Determinants of Capital Structure: UK Panel Data

Seyed Mohammad Ali Hamze Ahi

Submitted to the
Department of Banking and Finance
In partial fulfillment of the requirements for the Degree of

Master of Science
in
Banking and Finance

Eastern Mediterranean University
July 2013
Gazimağusa, North Cyprus

Approval of the Institute of Graduate Studies and Research

<div style="text-align:center">

_____

Prof. Dr. Elvan Yılmaz
Director

</div>

I certify that this thesis satisfies the requirements as a thesis for the degree of Master of Science in Banking and Finance.

<div style="text-align:center">

_____

Prof. Dr. Salih Katircioglu
Chair, Department of Banking and Finance

</div>

We certify that we have read this thesis and that in our opinion it is fully adequate in scope and quality as a thesis for the degree of Master of Science in Banking and Finance.

<div style="text-align:center">

_____

Prof. Dr. Salih Katircioglu
Supervisor

</div>

Examining Committee
_____

1. Prof Dr. Salih Katircioglu   _____

2. Accos. Prof. Dr. Sami Fethi   _____

3. Accos. Prof. Dr. Eralp Bektas   _____

ABSTRACT

The paper investigates capital structure determinants of 5 important non-financial firms listed in FTSE100. The firms are chosen from oil and gas and mining industry. The period chosen for the study is 22 years from 1990 to 2012. Firms are chosen according to capitalization in market. Theories in capital structure such as the trade-off theory, pecking order theory and agency theory are described in order to find the best possible formulation to predict the choice of capital structure in firms. This study has chosen panel data to perform regression analysis with fixed effects estimation model. The variables chosen for this study are total debt ratio, profitability, growth, non debt tax shield, liquidity, tangibility and size. The results have shown that the findings in this study are according to previous studies. The empirical results show that liquidity, profitability and size are the variables which can cause changes in total debt ratio of firms. It is concluded that the further directions for future studies could be choosing more firms take into consideration the other theories of capital structure. This study has used total debt ratio, while long term debt ratio and short term debt ratio could also be useful to analyze firms and obtain more detailed results.

Key Words: Capital Structure, Determinants of Capital Structure, Capital structure in FTSE, capital structure in oil and gas industry

ÖZ

Bu çalışma, FTSE100 indeks'inde işlem gören, beş önemli finansal olmayan şirketin sermaye yapısı belirleyicilerini inceler. Firmalar, gaz, petrol ve madencilik şirketlerinden seçilmiştir. Çalışmada, zaman 1990-2012 yılları arasında olmak üzere toplam 22 yıldır. Firmalar, pazardaki sermaye paylarına göre seçildiler ve bu çalışmada, firmalara en uygun sermaye yapısını seçebilmek için trade-off, hiyerarşi ve temsilci teorileri tanımlanmıştır. Bu çalışmada, sabit etki tahminleme modeli ile bağlaşım çözümlemesi uygulamak amacıyla panel serisi seçilmiştir. Çalışmada kullanılan değişkenler toplam borç rasyosu, karlılık, büyüme, borç dışı vergi kalkanı, likidite, somutluk ve aktif büyüklüğüdür. Bu çalışmada elde edilen sonuçlar, diğer çalışmalardaki sonuçlarla benzerlikler göstermektedir. Ampirik sonuçlar, likidite, karlılık ve aktif büyüklüğü değişkenlerinin, toplam borç rasyosunu etkileyebilecek değişkenler olduğunu ortaya çıkarmıştır. Sonuç olarak, ileride yapılacak çalışmalarda daha çok firma seçilip diğer sermaye yapısı teorilerinin uygulanabileceği sonucuna varılmıştır. Bu çalışmada toplam borç rasyosu kullanılmıştır ancak kısa ya da uzun vadeli borç rasyosu da analizde daha kapsamlı sonuçlar elde etmek adına yararlı olabilirdi.

Anahtar Kelimeler: Sermaye Yapısı, Sermaye Yapısı Belirleyicileri, FTSE'deki sermaye yapısı, gaz ve petrol endüstrisindeki firmaların sermaye yapıları

To My Parents

ACKNOWLEDGMENT

I would like to show my deepest appreciations to my supervisor, Prof. Dr. Salih Katircioglu who has always been there for me when I needed his guidance. He has always been penitent and without his help I would not be able to finish my thesis. I also would like to thank all the academic staff in the department of banking and finance at Eastern Mediterranean University for their contribution to my study.

TABLE OF CONTENTS

LIST OF TABLES

Chapter 1

INTRODUCTION

In 1958, 'The Cost of Capital, Corporate Finance and Theory of Investment' was published by Modigliani and Miller which caused several other researches to focus more on companies' capital structure (Modigliani & Miller, 1958). There have been a number of theories developed with this specific aim to describe the financing behavior of companies as well as establishing whether an optimal capital structure exists. Subsequently, the Trade-off Theory was developed by Modigliani and Miller in 1963 (Modigliani & Miller, 1963). Thirteen years later, Jensen & Meckling developed another theory on the same matter titled as the Agency Theory (Jensen & Meckling, 1976). Subsequent to the Agency Theory, Pecking Order Theory was developed by Myers & Majluf in 1984 (Myers & Majluf, 1984; Myers, 1984).

Modigliani and Miller (1958) tried to explain that the trade-off between the benefits of debt is a result of the decisions made to make a choice of the capital structure in a firm. Optimal Capital Structure which is known as the mix of debt and equity for a firm to achieve the minimum cost in capital, is what the trade-off tries to explain. In other words, companies use debts to the optimal level, which are caused by trading off between the incomes and expenses of those debts. In Capital Structure Theory it has been mentioned that if the firm's goal is to increase the performance, it has to decrease

its capital cost. If there is a relationship between the debt and financial performance in a firm, Agency Theory, Signaling and Asymmetric Information Theory, and Trade-off Theory are the best choices to describe the relationship. Since ownership and controlling in a firm are separated, there is always a good chance to face the agency problem. The conflict might happen because of the managers' lack of effort in their responsibilities and also their preferences on their own perquisites, or policy choices which are only suitable for their own preferences. The outcome is clear; the failure in maximizing the firm's performance. One of the tools to control the managers' opportunistic behavior is the debt. The idea is simple; to reduce the amount of cash that they are supposed to receive as a wage and focus more on the firm's financial activities. Hence, as the performance increases the managers' wages also increase. When managements are expected to pay interest for the projects' loans, they would be more careful on taking under the projects. There are other mechanisms to control and motivate the managers to work on their own and shareholders' interests but those which lead to maximize the firm's performance and maximize the shareholders' wealth should be used. Manners prefer the cheapest source of funding. It is explained by Pecking Order Theory, in which, due to information asymmetry, companies are more comfortable to choose a financing internal rather than an external funding as well as debt to equity funding (Myers & ,1984). The base of the theory is on two important assumptions. First one states that managers are more informed and well aware of the firm's prospects than the outsiders (outside investors). Second one assumes that managers devote themselves on the shareholders' best interests. So, the difference between Trade-off Theory and Tecking Theory is that Trade-off Theory uses taxes and the Tecking Order Theory uses

on asymmetric information. There have been a huge number of studies and empirical tests on the mentioned theories. These studies have revealed different and important key determinants of the leverage. These keys, as Titman and Wessels described, are collateral value of assets, firm size, growth opportunities and profitability (Titman and Wessels, 1988; Rajan and Zingales, 1995).

Other than the mentioned elements, it has to be mentioned that there are other factors which can determine the capital structure of a firm. These factors are mainly the differences in bankruptcy and tax laws, lender-borrower relationship, ownership concentration and financial orientation (Rajan and Zingales, 1995; Antoniou et al., 2008). For instance, Germany and United Kingdom have strict creditor rights in place when compared to the Netherlands (La Porta et al., 1999). In spite of having some limitations, theories have showed a great improvement and been used in many tests. These theories are still not able to completely explain the capital structure of a company. As the importance of the matter becomes brighter, researchers point out new directions and ways to use in the future cases (Graham & Leary, 2011). One of the most important researches done is on the determinants of capital structures choice in the United States of America (Titman and Weels 1988).

Rajan and Zingales (1995), tried to explain the determinants of capital structure in their empirical study by going through the details on the factors which make the capital structure differences in large industrial countries. Another factor which can affect the capital structure of a firm is a financial crisis. A good example is when a crisis rises the companies are most likely to face a bankruptcy. It has to be mentioned that not only the

capital structure of a firm is very important to all the academicians, but it is also important for all the financial and non financial firms. This research tries to find out if there is a relationship between the determinants of the capital structure in those firms which exist on FTSE100, and to realize if either debt or equity is playing the main role in capital structure of these firms. Many perspectives of it have been examined by researchers. For instance, Welch's study on the relationship between the stock returns and the capital structure is one of them (Welch 2004). He investigated the capital structure by analyzing the security issues. Other studies with the same perspective are done by (Baxter and Cragg, 1970) and (Taub, 1975). According to Ozkan in 2001, there are many aspects of capital structure but so far a limited number of them have been investigated for the UK. Lasfer (1995), Walsh and Ryan (1997), and Ozkan (2001) are some of the scholars who performed studies on UK.

1.1   Aim of the Study

This study has chosen FTSE 100 index since in 2011 London Stock Exchange faced worth of 3.2 trillion dollars in market capitalization and carried almost over 80 percent of the Initial Public Offering (IPO) in the whole of Western Europe. Also, it has to be mentioned that the results of previous studies on capital structure of the firms interestingly are somehow in contrast with each other, and this shows that there is still more investigation needs to be done. Oil and gas, and mining industries are always considered to have high tangible assets with high inventory. There have not been any significant studies done in these two industries. Hence the mentioned matters for firms in the United Kingdom is the motivation on choosing the UK to go further through the capital structure of the firms and to achieve more reliable results. So, this study chooses

the firms from the third prestigious stock market in the world, London Stock Exchange (http://www.londonstockexchange.com), to investigate the variables which shape the firms' capital structure. For this reason, this study tries to investigate the determinants of the capital structure in the United Kingdom on 5 important firms which are reported to be the representative of their own industries from 1990 to 2012.

1.2   Variables Chosen for the Study

Variables chosen for this study are based on the previous studies such as Brav (2009). Seven different variables are chosen: tangibility, liquidity, non debt tax shield, size, growth, profitability and total debt ratio. These variables are more discussed in the next chapter.

1.3   Research Methodology

The methodology used in this thesis is according to Brav (2009). He focused on the funding behavior of the public and private firms in the UK. He used a multi-variable linear equation to evaluate the relation between control and dependant variables. The model is also according to Modigliani and Miller theory of capital structure of non-financial firms. Panel data least square regression model is also used to study the correlation and relation between the different determinants of capital structure, such as the firm size, growth opportunities, asset tangibility, profitability, liquidity and non debt tax shield.

1.4   Thesis Structure

The thesis includes different sections: In the second Section, a review of the existing literature on the subject is done; in Section III, introduces the firms and the index used for the study. In Chapter IV, the hypothesis is developed according to the empirical

evidences, data and methodology are explained; in Chapter V, empirical results are discussed. Chapter VI discusses the conclusion; some important concluding remarks are discussed. Chapter VII brings the recommendations and suggestions for the future studies.

1.5   Conclusion Remarks

The results show that the capital structure in oil and gas and mining industry in the UK can be determined by three variables: size, profitability and liquidity. It is generally observed that for firms in the UK in oil and gas and mining industry, size may not be an active variable for the firms to decide on the level of borrowing. Since the coefficient is high, it can be said that firms in this study will not face the risk of asymmetric information. The result on size ratio shows that large firms are highly leveraged and in fact this borrowing has a positive significant result on size. In terms of profitability in the UK, large firms with negative correlation to leverage, prefer to issue debt and raise equity to satisfy their financial needs.

Chapter 2

LITERATURE REVIEW

The capital structure theory which was presented by Modigliani and Miller (1958) started a revolution in finance. A lot of theories have appeared since then which included disagreements with Modigliani and Miller's work. These papers were basically published by those who were not in a complete agreement with Modigliani and Miller's conclusion that financial policy is not related and useful. In this section, the study mostly focuses on the theories on the capital structure.

There have not been any theories on debt and equity which is completely accepted but there have been some theories in which their viability depends on the condition. The scarcity of a singular model for capital structure can be explained by the fact that the way organizations define their finances is affected by their ownership type and requirements. The unique requirements and attributes of the company make it difficult to generalize a singular capital structure for all the firms (Schwartz, 1959). This study aims to describe 4 important theories on capital structure; Trade-off Theory, Agency Cost Model, Pecking Order, and Modigliani and Miller.

As it was explained before, all of the above mentioned theories are affected by Modigliani and Miller work. For a better understanding, these four fundamental models are described below.

2.1   Modigliani and Miller Theory

The work which is done by Modigliani and Miller is discussed in most papers and articles as the first and the most criticized theory in capital structure.

Although their work is highly criticized and there are contradicting ideas about accepting or challenging the theory, there is a common belief that their theory opened a new discussion in this field with millions of papers published and researches conducted later. Such as any other framework, the theory presented by these two authors, was subject to specific conditions. The theory will be best practiced under a flawless capital market and zero business cost and tax. Companies do their finances based on two claims, risk free debt and risky equity. Berry (2006) mentioned that there would be no cost of failure, on this case in firms no cost of bankruptcy. By borrowing money, all investors have equal expectation and all companies face risks equally and all the incomes and outcomes are supposed to be in a growth with a constant speed and finally acquiring information would be costless and there was no agency cost.

With a brief look at the market value of the firm the Modigliani and Miller proposition could be realized. According to what was firstly claimed by Modigliani and Miller, the firm's value does not change without paying attention to ratio of debt to equity in capital structure (Modigliani and Miller 1995), so it is concluded that the items on the left side of the model such as assets and opportunities for growth will be steady. Therefore

financial leverage of the company is not related to them and it will stay irrelevant even if the maturity on debt is long or short term (Myers, 2001). It is also a very important issue to recognize the factors that affect firm's value whenever growth opportunities are altering. The proposition of Modigliani and Miller is only worthy when all the factors in left side of the balance sheet are steady and constant, because whenever the growth opportunities of the firm is altered, then this change will be reflected in working capital, debt service ratio, liquidity ratio, fixed assets and all other factors which constitute the value of the firm. Their theory also suggests that investment and finance decision are apart from each other with highlighting the fact that organizations utilize capital budgeting procedures regardless of how the money is raised for capital expenditure.

In the second proposition they contend that in a company which funds its operations by taking out loans rate of return on the common stock will go up in the amount of the ratio of debt over equity. So, according to the second proposition the firm's debt to equity ratio defines how much the shareholders will receive from the firm's rate of return (Brealey, Myers and Allen, 2006).

To conclude Modigliani and Miller's proposition, it can be said that the left side of the balance sheet which includes assets of the company appoints the value of the firm and it remains constant regardless of the change in amount of the liability. Therefore, to enlarge the firm's value, the investment should be done in projects with NPVs of positive number (Brealey 2006). The assumptions presented by Modigliani and Miller (1958) and the resulting outcomes caused a lot of criticisms and disagreements in the academic world. In Modigliani and Miller proposition, it is contended that borrowing

money and raising funds through debt in a vulnerable market is very costly and unsafe, which generates a desire in customers to pay a higher price for the shares of the firms. Therefore, it claims that in order to comprehend the premium, companies have to finance themselves with debt. Another thing to mention is that the overall costs of capital of firms do not depend on their capital structure. Speaking of taxes, it is notable that interest on debt is tax-deductible, and WACC is calculated on after tax interest rate. As a result by understanding the benefits of debt, firms may be more encouraged to use debt in their capital structure.

2.2   Trade-Off Theory

This theory is recognized as the most important theory in corporate finance literature. It claims that a firm uses debt in their capital structure to the extent that the marginal value of tax on extra debt compensates the rise in the present value of costs of financial affliction (Myers, 2001). Before going deep into the theory, it is very important to give some explanations. Imagine a firm that uses debt in its capital structure. The company achieves some benefits such as the interest expenses which consider deductible tax (tax shield). Rising finances through debt has also some risks such as being subject to bankruptcy or financial affliction. If the firm is not able to produce enough cash through its operational, financial or other activities to cover its borrowings, then the company is highly exposed to bankruptcy. When a company uses heavy debts in its capital structure then it has made itself to pay substantial amount of its income in the form of interest payment (Modigliani and Miller ,1958). Nevertheless, a firm which does not have debt can reinvest all the profit which makes in its business again.

The aim is not to criticize the raising capital through debt or equity, but it is to know the advantages and disadvantages together. It is not easy to find a firm that uses just one option (debt/equity) in its capital structure. Here, one can ask a quesion of how a firm which is willing to maximize its value can construct its capital structure or is there any ideal formula for debt equity ratio?

Based on trade-off theory, a firm which is willing to maximize the value can estimate the advantages and costs at the margin and control the function at the top of the curve.

The most important negative disadvantages associated with financing through debt is that it makes the firm highly dependent on debt as a source of cash. Cost of financial affliction is one of the most important consequences of financing with debt.

If there is a moderate debt level in the firm then the financial distress' effect is insignificant but with additional debt the probability of financial distress increases.

Furthermore, when the firm is not sure about obtaining from tax shield and is raising debt at the same time, then there will not be any benefits of raising debt and the firm can go bankrupt (Brealey, Myers and Allen, 2006). The model described by Modigliani (1985) was based on the taxation of the zero.

As it was mentioned before, the cost of financial distress affects a company. Two kinds of bankruptcy cost are recognized (threats):

(a) Administrative costs which is paid to third party

(b) Shortcomings of selling assets in liquidation process

Fig1. Trade off theory
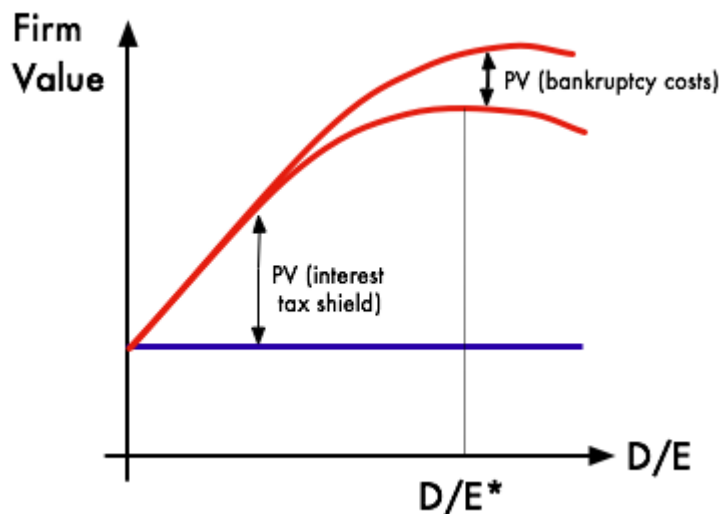
2.3 Pecking Order Theory

Another theory in corporate literature is Pecking Order which was first introduced by Donaldson (1961) and later was expanded by Myers and Majluf (1984). According to Donaldson (1961) most of the managers are seeking for internal funds rather than issuing stocks. Donaldson states that as a result of these new findings, managers tend to finance their funds mostly internally. Myers and Majluf (1984) started a new research by considering the importance of issuing stock to raise fund in order to achieve a positive NPV. Pecking Order Theory starts with the fact that managers have more knowledge about their company than the outsiders for the growing opportunity and for the risks that they can face (Brealey 2006). This fact (information asymmetry) is one of the most essential assumptions in this theory and encourages the managers to capitalize on this capability. It was observed during their research that most of the managers do not engage in issuing stock in favor of their current stockholders to the extent that they can

lose a positive net present value project. For this reason, the future investors, who are not going after news, can comprehend this event as an opportunity, so, in the end the number of the issue will be affected. Managers assume that communication information to the outsiders is very costly and it will not be any trouble when specific information is achieved without any extra cost.

Their theory concluded assumptions such as:

- Markets are perfect

- Issuing stocks would be costless

- The value of each firm is calculated by the information in the market

Based on the above mentioned assumptions it can be concluded that:

- Firms are more comfortable to do with internal financing

- Companies prefer to determine the dividend they are paying to investors

- In case of needing to borrow from outsiders or as it is called "External Financing" firms issue stocks (safe) and then if these needs are not satisfied there would be more mixed tools to acquire the amount (Myers and Majluf, 1984).

2.4   Agency Costs Based Theory

Agency costs show that firms chose their capital structure according to agency costs, which is the constitution of the costs in debt and equity. The costs which are linked to equity issue are: 1) monitoring expenses, 2) expenses in bonding of the agent (the manager), 3) decreased in the amount for principal caused by the difference of agent's decisions from those which maximize the proportion of the principal. Further, debt issue causes the owner-manager's incentive to increase, as the result they invest in more risky projects which have higher returns to the owner-manager. Though, these

incentives can cause more chance of failure. As it is expected in this case, a higher premium is needed to compensate the possible chances of failure. Afterwards, the agency costs of debt will consist of the opportunity costs which are the results of the effect of debt on the investment decisions in the corporation; "monitoring and bond expenditures by both the bondholders and the owner-manager; and the costs associated with bankruptcy and reorganization. No matter which one, equity and debt, can cause agency costs, the best ratio of debt-equity would be the one which takes into consideration of both of them as trade-off explains. As it has been stated in different studies and books, agency costs are the results of those conflicts between interests in firm's owners and managers. As Jensen and Meckling (1976) conclude, there are two types of conflicts; between shareholders and managers, between shareholders and bondholders.

Table1. Correlation among variables and different methodology

	Trade-off Model	Pecking OrderTheory
Profitability	+	-
Growth	-	+
Tangibility	+	+
Liquidity	-	-
Size	+	-

2.5   Variables of Capital Structure:

2.5.1   Tangibility

Theoretically it has been stated that tangibility has a positive relation to leverage. It has been shown that if a firm has a huge amount of intangible assets, it can be useful in terms of lowering the interest rate while it can help to decrease the risk in which those lenders suffer from the costs, which arise from the agency cost of debt. It is common in the economy to secure debts by tangible assets as collateral. In his study, Stulz (1990) mentioned that those firms with more intangible assets, are supposed to pay more in costs of capital since monitoring is more difficult. So, it is expected that in a firm with a huge amount of tangible assets debt is higher. Tangibility is explained as the book value of property, plants and equipment -total net over by total assets.

2.5.2   Non Debt Tax Shield

The impact of tax on leverage is not so clear. The interest from loan is tax-deductible and firms with higher taxable income ought to have more debt to benefit from the gain on the tax shield (Hauge and Senbet, 1986). Hence if the tax rate is effective then it is expected to have a positive correlation to debt. In a different approach, as Titman and Wessel (1988) said, "higher effective tax rate also reduce internal funds and increase the cost of capital". So, a reverse connection among the effective tax rate and the debt is expected. There has been a couple of studies which stated that there is not always a relation among the effective leverage and the tax.

2.5.3 Size

In most of the researches, it has been confirmed that in almost all situations size has a positive correlation with leverage (Rajan 1995). In economy, the scale expresses the importance of a firm's size as it has been said that by increasing the size the cost of debt can be reduced (Michaelas et al. 1999). When firms are bigger they are supposed to face a lower level of asymmetry in information.

2.5.4 Growth Opportunities

Most of the previous researches have concluded that there is a negative relationship between the growth and the leverage (Rajan 1995). Actually this relation is logical. Since there is a growth opportunity for a firm, the firm will put more effort on expanding and consequently on the income.

2.5.5 Profitability

Most of the previous studies show that the relation among profitability and leverage is negative (Rajan 1995). When a firm is in profit the need for raising to cover the operating expenses will be reduced.

2.5.6 Liquidity

The main goal of Pecking Theory is to make firms realize that the internal financing is be much logical than the external financing. It means that if a firm needs to raise money it is better for it to use the earnings in a way that whenever it is needed, cash them out and satisfy the financial needs (Rajan 1995). Trade-off Theory explains that liquidity ratio and the debt can have both positive and negative correlations. Sheikh and Wang (2011) states that liquidity ratio can send out obscure signals to outsiders which can cause the investors to consider the firm with high liquidity as a short-run investment

opportunity and not a long-run opportunity. On the other hand, it also can signal a reliable investment since the probability of default by firms is low. Antoniou (2008) and Mazur (2007) explained that the relationship between debt and liquidity is expected to be negative, so that firms having more liquid assets may issue less debt securities and use their internal return instead to perform their businesses. Abdullah (2005) expressed that there is be a significant negative relationship between short term debt and liquidity.

2.6 Empirical Evidences from the UK

There have been number of studies done on the capital structure of the firms in the United Kingdom. This thesis chooses the most important ones to discuss by basing on the number of firms and significance of results. In the first study which was done by Bevan and Danbolt (2004), a huge number of 1054 firms in the UK were selected by them. They tried to point out the structure of capital determinants as well as evaluating whether these determinates are time dependent or independent. Sector dependency has been evaluated too. They used OLS method. They concluded that when firms are bigger they tend to have more debt (both short term and long term) but for small firms the statement is not true. Their results also showed that there is a negative correlation between profitability and the ratio of long term debt to equity. In 2001 there was another investigation in the determinate of capital structure. In this study which was done by Ozkan (2001), a partial model was used. 390 firms (financial firms not included) were chosen for 18-year period (1984-1996). Results stated that leverage is negatively related to profitability and growth. Leverage also had a negative relationship with liquidity in these firms. For the period of 1977 to 1988 another study was done by Bennett and Donnelly (1993) to determine the capital structure of the firms in the United Kingdom.

17

They used regression analysis for their study. They concluded that variables such as size, tax rate and profitability are related to the capital structure. There have been evidences from other countries too. Rajan and Zingales (1995) studied the determinants of capital structure in public firms. They chose the firms from the most powerful industry wise countries. The period was from 1987-1991. They concluded that tangibility has a positive relation with leverage. Profitability, on the other hand, has a negative relation with leverage. Moreover, their results showed that the size of the firms is positively related to leverage except for Germany.

Chapter 3

DATA AND METHODOLOGY

3.1   Research Methodology

The main focus of this section is to describe the models and the basics of the used methodology. The data, variables, research questions and hypothesis consist the other part of this section.

3.2   Data Source

The focus of this study is the two important industries in United Kingdom; oil and gas, and mining. These firms are present in one of the most important indices in the world, and in one of the largest stock exchange markets. FTSE 100 index is chosen for the selection of firms, which is a part of London Stock exchange.

3.2.1   A Summary on London Stock Exchange and FTSE 100

In 1801 one of the most important stock exchanges, London Stock Exchange, was established in London, United Kingdom. The owner of the exchange is London Stock Exchange Group. Since the stock exchange is located in the UK, the main currency used in it is GBP. In 2011 the number of listing was 2864. In 2009 the volume was 1.7 trillion US Dollars. It consists of different indices and the most important one is called FTSE 100. FTSE 100 has 100 important firms which almost all of them are active internationally. These firms are considered to have the highest market capitalization among the other firms in the stock exchange. The weighting format is based on the

Capitalization Weighted Method. As in April 2012, the market capitalization was 1.549 billion Sterling (www.londonstockexchange.com).

3.2.2 Data collection

This study works on 5 important firms from 2 different main sectors in the UK. Oil and gas industry includes 2 major firms; Royal Dutch Shell and BG group. Both of these companies are selected according to their market capitalization. The reason behind choosing these 2 firms is that these firms are the representatives of this industry by having a large number of market capitalizations. The second industry is the mining. This industry includes 3 different and important firms which are considered to be the representatives of the mining industry. Firms are; Anglo American, Rio Tinto and Antofagasta. All these firms are in London stock exchange and more importantly they are included in FTSE 100 Index since their market capitalization is high. This study relies on two different aspects of research; theoretical and numerical aspects. To cover the theoretical sections of this study, different sources were chosen. Yet, the main focus was the capital structure of the firms, which were studied by the previous researches and articles. The information is extracted from different, yet important journals in economics and banking and finance. It is extracted by using the sources provided by the Eastern Mediterranean University (EMU) Library and also the online data base. EMU Library provides an opportunity to all the students to extract the most recent data out.

On the other hand, there is a number of numerical calculations done by the author. Since the main focus of this study is the determinants of the capital structure in 2 important industries, oil and gas, and mining in FTSE 100, a number of financial ratios were in need; such as, Total Debt Ratio, the growth of the firm, the ratio of net debt tax shield in

a firm, tangibility, size, liquidity and profitability ratio. These ratios were needed to be extracted from firm's financial statements such as Balance Sheet and Income Statement. The relative information to calculate the mentioned ratios, Data Stream Software of Thomson and Reuters which is provided by the Department of Banking and Finance at the Eastern Mediterranean University, has been used. First balance sheet and income statement of each is extracted, and afterwards the ratios are calculated. Since this study uses a broad period of 22 years from 1990 to 2012, these financial statements are extracted on yearly bases. Thus, the ratios are calculated yearly.

3.3   Variables

There have been a large number of studies on capital structure of firms and its determinants. As it has been covered in the second section of this study, there has not been a sole method to decide on the determinants; hence different authors have used different ratios. Another reason which makes the ratios different from one to another, is whether the firms are financial or non-financial. The scope of this study is on non-financial firms. So, the following ratios have been used according to Nadim and Wang (2011). Each of these ratios is calculated according to the formulas which are accepted by most researches and studies. Debt ratio is the ratio which determines the percentage of assets in a firm provided with debt. It is calculated yearly total debt of a firm; over yearly total assets of a firm. Ratio of growth in a firm is calculated as growth in sales over the total assets.

Size ratio is a factor of sales in a firm so the calculation is a natural logarithm of sales in each year. Ratio of tangibility is calculated as division of total intangible assets over the

21

total assets. The next ratio which is the liquidity is calculated as the division of current assets over the current liabilities. Profitability ratio is the result of division of Net earnings before taxes over total assets. And the last ratio, Net debt tax shield is a function of dividing the depreciation to total assets. Table 1 shows the summary of the applied ratios. In this study the dependent variable is the debt ratio and all the others are independent, which means changes in independent variables are expected to cause changes in debt ratio.

Table 2 Variables and definitions

Dependent Variable	Definition
DEBT	total debt over total assets
Independent Variables GROWTH NDTS PROFITIBILITY LIQUIDITY SIZE Tangibility	sales growth to total assets depreciation to total assets net profit before taxes to total assets current assets to current liabilities natural logarithm of sales Net fixed assets to total assets

3.4   Methodology

3.4.1 Research Question

As it has been mentioned earlier, the main scope of this study is the determinate of the capital structure in firms which are active in FTSE 100. This study tries to calculate the effect of the independent variables on dependent variable to understand whether the capital structure decisions are made based on leverage or equity.

3.4.2 Hypothesis:

The null hypothesis is as following:

H1a) Debt ratio is negatively related to growth

H1b) Debt ratio is negatively related to liquidity

H1c) Debt ratio is negatively related to size

H1d) Debt ratio is negatively related to profitability

H1e) Debt ratio is negatively related to tangibility

H1f) Debt ratio is negatively related to on debt tax shield

3.5   Information on Firms and industries

- **Oil and gas Industry**

In 2012 the oil and gas industry in the United Kingdom produced 50 million cubic meters of petroleum, of which 98% was produced from the offshore fields. It has to be said that most of all the UK oil and gas production comes from other countries (there is a network of 14,000 km of pipelines linking 107 oil platforms, 181 gas platforms and a large number of subsea installations). In 2008, the combined production of oil and gas was 1 billion boe (549 million barrels (87,300,000 m3) of oil and 68 billion cubic metres of gas). This represented a fall of 5% when compared to 2007 (6% oil and 3%

23

gas), a slight improvement on the decline rate in 2002-2007 which averaged 7.5% per annum. Oil and gas production from the UKCS has contributed £271 billion (2008 money) to tax revenues over the last forty years. In 2008, tax rates on UKCS production ranged from 50 – 75%, depending on the field. The industry paid £12.9 billion to corporate taxes in 2008-2009; the largest since the mid-1980s, because of the high oil and gas prices. This represented 28% of total corporation tax paid in the UK. It is expected that tax revenues from production will fall to £6.9 billion in 2009-2010 based on an oil price of $47 per barrel, providing 20% of total corporation taxes. In addition to production taxes, the supply chain contributes another £5-6 billion per year to corporation and payroll taxes. In 2008, the UK's balance of trade in goods and services was in deficit by £44 billion. If the UK did not produce oil and gas, its dependency on imported fuel would have been higher and the balance of trade deficit would have nearly doubled to £84 billion.

- **Mining Industry**

This industry in the United Kingdom is reported to produce a wide variety of fossil fuels, metals, and industrial minerals. In 2006, there were over 2,200 active mines, quarries, and offshore drilling sites on the continental land mass of the United Kingdom. The United Kingdom has a rich history of mining. There is evidence that mining took place in Wales during the Bronze Age approximately between 2200-850 BC. Metalworking debris found beneath the ramparts at Beeston Castle located in Beeston, Cheshire, England is an evidence of bronze production during the Bronze Age. Later, lead and copper attracted the Romans to Britain, and in the 15th century they erected a lead smelter at Flint in Northern Wales. The Romans introduced iron

tools and used local slaves to mine galena, an important lead ore mineral, from which they refined lead, tin, and silver. These metals were used locally and also transported by ship throughout the Roman Empire. Galena was mined from deep mines located in Scotland and Wales. Lead, tin, and aluminum were then refined from galena.

The widespread availability of coal and iron was a significant factor in Europe's Industrial Revolution of the late 18th and early 19th centuries. Although coal and iron ore are no longer mined in significant amount in the United Kingdom, they were once mined in large amount throughout the United Kingdom and utilized for steel and energy production. With large amount of important minerals available and easily accessible, the United Kingdom's economy grew rapidly.

- **Firms:**

1) Anglo American: It is one of the most important firms in mining industry which has the market capitalization of 26 billion GBP. The firm is active worldwide by having more than 100120 employees.

2) Antofagasta PLC: This firm is active since 1888 by market capitalization of more than 12.1 billion Pounds as in 2011.

3) BG Group: Oil industry in UK is one of the most powerful industries worldwide. One of the firms which is responsible for this reputation is BG Group which has been established in 1997. The market capitalization is 18.9 billion Pounds.

4) Rio Tinto: It was established in 1873 in London, UK. The market capitalization was 134 billion US Dollars in 2009.

5) Royal Dutch Shell: It can be said that this firm is the most well known firms in oil and gas industry. The market capitalization in 2012 was 140 billion Pounds.

3.6 Model

It is common in the econometrics to implement data with linear formulation to achieve the best results. This study also used a simple linear formula for regression.

1) $Y_{i,t} = \alpha + \beta X_{i1t} + \mu t$

Eviews has been used as the choice of software to input the formula and regress the variables. The above formula contains two parts; dependent and independent part. Debt ratio which is the dependent variable goes on the left side and others on the right.

The expected formula in Eviews is as following:

2) $Debt_{it} = \beta 0 + \beta 1 GROW_{it} + \beta 2 NDTS_{it} + \beta 3 profit_{it} + \beta 4 Liquidity_{it}$
        $+ \beta 5 TANG_{it} + \beta 6 SIZE_{it} + \mu_{it}$

As it has been mentioned before in Chapter 2, for each control variable there could be a negative or positive relationship with debt ratio. These relations may change according to various theories done on different aspects of capital structure but generally the model chosen for the study is according to Modigliani and Miller Theory. The results of the formula are more discussed in the next chapter. The methodology used in this thesis is according to Brav (2009). He focused on the funding behavior of public and private firms in the UK. He used a multi-variable linear equation to evaluate the relation between control and dependant variables. The model is also according Modigliani and Miller Theory of capital structure of non-financial firms. Panel Data Least Squares Regression Model is also employed to study the correlation and relation between the different determinants of capital structure, such as firm size, growth opportunities, asset tangibility, profitability, liquidity and non debt tax shield.

3.6.1 Choice of Software:

By development in technology especially in IT industry, results in quantitative finance has become more reliable. This study had the option of choosing Eviews, which the author has used both. To perform the regression and correlation Matrix Eviews 7 is used.

Chapter 4

EMPIRICAL RESULTS

During the previous chapters, the study tried to describe the foundation of thesis along with explaining the methodology, variables and software used to test the data. This chapter will analyze and interpret all the results since there were several approaches introduced. Descriptive analysis will be explained briefly. A correlation matrix will be represented and described. At the end, the results of the regression will be shown and discussed.

4.1   Descriptive Analysis

Descriptive analysis takes the variables as input and output, and it evaluates the relation between them. Descriptive analysis can be performed by different software. Among them, Excel and Eviews are very common among the economists. This study has used Eviews. Mean for the total ratio of debt which in this study is the dependent variable and is a result of the division of total debt over total assets, is 0.175 which states that only 17.5 % of the firms provided the fund needed by borrowing and the other 82.5 % is provided through other financing ways. It can be said that the capital structure of the selected firms in UK is not heavily dependent on debt. The minimum total debt is less than 5% while the maximum percentage of borrowing is 47%. The mean of growth which is the ratio of sales over assets is 45% between the whole 5 firms. Liquidity which is the ratio of current assets over current liabilities is more than 1.5 which is a strength for the firms against financial distress. Since the firms chosen are from oil and gas and mining industry, it is expected for them to have relatively high fixed assets,

that is why tangibility is reported to be more than 50%. The mean of profitability is reported to

be 13%.

Table3: Descriptive Statistics.

	DEBT	GROWTH	LIQUID	TAX SHEILD	PROFIT	SIZE	TANG
Mean	0.175498	0.452743	1.657236	0.040927	0.132216	15.65166	0.530605
Median	0.149445	0.385965	1.189446	0.042126	0.096683	15.78066	0.531453
Maximum	0.471201	23.40000	7.939459	0.117457	0.749719	19.49671	0.901914
Minimum	0.044857	-20.11111	0.261811	0.003405	-0.032196	10.94840	0.090265
Std. Dev.	0.096536	3.800959	1.280970	0.017469	0.122940	2.097865	0.166721
Skewness	1.097491	0.538410	2.608408	0.485406	2.795705	-0.334341	-0.326327
Kurtosis	3.923970	21.31725	10.73922	5.438643	13.12409	2.689173	3.868894
Jarque-Bera	27.17675	1613.265	417.4056	33.01198	640.9385	2.605465	5.658642
Probability	0.000001	0.000000	0.000000	0.000000	0.000000	0.271788	0.059053
Sum	20.18224	52.06540	190.5822	4.706651	15.20486	1799.941	61.01952
Sum Sq. Dev.	1.062392	1646.991	187.0608	0.034788	1.723035	501.7185	3.168739
Observations	115	115	115	115	115	115	115

4.2   Correlation Matrix

This study seeks to find out the relation between debt and other variables. Growth,

liquidity, profitability and size have negative correlation to debt. Tax shield and

tenability are positively correlated with total debt. The other reason of running a

correlation matrix is to find out whether there is a multi-co linearity between the

variables. Table 4 shows that the multi-co linearity does not exist among the variables.

Table 4: Correlation Matrix

	DEBT	GROWTH	LIQUIDITY	TAX SHEILD	PROFITABILITY	SIZE	TANGBILITY
DEBT	1.000	-0.2016	-0.20917	0.0710	-0.4763	-0.1472	0.4607
GROWTH	-0.2016	1.0000	0.0622	0.0184	0.1070	0.2940	-0.2518
LIQUIDITY	-0.2091	0.0622	1.0000	-0.4099	0.2687	-0.4450	-0.2692
NONDEBTTS	0.0710	0.0184	-0.4099	1.0000	0.1190	0.4787	0.5740
PROFITABILITY	-0.4763	0.1070	0.2687	0.1190	1.0000	0.1856	-0.2364
SIZE	-0.1470	0.2940	-0.4450	0.4787	0.1856	1.0000	0.1531
TANGBILITY	0.4607	-0.2518	-0.2692	0.5740	-0.2364	0.1531	1.0000

4.3   Regression Results

This study has used 5 different companies in 2 different sectors from 1990 to 2012. 7 different variables are defined. Total Debt ratio has been considered as the dependent variables while other 6 are independent. The above formula contains two parts; dependent and independent part. Debt ratio which is the dependent variable goes on the left side and others go on the right. The model which is OLS regression is structured to the following formula:

3)   Debt it = β0 + β1GROWit + β2NDTS it + β3profit it + β4Liquidity it
$\qquad$ + β5TANGit + β6SIZEit + μ it

4.4 Unit Root Test Results:

Table 5 Unit root test summary

Variables	LLC	ADF	PP	IPS
Debt *T*T	-2.9658***	33.7417***	23.1506**	-3.6863***
Tπ	-2.5074***	25.4259***	14.3373	-2.97704***
T	-1.4404*	10.7479	10.4491	
Growth Opportunities *T*T	-2.8307***	30.2646***	30.5429***	-3.50852***
Tπ	-2.7946***	22.1169**	21.5682**	-1.74227**
T	-2.6436***	34.379***	34.876***	
Liquidity *T*T	-1.59535**	13.6445	15.4433	-1.18369
Tπ	-1.41663*	9.20176	9.78715	-0.06967
T	-3.0309***	20.721**	22.281***	
Profitability *T*T	-3.9186***	41.111***	35.8604***	-4.0539***
Tπ	-3.4406***	36.321***	29.826***	-3.49150***
T	-0.86758	6.60583	8.54251	
Non debt tax shield *T*T	-1.8860**	25.3987***	22.777**	-1.82301**
Tπ	-2.17561**	19.9694**	17.1414*	-1.67405**
T	-0.15216	10.1399	10.1225	
Size *T*T	-0.47637	5.54836	5.38307	1.57942
Tπ	-1.55249*	12.4043	12.3002	-0.65710
T	2.69373	0.72069	0.65398	
Tangibility *T*T	-1.34450*	12.9598	12.6374	-0.86330
Tπ	1.79511	7.71483	8.17535	-1.68566
T	-1.68566*	14.1147	14.0437	

*Notes: T*T = individual intercept, **Tπ= Trend and intercept, *T=none*
    Optimum lags have been selected by Schwartz criterion
    "***" Denotes that the ratio is significant at (the null hypothesis is rejected at) 1%
    "**"   Denotes that the ratio is significant at (the null hypothesis is rejected at) 5%
    "***" Denotes that the ratio is significant at (the null hypothesis is rejected at) 10%

A unit root test is a procedure in econometrics which shows whether data is stationary or not. Stationary data is defined as the data which the mean and covariance and variance will not change over the time. To make sure the data is stationary and mean, variance and covariance do not change over time, and unit root test was tested in Eviews. After running the test it was revealed that all the variables are stationary at level and they are integrated to order zero. This study relies on the results of Levin, Lin & Chu. There was no need for checking the other levels. Table and graph of the results are presented here.

4.5   Heteroskedasticity and Autocorrelation

In statistics, when the standard deviations of a variable, monitored over a specific amount of time are non-constant, heteroskedasticity often arises in two forms; conditional and unconditional. Conditional heteroskedasticity identifies non-constant volatility when future periods of high and low volatility cannot be identified. Unconditional heteroskedasticity is used when future periods of high and low volatility can be identified. In finance, conditional heteroskedasticity is often seen in the prices of stocks and bonds. The level of volatility of these equities cannot be predicted over a period of time. Unconditional heteroskedasticity can be used when discussing variables have identifiable seasonal variability, such as electricity usage. In order to check the White's test, Eviews is used but, unfortunately, since the data is panel, it does not offer White's Heteroskedasticity Test for panels. In seeking to test for heteroskedasticity, it seems that the only way to use the Eviews built-in tests is to run an OLS model on the unstructured dataset (ie. as stacked data rather than as a pooled time-series cross section model) and apply the Eviews White's test that way. After the test it was seen that there was no Heteroskedasticity problem with the data.

Autocorrelation is checked through Durbin Watson test. The Durbin-Watson statistic is always between 0 and 4. A value of 2 means that there is no autocorrelation in the sample. Values approaching 0 indicate positive autocorrelation and values toward 4 indicate negative autocorrelation. Since in this study Durbin Watson is more than 1.3, the autocorrelation existence is rejected.

4.6   Regression Analysis

Results of the regression are close to the previous studies and theoretical backgrounds. Results state that there is no correlation between debt and liquidity, profitability and size. In other words, after regressing debt to independent variables, liquidity, profitability and size are statistically significant.

4.6.1   Interpretations on R-Squared

A statistical measure, if data fitted the regression equation, is called R-squared or coefficient of determination, or the coefficient of multiple determinations for multiple regressions. The definition states that it is the percentage of the response variables chosen for a model on how they describe the model. In other words it shows the percentage of ability of control variables to describe changes in dependent variable in a model. R-squared cannot determine whether the coefficient estimates and predictions are biased, which is why assessing the residual plots is a must. R-squared does not indicate whether a regression model is adequate. It is possible to have a low R-squared value for a good model, or a high R-squared value for a model that does not fit the data. R-squared is considered to be between 0% and 100%. 0% shows that the model explains none of the variabilities of the response data around its mean. 100% indicates that the model explains all the variabilities of the response data around its mean. Generally,

higher R-squared shows that the data is more fitted to the model. R-squared is a handy, seemingly intuitive measure of how well the linear model fits a set of observations. However, R-squared doesn't tell us the entire story. R-squared values should be evaluated in conjunction with residual plots and other model statistics. Now, by looking at Table 6, R-squared is 64% which is considered to be acceptable. It shows that the data in this study, according to the chosen model, is able to describe 64% of changes in dependant variable.

Table 6 Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.345532	1.089548	-3.07056	0.0030
GROWTH	0.005056	0.034851	0.145088	0.8850
LIQUID	-0.401876	0.118335	-3.39610	***0.0011
NDTS	0.020607	0.123057	0.167456	0.8675
PROF	-0.337439	0.083832	-4.02519	***0.0001
SIZE	1.990991	0.838139	2.375490	**0.0202
TANG	0.198398	0.245593	0.807833	0.4218

"*" Show the significant results. Durbin-Watson 1.349670, R-squared 0.647075, F-statistic 13.20092 Prob(f-statiscs) 000.00

4.6.2   Interpretations on F-Statistics

F-statistics is one of the most common tests in statistics which is also really important. The value is calculated by the ratio of two sample variances. The F-statistic can test the following null hypothesis: (1) that the two sample variances are from normal populations with a common variance; (2) that two population means are equal; (3) that no connection exists between the dependent variable and all or some of the independent variables. The test in this study is used to understand whether independent variables jointly can influence the dependent variable or not. The "F value" and "Prob(F)" statistics test the overall significance of the regression model. Specifically, they test the null hypothesis that all of the regression coefficients are equal to zero. It tests the full model against a model with no variables and with the estimate of the dependent variable

being the mean of the values of the dependent variable. The F value is the ratio of the mean regression sum of squares divided by the mean error sum of squares. Its value ranges from zero to an arbitrarily large number.

The value of Prob(F) is the probability that the null hypothesis for the full model is true (i.e., that all of the regression coefficients are zero). For example, if Prob(F) has a value of 0.01000 then there is 1 chance in 100 that all of the regression parameters are zero. This low value can imply that at least some of the regression parameters are nonzero and that the regression equation does have some validity in fitting the data (i.e., the independent variables are not purely random with respect to the dependent variable).

According to the Prob(F-statistic) which is equal to zero, it can be interpreted that it is statistically significant. The interpretation is that, since P-value is significant, independent variables are able to jointly influence the dependant variable.

4.6.3   Results on Liquidity

Liquidity is statistically significant at all the three levels (1%, 5%, and 10%). The coefficient's sign is negative. Interpretation can be, by an increase in liquidity by 1%, debt will decrease by 0.40. It can be concluded that borrowing in the selected firms could be expensive. It is also comprehensible that firms prefer to finance the needed fund through their liquid assets. In the other words, firms with higher liquidity prefer to use internal assets to finance their needs which are according to Pecking Order Theory. It also might be true that if internal financing was not helpful enough, firms choose equity financing. The other reason, as Ozkan(2001) stated in his paper, can be that liquidity and debt might have negative relations. He stated that this correlation could rise from the conflicts between the share holders. These issues happen when the

35

shareholders of a firm try to change the price of assets for their own benefits and force the expenses to the bond and stock holders. If firms have a reliable reserve of cash, it is not needed to raise the debt. Cash or money is always considered to be the best indicator of liquidity. Large firms are supposed to have larger cash. In critical situations such as recession, debt threats the liquid assets. So, it is better if there is no borrowing in such conditions. The expenses can be paid by using the current assets (Hooker 1994). It is true that profitability will decrease but according to regression results it would be the ideal choice.

4.6.4 Results on Profitability

Profitability is statistically significant at all the three levels (1%, 5% and 10%). The coefficient's sign is negative. Interpretation can be, by an increase in profitability by 1%, debt will decrease by 0.33. This result is in line with the hypothesis described earlier. Since the relation between profitability and total debt ratio is negative, it can be said that profitable firms in oil and gas and mining industry, prefer more of equity rather than debt. So, if firms are in profit it means that they have borrowed less. In other words, if firms such as Royal Dutch Shell or BG Group increase the level of debt in their capital structure, profitability of them will decrease. Thus, when the level of debt increases, the level of profitability will decrease.

Previous studies which have been done on the UK states the same correlation between profitability and debt. For instance, Ozkan (2001) found that, in UK firms, the relation between debt and profitability is negative. When debt increases, profitability decreases. In another study done by Bennet and Donnely(1993) these tow variables were negatively correlated.

4.6.5 Results on Size

Size is statistically significant at two levels (5%, 10%). The coefficient's sign is positive. Interpretation can be, by an increase in size by 1%, debt is expected to increase by 1.99. Since the coefficient sign is positive, the result on this variable is in contrast with the earlier hypothesis. The hypothesis stated that large firms, such as firms chosen for this study, are not heavily leveraged, while the result on the size ratio shows that large firms are highly leveraged and in fact this borrowing has a positive significant result on the size. This relation is also according to the theory of bankruptcy cost on debt. Large firms are heavily leveraged since they have the fear of bankruptcy. Lenders are also more eager to borrow to larger firms since the fluctuation of earnings in these firms are not high and firms are able to pay back their debts, and if they do not, these firms have high level of assets which can be used as collateral. The results in this section are consistent with Lasfer (1995). He stated that usually large firms are highly leveraged. In another study done by Ozkan (2001), the Pecking Order Theory is supported. In another study done by Bevan and Danbolt (2004), size is positively related to the debt. They concluded that it would be better for small firms not to borrow for long terms and instead, if they are confident enough, they should use short term debts. Since this study has chosen 5 giant firms in mining and oil and gas industries, and all these firms are active worldwide with massive market capitalizations, it is expected for them that debt is positively correlated to size.

Chapter 5

DISCUSSION

5.1   Discussion

According to the results, liquidity and profitability are negatively correlated to total debt. The findings in this study show that both of them are statistically significant. Theoretically when the relation between liquidity and total debt, profitability and total debt is negative, it is said that firms financed the fund needed according to Pecking Order Theory.

In general, it can be said that it is suggested that these firms use some proportion of leverage but not heavily depending on it. The borrowed fund can be to used to develop the size of firms. Since firms are liquid and profitable, it is ideal for them to satisfy their short term needs by using liquid assets. It is also suggested that firms run feasibility study before raising debt and acquiring new projects.

Size has a positive and significant relation with debt ratio. Trade-off Theory suggests that large firms should be highly leveraged since they can reduce the risk of failure by diversifying it. Since all the firms chosen in this study are large with huge market capitalizations, the finding of this study related to size is true and based on the previous

studies. It is also concluded that the firms chosen for this study use the Trade-off Theory to finance the needed fund.

The results of the regression model showed that in the chosen firms in UK, three variables are able to make changes in debt ratio: size, profitability and liquidity ratio. The other variables are highly insignificant. Size is significant and positively correlated to debt by 2.375. This suggests that the firms in this study have good relationship with bankers and creditors. Liquidity and profitability are negatively correlated to total debt ratio. The result in the previous chapter states that liquidity is expected to have a negative effect on firms' borrowing decisions. Economic wise, this negative correlation can be interpreted as there is always a conflict between debt holders and shareholders. Since the correlation between profitability and total debt ratio is negative, it is interpreted that profitability can negatively influence the decision of firms on borrowing. The findings on profitability are consistent with Pecking Order Theory. It is suggested that firms use internal financing rather than debt. The other variables remained highly insignificant. According to Myers (1997), the relation between debt and growth is negative. Ozkan(2001), in an investigation in the UK, found that growth and debt are negatively correlated. However, growth is not statistically significant here. Non debt tax shield theoretically assumes to be in a positive relation with leverage and debt, but here it is not significant. According to the results, profitability has a negative relationship with debt. This result was also found by Bevan and Danbolt (2004) and Ozkan (2001). This study showed that liquidity is negatively correlated to total debt. This result was also found by Ozkan(2001). Tangibility is not significant in this study; however, other studies stated that it has a positive relation with total debt (Jensen and Meckling, 1976).

39

Chapter 6

CONCLUSION

The study focused on the debt and its determinants in the UK firms. To find the best empirical results, 5 large companies from 2 industries in form of panel data were established. The time horizon chosen is 22 years, form 1990 up to 2012. The main target of the thesis was to find the decision made for capital structure in UK firms. All the ratios were stationary so the study used Panel Data Least Square Model to test the regression between dependent and independent variables. The formula for each ratio was presented. The dependent variable was total debt ratio. Growth, liquidity, size, tangibility, non debt tax shield, profitability are independent variables.

The results show that capital structure in oil and gas and mining industry in the UK could be determined by three variables: size, profitability and liquidity. It is generally observed that for firms in the UK in oil and gas and mining industry, size may not be an active variable for the firms to decide on the level of borrowing. Since the coefficient is high, it can be said that firms in this study will not face the risk of asymmetric information. The result on size ratio shows that large firms are highly leveraged and in fact this borrowing has a positive significant result on size. In terms of profitability in the UK, large firms with negative correlation to leverage, prefer to issue debt and raise equity to satisfy their financial needs. On the other hand, it can be said that level of liquidity in assets could determine the level of leverage. Firms chosen for this study has

high level of liquid assets, so whenever an extra fund is needed, there is always the choice of liquid assets rather than debt.

Chapter 7

SUGGESTIONS

Panel Unit root test and Panel OLS technique are employed to find out the determinants of the capital structure. However, for further studies a number of companies should be checked whether they represent the industries or not. The firms chosen for this study are the representatives of their own industry according to the annual report of London Stock Exchange. This can provide fragile or biased results that should be taken into account. Panel data with random effects and auto-correlated errors can invalidate the results of applications with a short time dimension, even in a correctly specified model. As a result, this study chose a period of 22 years which completely faced the mentioned possible issue. The further directions for future studies can be choosing more firms and more studies to take into consideration the other theories of capital structure. This study has used total debt ratio, while long term debt ratio and short term debt ratio can also be useful to analyze firms and obtain more detailed results. The period can be longer if the financial statements of firms are available. Generally, it is suggested that these firms use some proportion of leverage but they are not heavily depending on it. The borrowed fund can be used to develop the size of firms. Since firms are liquid and profitable, it is ideal for them to satisfy their short term needs by using liquid assets. It is also suggested that firms run feasibility study before raising debt and acquiring new projects.

REFERENCES

Baxter, N. D., and Cragg, J. G., 1970. 'Corporate Choice among Long-Term Financing
Instruments'. The Review of Economics and Statistics, 52(3):225-235.

Bennett, M. and Donnelly, R., 1993. 'The Determinants of Capital Structure: Some UK
Evidence'. British Accounting Review, 25: 43-59.

Berry, R. 2006. Corporate Financial Strategy, Lecture Handout.

Bevan, A. A, and Danbolt, J., 2004. 'Testing For Inconsistencies in the Estimation of
UK Capital Structure Determinants. Applied Financial Economics, 14(1): 55-66

Berry, R. 2006. Corporate Financial Strategy, Lecture Handout.

Brealey, R. A., Myers, S.C., and Allen, F., 2006. Principles of Corporate Finance. 8th
edition, McGraw Hill.

Donaldson, G., 1961. 'Corporate Debt Capacity: A Study of Corporate Debt Policy and
the Determinants of Corporate Debt Capacity'. Harvard Business School, Division
of Research, Harvard University.

Hooker, M., and M. Kohn. "An Empirical Measure of Asset Liquidity."
Unpublishedmanuscript (1994).

Jensen, M.C. and Meckling, W.H. (1976), "Theory of the firm: managerial behavior, agency costs and ownership structure", Journal of Financial Economics, Vol. 3 No. 4, pp. 305-60.

La Porta, R., Lopez de Silanes, F., & Shleifer, A. (1999). Corporate ownership around the world. Journal of Finance, 54(2), 471-517.

Lasfer, M. A., 1995. 'Agency Costs, Taxes and Debt the UK evidence'. EuropeanFinancial Management, 1 (3): 265–285.

Michaelas, N., Chittenden, F. & Poutziouris, P. (1999). Financial policy and capital structure choice in UK SMEs: empirical evidence from company panel data. Small Business Economics, 12(2), 113-130.

Modigliani, F. and Miller, M.H. (1958), "The cost of capital, corporation finance, and the theory of investment", American Economic Review, Vol. 48 No. 3, pp. 261-97.

Modigliani, F. and Miller, M.H. (1963), "Corporate income taxes and cost of capital: a correction", American Economic Review, Vol. 53, pp. 443-53.

Myers, S.C. and Majluf, N.S. (1984), "Corporate financing and investment decisions when firms have information that investors do not have", Journal of Financial Economics, Vol. 13 No. 2, pp. 187-221.

Myers, S. C., 2001. 'Capital structure'. The Journal of Economic Perspectives, 15(2):81-102.

Nadeem Ahmed Sheikh, Zongjun Wang, (2011) "Determinants of capital structure: An empirical study of firms in manufacturing industry of Pakistan", Managerial Finance, Vol. 37 Iss: 2, pp.117 – 133

Ozkan, A., 2001. 'Determinants of capital structure and adjustment to long run target: Evidence from UK company panel data'. The Journal of Business Finance and Accounting,28(1): 175-197.

Rajan, R.G. and Zingales, L. (1995), "What do we know about capital structure? Some evidence from international data", The Journal of Finance, Vol. 50 No. 5, pp. 1421-60.

Robert A. Haugen and Lemma W. Senbet, 1986,The Role of Options in the Resolutions of Agency Problems: A Reply, The Journal of Finance, December.

Schwartz, E, 1959. 'Theory of the Capital Structure of the Firm'. The Journal ofFinance, 14(1):18-39.

Stulz, R. (1990). Managerial discretion and optimal financing policies. Journal of Financial Economics, 26, 3-27.

Taggart, R. A., 1977. 'A Model of Corporate Financing Decisions'. The Journal of Finance, 32(5): 1467-1484.

Taub, A.J., 1975. 'Determinants of the Firm's Capital Structure. The Review of Economics and Statistics, Vol. 57(4):410-416.

Titman, S. and Wessels, R. (1988), "The determinants of capital structure choice", The Journal of Finance, Vol. 43 No. 1, pp. 1-19.

Walsh, E., J., and Ryan, J., 1997. 'Agency and Tax Explanations of Security Issuance Decisions'. The Journal of Business Finance and Accounting, 24(7&8):943 -96.

Welch, I., 2004. 'Capital Structure and Stock Returns'. The Journal of Political Economy', 112(1): 106-132.