' use of debt (Ferri and Jones, 1979, P: 634). They found that firms with high portion of fixed assets to total assets are concentrated in the low leverage firm classes, which implies a negative relation between firm leverage and tangibility. Rather than considering fixed assets as collateral value, authors associate fixed assets with the fixed costs employed in the production process, thus they suggest that fixed assets can magnify variability in the firms' future income. As a result, fixed assets to total assets should be negatively correlated with percentage of debt use.

In order to better understand the impact of tangibility on firm leverage it is necessary to analyze how tangibility affects short term and long term debt components. Within this aim, table 6 shows regression coefficients which were estimated for long term and short term debt ratios.

Now it is possible to say that the mystery of negative correlation between leverage and tangibility is completely resolved when the regression results are analyzed from the perspective of short term and long term debt.

Booth et al. (1999), performing capital structure regression analysis for ten developing countries, estimated negative correlation between total debt and tangibility and positive correlation between long term debt and tangibility for Turkey. One other important finding provided by authors is that tangibility of firm assets rises with long term debt and decreases with total debt. The reason for such behaviour is hidden in the notion that substitution effect of short term for long term debt is less than one.

Consistent with findings of Booth et al. (1999), estimation results in the table 6 show that tangibility is positively and significantly correlated with long term debt even at 1% confidence level. On the other hand, negative and significant correlation is observed between tangibility and short term debt.

Table-5 Conventional Determinants of Firm Capital Structure: Short Term versus Long Term Debt Ratios as Dependent Variables.

The table below table illustrates capital structure estimates by classifying dependent variable as long term and short term debt ratio. The panel data contains 147 cross section and 441 point observations. The regression analysis is performed by the fallowing model; $D_{it} = \alpha_0 + \beta_1 * GROWTH_{it} + \beta_2 * NDTSH_{it} + \beta_3 * ROA_{it} + \beta_4 * SIZE_{it} + \beta_5 * TNGB_{it} + \varepsilon_{it}$ where D is total debt over total assets, GROWTH, growth rate of total assets, ROA net income over total assets and TNGB stands for tangibility which is calculated by fixed assets over total assets. To decide between random and fixed effect methods Hausman Specification test is also presented. Table also presents estimated coefficients for random effects method. The variables are constructed from cash flow and financial statements of the manufacturing firms continuously listed in the Istanbul Stock Exchange between 2004 and 2007. Probability values are given in parentheses below each estimated coefficient.

	Dependent Variable Long Term Debt		Dependent variable Short Term Debt	
	LTD		SHTD	
	Fixed-Effects	Random-Eeffects	Fixed-Effects	Random-Eeffects
Constant	-0,717***	-0,071	1,788***	0,821***
	(0.000)	(0.599)	(0.000)	(0.000)
Growth	0,013***	0,028*	0,063***	0,053**
	(0.000)	(0.068)	(0.004)	(0.011)
NDTSH	0,042*	0,013	0,044**	0,048
	(0.022)	(0.731)	(0.042)	(0.348)
ROA	-0,228***	-0.278***	-0,105	-0,265***
	(0.000)	(0.000)	(0.167)	(0.000)
SIZE	0,042***	0,007	-0,066***	-0,014
	(0.000)	(0.342)	(0.000)	(0.124)
TNGB	0,138***	0,157***	-0,463***	-0,474***
	(0.000)	(0.000)	(0.000)	(0.000)
R-squared	0,85	0,12	0,86	0,19
R-adjusted	0,78	0,11	0,79	0,18
Hausman test, Chi sq stat.	9,14		32,48	
Prob	(0.104)		(0.000)	
F-Test	11,50	11,89	12,08	20,49
Prob	(0.000)	(0.000)	(0.000)	(0.000)

***, **, *, Represents statistical significance at 1%, 5% and 10%, levels respectively

Results are the same for fixed and random-effects estimation methods. Furthermore, estimated coefficients reveal very important information regarding preference of the

debt maturity of Turkish firms in the manufacturing sector. It seems that Turkish manufacturing firms tend to comply with matching criteria of asset financing. In other words, Turkish manufacturing firms tend to finance their fixed assets with long term debt and current assets with short term debt. If we take a glance on the issue from another side, it is observed that the more tangible assets firm has the more long term debt it can obtain. For this reason, there is a positive correlation between long term debt and tangibility.

Splitting dependent variable into long term and short term components does not alter statistical and economic characteristics of growth and profitability variables. But it does so for size and non-debt-tax-shields. The evidence in the table 5 suggests that size is positively and significantly correlated with long term and negatively correlated with short term debt. Although regression coefficients of the size are not statistically sensible for random effects they provide important insight regarding the preference of debt type of Turkish manufacturing firms. The results suggest that big firms are more able to find long term debt, because big firms are more diversified and have less probability of default which is consistent with trade off predictions. On the other side, short term debt decreases with size this is because bigger firms prefer more long term debt for their financing activities.

Finally, observed coefficients of size support the hypothesis that it should be negatively correlated with debt due to asymmetric information problems, only in case of short term debt. However, when table 6 is analyzed, some factors other than offered by the pecking order theory seem to be at work. In other words, trade off explanation is more suitable for the case provided in table 5.

Surprisingly, non-debt-tax-shields which are found to be highly significant for the overall sample, turned to be moderately significant for long term and short term debt components. But contrary to the expectations, non-debt-tax-shields have positive correlation with long term and short term debt components which is not sensible from the theoretical point of view.

Theoretically, it is obvious that asset scale of the firm may have a considerable impact on capital structure determinants. Within this regard, table 6 provides regression results for capital structure determinants by splitting the sample into big and small firms. Where big firms are with over the mean total assets and small firms are with under the mean total assets.

Actually, theoretical underpinning regarding leverage behaviour and factors correlated with it are well described by central theories. For example, according to the pecking order theory profitable firms should use less debt as they can generate more cash. More cash means more retained earnings, which are used for investments before issuing debt. Consistent with the pecking order theory, coefficient estimates of the profitability are negatively and significantly correlated with leverage in big and small firm samples. However, absolute value of the coefficient magnitudes for profitability is bigger for big firms than for small ones, which means that increase in the profitability results in more leverage decrease for big firms compared to small ones. Assumed that all other factors stay constant, one standard deviation increase in the profitability reduces leverage by 0.531 standard deviations in big firms and by 0.322 standard deviations in small firms. However, when incremental debt change is taken into account, it is seen that profitability creates more reduction in the debt change for small firms than for big ones.

From the perspective of the information asymmetries greater profitability coefficient for big firms is quite reasonable. As assumed by the pecking order theory and suggested by Özkan (2001), big firms are more diversified and offer less investment risk for investors. Size may also act as a proxy for the information investors endowed, and which may increase their preference for equity relative to debt (Rajan and Zingales, 1995, p: 1461). As a result, big firms are freer to issue equity because they have less value reduction during equity issuance, which is associated with information asymmetry between insiders and investors. From this regard, greater debt reduction for big companies could have also been resulted by an ability to issue cheaper equity. Another fact suggests that small firms which have more problems related with information asymmetry, even being profitable, are less

able to give up debt financing because it is cheaper than other sources of external financing.

Table-6 Conventional Determinants of Firm Capital Structure: Big versus Small firms

The table below illustrates estimated coefficients for the conventional determinants of firm capital structure and splits the sample into big and small firms according to their total assets. It is assumed that big firms are the ones with over the mean total assets and small firms are the ones with under the mean total assets. There are 120 of small and 27 big firms, outliers are excluded. The regression analysis is performed by the fallowing model; $D_{it} = \alpha_0 + \beta_1 * GROWTH_{it} + \beta_2 * NDTSH_{it} + \beta_3 * ROA_{it} + \beta_4 * SIZE_{it} + \beta_5 * TNGB_{it} + \varepsilon_{it}$ where D is total debt over total assets, GROWTH, growth rate of total assets, ROA net income over total assets and TNGB stands for tangibility which is calculated by fixed assets over total assets. To decide between random effects and fixed effects methods Hausman Specification test is also presented, as the Hausman test is significant for most of the sub samples random effects coefficients are not presented. The variables are constructed from cash flow and financial statements of the manufacturing firms continuously listed in the Istanbul Stock Exchange between 2004 and 2007. Probability values are given in parentheses below each estimated coefficient.

	Dependent D/TA		Dependent (D1-D0)/TA1	
	Big Firms	Small Firms	Big Firms	Small Firms
	Fixed-Effects	Fixed-Effects	Fixed-Effects	Fixed-Effects
Constant	0,714**	1,720***	-3,281	-6,78***
	(0.033)	(0.000)	(0.179)	(0.000)
Growth	0,087***	0,084***	0,362***	0,317***
	(0.002)	(0.000)	(0.000)	(0.000)
NDTSH	-0,231	0,008***	0,320	0,029*
	(0.616)	(0.000)	(0.462)	(0.069)
ROA	-0,531**	-0,322***	-0,518***	-0,611***
	(0.016)	(0.004)	(0.000)	(0.000)
SIZE	-0,008	-0,059**	0,159	0,384***
	(0.505)	(0.014)	(0.163)	(0.000)
TNGB	-0,218**	-0,373***	-0,031	-0,539***
	(0.036)	(0.000)	(0.794)	(0.000)
R-squared	0,96	0,93	0,87	0,66
R-adjusted	0,94	0,90	0,78	0,48
Hausman test, Chi sq stat.	7,84	30,33***	6,33	32,61***
Prob	(0.165)	(0.000)	(0.275)	(0.000)
F-Test	43,52	26,95	9,96	3,62
Prob	(0.000)	(0.000)	(0.000)	(0.000)

***, **, *, Represents statistical significance at 1%, 5% and 10%, levels respectively

Interestingly and contrary to what have found Titman and Wessels (1988) asset growth appeared to have similar positive correlation and magnitude characteristics both for big and small firms, meaning that both big firms and small ones prefer to finance their investments with debt. Such a finding complies with the pecking order prediction regarding financing hierarchy from internal sources to external and from debt to equity, because it seems that growth is financed firstly with

debt. In contrast, trade off theory predicts that high growth firms are generally accompanied by high bankruptcy risks, for such a reason there should be a negative relation between growth and debt. According to the regression results it is obvious that pecking order is more appropriate explanation for growth opportunities in the case of Turkish listed companies.

Lastly, according to the table 6, size appeared to be statistically significant only for small firms. However, magnitude and direction of the estimated size coefficients vary with leverage definition. For instance, size is negatively and significantly correlated with total debt ratio, but in the case of incremental debt change, size has positive and statistically significant relation with dependent variable. Such a finding leads to the conclusion that estimated coefficients are also sensitive to the leverage definitions, as it is suggested by many academic works.

Trade off theory suggests that firms determine their mix between debt and equity by balancing between various costs and benefits of debt financing. The advantages are associated with tax deductibility of interest and reduction of free cash flow problems. Costs, on the other hand, are associated with bankruptcy risks and other agency problems such as investment into risky projects at the expense of debt-holders. For such a reason, firms which have already reached maximum debt levels at which further debt financing may result side-effects, are expected to behave differently from the ones that have not fulfilled their maximum debt capacity. From this perspective, it would be reasonable to investigate how conventional capital structure determinants behave in over-debted and under-debted Turkish listed firms. At this point, it is assumed that firms with over the mean debt ratios are more likely to have fulfilled their debt limits and expected to have different relation with capital structure variables than their under-leveraged counterparts.

As it was noted by Myers (1984), firms with expected future growth opportunities tend to save their debt capacity by financing current ‘financing deficit’ mostly by equity. The explanation for such a behavior is hidden in the notion that

firms do not want to deplete their debt limits so that it would be possible to raise debt, less information sensitive source of financing, in the future.

Table-7 Conventional Determinants of Firm Capital Structure: Over-debted versus Under-Debted Firms

The table below illustrates estimated capital structure coefficients for highly and moderately leveraged firms. Highly leveraged firms are the ones with over the mean debt to total assets ratio, while moderately leveraged firms assumed to be the ones with under the mean debt to total assets ratio. Highly leveraged sample contains 61 firms and Moderately leveraged sample consists of 87 firms, outliers are excluded from the sample. The regression analysis is performed by the fallowing model; $D_{it} = \alpha_0 + \beta_1 * GROWTH_{it} + \beta_2 * NDTSH_{it} + \beta_3 * ROA_{it} + \beta_4 * SIZE_{it} + \beta_5 * TNGB_{it} + \varepsilon_{it}$ where D is total debt over total assets, GROWTH, growth rate of total assets, ROA net income over total assets and TNGB stands for tangibility which is calculated by fixed assets over total assets. To decide between random effects and fixed effects methods Hausman Specification test is also presented, as the Hausman test is significant for most of the sub samples random effects coefficients are not presented. The variables are constructed from cash flow and financial statements of the manufacturing firms continuously listed in the Istanbul Stock Exchange between 2004 and 2007. Probability values are given in parentheses below each estimated coefficient.

	Dependent D/TA		Dependent (D1-D0)/TA1	
	Over-Debted	Under-debted	Over-Debted	Under-Debted
	Fixed-Effects	Fixed-Effects	Fixed-Effects	Fixed-Effects
Constant	2,524***	0,101	-7,721***	-2,636***
	(0.000)	(0.773)	(0.000)	(0.066)
Growth	0,142***	0,044**	0,461***	0,209***
	(0.002)	(0.014)	(0.000)	(0.000)
NDTSH	0,849*	0,013**	2,679***	0,034***
	(0.079)	(0.007)	(0.000)	(0.000)
ROA	-0,303***	-0,382***	-0,523***	-0,382***
	(0.000)	(0.000)	(0.007)	(0.002)
SIZE	-0,091**	0,017	0,431***	0,145*
	(0.020)	(0.345)	(0.000)	(0.051)
TNGB	-0,486***	-0,220***	-0,907***	-0,185
	(0.000)	(0.000)	(0.000)	(0.142)
R-squared	0,84	0,89	0,76	0,60
R-adjusted	0,75	0,84	0,63	0,38
Hausman test, Chi sq stat.	12,11	26	19,54	9,68
Prob	(0.033)	(0.000)	(0.002)	(0.084)
F-Test	9,49	16,11	5,65	2,73
Prob	(0.000)	(0.000)	(0.000)	(0.000)

***, **, *, Represents statistical significance at 1%, 5% and 10%, levels respectively

However, in our case, because of data limitations, it is only possible to measure how firms, which have already over-passed their debt limits, behave in terms of capital structure determinants.

Normally, it is expected that over-leveraged firms should not be able to increase their debt amount, as they have already used up their debt capacity. However, results presented in the table 8, even being highly significant in general, offer some contradictory evidence to our expectations. For example, one would expect that highly leveraged firms should finance fewer amounts of growth opportunities with debt in contrast to their under-leveraged counterparts. But it is clearly seen that over-leveraged firms have greater regression coefficients for growth, meaning that they still raise more debt than under-leveraged firms. The results are in the same direction for the incremental debt change. On the other hand, regression coefficients for profitability are negative and significant, which support pecking order predictions. But again, contrary to the expectations, magnitudes of the coefficients suggest that profitable over-debted firms are less prone to reduce their debt financing, in case of total debt as a dependent variable. In contrast, profitability coefficients for incremental debt change suggest that profitable over-leveraged firms reduce their debt financing by 0.523 standard deviations compared with under-leveraged firms.

Such contradictory results could have been generated by the fact that dependent variables (total leverage and incremental debt change) might not account for the debt capacity of the Turkish listed firms. It seems that firms under investigation have not reached their debt financing limits, which stems from the fact that over-debted firms still prefer raising more debt than their under-debted counterparts. On the hand, as it was already mentioned in the previous sections, Turkish banking system accounts for a significant portion in lending activities to the corporate sector, which is in line with Turkish bank based institutional orientation and which could have induced the results provided in the table 7.

The next table presents empirical results for debt to equity dependent variable. Debt to equity, as an alternative measure of capital structure, has been employed by several studies among which it is possible to cite the works of Krishnan and Moyer (1997) and Brailsford et al. (2000).

Krishnan and Moyer (1997) investigated corporate performance and capital structure for large companies in the four Asian countries which are Hong Kong, Malaysia, Singapore and Korea . They built a model with debt to market value of equity as a function of assets structure (tangibility), growth, size, profitability, tax rate, risk, country dummies and industry classes.

Among the dependent variables employed by authors, only country specific factors, tax rate and size appeared to have significant correlation with capital structure. However, tax rate was found to be significant only for the overall debt to equity ratio (Krishnan and Moyer, 1997).

Within this regard, it would be useful to see how conventional capital structure variables are correlated with the alternative capital structure measures in Turkey. Table 8 shows estimated results for dependent variable, debt to book equity. Table 8 also presents estimated coefficients for fixed effects, GLS and for random effects methods.

According to the regression results, when debt to equity is considered as dependent variable, explanatory variables posses identical characteristics compared with normal regression results presented earlier. For example, consistent with the pecking order predictions, growth is positively and significantly correlated with debt to equity for fixed effects, GLS and for random effects methods. Such a finding suggests that high growth manufacturing firms in Turkey, which suffer with asymmetric information problems, opt to raise debt rather than issuing equity. The result could also be related with Turkish bank based institutional orientation, where raising debt is less costly than issuing equity, especially for high growth firms.

Profitability also appeared to have negative and significant relation with debt to equity which supports our pecking order hypothesis. Non-debt-tax-shields have positive and significant correlation with debt to equity which is in line with previously found results and which contradicts to the trade off expectations.

Table-8 Conventional Determinants of Firm Capital Structure: Relation between Debt to Equity Ratio and Capital Structure Determinants.

The table below illustrates estimated coefficients for the conventional determinants of firm capital structure. The regression analysis is performed by the fallowing model; $D_{it}=\alpha_0 + \beta_1*GROWTH_{it}+ \beta_2*NDTSH_{it}+ \beta_3*ROA_{it}+ \beta_4*SIZE_{it}+ \beta_5*TNGB_{it}+ \varepsilon_{it}$ where D/Eit is total debt over total equity, GROWTH, growth rate of total assets, ROA net income over total assets and TNGB stands for tangibility which is calculated by fixed assets over total assets. The sample contains 133 firms continuously listed in the Istanbul Stock Exchange between 2004 and 2007. After excluding outliers for debt to equity ratio sample size reduced to 133 firms. The panel data regression analysis distinguishes between fixed and random effects in order to see the firm specific effects. Table also presents GLS results for fixed effects with weighted periods and white cross-section coefficient covariance method. Random effects results are performed according to Wansbeek-Kepteyn random effects method. To decide between random effects and fixed effects methods Hausman Specification test is also presented. The variables are constructed from cash flow and financial statements of the manufacturing firms listed in the Istanbul Stock Exchange. Probability values are given in parentheses below each estimated coefficient.

Dependent Variable	**Fixed Effects**	**Random Effects**	
D/E	**No Weights**	**GLS**	
Constant	-3,891	0,206	0,064
	(0.299)	(0.288)	(0.972)
Growth	0,246***	0,847***	0,365***
	(0.000)	(0.000)	(0.000)
NDTSH	0,503**	-0,136***	0,333
	(0,033)	(0.003)	(0.097)
ROA	-1,617***	-3,421***	-1.819***
	(0.004)	(0.000)	(0.000)
SIZE	0,251	0,062***	0,054
	(0.185)	(0.000)	(0.311)
TNGB	0,158	-0,883***	-0,275
	(0.650)	(0.000)	(0.331)
R-squared	0,91	0,15	0,13
R-adjusted	0,87	0,14	0,12
Hausman test, Chi sq stat	**10,97***	-	-
Chi square	**(0.052)**	-	-
F-Test	20,84	-	12,14
Prob	(0.00)	-	(0.000)

***, **, *, Represents statistical significance at 1%, 5% and 10%, levels respectively.

On the other hand, tangibility appeared to have no explanatory power for debt to equity in case of fixed effects and random effects methods, but for GLS method, asset tangibility has negative and statistically significant correlation with dependent variable. The same negative correlation but with lower magnitudes was observed in the above presented regression results.

It is also worth of mentioning that size, even being non-significant for random and fixed effects, has positive impact on debt to equity within GLS method. The result contradicts to what has been observed in the table 4 for GLS method. In other words, positive and significant coefficient of size supports predictions of the trade off theory, according to which, big firms are more diversified and are less affected from bankruptcy risks. For this reason, big firms are more able to raise debt.

5.2.2 Concluding Remarks to the Capital Structure Analyses

Section 5.2 has been devoted to answer the question of how conventional capital structure determinants, proposed by so many authors, appear to work for Turkish manufacturing firms listed in the ISE. So long, it has been observed that in the emerging economies capital structure determinants operate in the same direction as in the developed countries. However, institutional differences also impose significant impact on the operating characteristics of the capital structure determinants (Rajan and Zingales (1995), Krishnan and Moyer (1997), Booth et al. (1999), Levine (2002)). From this perspective, regression results observed in this section, posses some supportive and contradictive evidence to the generally accepted rules. On the other hand, bank based institutional orientation in Turkey appeared to have some impact on firm capital structure determinants.

As it was aimed in the beginning of this section, conventional capital structure analysis shed light upon our understanding of firm capital structure determinants in Turkey. Furthermore, estimation results provided valuable evidence regarding the validity of the pecking order, trade off and agency based theories in the financing process of Turkish manufacturing firms.

The overall results provide some preliminary support for the pecking order theory. But there are also some evidence generated by trade off and agency based theories. For example, based on the empirical evidence, profitability, growth opportunities, and asset structure (tangibility) were found to have an important impact on capital structure of Turkish listed companies. The negative and significant impact of the profitability for all sub samples (long term vs short term, big vs small, under-debted vs over-debted) have supported our predictions within the context of the pecking order theory. On the other hand, asset growth which is assumed to account for growth opportunities, also presents stable characteristics for all sub samples, implying its importance within the determination process of the firm capital structure.

Actually, theoretical expectations regarding size and non-debt-tax-shields were not approved by the empirical evidence. Non-debt-tax-shields appeared to have no explanatory power and statistical significance as the determinant of the firm capital structure in Turkish manufacturing sector. On the other hand, size provided twofold results in some cases supporting and in some contradicting with pecking order predictions. Based on such a fact, it would not be true to derive any implications upon regression results of those variables.

The most interesting and at first glance contradictory results were observed for the tangibility of firm assets. Highly significant estimated coefficient of tangibility with leverage with negative sign is, in some way, inconsistent with general expectations. Normally, firms with more fixed asset should be able to raise more debt both from the perspective of trade-off and pecking order theories and under such conditions positive correlation between tangibility and leverage is expected. However, negative and significant statistical relation is reasonable form several aspects. Firstly, negative correlation implies that substitution of long term debt for short term debt is greater than one. Secondly, positive correlation with long term debt, negative with short term debt and further negative coefficient for overall debt possibly reveal the choice of Turkish firms regarding debt maturity. In other words, Turkish firms try to finance their assets in place with long term debt.

Finally, capital structure regression results, provided in this study, are in line with past researches. For example, Terim and Kayalı (2009) who investigated capital structure determinants for 134 firms, listed in the ISE between 2000 and 2007, observed positive relation between size and leverage and negative relation between asset tangibility, non-debt-tax-shields, profitability and leverage, which supports findings of this study as well.

5.3 ARE THE PECKING ORDER AND MARKET TIMING HYPOTHESES VALID EXPLANATIONS FOR THE FINANCING CHOICES OF TURKISH MANUFACTURING FIRMS?

Originally proposed by Myers and Majluf (1984), the pecking order theory is based on market imperfections which arise because of asymmetrically distributed information among investors and managers. Related with the fact, Oliner and Rudebusch (1992), analyzing the sensitivity of investment spending on internal funds for American firms traded on OTC (over the counter) and NYSE between (1970-80), have empirically observed that information asymmetries are the main source of the financing hierarchy put forth by the pecking order theory. Additionally, authors observed that investment is most closely correlated with cash flow for the firms expected to face relatively severe information asymmetries.

Within the pecking order concept it is assumed that managers are always one step ahead of investors and are better informed about real value of their firm assets. However, both managers and investors are aware of that fact; as a result, each financing decision of the firm generates important outcomes regarding valuation of issued security.

On of the most important underlying assumptions of the pecking order theory is that managers act in line with interests of old share holders and that shareholders are passive, which means, they do not adjust their portfolio in response to issue-invest decisions. Under such conditions, firms that have financial slack, which Myers and Majluf (1984) define as available cash plus marketable securities plus risk free

debt, will undertake all positive NPV projects. On the other hand, firms that do not have sufficient financial slack and which are in a need of external financing will pass up some projects and also those firms will prefer debt rather than equity. Debt is preferred because managers believe that equity issuance will be underpriced and this way some wealth of old share holders will flow to new ones. So, the pecking order theory suggests a hierarchy in choosing financing source. In the top of the hierarchy there is internally generated funds or cash plus marketable securities, after comes debt and finally equity.

As it was already presented, the reason for such a hierarchy is very simple. When firm decides to issue equity, investors rationally demand extra discount as they believe that managers issue equity only in case of superior information which means that equity is overvalued. In this case, extra discount for overvalued equity may reach the extent where firms are forced to pass up even positive NPV projects. Based on such a logic, Myers and Majluf (1984) suggest that firms, in a need of external financing, will firstly issue debt, because it does not have much informational content and does not result undervaluation of the underlying security. Furthermore, debt holders have a prior claim on firm assets and equity holders have residual. For such a reason, Myers (2001) state that the announcement of debt issue should have less downward impact on stock prices than the impact of equity issuances (Mayers, 2000 p: 92). Less downward impact means lesser transfer of wealth from current shareholders to new ones. As a result, for financing growth opportunities, firms prefer internal sources over external and when there is a need for external financing, debt over equity.

Finally, according to the pecking order theory total debt, within firms' financial structure, is the outcome of hierarchical choice of financing sources. As a result, it is expected when firm is in a financial need, debt ratios will be high and when firm has financial surplus debt ratios will be low, as the surplus will be used to pay down debt.

On the other hand, market timing theory suggests that firm capital structure is the outcome of the past actions to time equity issuances. In other words, market timing theory suggests that firms tend to issue equity at times when stock markets are overvalued and repurchase in the opposite case.

There are many works that aim to test the existence of market timing; such works can be attributed to Baker and Wurgler (2002), Flannery and Rangan (2005) and Elliott et al. (2007). Where the first two works utilize market to book ratio as the main indicator of market timing, it is suggested that at the times when market to book ratio is high firm leverage is low. This means that firms tend to issue equity when it is overvalued. However, Elliott et al. (2007) utilizes more efficient method, residual income model, to measure the market timing and which is going to be presented within coming sections.

This section aims to directly test the pecking order and market timing theories in the Turkish manufacturing sector by utilizing panel data for the firms listed in the ISE between 2004 and 2007. This study is unique in the way that it first time, attempts to test the pecking order theory for Turkish firms and utilize models developed by Shyam-Sunder and Myers (1999) and Frank and Goyal (2002). On the other hand, within this section pecking order and market timing theories are going to be tested simultaneously, as it was performed by Elliot et al (2007).

Furthermore, this section is important as it will contribute to the ongoing capital structure literature for Turkish firms, by testing the validity of one of the most trivial capital structure theory, pecking order.

It is also worth of mentioning that capital structure area for Turkish listed firms is not explored to its maximum extent, especially pecking order hypothesis, and there are not many works that investigate this issue. Furthermore, there is no work which directly tests the pecking order theory. For example, Gönenç (2003), Balsarı and Kırkulak (2008), has found some support for the pecking order theory through analyzing capital structure determinants for Turkish industrial firms. Both

studies has found negative coefficient for the profitability which is in line with the pecking order hypothesis and supports the existence of asymmetric market conditions.

The capital structure analysis within this study has also provided a number of supportive facts regarding pecking order hypothesis. However, the pecking order study is limited with the facts presented and more sound tests are going to be performed in order to reach some reasonable conclusions.

5.3.1 Direct Test of the Pecking Order Theory

The simplest version of the pecking order theory suggests that firms with external financing need will never issue equity because of asymmetric information problems. Within this regard, any increase in the external financing need should be associated with a unit increase in the debt financing. However, more realistic version of the theory accepts some degree of equity financing and does not require a unit increase of debt upon increase of external financing.

In order to empirically test the pecking order theory, both its simple and more elastic version, this study follows method proposed by Shyam-Sunder and Myers (1999) which is later modified by Frank and Goyal (2003). The logic behind the model is very simple; it is assumed that if firm follows pecking order predictions then total financial deficit should be followed with unit increase in the issued debt. Within this aim, financing deficit is regressed on debt issued.

As suggested by Shyam-Sunder and Myers (1999) financial deficit is calculated by aggregating accounting variables such as dividends, investments, change in the net working capital minus cash flow from operations. It is possible to denote financial deficit components as below:

DIV_{it} cash dividends for firm i in the year t

I_{it} net investment defined as the sum of acquisition of equipment plant and property, sale of the equipment, plant and property, acquisition and sale of the intangible assets.

ΔWC_{it} change in working capital from year t_0 to t_1 and net working capital is defined as the difference between current assets and short term liabilities from balance sheet variables.

C_{it} cash flow from operations which is calculated as net profit/loss before interests and taxes plus profit/loss from non affiliate shareholders plus amortization plus profit/loss from long term investments or from security investments plus interest expenses plus net profit/loss before change in the shareholders equity minus increases in the accounts receivable plus decreases in the inventory minus increases in the account payable plus cash from core operations minus interest expenses minus tax payments.

ΔD_{it} Net debt issues defined as the difference between total liabilities from t_0 to t_1 over total assets.

Using defined variables from cash flow statements and balance sheets it is possible to construct an accounting cash flow identity as proposed by Shyam-Sunder and Myers (1999).

$$DEF_{it} = DIV_{it} + I_{it} + \Delta WC_{it} - C_{it}$$

Firm financial deficit constructed above theoretically accounts for the total external financing need or surplus. When financial deficit is negative, DEF<0, there is a financial surplus, as internally generated cash outweighs total financial need and in cases when DEF>0 there is net financial deficit because internally generated cash is less than total financial need. In cases when DEF is positive, or in other words when firm faces financial deficit, firm seeks for external financing and in this stage pecking order theory suggests that firm will firstly issue debt or commit to the bank loan which will result an increase in the total debt. To test this hypothesis Shyam-Sunder and Myers (1999) suggest the following regression model:

$$\Delta D_{it} = \alpha_0 + \beta_1 * DEF_{it} + \varepsilon_{it} \quad \text{(Eq-1)}$$

Where dependent variable is the net issued debt and explanatory variable is the financial deficit constructed above, both dependent and explanatory variables are scaled by total assets. Finally, epsilon represents error term which accounts for the effects not represented by explanatory variable.

As the data utilized within this study is cross sectional, the regression model has to account for such a feature. Within this aim, notation *i* represents individual firms scale and *t* represents time scale. As a result, the model estimates coefficients which account for wider information possessed across firms and through time.

The strict version of the pecking order theory predicts $\alpha=0$ and $\beta_1=1$, which means that a unit increase in the financial deficit is strictly associated with a unit increase in the total debt issued. However, in reality it is not possible to obtain such conditions where firms' financing sources totally depend on debt because such conditions will most probably result a financial distress. But within more elastic pecking order assumptions β_1 is expected to be very close to 1 and α very close to 0.

Additionally to Shyam-Sunder and Myers (1999), Frank and Goyal (2003) along with estimating eq-1, also test whether aggregation of the accounting components into financial deficit variable (DEF) is empirically justified or not. Authors argue that in the pecking order analyses it is the financial deficit itself which is important. However, if aggregation of the deficit variable components is justified, then unit increase in each component should be associated with the unit increase in the debt issued ΔD_{it}. To test the hypothesis the following model is proposed.

$$\Delta D_{it} = \alpha_0 + \beta_1 * DIV_{it} + \beta_2 * I_{it} + \beta_3 * \Delta WC_{it} + C_{it} + e_{it} \quad \text{(Eq-2)}$$

A justification of the hypothesis is statistically approved if regression coefficients of the components are equal to one, $\beta_1= \beta_2= \beta_3= \beta_4=1$, which means that a unit increase in any of the financial deficit component is associated with a unit increase in the debt issued ΔD, assuming all other variables stay constant.

Frank and Goyal (2003) also argue that neglecting conventional capital structure analysis, within the scope of the pecking order test, may result insufficient information regarding the validity of the hypothesis, as conventional capital structure determinants have survived many tests and have some stylized facts. Therefore, it is argued that if financial deficit is the sole reason which generates the capital structure formation, then adding it into conventional capital structure regression should

provide additional explanation power. Within the scope of this aim, financial deficit is added to conventional capital structure regression model as in the eq-3.

$$D_{it} = \alpha_0 + \beta_1 * DEF_{it} + \beta_2 * GROWTH_{it} + \beta_3 * NDTSH_{it} + \beta_4 * ROA_{it} + \beta_5 * SIZE_{it} + \beta_6 * TNGB_{it} + \varepsilon_{it} \quad \text{(Eq-3)}$$

Then, magnitudes of R^2 are compared before and after inclusion of deficit variable. The hypothesis states that the inclusion of the financial deficit variable should wipe out effects of conventional capital structure variables by dramatically increasing explanation power R^2.

The application of the proposition put forth by Frank and Goyal (2003) is slightly different in this study in the way that authors run the regression with first differences. Whereas eq-3 does not consider differences, as the data exploited has only four year time period.

5.3.2 Joint Test of Market Timing and Pecking Order Theories

Elliott et al (2007) empirically showed that market timing theory can be jointly tested with the pecking order hypothesis through multiplying fundamental stock valuation metric with financial deficit and adding this interacted term into the pecking order regression model. This way it is aimed to find which type of security is used to fund the deficit under the presence of potential market misvaluation.

Misvaluation is measured and empirically tested through estimating an 'economic value' (EV) which is the intrinsic value of the firm. EV, in turn, is estimated through earnings based valuation model which is similar with dividend discount model. The residual income model (RIM) or its another name economic value (EV) has been utilized to determine misvaluation of the underlying security by a number of works some of which are; Frankel and Lee (1998), D'Mello and Shroff (2000), Elliot et al (2007).

The main hypothesis underlying market timing theory is simple; it states that when firm shares are overvalued financial deficit is funded mainly with equity, thus, generating low financial deficit coefficients. Otherwise, firms are expected to use

debt and repurchase their existing shares, which, finally, results bigger financial deficit regression coefficients generally close to unity.

Within this section the theoretical background for empirical test of market timing is going to be presented with all related stages based on the previous empirical works of Frankel and Lee (1998) and Elliot et al (2003).

5.3.2.1 Residual Income Model

The residual income model (RIM), also known as Edwards Bell-Ohlson (EBO) valuation technique, is primarily based on the assumption of clean surplus relation (Ohlson, 1995), according to which, the change in the book value is equal to earnings minus dividends. Under clean surplus assumptions the intrinsic value of the firm equals to the book value at time t_0 plus discounted expected future abnormal cash flow, where the 'abnormal cash flow' is the difference between current earnings and required return on book equity.

The residual income model has also been argued as more precise measure of current misvaluation of the firm equity, as this model strictly utilizes accounting data. Elliot et al. (2007), argue that their valuation metric which is based on estimation of EV, is superior compared with market to book method or examination of insider trading activities. The reason is that such proxies of market timing are not without exception of being contaminated by other information as well. For example, it was previously noted that market to book can also be used as a proxy for growth opportunities (Hovakimian et al., 2001). In this case, it becomes more complicated to attribute statistical outcomes of market to book measure to the certain factors such as market timing, growth opportunities or asymmetric information problems.

The method of testing market timing hypothesis is exactly similar with Elliot et al (2007) in the way that estimated firm specific EV is scaled by year-end stock prices and then interacted with Shyam-Sunder and Myers (1999) financial deficit, however EV itself is a replication of the model proposed by Frankel and Lee (1998).

The estimation process of RIM requires five main parameters such as future return on equity (FROE), book value of equity (BV), net income after interests and taxes (NI) and required return on equity or the cost of equity (r_e), along with estimation of the terminal value (TV).

William et al. (2007), Frankel and Lee (1998) and D'Mello and Shrof (2000) pointed to the fact that estimation of the future return on equity (FROE) is practically impossible, but instead it is possible to use ex-post realized values of ROE in order to estimate its future value. Along with ex-post realized values, cited studies also estimate RIM using analysis earnings forecasts. However, as such data is not obtainable in Turkey ex-post values of ROE are utilized. Finally, NI, which is used in calculation of the ROE, is restricted to be non-negative as in Frankel and Lee (1998). Negative NI is not reasonable for the estimation of the RIM, as it implies investment into negative NPV projects during the whole firms' life span and under such conditions terminal value becomes unreasonable. To overcome such a problem this study replaces all negative NI's with 2% of corresponding total assets thus estimating expected future net income of the firm, where 2% equals to the long run average return on firm assets.

5.3.2.1.1 Estimating Cost of Equity

One of the most important caveats within the estimation procedure of RIM is finding appropriate cost of equity (r_e). Cost of equity, used as discount rate in the model, is very important as its magnitude may dramatically affect current valuation of underling security. Furthermore, estimation of the r_e is complicated issue itself and has been criticized by many academicians like Fama and French (2004), lee and Upneja (2007). One of the best ways to estimate r_e is through estimation of the capital asset pricing model (CPAM) of William Sharp (1964) and John Lintner (1965).

In theory, r_e should be firm specific so that it could reflect the premium demanded by the investors to invest in the firm or project with comparable risk.

However, there is little consensus on how this discount rate should be determined (Frankel and Lee, 1998 p:288).

On the other hand, Lee et al. (1997) analyzing the ability of various value measures to predict the returns and track the DJIA-30 (Dow Jones Industrial Average) index, have documented that time varying discount rates are important in improving predictive power and tracking ability of value to price (VP/P) measure, implying that type of discount rates may generate different results.

Taking into consideration the fact discount rates may affect results, this study uses overall and firm specific cost of equity both estimated by utilizing Sharp-Lintner market model CAPM, in order to see how different types of discount rates affect the regression results.

The typical CAPM is the combination of returns on risk free assets with risk premium demanded by investors from risky assets portfolio. The model can be expressed as below:

$$E(R_i) = R_f + \beta_{im} * [E(R_m) - R_f] \quad \text{(Eq-4)}$$

Where $E(R_i)$ is the expected return on the combined portfolio, R_f, return on risk free assets, $E(R_m)$, return on market index. Sharp-Lintners' main CAPM equation says that expected return on any asset is the sum of the risk free return and risk premium, where risk premium is the multiplication of the market beta β_{im} with market excess return $E(R_m)-R_f$. Market beta β_{im} represents the sensitivity of the underlying asset to the variations in the market returns, this means that the higher market beta the greater sensitivity of the security to the market fluctuations is, and the greater sensitivity of underlying security the more risk premium is demanded by investors. More risk premium means greater portion of the difference between risk free rate and market return is demanded by investors.

In order to determine the cost of equity (r_e) it is necessary to estimate market beta (β_{im}), the estimation of (β_{im}) is possible by estimating the eq-5. Main components of the regression analysis are the risk free rate and return on market portfolio. Several studies suggest that weighted stock price indexes and monthly

return on treasury bills can be used as proxies for return on market portfolio (R_m) and risk free rate (R_f). Within this regard, this study uses monthly returns on treasury bills and ISE-100 index to estimate market beta through the following regression model:

$$r_p - r_f = \alpha_0 + \beta_i * (r_m - r_f) + \varepsilon_i \quad \text{(Eq-5)}$$

Where r_p stands for equally weighted return on the constructed portfolio from the firms under investigation, r_f risk free rate that is monthly return on government treasury bonds, β_i market beta, r_m is the monthly return on ISE-100 index and finally ε_i is the white noise error term.

In the regression model, excess returns on constructed portfolio (r_p - r_f) are regressed on market excess returns (r_m-r_f) where the OLS regression coefficient of the dependent variable represents market beta (β_i).

The estimation procedure is repeated for each firm in the sample to estimate firm specific beta (β_i) which is then used to estimate firm specific cost of equity (r_e). The overall cost of equity is estimated by constructing an overall risky portfolio for 141 firms from the sample of this study which had complete records of stock prices and returns between 2002 and 2008, such time span is quite enough to generate statistically sensible regression results[3].

5.3.2.1.2 Direct Determination of Misvaluation

Once all necessary parameters are defined it is time to proceed with construction of the main model.

The logic behind RIM is the same with the fundamental value of the stock which requires discounting of expected future dividends by appropriate discount rate. Where expected dividends are estimated based on all available information. Similarly, RIM is the sum of the current book value with discounted expected future

[3] An overall market beta has been found as 0.758, Expected Market Excess Return (MER) 1.704 and average risk free rate on treasury bonds 0.02. Based on the eq-4 monthly return on equity has been estimated as %1.12. In order to use the r_e within the estimation of the RIM, monthly r_e is annualized through the following compounding formula: $(r_e+1)^{12}$, where the annual cost of equity has been estimated as %16,9.

abnormal returns plus discounted terminal value (TV) of the firm. Following Frankel and Lee (1998), all these can be formulated as in the eq-5.

$$V_t = BV_t + \sum_{i=1}^{\infty} \frac{E_t(NI_t - r_e * BV_t)}{(1+r_e)^i} \quad \text{(Eq-5)}$$

Where abnormal returns are represented by the difference between net income NI_t and total required return on book equity, which is the multiplication of the cost of equity r_e and book value of equity BV_t. The firm fundamental value in the eq-5 is represented as current book value of shareholders equity plus present value of the infinite future cash flows.

In order to provide computational easiness it is possible to take out of the brackets BV_t as in the eq-6.

$$V_t = BV_t + \sum_{i=1}^{\infty} \frac{E_t(ROE_t - r_e)}{(1+r_e)^i} * BV_t \quad \text{(Eq-6)}$$

The eq-6 implies that firm creates value when its return on equity (ROE) is greater than its cost of equity (r_e). In other words, firm creates value when it earns more than it pays for the equity. In case when ROE equals to r_e firms' present value of future earnings is equal to zero, meaning that firm neither creates nor loses its value (Frankel and Lee, 1998 P: 286).

Considering that firm survives for unlimited period of time is not logically sensible, therefore, it is necessary to determine terminal value of the firm. Frankel and Lee (1998) suggest that estimation of the terminal value is possible by expanding the present value of the future abnormal earnings up to T periods and treat T+1 as perpetuity. Whereas Elliot et al (2007) estimate the terminal value by taking the average abnormal earnings for last two years and treating the average as perpetuity. However, for practical reasons in the calculation process, this study follows the way suggested by Frankel and Lee (1997) by formulating the terminal value equation as below:

$$V_t = \frac{(ROE_t - r_e)}{(1+r_e)^T * r_e} * BV_T$$

As it is seen, the last years' abnormal earnings are expanded by T periods and the next term is discounted in perpetuity.

Taking into consideration terminal value and present value of future abnormal earnings we estimate RIM for individual firms for years, 2007, 2006 and 2005.

$$V_{t2007} = BV_{t2007} + \frac{(ROE_{t2007} - r_e)}{(1+r_e)} * BV_{t2007} + \frac{(ROE_{t2007} - r_e)}{(1+r_e) * r_e} * BV_{t2007} \quad \text{(Eq-7)}$$

$$V_{t2006} = BV_{t2006} + \frac{(ROE_{t2007} - r_e)}{(1+r_e)} * BV_{t2007} + \frac{(ROE_{t2007} - r_e)}{(1+r_e) * r_e} * BV_{t2007} \quad \text{(Eq-8)}$$

$$V_{t2005} = BV_{t2005} + \frac{(ROE_{t2006} - r_e)}{(1+r_e)} * BV_{t2006} + \frac{(ROE_{t2007} - r_e)}{(1+r_e)^2} * BV_{t2007} + \frac{(ROE_{t2007} + r_e)}{(1+r_e)^2 * r_e} * BV_{2007} \quad \text{(Eq-9)}$$

Eq-7 is the estimation of RIM by expanding the terminal value by 2 periods and respectively Eq-8 and Eq-9 are the estimations for 3 and 4 period expanded terminal values.

Once the residual income model (RIM) is estimated it is time to proceed with estimation of the direct measure of the valuation metric 'value to price' (VP). As proposed by William et al. (2007), direct valuation measure of the underlying stock can be estimated by dividing estimated intrinsic value of the firm (V_t) by current stock price as below;

$$VP_t = \frac{E(V_t)}{p} \quad \text{(Eq-10)}$$

The valuation metric represents overvaluation of the stock when value to price is greater than one $VP_t>1$ and undervaluation when $VP_t<1$, or in other words, when firms' intrinsic value is greater than its market price the underlying security is overvalued and undervalued in the opposite case. Such a valuation metric provides clean determination of stock value relative to its current market price without contaminating possessed information, which is not possible to say for market to book valuation measure.

5.3.2.2 Constructing the Joint Empirical Model

The joint test of the market timing and pecking order through financial deficit variable is based on the hypothesis that firms tend to issue more debt when equity is undervalued and less debt when equity is overvalued by markets. Given this, the deficit coefficient β_1, from the eq-1, should vary with the level of misvaluation as proposed by William et al. (2007). In other words, deficit coefficient is expected to be lower at times when equity is overvalued than when it is undervalued.

The estimation of the market timing theory by utilizing financing deficit measure of Shyam-Sunder and Myers (1999) is undertaken by William et al. (2007), who construct a regression model as below;

$$D_{it} = \alpha_0 + \beta_1 * DEF_{it} + \beta_2 * DEF\_VP_{it} + \varepsilon_{it} \quad \text{(Eq-11)}$$

Where, the net change in the debt, scaled by total assets, (D_{it}) is regressed on financing deficit DEF_{it} and interacted term of misvaluation measure of market timing and financial deficit DEF_VP_{it} variables. Theoretically, it is expected that if firm follows pecking order in its financing decisions, α_0 should be close to zero and β_1 should be significant and close to one as well. Furthermore, if firm follows market timing as well, then β_2 should be significantly different from zero, otherwise β_2 is expected to be statistically non significant. Finally, the overall impact of market timing on dependent variable is the sum of the coefficients β_1 and β_2.

The interaction of the misvaluation measure with financial deficit pursued by William et al. (2007) is similar with Kayhan and Titman (2007). Kayhan and Titman (2007), interact market-to-book with financial deficit variable to construct timing measure. However, such approach does not provide a clean measure of market timing because of at least three reasons pointed by authors and which are nothing to do with pecking order or market timing theories. First of all, firms with high market-to-book are possibly more willing to issue equity because of fewer asymmetric information problems. Second, firms with high market-to-book could be more willing to be exposed to the increased scrutiny. And finally, as firms with high market-to-book value have more growth opportunities such firms tend to finance their external financing needs mostly by equity in order to preserve debt capacity for

the future expected investments. Relying on the evidence, it is possible to conclude that market-to-book is not a clean proxy for market timing in the way that it possesses too much of unrelated information. Having presented theoretical background we are now endowed with all preliminary information necessary to proceed with empirical analyses.

5.3.3 Empirical Findings

In the center of the pecking order test, based on the aggregation of the cash flow components, there is financial deficit which directly identifies current financial position of the firm. This explanatory variable shows whether firm is in a need of external financing or it has excessively generated internal sources. Analyzing the preliminary sample in the table 9 panel A, consisted of 151 manufacturing firms listed in the ISE the following facts are observed; 52.9% of the firms from the sample are in a net external financial need in 2005, whereas this percentage rises up to 70.9% in 2006 and again reduces up to 53.6% in 2007.

Table-9 Sample Characteristics of Financial Deficit

PANEL A	2005		2006		2007	
	Surp	Defi	Surp	Def	Surp	Def
DEF	71	80	44	107	70	81
	47,02%	52,98%	29,14%	70,86%	46,36%	53,64%

PANEL B	2005		2006		2007	
	Large	Small	Large	Small	Large	Small
	28	123	29	122	31	120
Of which Surp	15	56	9	35	15	55
Of which Fin. Def	13	67	20	87	16	65
Of which Surp%	53,57%	45,53%	31,03%	28,69%	48,39%	45,83%
Of which Fin. Def%	46,43%	54,47%	68,97%	71,31%	51,61%	54,17%

Source: Istanbul Stock Exchange Database

Splitting the sample according to book assets into large (firms with over the mean assets) and small (firms with under the mean assets) firms based on asset averages as in the panel B of table 9, and investigating each sample group, generates more interesting facts. For example, in 2005 there are 28 large firms, of which 46.4% are in an external financing need, and 123 small firms, of which 54.5% are also in an

external financing need. During the next years portions change as follows; in 2006 there are 29 large of which 68.9% and 122 small of which 71.3% firms are in a financing need. In 2007 the number of over the mean firms (large firms) increases up to 31, of which 51.6% are in a financing need and 54.2% of small firms also face external financing need. The evidence clearly reveals the fact that small firms, in general, are less able to generate sufficient internal funds and thus face financing deficit. The question of how those firms finance their deficits is going to be answered within this section.

Table-10 Average Funds Flow and Financing Components, as a Fraction of Total Assets

The table below presents averages, medians and standard deviations of funds flow components scaled by total assets, Operating cash flow CF is the aggregate of *operating income before changes in firm equity* plus *cash generated by core operations* (change in other receivables less receivable increase from related parties less change in inventory, less change in other current assets plus change in commercial liabilities) plus *change in liability to related parties,* plus *change in other liabilities* less *interest* and *tax payments.* Working capital WC is the difference between current assets and short term liabilities. Investment expenditures Inv are the aggregate of *plant and property acquisitions (-), cash generated from sales of plant and properties (+), acquisitions of intangibles (-).* Dividends Payment DIVis the cash distributed to the shareholders. There are 151 firms continuously listed in ISE (Istanbul Stock Exchange) between 2004 and 2007. The data is gathered from funds flow and income statements which were collected from ISE web site database.

		2005	2006	2007
CF	Mean	6,80%	3,06%	5,99%
	Median	5,16%	2,68%	7,13%
	Stnd. Dev	19,43%	11,42%	13,69%
ΔWC	Mean	2,09%	1,66%	-0,74%
	Median	1,69%	2,68%	0,43%
	Stnd. Dev	11,91%	16,25%	15,30%
Inv	Mean	-5,57%	-3,49%	-1,15%
	Median	-2,88%	-2,47%	-3,23%
	Stnd. Dev	21,77%	7,08%	20,15%
DIV	Mean	-1,15%	-1,37%	-2,49%
	Median	0,00%	0,00%	0,00%
	Stnd. Dev	2,39%	2,89%	6,25%
ΔTD/TA	Mean	2,97%	6,04%	-1,48%
	Median	3,25%	5,39%	0,59%
	Stnd. Dev	16,41%	17,30%	21,31%
ΔTFC	Mean	0,41%	2,40%	-2,39%
	Median	0,00%	0,79%	0,00%
	Stnd. Dev	13,00%	8,73%	14,13%
DEF	Mean	2,01%	3,46%	-3,09%
	Median	0,78%	4,41%	0,79%
	Stnd. Dev	17,06%	18,06%	31,04%

Source: Istanbul Stock Exchange Database

By analyzing properties of the financial deficit components in table 10 , it is seen that operating cash flow, change in the working capital and investments have reduced in 2006 and again increased to their normal level in 2007,whereas dividends

payments have steadily increased through time. As the outcome of the trends in the deficit components, financial deficit, itself, has increased from 2.01% in 2005 to 3.46% in 2006 and reduced up to -3.09% in 2007. The negative percentage value of the financial deficit component is the outcome of the sharp increase in the operation cash flow from 2006 to 2007, which means that many sample firms face financial surplus in 2007. Consistent with the pecking order theory, it seems that cash reach firms started to pay back debt and continued to increase dividend payments which is supported by reduction in the debt financing and increase in the dividend payments. From table 10 it is also seen that firms rather than investing into long term projects attempted to increase the utilization of their current production capacity by increasing investments into current assets, the outcome of which is the increase of operation cash flow in 2007.

Table-11 Direct test of the Pecking Oder Hypothesis

The table below illustrates panel data regression results for direct pecking order test. Regression analysis is performed by utilizing the following model: Dit =α0 +β1*DEFit +εit where first dependent variable Dit is the change of total debt from year 0 to year 1 divided by total assets in year 1 and the second dependent variable, represented by TFC/TA, is total financial credit divided by total assets. As an explanatory variable, financial deficit, DEFit, is used which is an aggregation of accounting variables such as dividend payments, investments, change in the net working capital minus operating cash flow. Sample contains 143 firms, after excluding outliers, and all data was collected form financial statements of the firms continuously listed in the Istanbul Stock Exchange between 2004 and 2007. Panel data regression coefficients are estimated according to GLS fixed effects with white cross sections coefficient covariance method and random effects method is performed according to Wansbeek-Kepteyn coefficient covariance method. Probability values are given in parentheses below each estimated coefficient.

	TD/TA		TFC/TA	
	Fixed	Random	Fixed	Random
Constant	0,022***	0,022	-0,001*	-0,0013
	(0.000)	(0.1364)	(0.079)	(0.877)
DEF	0,286***	0,292***	0,210***	0,242***
	(0.000)	(0.000)	(0.000)	(0.000)
R-squared	0,33	0,096	0,39	0,15
R-adjusted	-0,002	0,094	0,08	0,15
Hausman test, Chi sq stat.	0,017		1,43	
Prob	(0.895)		(0.230)	
F-Test	0,99	45,6***	1,26*	76,64***
Prob	(0.513)	(0.000)	(0.047)	(0.000)
DW	2,78	2,09	2,73	2,01

***, **, *, Represents statistical significance at 1%, 5% and 10%, levels respectively

Table 11 presents regression results for direct test of the pecking order theory by estimating fixed effects and random effects coefficients for the eq-1. The observed deficit coefficients are almost identical both for fixed effects and random effects methods, although Hausman test statistics suggests that random effects method should be preferred over fixed effects.

According to the random effects method, financing deficit coefficient is found to be 0.292, which is statistically significant and implies that around 29.2 % of the financing deficit is financed with debt. On the other hand, the goodness of fit R^2 suggests that only 9% of the variations in debt financing are explained by financing deficit variable.

When financing deficit is regressed on total financial credits (TFC/TA), it is seen that only 24.2% of the financing deficit is financed with bank credits, which suggests that important portion of the financial deficit is financed with trade credits that is included in the total debt variable.

Taking into consideration the hypothesis of the strict version of the pecking order theory, which requires statistically significant and very close to 1 financial deficit coefficient along with significant intercept very close to 0, provided evidence in the table 11 is not enough to support the hypothesis that Turkish manufacturing firms apply the pecking order among financing sources. In contrast, regression results suggest that much of the financing deficit is financed with equity, which is contrary to the central idea of the pecking order theory.

The pecking order theory also suggests that small firms, because of the asymmetric information problems, previously described, should use more debt compared with large firms which are less affected by the asymmetric information. From this perspective, splitting the sample by quartiles, from largest to the smallest according to book assets, should provide valuable information. According to the results, not reported here, regression coefficients are stable across quartiles and coefficients for financing deficit are almost identical for the largest and smallest

quartiles, which are 0.425 for largest and 0.467 for smallest firms. The 0.042 points difference of standard deviations between coefficients of largest and smallest quartiles is not a material fact to conclude that small firms use more debt than large firms do.

Frank and Goyal (2003) question whether the aggregation of the accounting components into financial deficit variable is justified empirically or not. Within this aim, the regression analysis presented in the table 12 tests the aggregation hypothesis

Table-12 Disaggregation of the Financing Deficit Variable

The table below illustrates panel data regression results for justification hypothesis of the aggregation of accounting variables into financial deficit variable. Regression analysis is performed by estimating the following model: $D_{it} = \alpha_0 + \beta_1 * CF_{it} + \beta_2 * WC_{it} + \beta_3 * INV_{it} + \beta_4 * DIV_{it} + \varepsilon_{it}$ where dependent variable D_{it} stands for TD/TA which is the change of total debt from year 0 to year 1 divided by total assets in year 1 and explanatory variables CF, WC, INV and DIV are operating cash flow, net working capital, investment and dividends. Regression analysis is performed according to fixed effects and random effects estimation methods. The sample contains 143 firms, after excluding outliers. The data is gathered form financial statements stored in the Istanbul Stock Exchange database for the firms continuously listed between 2004 and 2007. Probability values are given in parentheses below each estimated coefficient.

	TD/TA	
	Fixed	Random
Constant	0,47***	0,476***
	(0.000)	(0.000)
CF	0,016	0,001
	(0.883)	(0.990)
WC	-0,255**	-0,307***
	(0.048)	(0.000)
INV	-0,724***	-0,104
	(0.002)	(0.102)
DIV	0,449*	0,663***
	(0.074)	(0.003)
R-squared	0,92	0,109
R-adjusted	0,88	0,1
Hausman test, Chi sq stat.	41,23***	
Prob	(0.000)	
F-Test	23,08***	12,97***
Prob	(0.000)	(0.000)
DW	1,83	1,24

***, **, *, Represents statistical significance at 1%, 5% and 10%, levels respectively

by regressing DEF components on debt change. Theoretically, it is expected that a unit increase in the depended variable should be associated with unit increase in the explanatory variables, therefore the following hypothesis is tested; H_0 $\beta_1=\beta_2=\beta_3=\beta_4=1$. Unfortunately, regression results in the table 12 are far from supporting the aggregation hypothesis as observed coefficients are too small in magnitude.

Table-13 The Relevance of Financing Deficit within the Conventional Capital Structure analysis

The table below illustrates panel data regression results for the financial deficit relevance hypothesis within the conventional capital structure analysis. The regression coefficients are estimated for two equations, where first equation is $D_{it} = \alpha_0 + \beta_1 * GROWTH_{it} + \beta_2 * NDTSH_{it} + \beta_3 * ROA_{it} + \beta 4 * SIZE_{it} + \beta_5 * TNGB_{it} + \varepsilon_{it}$ and the second is $D_{it} = \alpha_0 + \beta_1 * DEF_{it} + \beta_2 * GROWTH_{it} + \beta_3 * NDTSH_{it} + \beta_4 * ROA_{it} + \beta_5 * SIZE_{it} + \beta_6 * TNGB_{it} + \varepsilon_{it}$ and where dependent variable is D_{it} represents total debt change from t_1 t_0 over total assets. Explanatory variables are DEF (financial deficit), growth (percentage change of total assets), NDTSH (non-debt-tax-shields calculated as depreciation over total assets, ROA (return on assets calculated as net income over total assets), SIZE (natural logarithm of total assets), TNGB (tangibility, calculated as fixed assets over total assets). The table also distinguishes between big and small firms according to the firms' book assets. The sample contains 143 firms where big sample contains 27 and small sample 116 firms. Panel data regression analysis is performed according to Wansbeek-Kepteyn coefficient covariance method. The data is gathered form financial statements stored in the Istanbul Stock Exchange database for the firms continuously listed between 2004 and 2007. Probability values are given in parentheses below each estimated coefficient.

	TD/TA		TD/TA			
	Random	Random	Big		Small	
		With DEF		With DEF		With DEF
Constant	-0,688*	-0,676*	-0,799	-0,543	-0,744*	-0,764*
	(0.025)	(0.028)	(0.107)	(0.208)	(0.058)	(0.057)
DEF	------	0,039	------	0,195***	------	0,010
	------	(0.355)	------	(0.000)	------	(0.836)
Growth	0,412***	0,404***	0,404***	0,354***	0,409***	0,406***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
NDTSH	-0,048	-0,049	-0,179	-0,523	-0,051	-0,049
	(0.466)	(0.461)	(0.683)	(0.197)	(0.485)	(0.501)
ROA	-0,149**	-0,156**	-0,471***	-0,428***	-0,128	-0,131
	(0.034)	(0.028)	(0.000)	(0.000)	(0.108)	(0.103)
SIZE	0,049***	0,048***	0,041*	0,03	0,052**	0,0504*
	(0.002)	(0.003)	(0.085)	(0.137)	(0.014)	(0.015)
TNGB	-0,512***	-0,500***	-0,039	-0,080	-0,478***	-0,487***
	(0.000)	(0.000)	(0.644)	(0.295)	(0.000)	(0.000)
R-squared	0,42	0,43	0,79	0,83	0,39	0,40
R-adjusted	0,41	0,42	0,77	0,81	0,38	0,39
Hausman test, Chi sq stat.	22,45***	22,06	22,05	6,34	24,48***	24,48***
Prob	(0.000)	(0.001)	(0.257)	(0.386)	(0.000)	(0.000)
F-Test	62,41***	52,13	57,05***	60,97***	44,56***	37,24***
Prob	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
DW	2,83	1,53	2,43	2,38	1,65	1,63

***, **, *, Represents statistical significance at 1%, 5% and 10%, levels respectively

Furthermore, according to the fixed effects, working capital, dividends and investments are statistically significant, whereas random effects results generate only two significant coefficients, which are working capital and dividends. However, since the Hausman test is significant, fixed effects should be taken into

consideration. Interestingly, cash flow from operations, the most important component of the deficit variable, appeared to be nonsignificant in both cases, and in both cases coefficients are very small.

One other implication of Frank and Goyal (2003) is testing whether financing deficit wipes out the effects of conventional capital structure variables. The hypothesis states that, if financing deficit is the sole explanation of debt issues then it should wipe out the effect of conventional capital structure variables by sharply increasing explanatory power of the model.

Table 13, illustrates estimation results for the conventional capital structure variables with and without including the financing deficit component. From table it is seen that inclusion of the financing deficit into the model in the overall sample, increases the explanatory power by only 1 percentage point. Whereas, if the sample is split into big and small firms, inclusion of the financing deficit within the big sample increases the explanatory power of the model by 4 percentage points, suggesting that financing deficit is more relevant for big firms. However, inclusion of the financing deficit into the conventional capital structure model fails to support the hypothesis that it is the sole explanation of the capital structure formation. Empirical results suggest that it is not possible to skip the importance of conventional capital structure variables, as they still account for significant portion of the variations within debt issuances.

To this end, empirical results for the pecking order regression analyses could not provide enough statistical strength and evidence to support the validity of the pecking order hypothesis. At least, this is true for the sample under investigation which is believed to be representative for broader population. The next step of the empirical analysis includes the test of market timing hypothesis which can be an alternative explanation of the capital structure formation in Turkish manufacturing firms.

Table 14 illustrates estimation results for the Eq-11 along with splitting the sample into small and big firms. It is also important to note that financial deficit is

interacted with two different value-to-price components. The first one, VP_1, is estimated taking into consideration firm specific cost of equity whereas VP_2 is estimated using overall cost of equity. Surprisingly, both cases generate completely different results.

Table-14 Joint Test of Market Timing and Pecking Order Hypotheses

The table below illustrates panel data regression results for joint tests of market timing and pecking order hypotheses. Table also presents estimation results for big and small firms where big firms are the ones with over the mean and small ones with under the mean debt ratio. The regression analysis is performed by estimating the following model: $D_{it} = \alpha_0 + \beta_1 * DEF_{it} + \beta_2 * DEF\_VP_{it} + \varepsilon_{it}$. The dependent variable D_{it} stands for TD/TA, which is the change of total debt from year 0 to year 1 divided by total assets in year 1, and for TFC/TA which is total financial credit divided by total assets. Explanatory variables are DEFit, which represents the net financing deficit or surplus and calculated by aggregating accounting variable such as dividend payments, investments, change in the net working capital minus operating cash flow, and market timing variable DEV_VP_{it} which is the interaction of the net financing deficit with value to price VP. There are also two different calculations of market timing variable, the first one, DEV_VP1 is calculated by taking into consideration firm specific cost of equity and DEV_VP2 is calculated taking into consideration an overall cost of equity. Considering that Hausman specification tests are insignificant for all below cases the regression results are performed according to random effects with Wansbeek-Kepteyn coefficient covariance method. The sample contains 143 firms, after excluding outliers, where big firms sample contains 27 and small firms sample contains 116 firms. The data is gathered form financial statements stored in the Istanbul Stock Exchange database for the firms continuously listed between 2004 and 2007. Probability values are given in parentheses below each estimated coefficient.

	TD/TA				TFC/TA			
	1		2		3		4	
	Overall	Overall	Big	Small	Overall	Overall	Big	Small
Constant	0,022	0,021	0,046***	0,015	-0,001	-0,003	0,015**	-0,007
	(0.123)	(0.121)	(0.000)	(0.293)	(0.886)	(0.719)	(0.017)	(0.451)
DEF	0,306***	0,244***	0,381***	0,233***	0,246***	0,190***	0,248***	0,186***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
DEF*VP1	-0,025	------	------	------	-0.008	------	------	------
	(0.464)	------	------	------	(0.716)	------	------	------
DEF*VP2	------	0,566***	0,645***	0,525***	------	0,609***	0,716***	0,567***
	------	(0.000)	(0.000)	(0.000)	------	(0.000)	(0.000)	(0.000)
R-squared	0,097	0,141	0,515	0,114	0,15	0,271	0,635	0,229
R-adjusted	0,093	0,137	0,503	0,109	0,14	0,267	0,626	0,224
Hausman test, Chi sq stat.	0,022	2,13	0,72	2,53	1,45	7,33	1,1	9,64
Prob	(0.989)	(0.344)	(0.692)	(0.281)	(0.482)	(0.025)	(0.576)	(0.008)
F-Test	23,06***	35,01***	41,49***	22,15***	38,32***	79,02***	68,14***	51,22***
Prob	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
DW	2,11	2,09	2,18	2,11	2,01	1,93	2,45	1,92

***, **, *, Represents statistical significance at 1%, 5% and 10%, levels respectively

Unfortunately, in all cases, the first market timing component which is the interaction of the deficit and VP_1, generates nonsignificant estimates, suggesting that firms do not take into account firms specific cost of equity in their assessing of the

investment projects. On the other hand, second market timing component, DEF*VP_2, generates very supportive estimation results.

For example, deficit and market timing coefficients from the sub-column 1 are 0.244 and 0.566 both significant at 1% significance level. The overall effect of market timing and pecking order on dependent variable is the sum of the coefficients, (0.244+0.566) = 0.80 where the greatest contribution comes from the market timing coefficient.

Furthermore, market timing and deficit coefficients are materially bigger for large firms compared with small ones. The coefficients for big firm sample are 0.381 and 0.645. Whereas, coefficients for small firm sample are 0.233 and 0.525. The goodness-of-fit R^2 for big firms is also bigger compared with overall and small samples, implying that 51.5% of variations in dependent variable are explained by pecking order and market timing variables in big firm sample. All coefficients from subsamples are significant at 1% critical level. Contradicting to the pecking order and supporting market timing hypothesis, evidence reveal fact that big firms use more debt and are more frequently engaged in market timing activities compared with small firms.

Table-15 Reduction in Debt Financing Per 10% Increase in the Firm Economic Value

	OVERALL	LARGE	SMALL
VP2	1,00	1,00	1,00
Predicted ΔDit	0,0274	0,0541	0,0210
%10 Overvaluation VP2	0,9	0,9	0,9
Predicted ΔDit	0,0269	0,0536	0,0206
Reduction in debt fin	-1,66%	-0,95%	-1,98%

Table 15, which illustrates estimated reduction magnitude of debt financing per 10% overvaluation of the firm also provides some supportive evidence for market timing hypothesis. The theory predicts that firms issue equity at times when they are relatively overvalued in terms of economic value. If that is true, overvalued firm should reduce debt by increasing the portion of the equity in its right hand side of the balance sheet. Consistent with the theory, the market timing model estimates

1.66% reduction in debt financing per 10% overvaluation of the firm equity. The reduction magnitude for large firms is 0.95%, whereas small firms reduce their debt financing by 1.98% per 10% of potential overvaluation.[4] Results contradict to the pecking order hypothesis suggesting that big firms are less responsive to overvaluation of the equity.

Using the same method, William et al. (2007) estimate 9% reduction in debt financing for their sample, which is materially bigger than the reduction within Turkish manufacturing sector observed in the table 15. The results may have been generated by the fact that Turkish equity market is not as efficient and deep as it is in U.S.. For this reason, U.S. firms respond with greater reduction per value increase in the equity by reducing their debt financing. The results are also consistent with Turkish bank based institutional orientation, which imply that manufacturing firms in Turkey are less able to cease from debt financing as it is the most available source in such a system. As a result, Turkish firms are less responsive even to the considerable degree of overvaluation compared to that of U.S..

Market timing hypothesis is also supported with the evidence that Turkish manufacturing firms reduce financial credits by 14.47% per 10% increase in the equity fundamental value. This clearly reveals that increase within firm equity value is more substantially reflected, as a reduction, in bank loans.

Comparing the reduction within total debt and total financial credits, one other important fact is highlighted; it seems that debt financing, within Turkish manufacturing firms, is highly dominated with trade credits which are note as sensitive to overvaluation as 'pure debt' is[5].

[4] The reduction in the debt financing level has been estimated as proposed by William et al (2007). Firstly, the debt level is estimated by plugging average deficit into equation-11, where initially no misvaluation VP_2=1 is considered. Then the same equation is re-estimated taking into consideration a 10% of value increase VP_2=0.90. Finally, we calculated the percentage change between first and second estimated values of the debt financing level, which exactly provides the magnitude of reduction in debt financing. For example, given that average DEF for 2007 is 0.00793, estimated debt level under no misvaluation, VP_2=1, is 0.027, approximately 2,7% of total assets. Under 10% overvaluation estimated debt level is 0.0269, 2,69% of total assets. So the reduction is (0.0274-0.0269)/0.0269=-1,66% (approximately).

[5] By 'Pure Debt' it is aimed to indicate bank loans and corporate bond issuance.

Table-16 The Effects of Debt Capacity and Valuation on the Pecking Order and Market Timing Hypotheses.

The table below illustrates the effects of debt capacity and market valuation on Pecking Order and Market Timing hypotheses. Those firms which are assumed to be over-debted are the ones with over the mean total debt to total assets ratio and under-debted firms are the ones with under the mean total debt to total assets ratio. Undervalued and Overvalued firms are determined according to the value to price ratio VP which shows undervaluation when it is bigger than 1 and overvaluation when it is smaller. The regression analysis is performed by estimating the following model: $D_{it} = \alpha_0 + \beta_1 * DEF_{it} + \beta_2 * DEF\_VP_{it} + \varepsilon_{it}$. The dependent variable D_{it} stands for TD/TA, which is the change of total debt from year 0 to year 1 divided by total assets in year 1. Explanatory variables are DEFit, which represents the net financing deficit or surplus and calculated by aggregating accounting variable such as dividend payments, investments, change in the net working capital minus operating cash flow, and market timing variable, DEV_VP_{it} which is the interaction of the net financing deficit with value to price VP. There are also two different calculations of market timing variables, the first one, DEV_VP1 is calculated by taking into consideration firm specific cost of equity and DEV_VP2 is calculated taking into consideration overall cost of equity. Regression results are performed according to random effects method with Wansbeek-Kepteyn coefficient covariance method. The sample contains 143 firms, after excluding outliers. The data is gathered from financial statements stored in the Istanbul Stock Exchange database for the firms continuously listed between 2004 and 2007. Probability values are given in parentheses below each estimated coefficient.

	TD/TA				TD/TA			
	Random		Random		Random		Random	
	OverDeb	UnderDeb	VP<1	VP>1	VP<1		VP>1	
Constant	0,044*	0,007	0,021	-0,011	0,021	0,019	-0,003	-0,008
	(0.074)	(0.471)	(0.121)	(0.433)	(0.122)	(0.168)	(0.775)	(0.476)
DEF	0,319***	0,258***	0,347***	0,334***	0,343***	0,265***	0,558***	0,151***
	(0.00)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
DEF*VP1					0,011		-0,069***	
					(0.904)		(0.006)	
DEF*VP2						0,974***		0,462***
						(0.000)		(0.000)
R-squared	0,09	0,15	0,177	0,39	0,17	0,23	0,48	0,76
R-adjusted	0,09	0,15	0,174	0,38	0,17	0,22	0,45	0,75
Hausman, Chi sq stat.	0,212	0,32	0,001	0,003	0,002	0,417	0,372	3,57
Prob	(0.645)	(0.57)	(0.972)	(0.957)	(0.999)	(0,812	(0.830)	(0.168)
F-Test	17,98***	45,99***	83,5***	29,64***	41,67***	58,17	20,93***	71,12***
Prob	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
DW	2,13	2,04	2,09	1,67	2,09	2,1	1,86	1,76

***, **, *, Represents statistical significance at 1%, 5% and 10%, levels respectively

It is assumed that firms, which have exceeded their limits in borrowing and where further addition of debt may cause financial distress, are expected to reduce their debt financing. Within this aim, the first two columns in the table 16 present regression results for the firms with over-the-mean and under-the-mean debt to asset ratios. Normally, it is expected that over-the-mean firms, which are extensively leveraged, should have smaller coefficients compared with under-the-mean firms,

because overleveraged firms are assumed to be less able to add more debt into their financial structure. However, regression results from first two columns suggest the opposite; according to the empirical evidence over-debted firms have bigger coefficients, meaning that they still raise more debt than under-debted firms. The problem may stem from the fact that regression results reflect current stage of the firms which have already raised substantial amount of debt, not their future behaviour, for this reason coefficients are bigger for over-debted sample.

The data from the column three and four in the table 16, illustrates pecking order regression results for the overvalued and undervalued firm samples. In fact, it is reasonable to assume that overvalued firms should use relatively less debt financing compared with their undervalued counterparts. However, coefficients are almost identical, 0.347 and 0.334, for both samples which is not in line with the market timing hypothesis.

But, when market timing component is considered in the analyses, figures change in support of market timing hypothesis. Within this regard, columns 5-6-7-8, from table 17, present estimation results for market timing model by splitting the sample into overvalued and undervalued firms. The analysis has been performed taking into consideration both firms specific cost of equity, $DEF*VP_1$, and overall cost of equity, $DEF*VP_2$. The results form column 5 and 7, where market timing component was estimated with firm specific cost of equity, generates statistically insignificant and irrelevant results. However, columns 6 and 8, where results take into consideration overall cost of equity, generate highly significant results which will be taken into consideration in the further analyses review.

Even coefficients for deficit component in column 6 and 8 from table 16 are contrary to the expectations at first sight, results for overvalued firms in same columns for market timing component suggest supportive results. For example, deficit and market timing coefficients, 0.265 and 0.974 respectively, are mach greater compared with column 8, where greater market timing coefficient suggest that overvalued firms reduce more debt compared with their undervalued counterparts,

which is in line with market timing predictions. However, greater coefficients for deficit coefficient are still contradicting to the expectations.

Table-17 Market Timing and Pecking Order: Splitting Big and Small Samples into Over-debted and Under-debted Subsamples.

The table below illustrates panel data regression results for the pecking order and market timing tests by splitting the big and small firm samples into over-debted and under-debted firms. Regression analysis is performed by utilizing the following model: Dit =α0 +β1*DEFit + β1*DEF*VP_2 +εit where dependent variable Dit is the change of total debt from year 0 to year 1 divided by total assets in year 1. As explanatory variables, financial deficit, DEFit, which is an aggregation of accounting variables such as; dividend payments, investments, change in the net working capital minus operating cash flow, and DEF*VP_2 are used. Value to price VP_2 component is estimated taking into consideration overall cost of equity. The overall investigated sample contains 143 firms, of which, over-debted big13, under-debted big 14, over-debted small 50 and under-debted small 66 firms, all listed in the Istanbul Stock Exchange between 2004 and 2007. The sample was split into big and small and into over-debted and under-debted by taking the mean values as benchmark. Panel data regression coefficients are estimated according to random effects with Wansbeek-Kepteyn coefficient covariance method.

	Big				Small			
	1	2	3	4	5	6	7	8
	OverDeb	UnderDeb	OverDeb	UnderDeb	OverDeb	UnderDeb	OverDeb	UnderDeb
	PO	PO	MT	MT	PO	PO	MT	MT
Constant	0,076***	0,031*	0,063***	0,029***	0,037	0,002	0,038	0,002
	(0.000)	(0.080)	(0.001)	(0.007)	(0.163)	(0.789)	(0.119)	(0.830)
DEF	0,427***	0,542***	0,333**	0,438***	0,317***	0,175***	0,286***	0,115***
	(0.001)	(0.000)	(0.013)	(0.000)	(0.000)	(0.000)	(0.007)	(0.008)
DEF*VP2			0,673*	0,57***			0,622**	0,457***
			(0.053)	(0.000)			(0.018)	(0.000)
R-squared	0,25	0,58	0,32	0,74	0,09	0,09	0,13	0,16
R-adjusted	0,23	0,57	0,28	0,74	0,08	0,08	0,11	0,15
Hausman, Chi sq stat.	0,131	0,063	0,657	3,96	0,19	0,01	0,24	9,24
Prob	(0.717)	(0.802)	(0.720)	(0.137)	(0.663)	(0.910)	(0.888)	(0.009)
F-Test	12,09***	55,07***	8,54***	61,94***	14,71***	18,24***	10,54***	18,21***
Prob	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
DW	2,66	1,42	2,53	1,38	2,12	1,95	2,14	1,95

***, **, *, Represents statistical significance at 1%, 5% and 10%, levels respectively

Such behaviour of Turkish manufacturing firms could have been resulted by several reasons. For example, it is known that Turkish listed firms are not actively engaged in seasonal equity offerings which means that even after IPO, firms still use substantial amount of debt. From this perspective, overvaluation probably acts like a positive information source to the credit authorities, which, in turn, provides overvalued firms more opportunity to raise more debt.

Splitting the sample into quartiles according to the book assets has provided little evidence that small firms use more debt financing compared with their big counterparts. It would be useful to see how big over-debted and big under-debted firms behave in market timing and pecking order models. Within this aim, table 17 presents estimation results by splitting the big and small firm samples into over-debted and under-debted firms.

One of the striking evidence presented in the table 17 is that pecking order, even being far from supporting its strict version, is better performing in big firm sample. The pecking order coefficients are bigger in magnitude and better explain variations in debt issuances for big firm sample. However, small firm sample has relatively smaller pecking order coefficients, which means that they are less able to finance their deficits with new debt. Such an outcome contradicts to the main hypothesis of the pecking order theory as it proposes more debt for small firms. Frank and Goyal (2002), however, have also found that small firms do not behave according to the pecking order and that pecking order better performs in large firm sample.

When average debt ratio is taken into consideration it is seen that small firms have higher ratios compared with big ones. The observed average debt ratio for small firms is 0.48 and for big ones 0.40. From this perspective, it seems like small firms have raised more debt which recalls us of a possibility that they have reached their debt capacity and are not able to add more debt into their capital structure. Looking to the issue from this side, small pecking order coefficients for small firms may look reasonable but this alone is not enough to approve the hypothesis.

Comparing column 1 and 2 from table 17, suggests that under-debted big firms use more debt in financing their deficit, which is in line with expectations from the debt capacity perspective. However, under-debted small firms use even less debt compared with over-debted small firm sample. On the other hand, in general, it is seen that big firms use more debt financing which is in line with asset collateral value, according to which firms with more assets in place are able to raise more debt,

but this has nothing to do with the pecking order hypothesis as it is more in line with trade off theory.

In line with above findings, table 17 presents sensible empirical facts in support of market timing theory. It is clearly seen that inclusion of the market timing component into the model dramatically increases the explanatory power in big firm sample. For example, after considering market timing component in big over-debted sample, explanatory power increases from 0.25 to 0.32 and in the big under-debted sample the explanatory power rises even more impressively from 0.58 up to 0.74. Even not as sharply as in the big firm sample, market timing also adds more explanatory power in small firm sample. On the other hand, the coefficients both in big and small firm samples are large and significant suggesting that market timing theory is more relevant in explaining capital structure for Turkish manufacturing firms.

William et al. (2007) suggest that if firms follow market timing then the market timing and deficit coefficients in the model should be greater for overvalued than undervalued firms. Columns 3 and 4 from table 16 reveal some supportive evidence, for example it is seen that market timing coefficient is larger in over-debted big firm sample compared with under-debted small sample. Also in line with market timing theory pecking order coefficient is greater in column 3 than 4. This could possibly mean that over-debted big firms in Turkey are undervalued as well, because they are actively engaged in market timing activities by increasing debt in their deficit financing. The columns 3 and 4, 7 and 8 reveal results in the same direction for small and big firm samples.

CHAPTER 6
CONCLUSION AND IMPLICATIONS

6.1 SUMMARY OF THE STUDY

Capital structure debate has witnessed a number of empirical studies that have examined which factors determine firm capital structure and how conventional capital structure theories appear to work within different institutional systems and different countries. This study adds another insight to the ongoing debate by empirically testing whether market timing and pecking order theories are valid financing strategies for Turkish manufacturing firms. Besides, this study raises the issue regarding the validity and operating characteristics of the conventional capital structure determinants, which have been examined by a large body of literature both on country specific and international level.

The primary aim of this dissertation is to empirically test the two competing capital structure theories, namely the pecking order and market timing within bank oriented institutional settings in Turkey. With such an aim, empirical analyses have been conducted on Turkish manufacturing firms listed in the ISE. Within this process, financial statements of 151, firms continuously listed between 2004 and 2007, were gathered from the ISE database and further used to create a panel data for relevant regression analyses.

One other dimension of the study is to provide a wide body of capital structure literature, by classifying it into Agency and Corporate Governance based theories and into Asymmetric Based theories. Doing so, it is aimed to set a strong theoretical base and to show where the proposed hypothesis of the study stands.

Furthermore, this is the first essay, within Turkish capital structure debate, that applies methodology proposed by Shyam-Sunder and Myers (1999) to test the pecking order hypothesis in Turkey. Shyam-Sunder and Myers (1999) develop a financing deficit , which is an aggregation of cash flow, working capital, investment

outlays and dividends, to measure whether firm is in a need of external funds or not. Financing deficit is then regressed on debt change variable, doing so it is aimed to see what portion of external deficit is actually financed with debt. In this case if pecking order is the actual financing policy, then deficit coefficient should be close to unity and intercept close to zero, both coefficients should be statistically significant.

Finally, another contribution of the study comes from the implication of the joint test of market timing and pecking order theories, proposed by William et al. (2007). The joint test is based on the direct measure of the firm value which is interacted with financial deficit and included in the regression model. Within this process, capital asset pricing model CAPM of Sharp and Lintner and residual income models have been utilized.

6.2 SUMMARY OF THE FINDINGS

As a result of empirical analyses, no strong support has been found in defense of the pecking order theory as a primary policy in the financing structure of Turkish manufacturing firms. Although some support for pecking order hypothesis was observed in the conventional capital structure regressions, regression coefficient for general sample within direct pecking order analysis was estimated 0.292 which forced us to reject the pecking order hypothesis that, in fact, proposes very high and significant deficit coefficients. Furthermore, empirical findings have suggested that there are special institutional features in Turkey which show their presence through various estimation results.

In line with Turkish bank oriented capital markets structure, regression results showed that big firms utilize more debt in their capital structures. Moreover, empirical findings provided evidence that firm assets are important in obtaining debt financing, which is an important feature of bank oriented institutional system. In such institutional systems firm tangible assets are important as a collateral value against which credit authorities provide loans to firms. One other outcome of Turkish

specific institutional settings is that high firm valuations are treated as good signal for credit authorities which provides an extra opportunity for overvalued firms to raise new debt.

On the other hand, joint test of market timing and pecking order theories provided strong support for market timing hypothesis by generating statistically significant and large estimated coefficients for market timing component. Even though decomposition of the sample into overvalued and undervalued firms generated some contradictive results regarding market timing theory, the overall sample and subsamples have provided strong supportive results. Regression results suggest that Turkish manufacturing firms, in general, are engaged in market timing and big firms are more prone to do so. On the other hand, estimated debt reduction per 10% value increase suggested that overall firm sample reduces debt financing by 1.66%, big ones by 0.95% and small ones by 1.94%. Such an outcome is a solid fact of existence of the market timing behaviour in Turkish manufacturing firms. However, those results suggest that big firms are less prone to reduce debt in their capital structures, which contradicts to the pecking order theory.

In general, pecking order and market timing analyses offered an insight that Turkish manufacturing firms use more equity in their financing activities, at least this is true for analyzed period. Furthermore, in line with ongoing literature, and contrary to the pecking order hypothesis, this study finds that big firms utilize more debt compared with small ones, which is not in line with the central idea of the pecking order theory. The results are in line with many empirical researches. For example, Seifert and Gönenç (2007), analyzing the validity of the pecking order hypothesis for US, UK, German and Japanese firms, have documented that, in general, small firms tend to issue more equity compared with large firms.

Moreover, overall findings suggest that conventional capital structure determinants such as asset growth, profitability and asset tangibility are still important in the capital structure formation of manufacturing firms in Turkey. The

direction of correlation between capital structure determinants and leverage is similar with Balsarı and Kırkulak (2008)

To sum up, in the light of empirical analyses it has been observed that pecking order hypothesis is not the sole policy which Turkish manufacturing firms follow while raising external funds. However, empirical evidence provide strong support for market timing hypothesis, implying that market timing has important impact on the type of security that Turkish manufacturing firms use in their financing of external financial deficit. For example, it has been observed that overvaluation of the security has a downward impact on debt financing, which means that firms, in general, rationally opt to increase equity in their capital structures when equity markets are overvalued.

6.2.1 Implications and Recommendations

Capital structure in Turkish manufacturing firms possesses very interesting features which are, in general, alike with firm capital structure in developing countries. Turkish capital structure is characterized with short term debt financing where trade credits dominate in terms of relative weight. In fact, such characteristics are unique to developing countries where long term debt financing is not easily obtainable. However, Turkish institutional structure is dominated with strong banking sector and for such a reason Turkey is listed among bank based institutional economies as Germany and Japan. But estimation results have highlighted special institutional structure in Turkey, where behind strong bank based institutional system, listed firms mainly utilize equity in their financing of investment projects. Moreover, small firms face serious difficulties in obtaining long term bank credits, which recalls the importance of collateral value of the firm assets. On the other hand, it is possible to note that overvaluation is perceived as a good signal for credit authorities in providing bank loans.

In general it is reasonable to conclude that there is a structural transformation of Turkish firm capital structure through time. Balsarı and Kırkulak (2008) have observed an overall debt ratio of 61% for their sample between, 1992 and 2003, and

concluded that big firms are more able to raise debt whereas small firms face difficulties in obtaining financial credits. This paper has found similar results by comparing financing behaviour of big and small firms. However, overall leverage ratio for investigated sample is 47%. Moreover, direct pecking order tests suggested that in general preference towards equity financing is still very high, which supports the view that through time, as equity markets normalized after 2001 economic crisis, Turkish manufacturing firms increased equity financing in their capital structures.

This study has highlighted a new dimension in our understanding of firm capital structure in Turkey. However, there is too much to be done in order to explore new dimensions regarding Turkish firm capital structure. Further researches should study the effects of alternative capital structure models in depth. For example panel data with longer time dimension should be analyzed to test mean reversion of firm leverage. It would be also useful to run a comparative analysis for Turkish capital structure in order to see whether there are transformational patterns in the leverage, its determinants and financing preferences, over time.

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