Birkbeck, University of London.

The relationship between Capital Structure and Corporate Governance in a UK Context.

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Thesis submitted in fulfilment of the requirements for the award of Doctor of Philosophy

I hereby declare that my thesis is the result of my own work and includes nothing which is the outcome of work done in collaboration except as declared in the Preface and specified in the text, and is not substantially the same as any that I have submitted, or, is concurrently submitted for a degree or diploma or other qualification at the University of Birkbeck or any other University or similar institution except as declared in the Preface and specified in the text.

Signature:  **Date: 17/07/18**

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Dedication

This thesis is dedicated to my son Thomas Keith, and my soon to be born daughter.

ABSTRACT

The extensive research in the field of capital structure provides a starting point to build upon within this research, to re-examine the relationship between capital structure and corporate governance for the period 2003-2012 for FTSE 350 companies. Previously investigated independent variables will be re-examined in the UK context, for example, gender of the CEO and the Board of Directors, size of the board, number of board meetings, board meeting attendance and managerial ownership. Previously, the focus has been on the relationship between the determinants and company performance. Prior studies focus on the use of single equation modelling (Berger *et al.*, 1997; Fosberg, 2004; Malmendier *et al.*, 2011; Ahern and Dittmar, 2012; Yim, 2013). The contribution of this study is three fold. Firstly, the use of both single and dynamic modelling allows for a more detailed analysis of the potential determinants on capital structure to emerge. Secondly, the use of several definitions of gearing enables a study into whether the duration of debt is one attribute in the capital structure puzzle. Thirdly, the use of comprehensive corporate governance factors including board structure, CEO characteristics, and ownership structure enable a wider number of independent variables to be included within the capital structure debate.

In relation to CEO age the study finds evidence that CEOs are demonstrating a difference in risk levels between short-term and long-term debt levels, with older CEOs being at risk of entrenchment. As the tenure period of the CEO increases the level of debt decreases, in line with managerial entrenchment theory. In relation to board characteristics; the size of the board, level of independence and meeting attendance, lead to a reduction in the uptake of debt. The number of board meetings is found to have a positive impact on the leverage levels; the increase in the time available to discuss options is found to have the opposite effect on debt levels.

Differences have become apparent in this study between the relationship with key corporate governance variables, and the length of time that debt is taken out. In the case of the variable duality, levels of short-term debt increase, while long-term debt decreases. A negative relationship is identified between the proportion of compensation received by the CEO and leverage levels.

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List of Abbreviations

AR1	First order serial correlation
AR2	Second order correlation
CEO	Chief operating officer
CFO	Chief financial officer
CPS	CEO pay slice
CV	Curriculum Vitae
ECMH	Efficient capital market hypothesis
ED	Executive directors
EGLS	Estimated generalised least squares
EPS	Earnings per share
FEM	Fixed effect model
FGLS	Feasible generalised least squares
FRC	Financial reporting council
FSA	Financial services authority
FTSE	Financial Times Stock Exchange
GLS	Generalised least squares
GMM	Generalised methods of moments
IFRS	International financial reporting standards
IOD	Institute of directors
IPO	Initial purchase order
IVs	Instrumental variables
LM	Lagrange multiple
LSDV	Least-Squares Dummy Variable
LSE	London stock exchange
LTIPs	Long term incentive plan
MM	Methods of moments

MTBV	Market to book value
NEDs	Non executive directors
NPV	Net present value
OECD	Organisation for economic co-operation and development
OLS	Ordinary least squares
POLS	Pooled ordinary least squares
PSID	Panel Study of Income Dynamics
R&D	Research and development
REM	Random effect model
SMEs	Small and medium sized enterprises
SOX	Sarbanes Oxley
TOL	Tolerance value
UK	United Kingdom
US	United States
VIF	Variance inflation factor
WACC	Weighted average cost of capital

Chapter 1 Introduction

1.1 Background to the research and determinants of the Capital Structure Puzzle

The UK was selected in this study due to the high reliance on banks for the raising of funds, to enable companies to continue and grow their operations. The financial crisis occurred in the UK during the mid-point of the period studied. As a result most of the banks within the UK drastically restructured their lending policy, and thus it was not possible for the companies to get money easily (Abraham and Cox, 2007). The changes in the financial and economic field in recent years have only highlighted attention on a company's capital structure. Secondly, banks have become more cautious in the issue of short term debt, which has led to the inclusion of the measure short term debt in this study.

A plethora of studies (see amongst others, Titman and Wessels, 1988; Michaelas *et al.*, 1999; Ozkan, 2001; Bevan and Danbolt, 2002; Charalambakis and Psychoyios, 2012; Öztekin, 2015; Chang *et al.*, 2014; Graham *et al.*, 2015; Chao *et al.*, 2017) on the capital structure puzzle have emerged since the debate was first introduced through Modigliani and Miller (1958, 1963). This study forms part of the ongoing research where the outcome is focused on attempting to fill the existing gap, in identifying which, if any, variables contribute towards the capital structure decision in UK companies.

Previous studies in the capital structure and corporate governance area have used single equation regression models (OLS and FEM/REM), however the issue of endogeneity presents a major methodological concern. Roberts and Whited (2013, p.493) define endogeneity as 'a correlation between the explanatory variables and the error terms in a regression.' Previous researchers acknowledge two sources of endogeneity; unobserved heterogeneity and simultaneity. One source of endogeneity that is often not considered,

is how current corporate governance variables are as a result of past company performance. In relation to the field of corporate governance Wintoki *et al*. (2012) argue the importance of adjusting for the dynamic effect in the corporate governance field, which is fundamental to understanding the relationship. For example, the current board structure is a result of past performance, which is likely to have an impact on future company performance. Hermalin and Weisbach (1998) created a model, which demonstrated how board structure is dependent on the bargaining process between the CEO and the board. The CEO's bargaining position is a function of their ability, which is measured by past company performance, leading to the board structure being dependent on past company performance. Harris and Raviv (2008) find board structure is not exogenous and not a determinant of performance, both are therefore functions of other variables. It is the unexplained determinants that fuel this research, which try to identify if there is a relationship between capital structure and corporate governance.

Existing research on the determinants of capital structure find that high levels of variation still exist after controlling for the firm-level characteristics, such as profitability and growth (See amongst others, Titman and Wessels, 1988; Michaelas *et al.*, 1999; Ozkan, 2001; Bevan and Danbolt, 2002; Charalambakis and Psychoyios, 2012). There has been previous research carried out which considers corporate governance variables such as CEO tenure (Berger *et al.,* 1997; Wen *et al.,* 2002; Malmendier *et al.,* 2011), board size (Berger *et al.,* 1997; Vafeas and Theodorou, 1998; Faccio and Lasfer, 1999; Al-Najjar and Hussainey, 2011) and institutional ownership (Chaganti and Damanpour, 1991; Grier and Zychowicz 1994; Bathala *et al.,* 1994); however, the relationship with capital structure remains inconsistent.

This study will recognise that managerial incentives have a role in the corporate decision-making process, the significance of CEO personal characteristics and corporate

governance variables will be tested and analysed in this study, identifying which characteristics provide a part in the capital structure puzzle. The degree of power and control the CEO has over the capital structure decision will depend on two aspects. Firstly, the level of discretion of the CEO and the Board of Directors. Secondly, the existing capital structure and the covenants that may exist. A ten-year study enables short-term decisions to be eliminated and the focus to shift toward the long-term, to enable more reliable results and identify the variables that enable the change in capital structure to occur over time.

A statement that sums up the differences between debt and equity; 'equity is soft; debt is hard. Equity is forgiving; debt is insistent. Equity is a pillow; debt is a dagger.' (O'Brien *et al.,* 2014). This statement implies that a capital structure with a high percentage of equity is likely to lead to inefficiencies in the operating and strategic areas going undetected. Whereas the use of debt presents monthly payments that have to be made regardless, some companies may have specific factors unique to them that result in a higher or lower amount of debt. The WACC has been found to be U shaped, and establishing the best leverage level is not possible. The following factors support the argument for lower debt levels; borrowing capacity, financial slack, control and tax exhaustion. The factors that are associated with higher levels of debt are motivation, reinvestment risk, and operating and strategic efficiency. While the following factors are still uncertain at this stage; managerial preference, pecking order, market timing, signaling, and industry group leverage. The major influences are the lower cost of debt, the tax relief, agency costs, and financial distress costs.

Linked to Agency theory is the 'under-investment problem' that is associated with debt in the capital structure. The uptake of projects by shareholders will depend on the percentage of debt in the capital structure. Projects with positive net present values are

accepted by shareholders in companies with all equity financed structures; however, these same projects would be rejected if debt is present in the company's capital structure. Debtholders are concerned with ensuring they see their capital returned; depending on the profitability of a project the shareholders may receive nothing, hence the reason to reject those projects that are financed through debt. The distribution of payoffs could result in 'good' projects being rejected.

There is a tradeoff between the costs and benefits of debt versus equity, resulting in the creation of an optimal capital structure being achieved by companies. Graham and Harvey (2001) find that only 10% of CFO's have a strict target, with 37% having a flexible target, and 34% of companies having a tight target. Trade-off theories stimulate companies that have capital structure targets. Capital structure theories that use information asymmetries, market inefficiencies and share price histories can lead companies to deviate from the traditional trade-off theory (Kayhan and Titman, 2007). There is a growing body of empirical literature considering whether companies move towards a debt to equity target; Fama and French (2002) provide evidence that companies slowly move toward their targets. Capital structures can be affected temporarily by transaction costs and market considerations. A long-term study between 1960 and 2003 (Kayhan and Titman, 2007) find companies move back towards their target at a slow pace, and provide results that are consistent with previous studies (Fischer *et al.,* 1989; Titman and Tsyplakov, 2005). Kayhan and Titman (2007) state that there are two key variables that attribute toward changes in capital structure. Firstly, there are share price changes and financial deficits, and secondly the amount of external capital raised.

The key corporate governance theories identify the need for companies to increase their levels of transparency, firstly for shareholders and secondly for other key stakeholders. Agency theory identifies two key parties in the companies; shareholders and managers.

Stakeholder theory builds on Agency theory with the identification of other parties. The level of complexity increases along with the number of parties; however, the control these parties have will depend on the exact nature of the relationship. In the UK, shareholder appreciation is the priority and this filters throughout the reporting process, as the shareholders are the owners of the companies. The nature of listed companies ensures that the decision-making process is very public, and through ECMH the stock market reacts to these decisions in a timely manner. The owners of a company, the shareholders, have the ability to sell their shares on the UK stock market. The combination of the high level of liquidity and the high levels of transparency, lead companies to consider all decisions very carefully. The level of information that is made available in the public domain is heavily scrutinised, and as a result the levels of disclosure have increased since the first capital structure and corporate governance theories.

1.2 Objectives and aims of the research

This thesis seeks to make three important contributions to the field of capital structure, and corporate governance literature[1].

Firstly, revisiting the capital structure puzzle, which has already been researched extensively previously, using data on the under researched dimensions in a UK context. Within this study a comprehensive selection of corporate governance dimensions have been applied, including CEO characteristics, board structure and ownership structure. The study can research the link between the time period and whether this has an influence on the level of short term, long term and total debt within the company. In this study the use of a comprehensive sample of 350 FTSE companies provides an opportunity to revisit

[1] The main findings of this research are discussed in Section 1.6.

the capital structure puzzle. The purpose of the study is to identify if any of the variables are fundamental to the capital structure decision that is faced by companies in relation to capital structure, and corporate governance in a UK context. Secondly, the increase in the level and detail of disclosures in the notes of the UK companies' annual reports[2] enables the collection of variables to emerge through an increase in the level of data that is now available in databases (DataStream, BoardEx). The study is split into three areas; CEO characteristics, board characteristics and ownership structure. The CEO (he/she) is the main decision-maker in a company. Within this study there are two main theories; Agency theory and Stewardship Theory. The separation of ownership from control drives the existence of corporate governance. Several variables will be collected based on the CEO characteristics, such as CEO age, tenure and gender. A longer CEO tenure period can translate to an increase in knowledge about the company, and the use of this knowledge can lead to the uptake of capital, which has a higher risk level. Alternatively, high CEO tenure levels could lead to the unwillingness of CEOs to take on more risk, as they have a greater level of information on past decisions. The relationship between the independent variables and capital structure is focused upon the risk level of debt and equity. Debt is seen as riskier due to the default risk that is attached naturally to debt, while equity doesn't need to be paid back and default risk remains non-existent.

The second main attribute that contributes to corporate governance is the structure of the board. In this study the independent variables include the mix of independent directors, and the number of board meetings. The link between board variables and capital structure is based upon Entrenchment Theory (Bebchuk and Fried, 2005). The Board of Directors have the ability to reduce the risk in order to protect their roles, or they can increase the risk levels of the company to avoid being taken-over. Corporate governance

[2] The increase is due to the FRC's drive to make annual statements clear and concise, to enable transparency and comparability.

arises due to the differences that are now inherent within the ownership structure of companies.

The last attribute in this study considers the structure of the owners of the company. For example, could high levels of board ownership, which reduce agency risk, lead to higher levels of debt because debt is cheaper in comparison to equity. Alternatively, could equity be chosen as it has a lower risk level in comparison to debt, and the Board of Directors do not wish to risk their own investment.

Thirdly, there is no one universal definition of leverage in prior literature. In this study, the use of three definitions of leverage enable a more robust relationship to be analysed among the investigated factors, and the capital structure field. In this research, there will be several definitions of leverage levels for all the companies in the study; these will be total debt, short-term debt and long-term debt. The ability to split debt that is taken out depending on duration, enables further analysis into whether companies choose different types of debt in particular situations. The data in this study covers the economic downturn in the UK. Therefore, year dummies will be created for 2008 through to 2012, to assess whether levels of short or long-term debt differ in response to changes in the economic climate.

Lastly, it highlights the bias issue with the single equation modelling technique, and enables a more dynamic approach to be conducted through the use of GMM. The GMM technique has been used in previous corporate governance research (Conyon and Peck, 1998) and in econometric analysis; and it has the benefits of taking account of the lag adjustments in companies leverage over time. In this study GMM has three main benefits. Firstly, GMM is able to control for variable simultaneity and unobserved heterogeneity. Ozkan (2001) find that GMM is able to deal with highly persistent data,

such as ownership data, one variable that is included in this study. Secondly, the use of GMM enables control of the firm-specific fixed effects, which whilst they are unobservable, they can affect a company's financial decisions, such as the capital structure decision. Thirdly, the endogeneity issue can be overcome through choosing more efficient instruments (Ozkan, 2001).

The impact of the research will depend upon the magnitude of the variables on how influential they are on the capital structure; and could lead to recommendations surrounding The Code (1998:2009) being developed in response to the findings of the study. The concern within this field is the list of variables is continuing to grow. The existence of a definitive list that is fundamental to the capital structure decision is yet to be established, preventing the Board of Directors being able to focus their attention upon the variables that have the greatest impact on the capital structure decision. The main aim of this research is to ascertain which factors have an influence on the capital structure decision.

1.3 Research problem and research importance

The voluminous research in the field of capital structure provides an extensive starting point to build upon within this thesis. Previously investigated dimensions will be reconsidered in the UK context, through the use of single and dynamic modelling. For example, gender of the CEO and the Board of Directors, size of the board and board share ownership. Previously, the focus has been directed at the company performance, and through the use of single equation modelling.

The list of determinants that are linked to capital structure is continuing to grow, some are more important to managers than others; these include tangibility, company size, risk, liquidity and growth (Harris and Raviv, 1990). These variables are the control variables

in this study, however, there is no optimal set of determinants. Corporate governance has been researched previously in the context of how it interacts with capital structure; the list of corporate governance determinants is growing with further developments in this area of research. Studies to date using fixed effects and random effects panel models indicate the key determinants are institutional ownership, and independent boards (Al-Najjar and Hussainey, 2011).

Corporate governance remains a topical area, the link between capital structure and corporate governance is the main essence of the thesis. Corporate governance is a control mechanism, the link with capital structure surrounds how debt is used as part of this mechanism. The two aspects of debt, servicing the monthly payments and paying the debt back on maturity, represent a control mechanism because a company can't.

This research seeks to contribute to the existing literature on the relationship between capital structure and corporate governance for UK listed companies during the period 2003-2012. The UK has seen an increase in the level of disclosure now documented in the financial statements for FTSE 350 companies (FRC); this enables the collection of previously under researched variables in the corporate governance field. Agency theory (Jensen and Meckling, 1976) underpins the relationship between the corporate governance variables due to the potential conflicts between the directors, and the shareholders of the company. For example, the proportion of CEO compensation in relation to total board compensation. The payment of CEO compensation is a committed cost, and could reduce the amount of money available to pay the interest on debt taken out. The existence of more recent data on variables requires investigation, to identify if the variables are able to explain the outstanding gap in the capital structure puzzle. The collection of more detailed information from existing databases (For example, DataStream and BoardEx), combined with the hand collecting of information from the

financial statements, enable more in-depth research to be undertaken in this study into the capital structure decision-making process in FTSE 350 companies.

1.4 Research questions

The thesis aims to answer the following questions;

1. What is the effect of CEO characteristics on capital structure?

The first question considers how the characteristics of the CEO could contribute to decisions being made between the uptake of debt or equity. The CEO has a very influential role within a company, and is responsible for making decisions such as the capital structure. The focus is upon the CEO, they are the leaders of the company, and ultimately have the final decision upon the direction that is the company is taking in relation to decisions such as the choice between debt and equity. The selection of several CEO characteristics was as a combination of previous studies, and considering the information that is now produced in company's annual reports. The result is a focus in this study on the CEO which consists of collecting data on six independent variables, in relation to the short term, long term and total debt levels in UK companies. The main theme of this study is the focus on the CEO variables. Variables in this study include gender of the CEO, nationality of the CEO, and the proportion of board compensation that is awarded to the CEO in relation to total board compensation. These variables will be analysed using the two types of modelling (single and dynamic), with three definitions of gearing.

How the CEO characteristics could be related to capital structure surround how the CEO is able to use their power, to influence the choice between debt and equity. Debt is used in companies as a control mechanism, to ensure the risk levels of a company are not

exceeded. These characteristics are considered in this study stem from the notion that what influences a company's capital structure still remains unanswered. The variables in this study surround the CEO to try and identify if there is a relationship, and the impact it has on capital structure in a company.

2. What is the effect of board characteristics and corporate governance on capital structure?

The second question considers whether board characteristics could influence debt levels in a company. Board characteristics are a form of internal corporate governance. The collection of several independent variables enables a study into the relationship between these and the long term, short term and total debt levels within UK companies. The selection of which independent variables to include within this study stems from previous research within this field, and the availability of further disclosures in the annual reports. Variables in this study include board meeting attendance levels, and the composition of the board members (independence and gender). These variables will be analysed using the two types of modelling (single and dynamic), with three definitions of gearing.

The relationship between the Board of Directors and a company's capital structure surround how corporate governance is applied in companies, and how this translates to their level of debt. Agency theory (Jensen and Meckling, 1976) drives The Code (1998:2009), and the development of guidelines for companies in relation to the composition of the Board of Directors. Corporate governance mechanisms are seen as one solution to the agency conflicts that arise between the owners (shareholders), and managers (Directors) to avoid agency costs. In this study, the relationship between several board characteristics will be researched to identify whether the advancement of The Code (1998:2009) can be linked to the debt and equity levels, and why these are

important. The use of Corporate Governance dimensions, such as percentage of NEDs, acts as a control mechanism to ensure debt levels remain within the risk levels set by the company.

3. What is the effect of the ownership structure and corporate governance on the capital structure?

Lastly, can the ownership structure of the company affect a company's capital structure. Agency theory (Jensen and Meckling, 1976) underpins ownership structure due to the separation of the owners and managers within UK companies. Previously, the focus has been upon institutional ownership. However, analysis of the annual reports identified that the ownership structure included other parties other than institutional investors. Variables in this study include the ownership of the Board of Directors, and foreign ownership. These variables will be analysed using the two types of modelling (single and dynamic), with three definitions of gearing.

The issuance of shares to employees of the company is one solution to minimising the agency costs. In this study, the ability to assess the ownership of the CEO, and the Board of Directors, in relation to the capital structure contributes to the literature on whether share ownership can have an impact on the corporate decisions in a company. The inclusion of board ownership in this study stems from the notion that employees of the company have equity in the company, and therefore, this could have an impact on the levels of debt and equity in the company. The Code (1998:2009) focuses on protecting the shareholders, and this extends to the Board of Directors if they have shares in the company. Therefore, aligning the goals of the owners and the managers through the encouragement of the managers owning shares in the company. The Code (1998:2009) seeks to protect the shareholders further; however, whether this has a direct influence on

the capital structure is tested in this thesis. The implication of the findings apply to whether guidelines on the number of shares held by the Board of Directors should form part of The Code (1998:2009).

1.5 Contributions to knowledge, theory, practice and methodology

There are several main contributions of this thesis, which contribute to the area of capital structure in a UK context. The main contribution across the independent variables arise due to the different estimation techniques that are applied in this study, along with three measures of gearing that are applied in a UK context. The inconsistency of prior research in the capital structure field, has led to no one universal theory of capital structure existing. In this study, the variables are categorised into three areas; CEO, board and ownership.

The contribution of this research does not surround the creation of new theories, it uses existing theories in the capital structure and corporate governance fields to create hypotheses for the independent variables. The contribution surrounds the identification of variables that could have an influence, and therefore an impact on the capital structure decision.

The implications of this research is the identification of additional guidance alongside The Code (1998:2009) that companies in the UK are advised to follow. The Code's (1998:2009) purpose is to set standards of good practice in relation to board leadership and effectiveness, remuneration, accountability, and relations with shareholders (FRC). The implications on The Code (1998:2009) would be contained to advice and recommendation, as opposed to imposing changes, because The Code (1998:2009) is not enforceable in the UK. However, companies are required to report, based on the comply or explain principle.

1.6 Summary of the main findings

The findings of this research identify several independent variables which agree with prior research; CEO age and CEO tenure. Research findings indicate that CEOs are demonstrating a difference in risk levels between short-term and long-term debt levels, with older CEO's being at risk of entrenchment. The implications of this finding focus on the long-term view of a company's capital structure. Companies who have a younger CEO will have a different composition of debt, in comparison to companies that are being run by older CEOs.

Findings from this study indicate that as the CEO tenure period increases, the level of short and long-term debt reduces. One possible reason behind this relationship could be as the CEO tenure increases, CEOs will seek to avoid the additional monitoring from shareholders, that occurs with the uptake of equity, preferring to take up debt instead of equity. The implication of this finding for companies is they might need to review the tenure period of CEOs, to ensure transparency, and ensure they are meeting the objectives of the role.

In this study, the findings between the CEO duality and leverage present a consistently different result in comparison to previous research in the US (Fosberg, 2004). However, the instances of duality existing in this study are very low; this is due to the recommended changes in the roles of the CEO and the Chairman as a result of The Code (1998:2009).

The consistent negative relationship between board size and all forms of gearing enables the study to conclude this is a key variable in the capital structure decision. The implication is companies will need to ensure that the size of the board does not become too large, the increase in the level of discussion is a positive aspect of a large board size. The board minutes are not available outside of the board room, therefore the time spent

discussing decisions, such as the choice between which form(s) of capital to take out are never disclosed. The availability of such information could provide additional disclosures and enable a more informed reason behind the relationship to be developed.

The relationship between the number of independent directors and leverage levels indicates that total debt, short-term debt and long-term debt reduce as the number of NED's increases, which is in line with a previous study (Weir *et al.,* 2002). The implication is an additional layer of caution is applied to prevent companies developing tunnel vision, and there is an increase in the ability to assess the internal and external risks from various perspectives.

The positive relationship identified for total and long term debt and the number of board meetings, highlights a difference in relation to prior studies. The implication of this finding concerns companies ensuring that they are holding the correct number of board meetings, to allow sufficient time to discuss each point on the agenda. Therefore, The Code (1998:2009) will want to avoid imposing guidelines regarding the number of board meetings a company must hold per year.

Research findings indicate that there is a relationship between leverage levels and the gender of the CEO. As the number of female board members increase, the level of total debt and long-term debt increases. The positive relationship identified is not in line with previous research (Malmendier *et al.,* 2011; Graham *et al.,* 2013). However, the inconsistencies between the sign and significance of the relationship in this study prevent any strong findings materialising, but it does highlight an area for future research.

The relationship between leverage levels and institutional ownership is positive and significant, regardless of whether static or dynamic modelling is applied using the 5% concentration definition of ownership. The positive relationship is not in line with the

negative relationships identified through previous US studies (Chaganti and Damanpour, 1991; Bathala *et al.*, 1994; Grier and Zychowicz 1994; Berger *et al.*, 1997). One reason behind the unexpected relationship could be attributable to the increased level of transparency within the information supplied to institutional investors, enabling an improved decision-making process.

A consistent negative relationship is identified between the independent variable board ownership and long-term and total debt; when applying FEM (Table 7.4B) and GMM (Table 7.5). The robust research findings highlight that one of the key influencers in the capital structure decision is the Board of Directors. The key decisions concerning capital structure are made by the executive directors, and the independent directors. The high level of board ownership provides evidence of the level of control the Board of Directors have when deciding upon the debt level of the company. There is strong support for high levels of managerial ownership reducing the level of debt in UK companies. Alternatively, an improved management could contribute to a lower reliance on debt. The implication of this finding could lead to the Board of Directors following a risk avoidance strategy in relation to the capital choices. The preference for alternatives to debt when capital is required could lead to the advantages of debt not being taken advantage of. The increase on the reliance of equity, instead of cash, as a form of compensation indicates that members of the Board of Directors have a personal interest in the capital structure decision, preferring equity over debt because of the servicing requirements and higher risk level associated with debt.

The presence of foreign ownership, albeit very low in the study, leads to a decrease in the level of debt, and is in line with expectations. The uptake of foreign investment is an alternative to obtaining capital through debt and/or equity, the negative relationship

identified in the study highlights that foreign investment could be a source of finance for companies.

1.7 Structure of the thesis

Chapter two identifies the key theoretical framework in the two main areas of the thesis; corporate governance and capital structure. Chapter three is split into two sections. Firstly, a discussion surrounding previous empirical studies, and secondly, hypothesis development. Chapter four identifies the methodology that will be used in this study, along with reasons as to why specific models have been chosen. Chapter five focuses on the effect that CEO personal characteristics could have on capital structure. Chapter six considers the effect that board characteristics could have on capital structure. Chapter seven analyses the effect of the relationship that the ownership structure could have on capital structure. Chapter eight covers the overall conclusions from the thesis, identifying limitations of the study and future areas of research.

Chapter 2 Theoretical Framework

2.1 Introduction

Capital structure is the balance between debt and equity that a company uses to fund its projects. In relation to the capital structure in the academic field it remains a puzzle due to the lack of an accepted universal theory (Myers, 1984). The use of debt in a company's capital structure is unresolved, while the optimal size of debt still remains a debatable question. In addition to a lack of a universal model there is debate concerning the list of variables that determine a company's capital structure. The theoretical framework in this study consists of two key areas; capital structure and corporate governance. The theory surrounding corporate finance decisions has been associated with trade-off theory, pecking order theory, signaling theory and Agency theory. Jensen and Meckling's Agency theory (1976) underpins the fundamentals of corporate governance.

2.2 Capital structure theory

Capital structure is the dependent variable in this study, and therefore the focus. There are four main capital structure theorists; Modigliani and Miller (1958:1963), Miller (1977), Ross (1977), and Myers and Majluf (1984).

2.2.1 Modigliani and Miller Theory

The earliest theorist in capital structure theory is Modigliani and Miller (1958); this is the first generally accepted theory in capital structure. This early theory has developed since 1958, and still fuels current research today. This Modigliani and Miller (M&M) theory leads to clarity and controversy (Frank and Goyal, 2009). Whilst the theory does not

provide a realistic model on how companies make financial decisions, it provides a way of finding reasons as to why the choices surrounding finance are important in companies (Frank and Goyal, 2009). M&M form their theory based on numerous restrictive assumptions. The assumptions vary in their degree of reality to the world in which companies operate, and allow the development of less complex theories to evolve, which contain a high number of complex variables. The first assumption states that there are no taxation costs, an assumption that is unrealistic and later modified in 1963 to incorporate taxes. However, the inclusion of personal taxation is excluded from both M&M models (1958, 1963). The second assumption is in relation to capital markets, and surrounds the idea that firstly, perfect capital markets exist. Secondly, access to information is freely available to everybody, and the information available has no cost in terms of money or time. The third assumption is in relation to companies taking on high levels of debt. As debt levels increase, the risk of liquation increases and financial distress costs appear; the M&M model assumes that there are no financial distress costs. The fourth assumption states that companies can be classified into distinct risk classes; whilst this may be possible, the practicalities and constantly changing levels of risk make this implausible. The fifth and last assumption is that individuals can borrow as cheaply as corporations, the availability of different types of capital and terms associated with these ensure the assumption becomes invalid. Access to financial markets is assumed to be equal between investors and companies, this allows for homemade leverage to exist. If a company decides to take on a higher level of leverage than the investor is comfortable with, the investor is able to remove this, and vice versa. According to Frank and Goyal (2009), leverage has no impact on the market value of the company. These are the assumptions of the model created by M&M; the theory is based upon three key propositions.

Proposition 1

The (Modigliani and Miller, 1958) first proposition states that a company's leverage level is irrelevant to the overall value of the firm, which remains constant, regardless of the amount of debt, i.e. the company could have 50% debt or 1% debt, and the shareholder wealth would not change.

"The market value of any firm is independent of its capital structure and is given by capitalising its expected return at the rate appropriate to its class" (Modigliani and Miller, 1958:268).

If the percentage of debt should change because of the increased risk that debt attributes to a company, the cost of equity will rise as shareholders demand a higher return for the additional risk they are effectively taking on, which will be offset, leaving the WACC unchanged. If the capital structure decision becomes irrelevant, then the only factor that could influence the value of a company is the cash flows that it generates; this is as a result of making good investment decisions and is independent of the capital structure. This proposition is based on two key concepts; arbitrage and the homemade dividend (Modigliani and Miller, 1958). Arbitrage occurs in situations where there are two companies who have different capital structures, yet their performance must be the same and is unable to be influenced by leverage levels. The second situation is the homemade dividend. An investor decides to sell their equity in a company that contains debt, and this money is then used to raise a personal loan for the same amount, and the investor can invest an identical amount into a company that contains zero debt. Therefore, the process of the investor increasing their income without incurring any cost occurs; this demonstrates that the shares of a company in any given class, both have the same

expected return, and are therefore perfect substitutes for each other (Modigliani and Miller, 1958).

Proposition 2

The Modigliani and Miller (1958) second proposition is the expected rate of return on equity increases proportionately with the leverage ratio. The increase in debt that is taken on by companies equates to more risk, and results in the equity holders demanding a higher level of return.

*"The expected yield of a share of stock is equal to the appropriate capitalization rate for a pure equity stream in the same risk class, plus a premium related to financial risk equal to the debt-equity ratio times the spread between the capitalization rate and the cost of debt" (*Modigliani and Miller, 1958:271).

The capital structure does contain debt and the debt that companies take out is assumed to be risk free; however, there is a point whereby debtholders require a higher return as debt levels increase, which forces the increase from the equity holders to slow down (Modigliani and Miller, 1958).

Proposition 3

The (Modigliani and Miller, 1958) third proposition surrounds the cut-off rate of return for new projects, and states this should be equal to the WACC. The WACC remains constant, irrespective of leverage, therefore implying that the type of security that is used to finance an investment is irrelevant. The value of an unlevered company is the unlevered company plus the present value of the tax shields, which are as a result of taking out debt (Solomon, 1963). The optimal point of debt is the point where by the marginal cost of debt exactly offsets, and equals the company's average cost of capital.

In 1963 Modigliani and Miller relaxed the assumption of no taxes in order to consider the tax shield that is generated in those companies whose capital structure contains debt; the result is the modification of the theory that was developed in 1958. Tax rates do vary across the world; on average UK listed companies pay a corporate tax rate of 30%, demonstrating the material impact this assumption has, therefore concluding that companies should contain as much debt as they are able to service, without risking financial distress.

The M&M theory still holds true today, despite the unrealistic assumptions (Modigliani and Miller, 1958:1963). If we assume that UK companies adhere to the M&M theory, then the decisions between choosing debt or equity in their capital structure is dependent on other factors. The firm specific factors, such as company size and tangibility, have already been researched in a UK context and will be used as control variables in this study. Other variables, such as CEO personal characteristics, board characteristics, and ownership structure are identified in Chapter 3 in the context of previous studies; these can be analysed in an attempt to identify the reasons behind a company's choice in relation to their capital structure. A statistician, Box (1979), concludes that "*All models are wrong, but some are useful*."

The M&M theory has withstood the test of time, despite the numerous unrealistic assumptions, and remains a key theory behind explaining how companies choose their capital structure. Whilst a unified capital structure theory has been unobtainable so far, the ongoing research surrounding capital structure incorporates the M&M theory. Current research, including this study, looks to extend the number of variables that enable the decision-making process between debt and equity to be more transparent. For example, does corporate governance mechanisms such as the number of board meetings reduce the level of debt in the capital structure? Does board ownership decrease the level

of debt in the capital structure? Can the attributes of the CEO play a role in the selection of debt or equity? A multi-factor model is often not preferred due to the complexities it creates. These models are often beyond reach, the identification of core factors in the capital structure decision enable a robust model to evolve. Therefore, the selection of the key independent variables (Discussed in detail in Chapter 3) surround how corporate governance protects the shareholders of a company, and debt acts as a control mechanism.

2.2.2 Trade off theory

Miller (1977) provides the second key capital structure theory, trade-off theory. Trade off theory focuses on achieving the perfect balance between maximising the tax shield, and minimising the financial distress costs. Trade-off theory incorporates corporate and personal tax into their model, unlike M&M who exclude personal taxation from both of their models. Trade-off theory is developed through companies trying to achieve the correct allocation of debt and equity in their capital structure, to ensure the optimal capital structure can be achieved. The aim of all companies is to achieve the optimal capital structure, to ensure the benefits of debt are maximised, without risking financial distress (DeAngelo and Masulis, 1980). The second assumption that is built into this statement is the company's profits are high enough to benefit from the tax shield, this is called tax exhaustion. The optimal debt ratio is found as a tradeoff between the costs and the benefits of borrowing, all else remaining constant to ensure the benefits of the tax shields can be achieved without risking financial distress. One issue with the tax shield is the assumption that all companies will receive the same marginal tax rate; this is rarely the case and does further complicate the advantages of debt. There are other variables to consider; these include depreciation tax shields, investment tax credits and finance leases

(DeAngelo and Masulis, 1980). One key benefit of companies taking out debt, is they are able to benefit from the tax shield; the size of the gain does differ between companies. The trade-off theory (Miller, 1977) explains why in reality debt ratios vary between different industries; for example retailers will have a high debt level due to the tangible nature of their safe assets. High growth technology companies that have intangible assets, which are inherently riskier, will therefore have lower debt levels.

Restructuring is the process which companies undergo to change their capital structure due to exceeding their target debt level, without changing their real assets, which remain the same. For example, issuing a rights issue in order to replace a percentage of debt, the number of shares in issue increases, while their assets remain the same.

The implication of trade-off theory in relation to leverage is the notion that companies adjust their leverage levels to a target, deviations from the target are slowly eliminated (Frank and Goyal, 2009). The target adjustment can be viewed as a separate hypothesis called static trade off theory; leverage is determined by taxes and bankruptcy in the static model. The static trade-off theory indicates that companies determine the level of debt, by balancing the advantages that the tax shield generates with the disadvantages of financial distress. Research (Brounen *et al.,* 2006) finds for the UK, Netherlands and Germany, over two thirds of companies aim for a target debt ratio. Brounen's study finds that bankruptcy costs are less important than the tax advantages, which are created through the inclusion of debt in the capital structure. The selection of the types of capital taken out in a company's capital structure is found to not have a relationship with the attraction of specific investors (Rajan and Zingales, 1995). However, support is most evident for the target adjustment hypothesis than for the static trade-off theory (Frank and Goyal, 2009). One criticism of the static trade-off theory concerns how the tax shield motivates companies to use debt in their capital structure. Corporate income taxes are

only a century old; taxes do not provide justification of the use of debt in companies. However, this does not imply that taxes should be ignored when considering the reasons behind the choice of debt and equity in a company's capital structure (Frank and Goyal, 2009). The rebalancing of a company's capital structure is often prevented through transaction costs; however, Fischer *et al.* (1989) and Brounen *et al.* (2006) find transaction costs to not be a key driver in a company's debt policy. Recently, dynamic structural trade-off models have been developed (Hennessy and Whited, 2005; Leary and Roberts, 2005), an advantage of these models is they are able to include many factors.

The UK operates a creditor oriented system which enforces a binding agreement between a company and its creditors, the aim is to maximise the payment to creditors during periods of insolvency and bankruptcy. The benefits of debt also present themselves in the company's cost of capital. As the level of debt increases in the company it lowers the WACC, whereby a point is reached in which companies achieve the minimum WACC, and it starts to increase. The minimum WACC is also achieved when the share price is maximised. Besley and Brigham (2005) find the optimal amount of debt and equity in the company's capital structure can be achieved through ensuring a balance between maximising the share price, and minimising the WACC.

The ability of debt to create a tax shield, and have a lower cost in comparison to equity, encourages companies to borrow more debt than they are able to service, leading to financial distress. Financial distress theory assumes that a company's debt is free of risk, this will hold true if the debt is small in relation to its total value (Gordon, 1971). However, any non-payment of the monthly interest payments that is caused by a lack of profits, or cashflow problems, increases the risk of financial distress. The result of a company going into financial distress can have implications on the value of their equity and debt, with access to future capital being implicated. The reactions of the

shareholders, and existing debtholders is another variable in the financial distress theory (Gordon, 1971). An efficient stock market will react to the information and revalue the company, which could have further spiraling implications if information is inaccurate.

The existence of debt in a company's capital structure has the advantages that the tax shield creates through the payment of interest; increasing the risk of companies becoming susceptible to financial distress. Companies who are unable to pay their liabilities, or make late payments face a higher liquidation and bankruptcy risk (Kraus and Litzenberger, 1973). Market imperfections are created through the taxation of company profits, and the costs of bankruptcy. The balance between maximising the tax savings at the avoidance of bankruptcy is such a delicate balance that companies aspire to achieve optimal leverage, to ensure the maximisation of the market value of the company (Kraus and Litzenberger, 1973).

The optimal mix of debt and equity is impacted by financial distress costs, which are evident in the real world; ignoring these costs could result in bankruptcy. Financial distress costs are split into direct and indirect. Direct costs are associated with bankruptcy proceedings, and include accountant and lawyer fees (Arnold, 2012). Indirect costs are the losses that arise following bankruptcy; however, they are not expenses that are spent on the process itself. For example, the loss of sales, loss of key employees, and the constraints on future projects.

As companies increase their level of debt, the probability of financial distress increases; advantages such as the tax shield increase as levels of debt rise. The balance between the risk of bankruptcy, and the benefits achieved through taking out debt in the capital structure is one that has to be carefully managed by companies. Optimal capital structure can be achieved through increasing the level of debt in order to equal the present value of

the expected loss from bankruptcy (Weston and Copeland, 1992). Robichek and Myers (1966) state that there is a trade-off between 'the present value of the tax rebate associated with the marginal increase in leverage, and the present value of the marginal cost of the disadvantages of leverage.' Hirshleifer (1966) states that in perfect capital markets, after the inclusion of the tax benefits and bankruptcy penalties, an optimal capital structure can exist. This enables the company's cost of capital to be minimised, and the company valuation to be maximised.

Trade-off theory (Miller, 1977) is a key theory in relation to this study, and could indicate how a company's decision in relation to the decision between debt and equity could be influenced by companies. In this study the dependent variable is measured using three measures of debt; total debt, short term debt and long term debt. The purpose of using several dependent variables allows the study to identify whether there are differences apparent within the duration of the debt that is taken out.

2.2.3 Pecking order theory

Pecking order (Myers and Majluf, 1984) theory suggests that management prefer internal over external finance, debt over equity, and is based upon four key assumptions. The first assumption states that companies will prefer internal finance to external finance. The second assumption is if external finance is required, then the company issues the safest security first. The third and fourth assumptions surround dividends, with a target dividend payout ratio being adopted and adjusted to if required, to ensure the dividend payouts are constant irrespective of the company's profits (Myers and Majluf, 1984). However, when considering the total debt and equity that is issued between 1973 and 1982 for non-financial companies, 62% of capital expenditure that is required is through the use of retained earnings, while all but 6% of the external financing is taken out as debt

(Brealey and Myers, 1984). The capital market is referred to in the capital structure literature; however, there are also assumptions attached, these mainly surround the ECMH (Fama, 1970). Semi-strong form of efficiency holds if the markets are said to be perfect; managers tend to avoid external finance because they risk becoming ruled by the capital markets. The modified pecking order theory describes how financial slack is created by issuing stock, even if the investment is not needed immediately; this has the impact of moving the company down the pecking order (Myers and Majluf, 1984). The heavy reliance on the capital markets is high in this study of listed UK companies.

Whilst the financing decision so far has revolved around debt or equity, or a mixture of the two, there is a third form of financing projects which is preferred, and this is called retained earnings, or internally generated funds. If the retained earnings have been utilised and more funds are required, a company will take on debt, and only then if funds are still required will equity be sourced; this is called the pecking order of financing. These types of finance can also be classified into internal, i.e. retained equity, and external, which can be either debt or equity. This is the opposite of Miller's (1977) trade-off theory because there is no target capital structure and equity is split into internal and external, with one being much higher up in the pecking order than the other (Myers and Majluf, 1984).

Issuing external equity has several issues, including the time it takes to physically obtain the finance. The main issue surrounds the price and timing implications of issuing equity (Myers and Majluf, 1984). If a company issues a rights issue, it demonstrates to the market that it has used up all of its retained earnings and it may have exhausted its debt capacity, therefore implying that the company requires finance urgently (Myers and Majluf, 1984). Research carried out (Myers and Majluf, 1984) finds that companies will only issue equity when it believes their shares are overpriced, while companies who have

underpriced shares opt to raise debt instead of equity, this is called 'adverse selection problem'. A model is created that consists of four aspects (Myers and Majluf, 1984), whereby managers have information that shareholders do not. The first aspect is when finance is required, you should issue safe as opposed to risky securities first. If a company is in the situation whereby the need for investment is outstripping cash flows, with the possibility of taking out safe debt having been used up, then they should choose not to invest, rather than take on risky securities. The second aspect concerns dividends; these can be reduced or not paid out in order to build up financial slack, to enable companies to avoid losing out on the opportunity of investments due to a lack of finance. The paying out of dividends should not occur if the necessary cash requires the issue of equity, or another risky security (Myers and Majluf, 1984). The third aspect concerns the issuing of shares, if equity is used to finance investments, the share price will fall, while if default risk free debt is taken out the share price will not fall. The last aspect is in relation to merger and acquisition activity, if a slack rich company takes over a slack poor company, the result will be an increase to the firm's combined value (Myers and Majluf, 1984).

In accordance with pecking order theory (Myers and Majluf, 1984), it states that managers objectives fall into three areas. Firstly, management will act in the interests of all shareholders and will not differentiate between old and new shareholders. Secondly, managers assume shareholders are passive and act in their interests only. Thirdly, shareholders are not passive, and are rational through the process of adjusting their portfolio, depending on the company's past decisions. The very nature of the UK stock market, combined with the high degree of liquidity enables the companies in this study to take out equity easily.

Pecking order theory was identified 26 years following M&M; the very nature of it assumes how equity is taken out as a last resort. Companies issue equity on a frequent basis, the reasons behind this go beyond this theory. One issue with pecking order theory is the use of equity, Frank and Goyal (2009) state that companies issue too much equity and at the wrong time (Fama and French, 2002). A deficit in finance drives companies to choose debt over equity; there are other factors that appear to drive the use of debt in the capital structure (Frank and Goyal, 2009). Research on pecking order theory focuses on the debt capacity (Lemmon and Zender, 2004), and the complex selection models (Halov and Heider, 2004). The pecking order theory (Myers and Majluf, 1984) states that equity is issued as a last resort; a counter argument to this is the market timing theory. This theory states that you issue equity during times when share prices are over-priced and therefore leverage decreases, while leverage increases when share prices are undervalued. The market timing theory is the opposite of the theory on optimal capital structure. However, it has been shown that the result of regularly changing debt and equity levels is why this occurs, and firms do have a debt-equity target, which they move to gradually (Kayhan and Titman, 2007). Managers suffer should a company go into liquidation; and leverage levels will increase if they are confident about the future. The uptake of debt sends signals to the market, leading to an increase in the share price, and therefore decisions concerning leverage are often considered thoroughly before being announced to shareholders (Ross, 1977). Issuing debt enables banks to take a controlling stake in the business. This is in comparison to issuing equity which gives control to the shareholders; control is a key aspect that requires consideration in the leverage decision. For example, if a company wishes to issue equity and retain its current shareholder base, this may not be possible if not all the shareholders have the money to purchase the additional shares, resulting in debt being the only option available to a company. Tax exhaustion is another

factor to consider (Modigliani and Miller, 1963), whilst we may encourage the increase in the total debt taken out due to the tax shield value rising, a company may not earn sufficient profits to benefit from this. The theory of capital structure includes many factors described above. One factor that ignores all the theories is to simply follow what is happening in your industry, and observe how the market is reacting to other companies, and this is called industry group leverage (Arnold, 2012). There is no exact formula that tells companies the optimal capital structure, and often factors that are very difficult to measure and quantify play a part.

Pecking order theory (Myers and Majluf, 1984) is a fundamental theory in this study. Companies often have a variety of debt and equity capital sources available to them, the active decision of choosing between the two could be guided by pecking order theory as opposed to the independent variables within this study. This will be measured using three different measures of debt to identify if the duration of debt is impacted via the independent variables.

2.2.4 Signaling and information asymmetry theory

The capital structure decision does convey information to investors. This is because share prices do change as a result of information being released; this is the reason why the question is still topical and is called the 'information effect'. Signaling theory (Ross, 1977) suggests that managers use debt to signal to the market, and therefore shareholders, of the company's prospects. For example, if a company exchanges debt for equity, the share price will rise, while the share price will fall when equity is exchanged for debt. One area of the decision-making process which is more subjective, is companies may find themselves in patterns or habits. These can be used to predict financing behaviour, and may lead to the occurrence of red herrings (Arnold, 2012). Previous research indicates

that companies tend to issue equity when market values are high, and repurchase equity when they are low. The main conclusion from the study (Baker and Wurgler, 2002), is companies that have low levels of leverage raise funds when their market valuations are high. Those companies with high levels of leverage raise funds when their market valuations are low, suggesting that the cost of capital could be minimised by the timing, and implying that this does influence pecking order. Fluctuations in market value have long-run impacts on capital structure; this is difficult to relate back to traditional theories of capital structure. One of these theories is the trade-off theory (discussed in Section 2.2.2); temporary movements in the market-to-book ratio or other variables will lead to temporary effects. However, this research indicates that the effect isn't temporary, but persistent.

The reliance of the UK on the Stock Exchange for key components of its capital structure, in particular equity, provides evidence of signaling theory. Due to the temporary changes that occur in companies, this study aims to take a long-run view of ten years. Share prices and interest rates have decreased significantly in 2008 due to the economic downturn. How companies alter their capital structure and corporate governance variables as a result of this crisis can be identified by splitting the data analysis into pre-crisis, during the crisis and post crisis. However, in this study the splitting of the data has not been possible due to the CHOW test, which considers the structural stability of the data and provides a statistically significant result (See Tables 10.3 and 10.4 in the Appendix).

The choice companies make between debt and equity could have an impact on future decisions, through the use of signaling theory (Ross, 1977). The reaction of the market could encourage or prevent future uptake of debt, or issuance of equity.

2.3 Corporate governance theories

2012 marks the 20th anniversary of the first corporate governance code in the UK, the Cadbury Code. The Code (1998:2009) has been continually developed following a number of corporate scandals in the 1990's. The second corporate governance report that was released three years after the first corporate governance report (Cadbury, 1992) is the Greenbury report (1995); this report focuses on executive compensation policies. The Hampel (1998) report followed the Greenbury report (1995), and recommends for UK companies to disclose compensation information in line with the US. The combination of the three reports now form part of the LSE Combined Code, all listed companies on the LSE must adhere to The Code (1998:2009). The relatively most recent report by Higgs (2003) focuses on UK companies developing a transparent procedure on executive compensation, and the fixing of compensation for individual directors. The importance of these reports enables a greater degree of information to be included in the financial statements, enabling the study of more variables to be carried out. The identification of a relationship poses the question of whether the corporate governance reports should be mandatorily imposed onto companies, as opposed to the current voluntary practice. If this were to occur it would require enforcement to ensure the key goal of shareholder maximisation is achieved, which is in line with traditional economic theory (Graham *et al.*, 2013).

Corporate governance is an umbrella term that encompasses a multitude of areas; it can be defined as:

*"Procedures and processes according to which an organisation is directed and controlled. The corporate governance structure specifies the distribution of rights and responsibilities among the different participants in the organisation – such as the board, managers, shareholders and other stakeholders – and lays down the rules and procedures for decision-making"(*OECD, Principles of Corporate Governance 2004:38).

In September 2014, the FRC outlined a proposal for Board of Directors to include a 'viability statement' in their strategic report to investors. The report will focus upon the long-term solvency and liquidity of the company, beyond the standard 12 months going concern basis. In relation to a company's capital structure The Code (1998:2008) is encouraging companies to assess their risks, and explain how they are managed or mitigated.

In September 2014 the FRC recommended that Board of Directors will also need to demonstrate to shareholders how remuneration is designed to encourage the long-term success of the company. The proposal also includes some guidance on deferred remuneration where appropriate.

In February 2017 the FRC announced a fundamental review of The Code (1998:2009) to engage with a wide number of stakeholders. The consultation is expected to take place in Autumn 2017.

Corporate governance mechanisms can be split into internal and external. Internal mechanisms include the number of board meetings, duality and percentage of NEDs. External mechanisms include the market for corporate control, and the threat of

replacement due to poor performance. This study will be focusing on the internal corporate governance mechanisms, as opposed to the external mechanisms.

2.3.1 Agency theory

Agency theory (Jensen and Meckling, 1976), or Principal-Agent theory, is the most important theory in relation to corporate governance, the relationship inside the firm is defined as:

"A contract under which one or more person (the principal) engages another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent" (Jensen and Meckling, 1976:305).

In Agency theory, the managers (top management and Board of Directors) are the agents of the shareholders and they have their own agendas; these are separate to the shareholders who employ the managers to represent them and their interests (Fama and Jensen, 1983). The existence of two key parties in companies, principal and agent, ensures there are two sets of objectives, which can be in conflict with each other and can lead to agency costs developing. Agency costs are the costs of reducing the conflict between the agent and the principal, if the agent and the principal are the same these costs would be zero. One such solution to reducing agency costs is through the use of good corporate governance. In this study, variables include board share ownership, CEO duality and the number of non-executive directors.

There are two hypotheses in relation to the relationship between shareholders and managers; these are agency costs of equity and agency cost of debt hypotheses.

The agency cost of equity hypothesis incorporates lenders to perform a monitoring role, due to companies having a reduced cashflow after servicing their debt. The effect is it

encourages managers to focus on maximisation of value when faced with the threat of bankruptcy (Jensen, 1986). The threat of bankruptcy is increased in companies with high levels of debt. CEOs wish to avoid this threat, and avoid those policies that reduce company valuation, even if they prefer different policies (Grossman and Hart, 1982). The fixed payments associated with debt reduce a company's free cashflow; a CEOs ability is limited to prevent the use of the company cashflows for their own benefit. The issuance of external debt introduces a third party; for example bondholders, other lenders, investment bankers or bond rating agencies (Ortiz-Molina, 2007). The use of debt covenants leads to higher monitoring of the company's performance. Debt covenants are expensive to write and enforce, however, they can limit the company's flexibility to respond to unexpected contingencies (Ortiz-Molina, 2007). High debt and high-powered incentives are costly to undertake by under-diversified CEOs, and can act as substitutes (Ortiz-Molina, 2007).

Agency theory focuses on the costs associated with the separation of ownership and control; shareholders own the business, while the managers control the business. Entrepreneurs who own 100% of their company have no separation of ownership from control, agency costs are kept to a minimum, situations whereby venture capitalists/business angels invest in the company ensure the issue of separation is apparent again (Cannella and Monroe, 1997). Agency theory has arisen due to the increase in public corporations that developed in the 1930s. The association with Agency theory and the link with corporate governance was not identified until the 1970s; this develops an agency cost of equity. The percentage of managerial ownership is important to identify the magnitude of the agency costs of equity. The impact of a reduction in managerial/insider ownership is the search for profitable projects may reduce; in addition, the risk level of projects may alter, with riskier projects being eliminated. The

misalignment of goals can lead to managers focusing their efforts on their own goals, instead of the company goals (Jensen and Meckling, 1976). Companies use methods such as incentive compensation systems, budget restrictions and formal systems in an attempt to prevent and mitigate this behaviour (Fama, 1980).

Jensen and Meckling (1976) identify three reasons that prevent large companies having capital structures containing a large percentage of debt. The first of these three reasons surround who bears the cost of debt should a project be unsuccessful, and therefore unprofitable. Managers who operate within companies whose capital structure contains a high percentage of debt are encouraged, and incentivised to undertake high risk projects with high returns. The remaining amount generated from the project, following the servicing of the debt, is awarded to the shareholder(s). Meanwhile, should the project fail, the costs fall to the debtholders, and therefore the balance is essential to ensure the debt is competitive, and is in the best interests of the shareholders (Jensen and Meckling, 1976).

The second reason relates to the legal contract that exists between the debtholders, and the company. The contract can include conditions to limit the manager's behaviour, and avoid debtholders bearing the costs as a result of poor management decisions. One condition is debt is required for future projects, and conditions can be attached to the issuance of debt in the future (Jensen and Meckling, 1976).

Lastly, the increase in debt levels increases bankruptcy costs, these occur when there is a delay to a company servicing their interest payments/obligations. During bankruptcy, the shareholders claim is reduced to zero, the remaining loss being borne by the debtholders. The balance between the tax related benefits and bankruptcy costs is key, an imbalance between the two can be fatal for the company (Jensen and Meckling, 1976).

The second hypothesis is the agency cost of debt; there are two conflicts of interest – shareholder-manager and shareholder-bondholder. Managerial incentives are driven by the need to mitigate these conflicts of interest (Jensen and Meckling, 1976). The close alignment of the manager and shareholder's interests enables managers to choose the investment policies that benefit shareholders, over the needs of the bondholders (Ortiz-Molina, 2007). This creates agency costs of debt finance, due to lenders pricing debt based on managerial incentive structures. Shareholders may have incentives to reject positive NPV projects that benefit bondholders, while reducing the value of their equity (Myers, 1977). The undertaking of high risk negative NPV projects can increase equity values while reducing bond values, the relationship between managers and shareholders depends on the equity based incentives to increase shareholder wealth (Jensen and Meckling, 1976). Companies that contain a higher percentage of debt in their capital structure are faced with higher shareholder-bondholder conflicts. Having a lower alignment with their managers can reduce the agency cost of debt finance, while increasing the agency cost of equity. The agency cost of debt and equity hypothesis predict higher levels of debt within the capital structure, and ensure the reduction in agency conflicts between the manager and shareholder. Secondly, it reduces the conflict between the shareholder and bondholders (Jensen and Meckling, 1976).

Agency theory is based upon the assumption that humans are risk adverse; the investment of their capital into corporations allows risk diversification of their wealth (Jensen and Meckling, 1976). The two parties' goals and motives are very different, therefore resulting in conflicts with each other. For example, a company whose capital structure contains a high percentage of debt will benefit from the tax shield and therefore pay less taxation, in comparison to a company whose capital structure contains more equity. Interest payments for debt are paid out before taxation; the reduction in tax enables

retained profits that are available for the owners to be lower in the form of dividends. One solution used in companies is to issue high dividends to satisfy the owners of the business, shortly followed by raising finance through the issue of new shares. The costs of this process, along with the timespan, mean this approach is not advisable. The decision-making process is the root of the conflict; ensuring that both parties are satisfied with the decisions being made often creates a cost, called agency cost (Jensen and Meckling, 1976). This cost can be minimised through various ways. However, it is simply a result of having two parties involved in the running of the business, and the rise of this conflict has led to the development of the corporate governance theory.

There are three main agency costs; these are the monitoring expenditure which is incurred by the principal, the bonding expenditure which is incurred by the agent, and lastly the residual loss (Jensen and Meckling, 1976). The first cost concerns the issue of two parties having different interests, and the process that is needed to try to align these through the use of incentives such as share options. The second cost is called the 'bonding costs,' these are arrangements whereby there are penalties if the agents do not act in the best interests of the principal, while rewarding them if goals are met. The last cost occurs when the previous two costs are not sufficient to prevent a reduction in shareholder wealth. This is due to the 'free-ride' issue (Keasey *et al.*, 1997), whereby shareholders rely on each other to monitor the company; if ownership is diffused it does present a bigger issue.

Positive agency theorists have sought to develop ways to overcome the ever-present issue of differing interests between the shareholders and the managers. For example, the development of contracts, setting up of Boards of Directors, the use of labour market theory, the use of corporate control markets and compensation levels (Cannella and Monroe, 1997). Compensation is one area that has seen the development of various

incentive based forms of compensation for the CEO, and those directors who form the Board of Directors. One frequent solution is through using equity based forms of compensation, such as share options. Issues that surround these solutions to the agency issue surround the ability of managers to manipulate the accounting data, upon which the compensation is based. Enron is an example of where this happened in relation to their share price, they no longer operate and several employees served time in prison following the scandal. Eisenhardt's (1989) review of the solutions to Agency theory suggests that they do result in the alignment of the shareholder and managers interests. The threat of dismissal serves as a market for corporate control; Cannella *et al.* (1995) find that managers who are dismissed due to poor performance, subsequently find it difficult to find equivalent employment following their dismissal. The labour market theory (Cannella *et al.*, 1995) presents more questions than it addresses; poor performance in companies cannot be linked directly to the performance of CEO/directors. Meanwhile, diversified shareholders expect managers to undertake risky investments on their behalf, managers are careful to avoid risky investments in order to remain employed, leading to managers who are more risk adverse than the shareholders (Cannella and Monroe, 1997).

Secondly, public limited companies have a reduced incentive to monitor due to the existence of the efficient capital market hypothesis, which results in the efficient capital market. There are two areas of conflict, the first is between the shareholders and managers as mentioned above, and the second is between the debtholders and equity holders (Cannella and Monroe, 1997). The first conflict arises due to managers holding less than 100 per cent, if any, percentage in the business. The nature of taking out debt reduces the amount of free cash flow available, as interest payments need to be made on the amount of debt taken out. This commitment has the effect of discouraging managers from using resources towards their own personal goals. How this conflict arises is still

debatable, however, some researchers say debt can alleviate the problem, whilst others see the issue of taking out debt as the root of the problem. For example, a high level of debt increases the risk of default, and it is argued would improve the liquation decision. The second conflict surrounds who benefits or carries the risk, when investments perform well or not. If the issuance of debt results in the investment succeeding, then the equity holders will benefit, following the servicing of the debt. In situations where the investment fails, the debtholders bear the fallout. The agency cost of debt financing occurs when equity holders are able to benefit from the company investing in risky projects, which is value decreasing. The impact of these investments leads to a decrease in the value of the debt, enabling the equity holders to gain at the expense of the debtholders, called 'asset substitution effect' (Harris and Raviv, 1990).

Linked to agency cost is firstly the borrowing capacity of companies, which will depend upon the type of assets held by a business. Assets with an active secondhand market increase the capacity, due to security being provided by the companies who are taking out the debt. Secondly, managerial preferences, if a company goes into liquidation the shareholders lose their financial stake, and managers lose their jobs. The implications are far wider and result in managers being less likely to want to increase the company's debt level in the future, and reduce the risk level of the company (Hermalin, 1993). The issuance of bonuses to managers, which is based upon EPS, unlikely in periods of recession, is another aspect to consider. Bonuses could result in managers replacing equity in the business with debt and artificially increasing the EPS, and therefore their bonus, placing the company at the risk of financial distress. The level of union activity in a company is the third reason; having low levels of debt and low cash outflows may allow the employees to demand a higher pay level.

The establishment of the Board of Directors is as a result of the two parties that now exist within companies, and the alignment of the two parties' goals form an agency cost (Jensen and Meckling, 1976). The composition of the Board of Directors provides a collection of independent variables in this study, in addition to board ownership variable. It is the relationship of these independent variables, for example the percentage of independent directors, with capital structure, which forms the basis of this study.

2.4.1 Other Theories

Alongside the theories on capital structure there are several other key theories that are important in this study.

2.4.2 Cultural theory

Hofstede (2001) defines culture as "the collective programming of the mind that distinguishes the members of one group or category of people from another". Cultural theory in linked to several independent variables in this study, including CEO gender and nationality. Cultural is seen as an informal institutional factor (Gray *et al*., 2013), and can be difficult to identify. This is overcome through the use of Hofstede's (2001) framework which categories the different dimension of culture. The dimensions are as follows; Power Distance, Individualism versus Collectivism, Uncertainty Avoidance, Masculinity versus Femininity. Power distance is in relation to the extent to which inequality in power distribution is expected and accepted by those in less powerful positions. Countries with a high power distance have a greater acceptance of wealth and power differentials (Hofstede, 2001), leading to a reduction in the level of agency issues (Jensen, 1986). The perceived lower risk of agency problems, and therefore costs, encourages investors to choose short term debt over long term debt (Zheng *et al*., 2012). Individualism considers the degree to which society emphasizes the role of individual, versus the role of the group, and consider the level of integration in society. Agency

problems are higher in countries with high levels of individualism, this is due to companies increasing their debt levels in a way to mitigate agency costs (Jensen, 1986). Uncertainty avoidance is in relation to how people avoid or feel uncomfortable with uncertain, ambiguous, unstructured situations or events. Masculinity considers the extent to which male assertiveness, represented through material success, is promoted over female nurturance which values relationships over money/success.

Later, Hofstede (1991) added a fifth dimension called Long-term Orientation, in response to research, which identified a significant difference between the thinking in the Eastern and Western countries. Long-term orientation is in relation to the extent to which society encourages persistence and focuses on the importance of future-orientated goals, and their adaption to changing circumstances. Countries that are on the short term orientated spectrum attach more value to the past and present. In 2010 a sixth dimension was added, indulgence versus restraint, this is based upon Michael Minkov's World Values Survey.

2.4.3 Market Learning Model versus Managerial Signaling Theory

Market learning models have been developed by Scharfstein and Stein (1990), and Holmstrom (1999), which relate to the age of CEO which is one independent variable in this study (See Section 3.1.2). These models indicate that younger CEOs are more risk adverse, the impact on their investment strategies is less aggressive ones are chosen in comparison to the investment strategies of older CEOs. CEOs who are new to the role and lack experience, and therefore lack a record of previous accomplishments in the CEO role, face higher levels of scrutiny and monitoring by the rest of the Board of Directors. In situations, whereby poor decisions are made by the CEO, the level of scrutiny and monitoring is exacerbated for the future. The impact of poor decisions by the CEO is firstly the company will suffer; secondly the future career opportunities for the CEO will be reduced (Holmstrom, 1999). The overall result is younger CEOs are less reluctant to

pursue risky investments, indicating there is support for a positive relationship between CEO age and leverage levels.

Agency theory models acknowledge that CEOs have a level of discretion that can be used internally to influence corporate decisions, such as capital structure. Secondly, to advance their personal objectives (Bertrand and Schoar, 2003). The level of discretion depends on the degree of corporate governance in place; two actions which are seen to strengthen corporate governance is splitting the role of CEO and Chairman, and increasing the number of NEDs on the board. CEOs who operate under weak corporate governance are able to impose their own style on the company, the implications are CEOs may face less opposition to the decision-making process, impacting the capital structure decisions. The second model is manager specific, CEOs are chosen by the companies because of specific skills. For example, previous experience of managing an expansion into Japan, or leading a company through a merger and acquisition. Differences within the CEO styles ensure inefficiencies are avoided, and the board is able to select the right CEO (Bertrand and Schoar, 2003).

The second and alternative model is the managerial signaling model (Prendergast and Stole, 1996). In opposition to the market learning models; it predicts that younger CEOs make a higher number of riskier decisions, in comparison to older CEOs. CEOs who are younger wish to prove their abilities, and are able to do so by adopting an aggressive investment strategy. This conveys to the market that they have the ability in the CEO role, indicating a negative relationship exists. Coupled with this finding are those CEOs who are older are reluctant to change their investment strategies, for fear of indicating their previous investments decisions were incorrect. In line with the managerial signaling model is the length of time a CEO has been in their position. A previous study indicates

that entrenched CEOs are risk adverse (Shleifer and Vishny, 1989), and adopt lower investment levels in comparison to younger CEOs.

2.4.4 The Stewardship Model

The stewardship model is an alternative model to the Agency theory concept and has its roots in the psychology and sociology area, stewardship theory maintains that the conflicts between managers and owners do not exist:

"The essential assumption underlying the prescriptions of stewardship theory is that the behaviours of the executive are aligned with the interests of the principals" (Davis *et al.,* 1997:25-26).

This model is built upon the idea that managers have a broader range of goals, other than maximising their own wealth. For example, managers have a commitment to meaningful work (Davis *et al.,* 1997), and therefore acting in the best interests of the company at all times. The pro-organisational, collectivistic behaviours have a higher utility in comparison to the individualistic, self-serving behaviours (Davis *et al.,* 1997). In accordance with rational and game theory, if the interests and the principal are not aligned, the steward will place a higher value on cooperation as opposed to defection. The objectives such as profitability are seen as key objectives by the steward, enabling the principals and other stakeholders to benefit through increased organisational wealth. How manager's goals are measured is a difficult process, one that excludes the intangible elements, and focuses on the tangible factors due to the difficulty of measuring intangible goals. The goals tend to be based around executive compensation; such as bonuses, stock options and shares. It is difficult to identify whether the stewardship model still holds true in UK companies. Unlike agency costs which can be measured; the costs associated with the stewardship model can't be measured, and therefore get absorbed into the

general costs in a company. These costs are difficult to separate out, and therefore identify and measure.

2.4.5 Entrenchment Theory

The entrenchment theory is proposed by Bebchuk and Fried (2005); as CEO tenure increases the level of entrenchment increases, and enables CEOs to have power over the Board of Directors. CEO tenure is one of the independent variables in this study (See Section 3.1.3). The increase in the level of power enables the CEO to set their own level of compensation, irrespective of shareholder needs, and thus compensation levels become less sensitive to the performance of the company. The entrenchment hypothesis assumes CEOs with a longer tenure are entrenched, which is difficult to quantity, and therefore measure.

This study is using several CEO characteristics to assess the degree of CEO power, including CEO duality and CEO age. One theory is based on learning about the CEOs ability (Murphy, 1986); shareholders are able to structure a CEOs contract to enable them to learn about the CEOs ability. Shareholders and the Board of Directors are able to learn about the CEOs abilities over time, CEO compensation increases with experience, and this is gained over time. This theory is dependent on the degree of opaque information, economic factors and the degree of shareholder ownership (Cremers and Palia, 2011).

2.4.6 Behavioural consistency theory

Behavioural consistency theory can be linked to the CEO characteristics, in particular the gender of the CEO (See Section 3.1.5). One previous study finds that the decisions made on leverage by the CEO are related to their personal leverage decisions (Cronqvist *et al.*, 2011), in particular their personal house purchases. The theory behind the research is

called ‘behavioural consistency theory,’ indicating that individuals behave consistently across all situations, whether it is buying a house or choosing to invest in building a new factory. The CEO characteristics in this study will focus on their attributes as CEOs within the company, as opposed to their personal attributes outside of the company. CEOs are in positions of significant power, the focus of this study is on the role of the CEO due to the responsibility they hold in regard to the capital structure decisions; decisions that are made internally. Risk is a key driver in the capital structure decision; specific attributes of the CEO may contribute to a higher percentage of debt or equity in the capital structure. Several variables related to the CEO characteristics will be collected in this study, for example CEO gender and percentage of female board members.

2.5 Summary

Following the discussion of the theories surrounding capital structure, there is no single theory that can explain the capital structure puzzle. Research since the M&M (1958:1963) theory has not identified a superior theory, ensuring that the four capital structure theories discussed so far (Modigliani and Miller, 1958:1963; Miller, 1977; Ross, 1977; Myer and Majluf, 1984) still underpin the research in the area of capital structure. The theories have developed from each other, and all remain valid today. The three theories (Miller, 1977; Ross, 1977; Myer and Majluf, 1984) are all based on the relaxed assumptions of the M&M (1958:1963) theory. Miller (1977) incorporates corporate taxes into the model following M&M's later model (1963). In addition, personal taxes are incorporated into the model, which M&M exclude in both of their models (1958:1963). The results of the M&M model enable the development of the trade-off theory (Miller, 1977), which incorporates how changes in interest rates and bankruptcy costs impact the capital structure decision. One of M&M's key assumptions is based on investors and managers having access to the same information. Managers often have access to more detailed information in comparison to investors, which leads to the development of signaling theory (Ross, 1977). A key assumption in the trade-off theory (Miller, 1977) surrounds the assumption that all parties have homogenous expectations; Myers (1984) finds that if expectations are not homogenous, then Donaldson's (1961) earlier research can be explained. This development has led to the pecking order theory (Myers and Majluf, 1984), which still underpins the capital structure debate today.

The presence of corporate governance in a company acts as a control mechanism on its own. The identification of which corporate governance variables have more of an

influence on capital structure is the aim of this study, and how it can impact the decision-making process in a company.

The lack of one universal capital structure theory, combined with significant advancements in further development of the theories discussed presents an opportunity to conduct further research. This study will aim to identify whether CEO characteristics, board and ownership variables can explain some of the reasons behind the capital structure choices that are faced by UK companies. How companies are run has changed significantly since the theories have been developed; however, the advancement of the theories remains slow. The list of variables in the capital structure puzzle that are used to explain the variation are continuing to grow, but the definite list of key variables remain elusive. The emergence of new theories in the capital structure and corporate governance fields remains confined to analysing the variation in capital structure, against already existing theories. Therefore, the continual research in this area provides support for evidence that the mystery behind a company's capital structure remains unanswered, and requires more extensive research into how the Board of Directors make their final decision between debt or equity. The creation of updated theory is an aspiration of all researchers; one that continually drives the field of research in capital structure.

Chapter 3 Previous Empirical studies and Hypotheses development

Chapter two discusses the main theories of capital structure and corporate governance, this chapter is split into two sections. This chapter firstly discusses the previous empirical evidence for each determinant in this study. Secondly, the hypothesis development to determine how each independent variable will impact the capital structure decision. The section is split into three subsections; CEO characteristics and capital structure, Board characteristics and capital structure, and ownership structure and capital structure. The chapter will take each determinant in relation to previous studies to enable the identification of gaps in the research, leading to the development of a hypothesis for each variable. The study is based on FTSE 350 companies and sits within the literature on UK capital structure studies (see amongst others Ozkan, 2001; Bevan and Danbolt, 2002; Charalambakis and Psychoyios, 2012). The focus on capital structure is underpinned by the four main capital structure theorists; Modigliani and Miller (1958:1963), Miller (1977), Ross (1977), and Myers and Majluf (1984) which are discussed in detail in Chapter 2 (See Section 2.2).

This study is expected to follow the findings of the US studies, due to the similarities between the UK and the US. The UK and US corporate governance systems are market-based; an alternative system is a relationship-based system which is evident in countries such as Japan and Germany. The market-based system has a liquid market as a result of the ECMH theory that holds in the UK and the US; the study consists of companies who are listed on the LSE. Secondly, there is a diffuse ownership structure. Research on corporate governance is vast, whether corporate governance variables alter over time and therefore have an impact on capital structure is the focus of this study. The increase in the attention on corporate governance is due to the release of codes in relation to

corporate governance, the first one was issued in 1992 (Cadbury). The nature of corporate governance is controversial, however very topical. Therefore, the process of hypothesis development for several of the determinants is simply the identification of a relationship between the corporate governance variables and capital structure, as opposed to stating whether the relationship is positive or negative.

3.1 CEO characteristics and Capital Structure

The CEO is the main decision-maker, and therefore the most powerful person in a company (Graham *et al*., 2013). The personal attributes of the CEO is one of three themes in this study, to identify if a particular characteristic of the CEO has a relationship with the capital structure of the company. Agency theory (Jensen and Meckling, 1976) forms the basis for understanding why characteristics associated with the CEO could provide an understanding to the capital structure decision. The CEO is no longer the owner of the company, leading to a difference within their goals becoming apparent. It is this difference in roles that companies now consist of that forms the basis for this study. This study will identify the impact of CEO personal characteristics; these will include age, gender and nationality.

3.1.1 CEO Age

Prior research (Scharfstein and Stein, 1990; Prendergast and Stole, 1996) identify two competing theories about how the age of the CEO can have an impact on a company's investment decisions, because of their level of experience surrounding debt and their risk levels. An early study (Bertrand and Schoar, 2003) on US publicly traded companies collects data on CEOs for a six-year period covering 1992 to 1999. The study demonstrates how for each ten-year increase in the age of the CEO, the financial leverage (measured as long-term debt/equity) increases by 2.5%. The study is in line with the

market learning model and demonstrates that for US companies lower leverage levels exist in companies in which there is a younger CEO in place, indicating a positive relationship between CEO age and leverage levels.

Malmendier *et al. (*2011) use a sample of US companies, and find that higher levels of leverage exist in companies with a young CEO. Li *et al.* (2014) consider plant level investment decisions. The study finds evidence to support previous research that CEO age does impact a companies' investment style, with older CEOs having a less aggressive strategy with regard to investment decisions. Investment decisions do have varying levels of risk, for example, investments in R&D carry a higher level of risk in comparison to capital expenditure, due to their uncertain future benefits (Cassell *et al.,* 2012). Consistent with this finding, Serfling (2012) finds that older CEOs invest 0.63% less in R&D in comparison to younger CEOs. In line with the managerial signaling model, younger CEOs would prefer to invest in a higher number of R&D projects in comparison to older CEOs. There is one new variable with regard to CEO age and this is acquisition activity. Yim (2013) finds a company's acquisition propensity is decreasing in the age of its CEO, a company with a CEO who is 20 years older is 30% less likely to announce an acquisition; with younger CEOs more likely to pursue acquisitions as they are able to reap the benefits of successful acquisitions over a longer time horizon. Yim (2013) also provides evidence that acquisitions are quickly followed by permanent increases in CEO compensation; leading CEOs to pursue acquisitions to increase their compensation levels. The financing of these acquisitions presents the link with CEO age and capital structure, with the use of debt being sought to finance the acquisitions.

Frank and Goyal (2009) suggest the relationship is more complex and there are other CEO traits, other than age, that play a role in determining what dictates the leverage decisions of companies. One determinant used in previous research is the confidence

level of CEOs. Overconfident CEOs have an impact on investment decisions (Malmendier *et al.*, 2011), and the personal life experiences of CEOs have an impact on their attitude to risk (Malmendier and Nagel, 2011). The measure of CEO confidence is often the amalgamation of several variables; for example, CEO duality, tenure and age. Previous studies have been based on US data, this study will use UK data to enable a contribution in the field of capital structure and corporate governance.

3.1.1.1 CEO age Hypothesis

The age of the CEO is linked to capital structure because debt and equity have different risk levels attached to them, therefore the age of the CEO could influence the choice between debt and equity. Debt has a higher level of risk due to the monthly servicing that is required, as opposed to equity which doesn't need to be paid back. CEOs who are younger (age not specified) often want to prove their abilities, which translates to the uptake of debt over equity, this is based upon the managerial signaling model (Prendergast and Stole, 1996). The implications are that the age of the CEO becomes a determinant in the choice between debt or equity because of the associated risk levels attached to each component, indicating there is a relationship between CEO age and leverage levels in US companies. The UK is expected to follow the findings of this US study (Malmendier *et al*., 2011), due to the market based corporate governance systems in place.

In line with managerial signaling model and previous studies (Malmendier *et al.,* 2011; Serfling, 2012; Yim, 2013; Li *et al.,* 2014), a negative relationship is expected between CEO age and the level of debt in a company's capital structure.

The hypothesis is:

H1: There is a negative relationship between CEO age and leverage.

3.1.2 CEO Duality

The Board of Directors has the responsibility to ensure that the CEOs carry out their duties, which is in the best interests of the shareholders (Vance, 1983). Boards perform a monitoring role to align CEO and shareholder interests. CEO duality demonstrates the separation of decision management and decision control (Fama and Jensen, 1983), boards that are vigilant prefer nonduality. Previous literature focuses on the relationship between CEO duality and the performance of the company, this study investigates the relationship between CEO duality and capital structure.

Since the development of the Cadbury Report (1992) the roles of the CEO and Chairman have been recommended to be separated into two; companies are able to decide if they wish to separate the two roles. The key assumption behind Agency theory is the CEO will take advantage of all opportunities that arise to increase their personal wealth, indicating a negative relationship. Alongside the increase in shareholder wealth (Donaldson and Davis, 1991), there are other motives, which include recognition and responsibility needs.

Findings for the US companies in 1980 (Boyd, 1995) suggest Agency theory can't identify the consequences of CEO duality, while the separation of the CEO and Chairman role isn't supported. Brickley *et al.* (1997) find consistent results with Boyd (1995) that there is no one optimal board leadership structure. CEO duality will benefit some companies, whilst the separation of the CEO and Chairman roles will benefit other companies. The separation of the two roles has potential costs and benefits, the costs of

separation are larger than the benefits for the majority of large companies (Brickley *et al*., 1997). The relationship is dynamic and can vary with corporate characteristics, and/or the industry context (Elsayed, 2007).

A two-tier structure exists in companies who have a separation of the CEO and Chairman roles. Fosberg's (2004) research on the US companies concludes that those companies that have a separation between the CEO and Chairman (two tier) have a higher debt to equity ratio, the relationship isn't statistically significant. In contradiction to Fosberg (2004), a study of Ghanaian listed companies over a six-year period (1998-2003) find a statistically significant positive relationship. Companies who have a one-tier system contain high levels of debt in their capital structure (Abor, 2007), indicating a positive relationship between CEO duality and debt levels.

Boards no longer reward the CEO with the Chairman's title, the merits of duality are considered in comparison to the potential agency abuses (Boyd, 1995). This study seeks to identify the sign of the relationship between CEO duality and leverage for UK companies. In line with The Code (1998:2009), it is expected that UK listed companies have faced a change in duality levels since the implementation of The Code (1998:2009). The adherence to conform to The Code (1998:2009) enables a broader decision-making base for making changes to leverage levels. The avoidance of conflict between the CEO and Chairman in companies who have nonduality is of great importance. The one-tier system is able to operate without any conflicts, and can be one reason behind the higher levels of debt identifiable in the capital structure (Abor, 2007).

3.1.2.1 CEO Duality Hypothesis

Agency theory (Jensen and Meckling, 1976) advocates the separation of the two roles, while organisational theory, which focuses on leadership and structure, advocates duality. Finkelstein and D'Aveni's (1994) research develops a contingency framework to enable agency, and organisational theory to exist in companies in a complementary way. This study identifies the importance of how CEO duality creates CEO power, and the impact this has on company decisions. The balancing of the advantages and disadvantages of CEO duality is fundamental to companies to ensure they avoid the risk of entrenchment; the study recognises the complexity of CEO duality, and argues that vigilant boards who can balance objectives are seen as more important than the issue of duality.

Corporate governance is as a result of Agency theory (Jensen and Meckling, 1976). The separation of two powerful roles (CEO and Chairman) is an example of good corporate governance in action, therefore the avoidance of the risk of entrenchment and ensures risk is evaluated by a diverse number of Board members. Therefore, if the Chairman and CEO role are held by one person the concentration of power in one person could lead to high levels of risk being taken on in the company, which translates to the uptake of debt over equity. The study is expecting to contain companies who have nonduality due to the recent reforms by The Code (1998:2009); therefore, the relationship between leverage levels is expected to be negative in line with the US study (Fosberg, 2004).

The hypothesis is:

H2: There is a negative relationship between CEO duality and leverage.

3.1.3 CEO Tenure

CEO tenure is the length of time the CEO has been in the position of CEO, as opposed to how long the CEO has been employed by the company. Tenure of the CEO is often associated with CEO compensation and CEO power, which is associated with overconfidence. The longer the period of time the CEO has been in the role the more entrenched they are likely to become (Hermalin and Weisbach, 1998), which leads to an increase in power. CEOs can influence and dominate the Board of Directors, and therefore the compensation of the CEO, provides the question of whether CEO tenure is a variable, which can have an impact on the capital structure of companies. Corporate scandals, such as Enron, WorldCom and Tyco, have centered on powerful CEOs. The development of corporate governance guidelines indicates a possible link between the characteristics of the CEO and firm specific variables. Meanwhile, there are advantages of companies being run by a powerful CEO; faster response times to strategic decisions, clear lines of authority, and clear lines for external accountability (Finkelstein and D'Aveni, 1994; Cannella and Monroe, 1997).

Companies who are led by CEOs who have long tenures tend to have persistent unchanging strategies, strategies that conform closely to industry averages, and performance that is in line with industry averages (Finkelstein and Hambrick, 1990). Tenure is associated with increased levels of rigidity, and a commitment to established practices and policies (Finkelstein and Hambrick, 1990). The link between tenure and risk is negative; CEOs with long tenures have more to lose than to gain by taking unnecessary risks (Coffee, 1986). Teams/Board of Directors with short tenures have fresh and diverse information, while the ability to take risk is higher in comparison with teams with longer tenures (Finkelstein and Hambrick, 1990). As tenure increases, levels

of risk taking reduce, and perceptions become restricted. One impact on decision-making is information processing becomes restricted, habits develop and there is a greater reliance on making decisions based on past experiences, as opposed to new stimuli (Katz, 1982). The social and psychological effect of CEO tenure for a company's strategy is it remains stable over time, increasing as the tenure of the team/Board of Directors increases (Finkelstein and Hambrick, 1990).

An important and often difficult decision that falls to the responsibility of the Board of Directors, is whether to remove the existing CEO from their position. The length of time that the CEO has served makes it particularly difficult if the CEO has built up a long period of time in the role. A situation whereby the CEO has built up long periods of service occurs when the company has been increasing its value year on year, as a result of key decisions being made by the CEO. In situations where the CEO has an exemplary history of making good decisions, it becomes difficult to replace the CEO. However, good decisions do not always result in increases to the valuation of the company. CEO tenure is determined by the performance of the CEO, or by the good functioning of the corporate governance structures. The difficulty of ensuring how effective the corporate governance structures are in a company surrounds the CEOs risk of termination. CEOs gain power in their role, as the CEO tenure increases the likelihood of CEO termination decreases. CEOs gain power through board selection and/or making good investment decisions (Shleifer and Vishny, 1989; Hermalin and Weisbach, 1998). Secondly, matching theory is evident in CEO appointment; the period following the appointment of a CEO sees the risk of termination increase, while decreasing as tenure increases. CEOs that are poorly matched to the role will leave the company quickly, while those who are well-matched remain in the role (Allgood and Farrell, 2003). A change in CEO can be a traumatic event for a company, the decision to appoint a new CEO has big implications.

The study includes listed companies, and the reaction of the stock market is closely monitored through ECMH. Sebora (1996) states that 34% of CEO tenures last no more than four years.

An increase in the tenure of the CEO enables an increase in profile, through an increase in social networks and contact with board members. The power and security gained by the CEO from the increased social network enables CEOs to use resources for their own benefit, rather than to the benefit of the company (Kirchmaier and Stathopoulos, 2008). In support of the Agency theory, UK non-financial companies with a higher level of leverage appoint CEOs who have a smaller social network, due to a lack of experience and/or low tenure (Kirchmaier and Stathopoulos, 2008). The level of CEO influence over the Board of Directors can increase over time. One reason is in relation to the nomination procedure for new members of the board, it is normally the CEOs responsibility to nominate new board members (Herman, 1981; Vance, 1983).

CEO tenure is closely linked to CEO power and is one of the key influencing factors that lead to an increase in CEO power. Hermalin and Weisbach (1998) suggest this can be achieved through the degree of influence that the CEO has over the selection of new board members. In companies where the CEOs are approaching retirement, the succession process sees an increase in the number of EDs appointed to the board, these directors may be possible candidates for the CEO role. The appointment of a new CEO in companies will find that EDs who are recently appointed are more likely to leave the board, due to being unsuccessful in the gaining of the CEO position (Hermalin and Weisbach, 1988). CEOs who remain on the Board of Directors as Chairman of the board could limit the power of the new CEO, and therefore the decision-making process (Hermalin and Weisbach, 1988). In opposition to Hermalin and Weisbach's research is Brookman and Thistle (2009), who suggest that long CEO tenure periods can lead to

good decisions, due to the level of specific knowledge a CEO has to influence the board during the decision-making process. Alternatively, CEOs with long tenures have a higher chance of becoming over confident, called hubris (Hayward and Hambrick, 1997). CEO hubris can occur in situations whereby the CEO is also the Chairman, or if the board consists of a large percentage of EDs, and/or if the CEO has a long tenure in the role. Brookman and Thistle (2009) analyse CEO tenure, and find that 18% of CEOs have more than thirteen years of tenure. As CEO tenure increases, the board independence may decrease, and the board becomes more relaxed and less vigilant (Lorsch and MacIver 1989; Coles *et al.*, 2001).

Along with the nomination procedure, the removal of directors (Finkelstein and Hambrick, 1990) is another factor that CEOs have a strong influence over. The degree of loyalty that board members have to the previous CEO will play a role in the number of new appointments. The career of the board members is often tied to the CEO, ensuring that directors are reluctant to challenge the CEO for fear of the damage it would do to their future careers. The second reason is in relation to the time period the CEO is in position. An increase in the time period that the CEO is in the role enables more information concerning internal information systems to be obtained. This could lead to the withholding of information, which demonstrates poor management, which in itself can control the board meeting agenda (Coughlan and Schmidt, 1985).

CEOs who are overconfident choose higher debt levels and issue debt in more cases, in comparison to less optimistic CEOs. This is not in line with the pecking order theory (Myers and Majluf, 1984). Overoptimistic managers predict future events at higher favourable levels, whilst believing the knowledge they have is more precise than it actually is (Hackbarth, 2008). The positive impact of overconfident CEOs has also been reported, the higher debt levels avoid the diversion of money away and thus increases the

value of the company, and reduces manager-shareholder conflict. The higher levels of debt can prevent future investment; the bondholder-shareholder conflict can be reduced through the increase in company valuation (Hackbarth, 2008).

One study (Hackbarth, 2008) finds that managerial traits can increase the valuation of the company. Companies that make inefficient low leverage decisions because managers are incentivised to use excess funds for discretional purposes, have a lower impact for managers who have a growth and risk perception bias. This is in line with Berger *et al.* (1997), where entrenched managers lead to lower leverage levels. The degree of bias is key, managers who are mildly bias undertake capital structure decisions that are in the interests of shareholders, and meanwhile extreme bias is detrimental to the company (Puri and Robinson, 2007).

Studies on the US companies (Brookman and Thistle 2009; Malmendier, *et al.*, 2011) identify that CEOs who are overconfident are more likely to choose debt over equity, avoiding external finance due to the opinion that the market will undervalue the company. CEOs prefer to use cash or riskless debt to finance their projects, the use of internal funds over external funds is in line with pecking order theory (Myers and Majluf, 1984). An increase in the tenure period of the CEO results in a reduction in the level of long term debt being taken out, indicating a negative relationship between CEO tenure and leverage levels. There are two possible reasons behind this relationship. Firstly, the longer a CEO is in position the more time they have to learn to issue risky capital more appropriately. Secondly, CEOs may have exhausted their company's debt capacity early on in their tenure (Malmendier *et al.*, 2011).

Previous studies for non-UK companies (Berger *et al.*, 1997; Wen *et al.*, 2002; Malmendier *et al.*, 2011) find a negative relationship between CEO tenure and leverage

levels. CEOs who are entrenched, pursue a strategy of lower debt levels in order to avoid the performance pressure that is associated with high levels of debt (Abor, 2007). There is a lack of studies for the UK companies that consider how CEO tenure could have an impact on capital structure. This study will be analysing the relationship between the length of time the CEO has been in the role and the level of leverage. Additional capital in highly leveraged companies is sought through external capital markets. The additional level of CEO monitoring by shareholders (Jensen, 1986), combined with company poor performance can ensure the removal of the CEO.

The implication of growth and risk perception bias is under researched due to the complexities of determining these attributes for the CEO and managers. Manager-shareholder conflicts arise when managers avoid paying out cash, preferring to consume private benefits (Jensen and Meckling, 1976). The presence of debt in a static capital structure model restricts cash being available to managers, and managers having reduced funds to use to their advantage (Grossman and Hart, 1982). A dynamic capital structure model contains disciplining forces to impose debt issuance at the beginning, and avoid the reversing of the initial leverage choices later on (Hackbarth, 2008). The type of CEO likely to choose the disciplinary debt levels, and continue the efficiency enhancing debt policy in dynamic environments is difficult to identify (Hackbarth, 2008).

Bondholder-shareholder conflicts arise in companies who have capital structures that contain risky debt, and focus on maximising equity rather than the company value. Risky debt is able to encapsulate the investment benefits without incurring any investment costs. This behaviour is anticipated by the bondholders and the cost is included within the debt value upon issuance, called agency cost of debt. It is the underinvestment of debt that makes it risky, and leads to inefficient investment behaviour (Hackbarth, 2008).

3.1.3.1 CEO Tenure Hypothesis

Managerial and CEO traits, such as risk and growth perception biases, can have an impact on the debt to equity ratio, and debt issuance decisions (Hackbarth, 2008). Growth perception bias overestimates the growth of future company earnings, viewing external finance as unnecessary and costly. Risky securities are perceived to be undervalued by the market, and managers become reluctant to take out external financing. Equity prices are more sensitive to biases in belief, with equity being seen as having a higher cost in comparison to debt. In situations where equity is sought, it reverts back to pecking order theory (Myers and Majluf, 1984). The preference for debt over equity leads managers to seek discounts on riskier debt and equity. Managers with risk perception bias underestimate the riskiness of future company earnings, hence believe debt finance is undervalued by the market. Combined with the complexity of equity and managers viewing equity to be overvalued, leads to managers with risk perception bias seeing a larger benefit in issuing equity than debt. This is not in line with pecking order theory (Myers and Majluf, 1984). The selection of capital by biased managers results in their choices differing from the optimal debt to equity level, that companies are seen to move towards. Growth perception bias leads managers to believe the company is more profitable than it is, and less prone to the risk of financial distress. The impact on the level of debt in companies is managers who are biased choose higher debt levels, in comparison to managers who are unbiased. In relation to debt restructuring, managers who are biased have higher debt levels and float new debt earlier, resulting in shorter debt maturities, leading to costly distortions of debt levels. These personal characteristics can have an impact on capital structure decisions, the magnitude and combination of managerial bias can determine the preference between debt and equity. Managerial traits theory is consistent with pecking order theory in situations whereby managers exhibit

growth perception bias, while risk perception bias is not consistent with pecking order theory (Hackbarth, 2008).

CEOs are employed to look after the interests of the shareholders; however, from Agency theory (Jensen and Meckling, 1976) it is known that CEOs are often self-interested, risk adverse and have goals not in line with the shareholders. As the CEO tenure increases, they will seek to avoid the monitoring from shareholders that occurs with the uptake of debt. Entrenchment theory (Bebchuk and Fried, 2005) indicates that the longer the CEO has been in the position, the less likely they are to take on riskier projects, which require capital. Therefore, the payment of existing debt and not replacing this with new debt leads to a reduction in the debt levels. In line with previous US studies (Berger *et al.*, 1997; Wen *et al.*, 2002; Malmendier *et al.*, 2011), a negative relationship is expected.

The hypothesis is:

H3: There is a negative relationship between CEO tenure and leverage.

3.1.4 CEO Compensation

CEO compensation has altered substantially from the 1980s up until 2012; there is a greater emphasis on option and share grants as opposed to cash forms of compensation (Perry and Zenner, 2001). The increase in the number of academic papers during the 1990's has outpaced the increases in CEO pay (Murphy, 1999). The issue of the level of CEO compensation relates back to the concept of the separation between shareholders and managers (Berle and Means, 1932), the structure of company's enables directors and CEOs to have control over their level of compensation.

Previous studies (Core *et al*., 1999; Cyert *et al*., 2002) link CEO compensation with corporate governance variables, such as the size of the board and CEO duality. Core *et*

al. (1999) find that CEO compensation is high in situations where the board size is large; due to directors facing more difficulties to oppose the CEO. Secondly, in situations whereby the CEO has appointed outside directors, these directors feel a sense of gratitude to the CEO and are less likely to oppose any decisions put forward by the CEO, including those decisions on compensation. CEO compensation is found to be 20-40% higher in the US if the CEO is also the Chairman of the Board of Directors (Core *et al*., 1999; Cyert *et al.,* 2002). While CEO compensation is found to be 4-5% lower if the CEO holds shares in the company. In this study, the compensation of the CEO will be compared to total board compensation, to establish the percentage of total board compensation that is paid to the CEO. Executive compensation is seen as a solution to the Agency theory (Jensen and Meckling, 1976), and the conflict between shareholders and managers. Aligning both parties through the use of compensation is now commonly used by all companies, the nature of listed companies enables the equity element of compensation to be highly liquid. Through the use of specific compensation, such as bonuses and share options, shareholders are able to motivate managers in the direction of accepting projects that are high risk. Stakeholders who would also benefit from the increase in compensation, and therefore increases in managerial effort, are creditors due to a reduction in the probability of the company defaulting (Jensen and Meckling, 1976). The increase in the number of risky projects also has an impact on increasing the company's probability of default.

One measure of CEO dominance is related to the CEO compensation (Bebchuk *et al.,* 2011). CEO pay slice (CPS) is calculated as the CEO compensation as a percentage of the compensation of the total top five directors (including the CEO) of the company. CEO dominance, as measured by CPS, is used to identify the impact it has on capital structure decisions. The use of CPS as a measure of CEO dominance, as opposed to CEO

duality, prevents any firm-specific characteristics having an impact on the analysis; it is also a continuous variable as opposed to a dichotomous variable. Other indications that have been used in previous studies include whether the CEO is the company founder or not (Adams *et al.*, 2005), and whether the CEO is the only insider on the Board of Directors. CPS can also be linked to company valuation, profitability and share prices. Results from the study by Jiraporn *et al.* (2012) are in alignment with prior literature, high levels of CEO dominance increase agency costs and reduce the company valuation. The relationship between the company and the shareholders is impacted by the level of CEO dominance; high levels of CEO dominance translates to a reduction in the ability of shareholders to remove the CEO if required.

CEO pay has links to other variables, including company size, performance and CEO power. Girma *et al. (*2007) use the amount paid to the CEO in the form of cash (salary and bonus) as a measure of executive compensation for UK companies, therefore excluding the equity based component of executive's compensation. Girma *et al.* (2007) and Gregg *et al.* (2005) both find a weak relationship between CEO pay and performance; in this study CEO pay consists of the cash based component and the share based component. Conyon (1997) finds mixed evidence; the study does find that compensation committees are being used to influence the compensation of directors. Main *et al.* (1996) collect cash and equity based components of compensation for the period spanning 1983-1989, findings are inconclusive; however, corporate governance rules have changed considerably since the period covered, therefore this study could provide different results.

Studies are mixed on the relationship between CEO compensation and leverage levels. Berger *et al. (*1997) find a positive relationship and suggest that when finance is required, managers who own a percentage of the business would prefer to retain the control in the

business, and therefore debt is issued instead of equity. Evidence in line with Berger *et al.* (1997), and in support of a positive relationship between company leverage and executive compensation leverage is found by several previous studies (John and John, 1993; Bryan *et al.*, 2000; Ortiz-Molina, 2005). Eisdorfer *et al. (*2013) focus on the relationship between companies leverage ratio and executives' compensation leverage, introducing a new variable called compensation leverage.

Directors who have shares in the company develop shareholder-like interests (Vafeas and Theodorou, 1998), which can lead to directors raising their monitoring performance, and could filter into the capital structure decisions. Share ownership is also the focus of a previous study (Bertrand and Mullainathan, 2001), and finds that CEOs of companies who do not have a 5% external shareholder will receive more 'luck based' compensation. For example, a favourable change in exchange rates as opposed to CEOs making good corporate decisions. One study which considers cash and equity based forms of compensation (Ozkan, 2007) for the financial year 2003/2004 for UK companies, finds no significant relationship between CEO compensation and company performance. This study aims to look at the proportion of CEO compensation to board compensation, in relation to capital structure. The relationship between CEO pay and capital structure is linked. Companies can minimise the agency costs created through misaligned incentives by cooperating together over capital structure, and compensation decisions (Ortiz-Molina, 2007). A study undertaken during 1992-2007 (Cremers and Palia, 2011) finds a positive relationship between CEO tenure and compensation, this is consistent with Entrenchment Theory.

Brisker and Wang (2017) find that risk adverse CEOs use less debt, and will reduce debt when the company is overleveraged, while reluctant to increase the level of debt when the company is under leveraged. CEOs insider debt ratio is defined as the level of inside debt as a percentage of total incentive compensation. The study finds that the debt ratio, which is aligned to capital structure rebalancing, is around 10% of the company's market debt ratio.

Economic theory indicates that executive pay packages should be designed to achieve attraction, retention and incentive objectives (Prendergast, 1999). Previously, companies have used deferred compensation, pension plans and post-retirement benefits to camouflage levels of compensation (Bebchuk and Fried, 2003). There are other forms of reward other than compensation, for example, empire building (Williamson, 1964; Jensen and Meckling, 1976). Managers may avoid paying out dividends and withholding the cash in situations where there is a lack of profitable investment opportunities (Jensen 1986). Managers could entrench themselves in their positions, making it difficult to remove them from their positions due to poor performance (Shleifer and Vishny, 1989). CEO compensation is one way that is used to overcome the agency issue (Jensen and Meckling, 1976), and the use of compensation packages is one way that is used to incentivise CEOs and managers.

CEOs are more willing to take risky managerial actions in order to increase their reputation in the labour market (Gibbons and Murphy, 1992). CEOs are incentivised through their compensation in the early stages of their career, while later on in their careers CEOs expect higher levels of compensation in order to compensate them for their reduced career concerns.

3.1.4.1 CEO compensation Hypothesis

The compensation that CEOs receive is normally in the form of salary and bonuses. Managers who receive good compensation are less likely to take on more risk in the form of taking out debt, therefore to safeguard their jobs they prefer to keep leverage levels low (Ortiz-Molina, 2007). Studies to date (Liu and Jiarporn, 2010; Bebchuk *et al.*, 2011) suggest that companies with powerful CEOs demonstrate lower company valuations, lower profitability, lower credit ratings, higher costs of taking out debt, and higher negative market reactions to merger and acquisition announcements. High levels of CEO dominance increase the levels of agency costs, resulting in lowering the company valuations and sub-optimal capital structure decision making. Adams *et al. (*2005) investigates how the variation in performance is influenced by CEO power, specifically the level of compromise. Powerful CEOs require lower levels of compromise with fellow board members, and alter the decision-making process to one which becomes more centralised on the CEO.

Agency theory (Jensen and Meckling, 1976) and entrenchment theory (Bebchuk and Fried, 2005) are the two key theories, it is expected to follow that CEO compensation increases as the leverage levels decrease, indicating a positive relationship. The differences in the outflows of monthly costs associated with debt and equity, result in more cash being available in a company with low levels of debt; from a shareholder's perspective this is sub-optimal. The level of opaqueness of information in the company could impact the level of monitoring; an increase in monitoring could lead to a closer relationship between CEO compensation and the performance of the company. This is dependent on the power the CEO holds, a CEO who has a high degree of power may negate the relationship void (Cremers and Palia, 2011). The entrenchment theory

(Bebchuk and Fried, 2005) predicts that companies who have poor levels of corporate governance are likely to have entrenched CEOs, resulting in higher levels of CEO compensation.

Does the tenure of the CEO have an impact on the choices surrounding capital structure, and in addition does it have an impact on CEO compensation? Or does the capital structure have an impact on CEO compensation and CEO tenure. However, companies whose capital structure contains high debt levels leads to a lower availability of cashflows. This is due to the inherent nature of debt and the associated interest payments, suggesting how capital structure choices may impact compensation, in particular CEO compensation. Likewise, high CEO compensation may prevent companies taking out high levels of debt, indicating a different cause and effect situation. This study is focusing on the sign of a relationship, as opposed to discovering which variable has an impact on the other.

If weak corporate governance practices are evident, the use of compensation consultants is one mechanism used to ensure CEOs are prevented from awarding themselves excessive pay packages. The independence of compensation consultants does raise different issues, and may have the opposite effect due to the reliance that the consultants may have for future business (Armstrong *et al.,* 2012). What constitutes weak corporate governance is difficult to specify, combined with excessive CEO pay ensures that shareholders best interests are not the primary concern of CEOs. High levels of monitoring could lead to the CEO withholding information from the rest of the Board of Directors, avoiding more intensive monitoring (Adams and Ferreira, 2009). The information could be considered important during the process of evaluating the CEO in order to decide whether they require replacement or not (Laux, 2008). The identification of the key corporate governance determinants for the corporate financial decision-making

process is a key part of this research; the CEO is the driver of the company and holds power in the decision-making process.

Jensen and Meckling (1976) first identify one solution to the agency cost of outside debt; the solution is to ensure executives hold debt and equity in the same ratio as the company's capital structure. This enables those projects that increase the value of the company's total assets to be taken on; ensuring the under-investment problem (Myer and Majluf, 1984) is overcome. If there are large leverage gaps between the two ratios it can lead to investment distortions, executive compensation plans that contain debt based compensation tend to under-invest. While those with equity based compensation plans will over-invest (Eidorfer *et al.,* 2013). Setting the compensation leverage of executives as close to the company's leverage ratio ensures the mitigation of agency costs. Increases in the value of their portfolio suggest that ignoring the optimal investment policy, combined with lowering the leverage gap can reduce the agency costs.

In October 2013, the consultation on the UK Corporate Governance Code focuses on director's compensation, and the encouragement of the Board of Directors to focus on the long term and increase their accountability to shareholders. The changes came into force for financial years beginning on or after 1st October 2014.

Ozkan (2007) studied the relationship between compensation and corporate governance variables for the period 2003/2004, this study seeks to extend the sample period for UK companies. In line with previous non UK based studies (John and John, 1993; Berger *et al.,* 1997; Bryan *et al.,* 2000; Ortiz-Molina, 2005; Eisdorfer *et al.,* 2013) the relationship is expected to be positive.

The hypothesis is:

H4: There is a positive relationship between CEO compensation and leverage.

3.1.5 CEO Gender

The percentage of female CEOs in listed UK companies is very low. The Davis report (2011_a: 2014_b)[3] focuses on increasing the number of female board members, as opposed to increasing the number of female CEOs. The Davis report (2011_a:2014_b)[4] provides recommendations, as opposed to stipulating FTSE 350 companies must conform to a percentage of female directors, and is voluntary. Since the first Davis report in 2011, the number of women on FTSE 100 companies has increased by 8.2% between 2011-2014, and female directors make up 20.7% of all directors in 2014. For FTSE 250 companies the percentage of female directors has increased by 7.8% between 2011-2014, 15.5% of directors are female in 2014. In 2011 there were 83 all male boards for FTSE 250 companies; by 2014 these boards have now recruited one or more female directors onto their boards. The guidelines from the Davis report (2011_a:2014_b)[5] are proposing quotas for female directors for FTSE 100 and FTSE 250 companies. If this study finds that CEO gender is impacting the capital efficiency, growth and therefore shareholder wealth, the guidelines may be challenged by shareholders, and ultimately then companies. Higher debt ratios for male CEOs in comparison to female CEOs have been found in a study by Graham *et al.* (2013), in particular the higher short-term debt ratios.

Previous studies identify evidence of gender impacting corporate decisions, for the US (Adams and Ferreira, 2009) and for companies in Norway (Ahern and Dittmar, 2012). Ahern and Dittmar (2012) consider the impact of companies in Norway having to

[3] 2011_a Davis Report 2011, 2014_b Davis Report 2014
[4] 2011_a Davis Report 2011, 2014_b Davis Report 2014
[5] 2011_a Davis Report 2011, 2014_b Davis Report 2014

conform to a percentage of female directors, for a 20% increase in female board representation the leverage level increases by 6.4%, and increases the company's financial risk. The reasons behind the increase in leverage levels are thought to be associated with changes in accounting standards, the results are found to be insignificant for this particular study. There is very little evidence that the different characteristics of men and women filter through to the corporate decisions, such as determining the level of debt in a company's capital structure.

Faccio *et al.* (2012) identifies how companies run by female CEOs have lower levels of leverage, less volatility of earnings and a higher chance of survival, in comparison to male CEOs. The research is found to be statistically significant, and provides evidence that CEO gender does have an impact on risk taking choices. The evidence relates to the allocation of capital, and demonstrates differences for capital efficiency, which is dependent on the gender of the CEO. Confidence levels of the CEO demonstrate how male CEOs have a higher confidence level, in comparison to female CEOs (Malmendier *et al.*, 2011). There are two implications, firstly the avoidance of 'risky' investments, and secondly, not undertaking all positive net present value projects. These two implications are unable to be explained through the traditional theories (agency, informational asymmetric and overconfidence). One explanation is the high number of private companies in the study (Faccio *et al.*, 2012); undiversified CEOs who have a large proportion of their wealth concentrated within the company they are running, biasing the results of the study. Risk avoidance behaviour is difficult to quantify, long-term studies, such as this study, can identify relationships between the change in leverage and the gender of the CEO.

Regardless of the sign of the relationship, the impact on capital structure concerns whether gender diversity is able to have an impact on the decision, and if so, does the

independent variable require guidance in The Code (1998:2009). The ability of the CEO to have different risk levels in their role compared to their personal life is one area of previous research; however, this remains subjective and in this study the personal risk levels of the CEO will not be collected. If the study identifies a relationship between CEO gender and capital structure, will this guide the decision-making process for the selection of future CEOs?

3.1.5.1 CEO Gender Hypothesis

The main theory underlying the relationship between how the gender of the CEO can have an impact on capital structure is behavioural theory (Malmendier *et al.*, 2011). Under perfect capital markets, investments are chosen in order to increase the company valuation, managers undertake all positive net present value projects (Fama and Miller, 1972). Previous research on the characteristics of the decision-makers includes Agency theory (Jensen and Meckling, 1976), asymmetric information (Myers and Majluf, 1984) and behavioural theory (Malmendier *et al.,* 2011). Bruce and Johnson (1994) and Johnson and Powell (1994) consider how betting behaviour varies between men and women; the studies find evidence that women have a lower level of risk taking in comparison to men. A further study in relation to pensions (Bernasek and Shwiff, 2001) finds women are more risk-adverse in relation to the allocation of their wealth in their pension. The growing literature demonstrates that males have higher levels of overconfidence than females (Barber and Odean, 2001), impacting their risk levels and corporate decision-making. The impact on capital structure surrounds the differences between the risk levels of debt and equity, with debt having a higher risk attached to it because of default risk.

The concept that CEO characteristics play a role in the capital structure decisions is a controversial topic; however a new area to consider in the constantly changing capital structure puzzle. There are very few UK studies as the new reforms take time to filter through to the Board of Directors. There is a low percentage of female directors serving as directors on the Board of Directors of listed UK companies, and the percentage of female directors being promoted to CEO of the company is very low. The implication of the gender of the CEO determining the capital structure surround the selection process when recruiting a new CEO.

There is no direct evidence as to whether there is a relationship between the gender of the CEO and the choice between types of capital; previous research focuses on risk levels and is linked to behavioural theory. In line with Adams and Ferrerira (2009), Faccio *et al.* (2012) and Graham *et al.* (2013), the relationship is predicted to be negative between female CEOs and debt levels. There is a lack of female CEOs in UK companies (Davis, 2011_a:2014_b)[6]; therefore, this study will consider the impact of female directors and the percentage of female directors on the board (Section 3.2.1), in relation to the debt levels of the company.

The hypothesis is:

H5: There is a negative relationship between female CEO and leverage.

3.1.6 CEO Nationality

Cultural values are not new, with Hofstede's cultural dimensions (1980:2001) first identifying individualism (versus collectivism), uncertainty avoidance and harmony (versus mastery). Cultures that have high levels of individualism focus on individual freedom and achievement, whilst cultures that are at the lower spectrum of individualism

[6] 2011_a Davis Report 2011, 2014_b Davis Report 2014

have strong group cohesion. Cultures that score high on the uncertainty avoidance spectrum prefer clear rules and dislike ambiguous situations, those cultures that have low uncertainty avoidance prefer events that are novel and prefer innovation. Cultures that are towards the high spectrum of the harmony value learn to accept situations and decisions as they are, while those cultures with low levels of harmony emphasis their assertiveness to advance personal and group goals. The UK is high on the spectrum for individualism, high on uncertainty avoidance and low on harmony (Li *et al.,* 2013). This study focuses on non-financial companies and considers the implications that these cultural measures could have on decisions that are made during board meetings; the focus of the study is on the nationality of the CEO.

Schwartz (1994:2004) has built on Hofstede's work to develop cultural value orientations. Schwartz developed six values types, including conservatism, which is primarily concerned with security, conformity and tradition. The impact that culture could have on capital structure is focused around how the uptake of high levels of debt in a company's capital structure, could lead to a higher risk of liquation. The costs that arise due to the liquation of a company include costs to the workers, suppliers and customers (Titman, 1984). Companies in conservative societies would emphasis harmony, and try to avoid liquation costs through having lower debt levels. Secondly, a company's public image is highly regarded in conservative societies. The threat of bankruptcy is a sign of losing public's image, therefore in order to reduce this threat lower debt levels could be adopted. Lastly, companies with high levels of conservatism wish to avoid ambiguity and prefer predictability. The difference within the risk levels of debt and equity, lead to equity being chosen over debt, for companies in conservative societies.

Mastery is the second dimension and is closely linked to locus of control. In countries who have high levels of mastery control managers wish to demonstrate their abilities,

through the use of aggressive policies. Therefore, the avoidance of covenants that are attached to debt, could lead to a preference of equity over debt. Secondly, the avoidance of the threat of bankruptcy could be avoided through the use of equity, due to a lack of monitoring of cashflows being required, to ensure there is sufficient to pay the monthly debt finance cost. Secondly, in countries where mastery is high there is evidence of managers valuing individual success and independence. Therefore, the performance of managers is closely monitored, with safer projects being chosen to avoid managers being seen as failing. The impact on the capital structure leads to equity being preferred over debt, to avoid companies being unable to meet their debt obligations and therefore avoid the threat of bankruptcy.

One study (Li *et al.,* 2013) that considers US companies find a positive and significant relationship between uncertainty avoidance and corporate risk taking, while a negative and significant relationship for the relationship between corporate risk taking and uncertainty avoidance and harmony. The measures of risk taking include cash flow risk, financial leverage and liquidity, the key determinant in this study is financial leverage. The study identifies how important culture can be both directly and indirectly; through making corporate decisions, and secondly through influencing countries to make these decisions. The main objective for companies is the efficient allocation of capital to ensure the company grows. If capital is not taken out for fear of the risk level, the implication is the loss of profitable projects which is detrimental to the maximization of the value of the company.

One study (Jalbert *et al.,* 2007) surrounds the country in which CEOs receive their degree, and the link with the level of compensation received. The results were inconclusive and highlight instances whereby CEOs who did not have degrees were receiving higher levels of compensation than CEOs who did possess a degree. Jalbert *et*

al. (2007) considers the relationship between CEO nationality and compensation, there is some evidence of different capital structures operating within companies. The study has been conducted in the US; and finds evidence that CEOs with different nationalities are being compensated differently. When return on assets is considered, it is found to be higher for CEOs born in Central and South America, Australian and New Zealand. The relationship between CEOs nationality and a company's capital structure was found to be inconclusive, however it highlighted that CEOs with different birth places adopted a different capital structure policy.

Jalbert *et al. (*2007) indicate a link between the age of the company and their capital structure as opposed to the characteristics of the CEO. Baker and Hall (2004) identified a link between CEO compensation and the size of the company, indicating that the relationship maybe more complex.

3.1.6.1 CEO Nationality Hypothesis

A combination of dimensions created through work conducted by Hoftstede (1980:2001) and Schwartz (1994:2004) underpin the development of this hypothesis. One way to consider culture is through measuring the nationality of the CEO. Few finance studies have investigated the influence of culture on capital structure. Firstly, due to a lack of disclosure, and secondly, due to the subjectivity of the topic.

The size of the companies may impede a significant relationship as larger companies are able to mitigate against cultural issues (Li *et al.*, 2013). The nature of culture and the difficulty surrounding the implicit nature of some decisions could prevent a significant relationship being identified; however, it is one of many CEO characteristics in this study that is based upon Hofstede's cultural theory.

This study seeks to classify the CEOs of the FTSE 350 as either British or non-British, and identify if there is a relationship between CEO Nationality and leverage levels. CEOs whose nationality is high on the conservatism spectrum place a higher level of importance on achieving harmonious relationships with all parties, avoiding bankruptcy, and ensuring there is predictability within the company. Therefore, it is expected that where the CEO is British there is a negative relationship with leverage. Whether national culture is part of the capital structure puzzle is one aspect of this study, previously it has remained as a fuzzy area within the field and has been elusive.

The hypothesis is:

H6: There is a negative relationship between CEO nationality and leverage.

3.2 Board characteristics and Capital Structure

The 2002 SOX Act was set up to improve corporate governance in the US, and it seeks to provide guidance for board structures. Research on the board characteristics, such as size of the board and percentage of NEDs, yields inconclusive results (Raheja, 2005).

The Board of Directors is an economic institution that has been created to help solve the agency issues that are inherent in managing companies (Hermalin and Weisbach, 2003). A major conflict within the boardroom can be between the CEO and the directors (Hermalin and Weisbach, 2003), EDs and NEDs. Adam Smith (1776) is the first economist to discuss the role of the Board of Directors. One hundred and fifty-six years later, Berle and Means (1932) develop it further to discuss the committees.

The Hermalin-Weisbach model (Hermalin and Weisbach, 2003) derive a number of predictions about the relationship between the CEO and the Board of Directors, it predicts the following:

1. A CEO who performs badly is more likely to be replaced in comparison to a CEO who is performing well.
2. CEO turnover is more sensitive to company performance when the board is more independent.
3. The probability of NEDs being added to the board increases following poor company performance.
4. Board independence decreases over the course of a CEOs tenure.
5. Accounting measures of performance, as opposed to share price performance, are better indicators of management turnover.
6. There should be long-term persistence in corporate governance.
7. The share price reaction to key management changes should be negative if the CEO is dismissed based on private information, while positive if the management is fired on the basis of public information.
8. A CEOs salary should be insensitive to past performance at low levels of past performance, while sensitive at high levels of past performance.

The first five predictions have strong empirical evidence (Hermalin and Weisbach, 1988; Weisbach, 1988; Bhagat and Black, 1999). The three remaining theories lack consistent support from existing research.

In addition to being a solution for agency issues the Board of Directors is a product of regulation between state incorporation laws, and the stock exchange governance requirements (Hermalin and Weisbach, 2003). Board characteristics are split into two attributes, the first is associated with the composition of the board, for example the percentage of male and female board members, and the mix of EDs and NEDs. Secondly, the occurrence of meetings, the number of board meetings and attendance rates at these meetings. Previous studies focus on the relationship between board

characteristics and company performance (Klein, 2002; Farber, 2005; Larcker *et al.*, 2007) over a small time period, or in some cases just one year (Faccio and Lasfer, 1999) for UK listed companies. The focus of this study is on the relationship between board characteristics and capital structure, and is underpinned by Agency theory (Jensen and Meckling, 1976) which is discussed in detail in Chapter 2 (See Section 2.3.1).

3.2.1 Percentage of female board members

The number of female board members that make up a company's boards is one which led to the writing of the Davis report in 2011, the purpose of the report is to increase the promotion of gender equality on the boards of listed companies. The report (Davis, 2011) identifies several advantages to companies increasing the number of female directors;

1. Improve performance at Board and business levels through input, and challenge from a range of perspectives.
2. Access and attract talent from the widest pool available.
3. Be more responsive to market by aligning with a diverse customer base, many of whom are women.
4. Achieve better corporate governance, increase innovation and avoid the risks of 'group think.'

'Improving gender balance in the boardroom not only increases the performance of the board and strengthens the business but is also good for the UK economy, as it enhances our competitiveness, ability to attract talent and reputation for good governance in a global market.' (Philip Hampton, Chairman – Royal Bank of Scotland, p5)

Research findings on share price growth from European companies find high levels of growth in those companies with a high proportion of women on the senior management teams (Mckinsey and Company report, 2007). Performance measurements for companies

whose boards contain female representation include a 42% increase in return in sales, 66% increase in return on capital employed, and a 53% return on equity (Joy *et al.*, 2007). The Davis report (2011) considers female board appointments over a six-year period between 2004-2010, and the percentage of female board members increases by 3.1% between the periods studied. Corporate governance reforms focus on the percentage of NEDs as opposed to the sex of the board members. The Chairman for the FTSE 350 companies is expected to review their executive committees, with regard to the number of male and female directors, and set out future goals. The Davis report (2011) advises FTSE 100 companies to aim for a minimum of 25% female representation by 2015.

The procedure in which board members are appointed has increased disclosures as a result of the Davis report (2011). The annual report must include, under provision B2.4, the process that has been undertaken in the appointment of new executives. This includes details about the search and nominations procedure, to enable diversity to be achieved. A voluntary code of conduct is effective from 2012 to address the issue of listed companies having poor diversity within their boards.

Reasons why there are so few female directors incorporate several issues. These include a lack of qualified women with experience of serving on boards, combined with women not making their interests clear. Findings from a study on FTSE 100 companies during 2001-2004 (Singh *et al.*, 2008) highlight that women are significantly more likely to bring international diversity to the boards, while a quarter of new appointments during the period under study highlight previous experience at board level. Previous experience consists of prior employment at financial institutions, senior positions in the public sector, and carrying out roles in voluntary and charity organisations. The recommended duration of female board members is two terms, identical to men, therefore the current small group of experienced directors is likely to be 'recycled' between companies. One

such example is current CEO of Royal Mail (listed on the stock market in October 2013); Moya Greene's previous roles include government and financial positions.

Canadian research studies public, not for profit and private boards, and find that boards that consist of three or more women demonstrate different corporate governance behaviours' in comparison to all male boards (Brown *et al.*, 2002). Boards that consist of gender balance demonstrate a higher level of monitoring of board accountability. This is a key element of corporate governance, in addition increased communication levels are identified, with non-financial performance measurements being monitored. The link between the percentage of female board members and a company's leverage levels focuses on whether gender has an impact on the choice between debt and equity in the capital structure. The Board of Director's attitudes to risk filters into the choices that are made with regard to the capital structure.

Guidelines that have been introduced following the publication of the Cadbury Report (1992), and the Higgs Review (2003) for the UK, focus on diversity for the members of the Board, and the ability to select future directors from a wider talent pool. Diversity can take many forms; gender, race, ethnicity and nationality (Erhardt *et al.*, 2003). Female board members also provide role models for younger women, and signal career progression is achievable in companies (Bilimoria, 2000). In addition, the benefits that diversity brings to the board are the creation of new ideas, and improvements in communication (Milliken and Martins, 1996).

How and if gender diversity impacts corporate governance and the capital structure decisions, is an area that this study seeks to identify. Economic growth is based upon the efficient allocation of capital. CEO gender plays a role in the choice between debt and equity, and theories include Agency theory (Jensen and Meckling, 1976), asymmetric

information (Myers and Majluf, 1984) and behavioural considerations (Malmendier *et al.*, 2011). Previous research considers how gender related differences impact risk levels, and how this has an influence on the capital structure of a company as debt and equity have different risk levels. One such study considers the betting behaviour of men and women, Bruce and Johnson (1994) and Johnson and Powell (1994) provide evidence to support women exhibiting a lower level of risk in comparison to men. Bernasek and Shwiff (2001) demonstrate that the allocation of wealth to pensions clearly shows that women are significantly more risk adverse in comparison to men. How this translates to the choice between debt and equity in the capital structure surround the higher risk level that debt has in comparison to equity. For example, the higher the number of female executives on the Board of Directors could lead to lower levels of debt; therefore, when companies make decisions for future capital, the use of equity is employed over debt as the risk of default is lower.

3.2.1.1 Gender Hypothesis

In the UK, the Davis Report (2011_a:2014_b)[7] provides recommendations for FTSE 350 companies to conform to a specific percentage of female directors; however, the relationship with capital structure is under-researched. The implications of the Davis Report 2011 can be identified within the data period selected in this research. Firstly, the increase in the number of female directors can be identified, and secondly whether the guidelines have an impact on the debt levels in companies. If there is a significant relationship, the impact on recruitment for future members of the Board would be affected. The guidelines in 2014 will take time to filter through to companies; this study is too early to identify what the implications would be.

[7] 2011_a Davis Report 2011, 2014_b Davis Report 2014

Higher debt levels have been found for male directors in comparison to female directors, in particular the higher level of short-term debt (Graham *et al.,* 2013). The confidence levels of male directors is higher in comparison to female directors (Malmendier *et al.*, 2011), indicating a preference for debt over equity. The impact on the capital structure surrounds whether the choice between debt or equity can be linked to the gender of the CEO.

The relationship is expected to be negative, in line with behavioural theory (Malmendier *et al.*, 2011), and previous studies (Graham *et al*., 2013; Malmendier *et al*. 2011).

The hypothesis is:

H7: There is a negative relationship between percentage of female board members and leverage.

3.2.2 Board size

A board is 'the shareholders first line of defense against incompetent management,' (Weisbach, 1988). A board is responsible for monitoring current projects, deciding on new projects, and making CEO succession decisions. A board consists of insiders and outsiders. Insiders have a higher level of information about the company, while outsiders are able to use the power of CEO succession to ensure insiders reveal information as required, to ensure decisions are able to be made with all the information available.

There is no standard board size, FTSE 100 companies have a board size of between 6 and 18 members, and FTSE 250 companies tend to have a smaller board size (Davis, 2011). The Higgs report (2003) recommends the reduction in the number of executives on the board. The composition of board members has altered since the introduction of the Corporate Governance Reports, which were first introduced in 1992. One

recommendation includes the requirement that the percentage of NEDs as a percentage of the total number of board members should be 50% or more, including the Chairman. The increase in the board size has an impact on coordination, communication and conflict resolution of the board, decreasing productivity, and rendering the board a bureaucratic forum (Jensen, 1993) so the combined role (Duality) is no longer an issue.

Findings on the relationship between the size of the board and firm performance (Jensen, 1993), suggest that a board size of seven or eight board members has a higher level of functionality, and becomes easier for the CEO to chair. The degree of communication, coordination and decision-making are likely to be less effective the larger the board becomes. Board size should be limited to avoid co-ordination issues that result from unmanageable directors on the board (Yermack, 1996). The measure of company performance is researched through Tobin's Q, the calculation of the market valuation of the company. Previous studies that support Jensen are Yermack (1996), based on 452 US companies during the period 1984-1991, and Eisenberg *et al.* (1998), which is based on Finnish firms over a two-year period (1992-1994). The mean and median board size is 12 for Yermack's study, the number of board members range from 4 to 34. While a study conducted in Singapore and Malaysia companies (Mak and Kusnadi, 2005) find a mean and median of 7, with a range of between 4 and 14. These studies are all in support of the negative relationship between board size and company performance, the link with leverage is with the efficiency of the assets of the company. Yermack concludes that the largest losses in companies occur when a move from a small to medium sized board occurs. Evidence from five European countries (Conyon and Peck, 1998) identifies costs associated with large boards, such as monitoring; these findings support Yermack. The speed of decision-making, combined with levels of risk, can lead to larger boards taking less extreme decisions (Cheng, 2008). One study (e.g. Hermalin and Weisbach, 2001)

finds evidence to support the negative relationship between board size and company performance. A variation of company performance is the variability of company performance, determined by the monthly share returns; a study by Cheng (2008) provides evidence that firms with larger boards have a lower variability of corporate performance. Companies with a larger board size have the impact of creating pressure on managers to reduce the debt to capital ratio, to ensure good performance results are achieved.

The relationship between the size of the board and capital structure is based upon Agency theory (Jensen and Meckling, 1976) and entrenchment theory (Bebchuk and Fried, 2005). Berger *et al. (*1997) find a negative relationship between the years 1984 and 1991, in which the leverage level is lower where there is a higher number of directors. The reason for the relationship is due to the higher levels of monitoring, and the strong pressure from the Board of Directors to make managers pursue the lower leverage levels in order to achieve good performance results. There is an added level of supervision through the supervisory board; their role is to supervise the Board of Directors and the senior management. Companies who have high levels of leverage within their capital structure are likely to be more complex than those companies whose capital structure contain more equity; the increase in complexity requires a higher level of advisory requirements (Pfeffer, 1972; Klein, 1998). Hence, the Board of Directors is likely to benefit from being larger, and consist of a higher percentage of NEDs with expertise and experience (Coles *et al.*, 2008). Vafeas and Theodorou's (1998) findings follow the US studies, and whilst inconsistent relationships have been found, it does provide a starting point for future research.

3.2.2.1 Board Size Hypothesis

The relationship between board size and leverage has remained relatively under researched, focusing on the relationship between board size and company performance. Research in line with Agency theory (Jensen and Meckling, 1976) establishes that managers do not always adopt capital structures with the value-maximising level of debt. Through entrenchment, managers are able to protect themselves against internal and external corporate governance mechanisms. Entrenchment is defined as a lack of discipline from the corporate governance and control mechanisms. For example, monitoring by the Board of Directors, threat of dismissal, threat of being taken over, and compensation based performance incentives (Berger *et al.,* 1997).

The implications on capital structure are those managers and CEOs who are entrenched, have a higher level of discretion over the company's capital structure decisions. The desire to reduce company risk, and protect their undiversified human capital may result in managers preferring less than optimal levels of debt in their capital structure (Fama, 1980). While the avoidance of performance pressures that are associated with higher levels of debt occurs (Jensen, 1986). While in contrast, Harris and Raviv (1988), and Stulz (1988), propose that entrenchment motives could encourage managers to increase leverage levels beyond the optimal level. The effect is to reduce the risk of takeover attempts, and inflate the voting power of their equity stakes (Berger *et al.,* 1997). The impact is managers who are entrenched, take out excessive leverage that preempts takeover attempts by demonstrating a signal of commitment to sell assets, and/or restructure (Berger *et al.,* 1997).

This study will extend previous UK studies (Vafeas and Theodorou, 1998; Faccio and Lasfer, 1999; Al-Najjar and Hussainey, 2011) using more recent data, to identify if

following the issuance of several corporate governance reports, a negative relationship still exists. In line with Berger *et al. (*1997) and Agency theory (Jensen and Meckling, 1976), a negative relationship is expected due to the increases in the level of monitoring.

The hypothesis is:

H8: There is a negative relationship between board size and leverage.

3.2.3 Number of Board meetings

Previous research focuses on board size and board composition, one key dimension is the intensity of board activity that is measured by the number of board meetings held per month/year. The frequency of board meetings can depend on the company's activities. For example, the number of meetings would increase if the company is involved in a major investment programme because the capital requirements for the investment programme would need to be discussed. The monitoring costs can be higher in companies whose boards consist of a high percentage of outside board members, due to the higher communication costs (Raheja, 2005). The effectiveness of the board can be compromised if the CEO has control over the composition of the board (Jensen, 1993). The level of board monitoring can be impacted when the roles of CEO and Chairman are not separated into two. The duality of the roles can be a sign of entrenchment (Linck *et al.*, 2008), leading to lower levels of board monitoring. The alternative viewpoint, is the increase in board activity can counter act the risk of entrenchment, enabling the access of information to be greater when the CEO is also the Chairman of the Board of Directors (Brick and Chidambaran, 2010).

Agency theory drives the relationship between the number of board meetings and capital structure, driven by the inability of shareholders who do not have access to all the

information, and ultimately decisions being made. Managers will be keen to ensure they are portraying a thorough discussion of the capital options available to them through the board meetings, shareholders are not privy to the detail of the board meetings, but are aware of the number of board meetings as it is reported in the annual statements.

The Code (1998:2009) does not state the minimum number of board meetings a company must have per year; however, it states that 'the board should meet sufficiently regularly to discharge its duties effectively.' Records of attendance are kept; there is no minimum number of meetings that board members must attend. Studies in this area have been limited due to the unavailability of information in databases for all companies, such as DataStream. This detailed information has since become available in DataStream; however, the time period it covers is very limited. Therefore, this information will be extracted from the annual financial statements for this study.

3.2.3.1 Number of Board Meetings Hypothesis

The relationship between the number of board meetings held and the capital structure is unclear at the moment due to a lack of studies in relation to leverage levels; this study seeks to identify if the determinant is significant enough to have an impact on leverage. The increase in the number of board meetings could lead to an increase in discussion, and therefore monitoring of the existing and future capital of the company. However, the increase in the number of board meetings could be as a result of concerns within the company regarding gearing levels, and a risk of financial distress.

Previous literature focuses on the size of the board, along with the composition (see for example, Linck *et al.,* 2008). Board activity has seen an increase in its importance; one measure includes the number of board meetings. The number of board meetings per year can depend on the situation of the company. The involvement in merger and acquisitions, or engagement in a large investment requires a higher frequency of board meetings. The relationship between the number of board meetings and company valuation has previously been researched (Vafeas, 1999; Adams *et al.*, 2005; Brick and Chidambaran, 2010), indicating how poor company performance can lead to a higher number of board meetings. In this study, the focus will be on the impact the number of board meetings could have on the company's capital structure. The results will depend upon the direction that the company is wishing to take with regard to the current, and future debt levels within their capital structure.

The increase in debt in a company's capital structure requires a higher level of monitoring, in comparison to a company taking out equity. The requirement of monthly servicing of the debt indicates a negative relationship should exist between leverage

levels and the number of board meetings, which is in line with Agency theory (Jensen and Meckling, 1976).

The hypothesis is:

H9: There is a negative relationship between number of board meetings and leverage.

3.2.4 Board Meeting Attendance

Meeting attendance is a relatively new variable due to the data being previously unavailable; whilst attendance records have always been kept by companies, the publication of this information has been limited to being held within the company. Financial statements now contain attendance records for each director on the board; there is a differing level of disclosure across the companies in the study. The reasons for non-attendance at board meetings can now be found in the financial statements. Additional information includes if a director attends for part of the meeting, if a director attends the meeting via telephone or video conferencing, information that previously was excluded from the financial statements. For this study, meeting attendance by a director via telephone or Skype is recorded as the director being present at the meeting.

The relationship between board meeting attendance and the gender composition of the Board of Directors, identifies higher attendance levels for female directors in comparison to male directors (Adams and Ferreira, 2009). A second interesting finding is the higher level of attendance of all directors on the Board of Directors that consist of a higher percentage of female directors.

3.2.4.1 Board Meeting Attendance Hypothesis

The relationship between meeting attendance and capital structure is based upon Agency theory (Jensen and Meckling, 1976); the uptake of external debt as opposed to internal/external equity. Debt is more complex in comparison to equity because of variables, such as variable or fixed interest rates, duration, covenants, and options to repay early. The complexity of debt requires more detailed discussion, along with the existing forms of debt that the company has.

Adams and Ferreira (2009) propose that attendance at board meetings could be as a result of the composition of the Board of Directors. However, the study is unable to ascertain whether attendance records are impacted by the presence of female directors. Possible reasons behind the finding include a new appointment, better scheduling of the meetings, or simply the peer effect as directors do not wish to be seen as having poor attendance. The higher the levels of attendance at the Board of Director meetings can transfer to an increase in discussion, and monitoring at the meetings by the executive directors and non-executive directors. The increase in availability of the meeting attendance in the financial statements could be seen to have an increase in attendance, while the percentage of NEDs (discussed in 3.2.5) could have an impact. The variable board meeting attendance could be related to the nature of the agenda that is being discussed at the meeting, however this is much harder to consider in this context. Likewise, a higher board meeting attendance doesn't necessarily mean that debt will be chosen over equity, it is focused upon all the options being discussed and in the context of the existing capital structure.

In line with Agency theory (Jensen and Meckling, 1976) an increase in meeting attendance could result in a greater discussion with regard to the capital structure options

available to the company, which could lead to a reduction in the leverage levels, indicating a negative relationship is expected.

The hypothesis is:

H10: There is a negative relationship between board meeting attendance and leverage.

3.2.5 Independence - Percentage of non-executive directors

The encouragement of good corporate governance has led to the creation of non-executive directors (NEDs), who form part of the Board of Directors. In the UK, a unitary board exists in companies, the board is made up of EDs and NEDs, also known as insiders and outsiders. EDs are employed on a full-time basis by the company, with the overall aim to oversee the daily running of the company, the transition to this role is through internal promotion. NEDs are not full-time employees of the company, and are appointed from outside of the company. Their role is to attend the monthly board meetings, enhance shareholder value and provide a monitoring role (Institute of Directors). In accordance with the Institute of Directors definition of director independence, it occurs when directors have not been full-time employees, in addition the directors hold no shares in the company whose board they sit on (Institute of Directors).

The introduction of the SOX Act in 2002 as a consequence of the global financial scandals such as Enron and WorldCom, has meant that the NED role has become a pivotal one to companies not only in the United States, but across the UK as well. The NED role is not a direct result of the Cadbury (1992) report as it was the norm for companies to be run by part-time NEDs. The guidelines state an NED is available to work 100 hours per year (Charkham, 1994), while guidelines as to the number of boards you are able to sit, and advise on, has now been recommended. The Higgs (2003) report

recommends significant changes to the board composition, these include an increase in diversity, and the requirement that board members should have business and board level expertise. The guidelines state that at least 50% of board members should be independent. NEDs are also known as outsiders, independent and supervisory directors. Hart (1995) states that 'NEDs may owe their position to management.' The appointment of NEDs in the UK is seen as controversial. Following the guidance of the Hampel report (1998), The Higgs report (2003) indicates the process of appointing NEDs has high levels of informality attached to it. "Almost half of the NEDs surveyed for the Report were recruited to their role through personal contacts or friendship. Only 4% had a formal interview, and 1% had obtained the job through answering an advertisement." The implications are that only quiet NEDs are appointed onto the Board of Directors (Hart, 1995), preventing the monitoring role from occurring. In the UK, 44% of boards consist of NEDs (Peasnell *et al*., 2003), with 31% of the board being defined as independent. In contrast, in the US, outside directors make up 76% of the board (Bhagat and Black, 1999) and 77% (Klein, 1998).

The boards' main role is to be vigilant; this can be increased due to the presence of NEDs. NEDs are seen as independent, and are not employed full-time by the company, neither are they affiliated to the company whose board they sit on (Hermalin and Weisbach, 1988). The central aspect of monitoring is to focus on the financial performance of the company (Fama and Jensen, 1983). NEDs are more likely than insider directors to dismiss CEOs following poor performance (Coughlan and Schmidt, 1985), and through maintaining their own reputation as directors, have an incentive to monitor the board they sit on. In the UK, directors do not have fiduciary duties; NEDs view their role as advisory as opposed to disciplinary (Franks *et al.,* 2001). In the US, directors have a duty of care to their shareholders and can be sued should they fail to

fulfill their fiduciary duties, this is in contrast to the UK (Ozkan, 2007). NEDs are delegated monitors who are appointed by the shareholders to monitor the manager's use of the company's resources (Hart, 1995). NEDs concern for their reputation and future career opportunities, ensure directors are effective monitors (Fama and Jensen, 1983).

Agency theory (Jensen and Meckling, 1976) is still a valid theory; directors are motivated to act in the interests of shareholders in situations whereby they have significant ownership in the company (Morck *et al*., 1988; Jensen, 1993). Rosenstein and Wyatt (1990) find for US companies that NED appointments lead to significant increases in shareholder wealth; the relationship with capital structure is mixed, in terms of its direction and significance. Previous literature suggests theories on how boards are developed. Firstly, firm specific characteristics, such as company size, age of the company, cashflows and scope of operations can determine how the board is shaped. Secondly, owner specific characteristics that ensure the bargaining process between EDs and NEDs occur.

A Board of Directors that contains a high percentage of outside directors performs a monitoring role of the CEOs behaviour, and ensures incentives offered to the CEO are also in the shareholder's interests (Fama and Jensen, 1983). Young (2000) and Peasnell *et al.* (2003) find evidence that firm specific variables influence the board composition. Larger companies who have lower growth prospects are more likely to adhere to the Cadbury Report recommendation on the number of NEDs. The period before equity issuance, and following the departure of the CEO, also encourages companies to comply with corporate governance guidance.

Previous literature has focused on the relationship between the number of outside directors and company performance, and findings are mixed. Rhoades *et al.* (2000) find a

small positive relationship; Wagner *et al.* (1998) find an inverted U-shaped relationship, while Dalton *et al.* (1998) find no significant relationship. One study (Dahya and McConnell 2007) that considers the period following the release of the Cadbury Code, 1989-1996, finds improvement in the performance of UK companies. Companies that add directors in line with the guidelines, report a significant improvement in operating performance (Dahya and McConnell, 2007). In a study of UK companies Weir *et al.* (2002) find a negative relationship between the percentage of NEDs and company performance. Weir *et al.* (2002) find weak evidence between the structure of the board and the performance of UK listed companies, arguing that companies should be given greater freedom over the control mechanisms that they adopt. The difficulty with greater choice is the ability to assess which controls are effective in ensuring good corporate governance occurs. The impact on capital structure for UK companies has been researched in previous UK studies; Faccio and Lasfer (1999) find a weak relationship for a one-year time period, 1996/1997. The focus of this study is on the relationship between the percentage of NED's and capital structure with more recent data.

3.2.5.1 Percentage of NED's Hypothesis

Agency theory (Jensen and Meckling, 1976) drives the relationship between the independence of the board and capital structure, to avoid control of the decisions being held by one person to ensure capital efficiency occurs. The choice between debt and equity surrounds the different risk levels, and the additional uptake of debt should be considered in relation to existing levels of debt. The risk of default increases as debt levels increase, therefore the role of the NED's is to ensure the managers are looking after the needs of the shareholders. The uptake of positive net present value projects is key to ensure the payment of dividends to shareholders, or increase in the share price, and

NED's provide an independent discussion surrounding the options available regarding capital.

In this study, the variable board composition is the percentage of NEDs a company has, which is expressed as a percentage of the number of directors in total. Following the guidance of the Hampel report (1998) the increase in NEDs for monitoring and control purposes is seen as irrelevant, excessively costly and presents a threat to board unity (Young, 2000). The impact of the increase in the percentage of NEDs on UK boards still remains open for debate, this study seeks to identify whether the composition of the board is one factor that contributes to a company's choice between debt and equity.

As the number of NEDs increases, it translates to higher levels of monitoring, and leads to the expectation of a negative relationship. The implications are managers wish to avoid the high level of monitoring, therefore leading to the avoidance of high leverage levels. Therefore, in line with Weir *et al*. (2002), to avoid the pressures and increases in monitoring levels that are associated with servicing debt, a negative relationship is expected.

The hypothesis is:

H11: There is a negative relationship between board independence and leverage.

3.3 Ownership characteristics and Capital Structure

The relationship between ownership structure and capital structure has been extensively researched; however, results are inconsistent with each other. Ownership structure can be split into three variables; institutional, managerial and foreign ownership. Ownership structure is underpinned by Agency theory (Jensen and Meckling, 1976), which is discussed in more detail in Chapter 2 (See Section 2.3.1).

Titman and Wessels, (1988); Ozkan (2001, 2007); Booth *et al.* (2001); Bhaduri (2002) exclude the ownership variable in their studies. The lack of prior research into the ownership structure of companies in the UK, and how this is associated with corporate governance helps to question whether a link exists between capital structure and ownership structure. The increase in the level of disclosure surrounding the Board of Director's compensation has been brought about as a result of the corporate scandals (Coates, 2007). In this study, there is the opportunity to collect data on the Board of Director's share ownership, to identify whether the process of mitigating against agency costs through the issuance of shares, to the Board of Directors, can have an impact on the leverage levels of the company.

3.3.1 Institutional Ownership

Institutions differ to individual investors due to the larger equity stakes that are held by institutional investors; institutional investors own 80% of UK equity. Institutional investors manage large pools of investment funds, and have the ability to invest larger amounts in each form of equity in comparison to individual investors (OECD, 2004). The level of institutional activism in the UK is high; in 2012 Glaxo-SmithKline faced a vote against increasing pay for its executives at their AGM due to institutional investors voting against the increase in pay deals. The large quantity of shares held by institutional investors ensures that selling large quantities of shares is prevented to ensure the share price does not decline (Ozkan, 2007).

McConnell and Servaes (1995) find for a US based study that the distribution of equity ownership between the Board of Directors, and external investors is more important in low growth companies than in high growth companies. The allocation of equity ownership is found to have an impact on companies; debt is an important aspect which

depends upon the investment opportunities that the company has access to. The findings, whilst not conclusive, do suggest that how equity is distributed is of more importance in low growth rather than high growth companies. The high level of institutional ownership suggests that the monitoring levels are also high. Al-Najjar (2011) find a negative relationship in Jordanian companies between the number of shares owned by the institutional investors and debt levels; this is in line with Agency theory (Jensen and Meckling, 1976). One difference between the analysis methods occurs when using the pooled model, a positive relationship is identified, meaning that institutional investors prefer companies with high levels of debt.

Agency theory (Jensen and Meckling, 1976) is the main theory underlying studies that analyse the relationship between the percentages of shares held by institutional shareholders, and the impact of this on key corporate finance decisions. UK companies have a dispersed shareholder base, therefore the process of ensuring they determine the compensation package of the CEO and board members is unrealistic. The protection of the shareholder's equity is the key driver behind Agency theory, this is conducted through corporate governance practices.

Berger *et al.* (1997) find a negative relationship between institutional investors and leverage in US companies, due to the higher levels of monitoring and reduction in agency costs. Additionally, the study finds an inverse relationship between institutional ownership and managerial ownership. Board of Directors can appear to entrench themselves against corporate governance mechanisms, which could have an impact on the capital structure decisions. Berger *et al*. (1997) find that directors may decide to take out less debt than is optimal to reduce the company's risk, and therefore protect their investment within the company. Secondly, directors could increase debt levels to beyond the optimal point, in order to inflate their voting rights and reduce the chances of being

taken over. Lastly, entrenched directors may take on high levels of debt which signals a commitment to restructure or sell assets. Berger *et al*. (1997) find that directors/managers are using leverage as a defensive mechanism to commit to value increasing changes, for example restructuring. This relationship can be tested in this study using more recent data for the UK as opposed to the use of data on US companies.

3.3.1.1 Institutional ownership Hypothesis

How institutional investors impact leverage levels is dependent on the level of monitoring conducted by the institutional investors, and their level of involvement. However, shareholders will seek out companies to invest in that are in line with their risk level. Shareholders are automatically invited to the AGM, and if their shareholding is significant they may be entitled to a place on the board. Proactive shareholders will take an active involvement in a company's capital structure; however, their level of influence may remain small.

There is a relationship between capital structure and institutional ownership; however, the sign is still unresolved as the results from previous studies are mixed. A negative relationship is found in non-UK studies by Chaganti and Damanpour (1991); Bathala *et al.* (1994); Grier and Zychowicz (1994); Berger *et al. (*1997). Previous research has focused upon risk orientation in owner controlled versus manager controlled companies. Companies with high levels of institutional ownership will avoid risk, choosing to avoid debt and the associated monitoring that debt entails. Whilst the existence of debt in a capital structure has the effect of monitoring managerial behavior, and mitigating agency issues, the role of institutional are also important monitoring agents. Institutional investors are assumed to be beyond the control of the company, however Agency theory indicates their presence will reduce leverage levels, and reduce manager's opportunistic

behaviour (Bathala *et al.,* 1997). In line with Agency theory (Jensen and Meckling, 1976), the UK is expected to follow these US studies that find a negative relationship between institutional ownership and leverage levels:

The hypothesis is:

H12: There is a negative relationship between institutional ownership and leverage levels.

3.3.2 Management ownership

The Boards of Directors are responsible for setting the compensation packages for the CEO and themselves, indicating a potential area for compensation manipulation to occur (Laux, 2008). Corporate scandals, such as Enron, and more recently in 2013 Save the Children, have fueled the concern over the compensation packages of the Board of Directors. Whilst the shareholders may have delegated away from the agency problems, the directors become the agents, and their interests may not align with the shareholders. The conflict is present in situations whereby a director's career is linked to the CEOs; this can present an issue for NEDs, however to a lesser extent (Ozkan, 2007).

Management ownership can be associated with managerial entrenchment. The absence of effective monitoring and disciplining mechanisms can lead to companies having poor corporate governance, enabling the gap between the manager and shareholder objectives to widen. The existence of suboptimal strategies is likely in companies with poor corporate governance. For example, managers being seen as indispensable, performance measures being manipulated, and the resistance of takeovers (Shleifer and Vishny, 1997). One study finds that internal corporate governance mechanisms, such as managerial ownership and managerial compensation, interact with each other to determine

managerial entrenchment and therefore agency costs (Florackis and Ozkan, 2009). Florackis and Ozkan (2009) find that agency costs persist over time; the study identifies how corporate governance devices interact with each other and how they should not be analysed in isolation. Previous research on the existence of entrenchment in companies demonstrates lower than optimal leverage levels (Berger *et al.,* 1997; De Jong and Veld, 2001; Brounen *et al.,* 2006). Chen and Steiner (1999) find a positive and significant relationship between risk and managerial ownership. Managerial ownership is a determinant of risk, the increase in monitoring is seen as reducing the agency conflict between shareholders and managers. Management ownership is seen as a function of risk in addition to a determinant of risk (Chen and Steiner, 1999); therefore, the relationship is two way.

The results will have important implications to the macroeconomics, the pursuit of positive net present values projects leads to company growth, a key goal of companies. Grossman and Hart (1982) state that the presence of debt in the company's capital structure encourage managers to become more efficient, reducing the threat of bankruptcy, and therefore managers avoid the loss of control and the loss of their reputation. The balance between debt and equity requires careful management; a capital structure containing too much debt can increase the agency costs of debt in the form of a risk shifting incentive. Risk shifting occurs in situations whereby companies increase their levels of debt, shareholders also increase their risk levels, and the uptake of riskier projects by companies is preferred. The uptake of riskier projects enables the debt to be paid off more quickly, and shareholders can gain the excess once the debt has been repaid. The failure of projects, results in the debtholders bearing the cost of the higher risk debt levels (Bathala *et al.*, 1994). The increase in debt levels in the company can increase bankruptcy risk, and an increase in non-diversifiable risk of bankruptcy to the

managers. Short-term myopic and share price volatility is increased through high levels of managerial ownership. High levels of managerial ownership can result in entrenchment problems, if directors hold a managerial interest in the company it can result in the failure of voting and takeover activities.

McConnell and Servaes (1990) find how the relationship between managerial ownership and company performance increases at low levels of ownership, while it decreases at high levels of ownership. The focus of this study is on the relationship between managerial ownership and capital structure, which has been under-researched in a UK context. The results indicate how an optimal corporate governance structure may exist; however, this differs for different companies due to each company facing different management issues, and therefore solutions. How managers exercise their options is dependent on company performance; there are two reasons behind this. The first reason is as share price increases it will encourage directors to exercise their share options, while choosing not to exercise their options if share prices fall. The second reason concerns the level of information directors have; directors with information that the company has good future prospects will purchase more shares, while they will sell shares if they have poor information (Bebchuk and Fried, 2003). The responsibility of setting the compensation packages for the Board of Directors lies with the compensation committee, which often contains directors for whom compensation packages are being decided upon.

The relationship between capital structure and shares held by the Board of Directors over a ten-year period is relatively undiscovered in a UK context. Harris and Raviv (1988), and Stulz (1988) state how managers increase their leverage levels in order to temporarily inflate shareholders voting power, therefore decreasing the requirement for corporate control by the market. Fama (1980) and Jensen (1986) find how managers prefer to reduce the level of debt and with it the interest requirements in order to protect their own

wealth, which may be under-diversified. The two consequences of managerial entrenchment lie firstly in the lack of monitoring (Jensen, 1993) that is undertaken by boards with a high level of managerial ownership. Secondly, the protection from hostile takeover bids (Stulz, 1988) that high managerial ownership creates. The presence of large shareholders on the Board of Directors should aid to reduce the agency costs; these shareholders may be undiversified, which could lead to an aversion to debt. Meanwhile, if these shareholders are banks, then they may encourage companies to borrow from banks. The fear of being taken over could result in companies taking on more debt to make the company less attractive (Stulz, 1988).

Agency theory (Jensen and Meckling, 1976) is the main theory underlying studies that analyses the relationship between the percentages of shares held by the Board of Directors, and the impact of this on key corporate finance decisions. Agency costs are created through the process of trying to reduce the conflict of interest that is present between shareholders and managers having different goals. One solution to reducing the agency costs is through management, i.e. Board of Directors, having shares in the company as part of their compensation package. Share ownership is seen as a solution to mitigating the agency costs, and aligning the two party's goals.

3.3.2.1 Board Ownership Hypothesis

Jensen and Meckling (1976) agency's theory can be attributed to the percentage of managerial ownership, which can align the interests of shareholders and managers. The 'convergence of interest hypothesis' identifies how an increase in managerial ownership can increase the performance of the company; managers are less likely to use resources for their own consumption and focus on share maximisation. In contrast Fama and Jensen (1983) find that the discipline of the market focuses managers on share

maximisation at low levels of share ownership. While Morck *et al.* (1988) find that high levels of managerial ownership can led to managerial entrenchment.

Evidence from a UK study (Short and Keasey, 1999) over the period 1988 to 1992 find management become entrenched at a higher level of share ownership, in comparison to the US. In particular management owning between 12% and 40% are shown to have a negative impact on performance. However, positive relationships are found by Leland and Pyle (1977); Berger *et al.* (1997), and indicate inconsistencies. The impact on debt levels of managerial share ownership is undiscovered, and the focus of this study to identify whether the solution to reducing the agency costs can influence the company's capital structure.

The relationship between managerial ownership and performance is not the focus of the study; the focus is on the relationship between managerial ownership and capital structure. A study by Chen and Steiner (1999) link levels of risk to managerial ownership, the study finds a substitution monitoring effect occurring between managerial ownership and the debt policy. Debt is seen as riskier than equity, indicating a negative relationship between managerial ownership and leverage levels. The use of debt as opposed to new equity does dilute the existing shareholders ownership, and presents a different shareholder base. The use of shares as a financial reward to the Board of Directors does depend upon the share price, and how volatile it is.

The relationship between managerial share ownership and leverage will be considered in this study, to identify whether a relationship exists as proposed by a previous study (Faccio *et al.,* 2012) of private companies. In line with managerial entrenchment (Bebchuk and Fried, 2005) and a US study (Chen and Steiner, 1999), a negative

relationship is expected in this study. The higher levels of managerial ownership enable managerial entrenchment to occur, and therefore the impact is on lower leverage levels.

The hypothesis is:

H13: There is a negative relationship between the number of shares held by the Board of Directors and leverage.

3.3.3 Foreign ownership

Ownership by foreign companies can be seen as a sensitive area, with foreign investment being viewed as 'outsiders'. There are three main benefits of companies having foreign ownership. Firstly, the size of the foreign ownership could result in representation on the Board of Directors. The second key benefit of foreign investment depends on the level of ownership, if it is sufficient it can bring independence and objectivity to a company, one key aspect that corporate governance was originally set up to create. Thirdly, it can have a positive impact on the informational effect; the convergence to IFRS enables improved comparability. The logistics of foreign investors monitoring their investment have been removed due to the introduction of the Internet, and the ability to attend board meetings without being physically present. However, the implications on existing shareholders can be viewed in a negative way, with shareholder wealth being reduced and concerns over stability. Foreign investors do face an increase in risks, including business risk, cultural risk, currency risk and country risk. The conflict between insiders and outsiders is previously researched (Shleifer and Vishney, 1997), with insiders being able to pursue their own benefits at the expense of outsiders.

In this study, foreign ownership is defined as the percentage of shares held by foreign shareholders. There are two different viewpoints on the relationship between foreign

investment and capital structure. The first viewpoint is foreign investment is able to exert a positive influence on a company's level of debt, a previous study of Polish listed companies finds a positive relationship existing. A second study of European countries supports the positive relationship (Egger *et al*., 2010); however, attribute the reason behind the positive relationship to be due to the corporate taxation structure. The advantage of diversification that foreign ownership creates is able to reduce the bankruptcy costs, and a company can take out higher levels of debt. A previous study in China finds that long-term debt is negatively associated with foreign ownership (Li *et al*., 2009). However, there is a lack of previous studies in relation to the UK which currently lead to speculation.

3.3.3.1 Foreign Ownership Hypothesis

Agency theory (Jensen and Meckling, 1976) is the main theory underlying studies that analyse the relationship between the percentages of shares held by foreign investors, and the impact of this on key corporate finance decisions. The requirement to issue equity instead of debt is not in line with pecking order theory (Myers and Majluf, 1984), and is seen as the more expensive option.

The impact on foreign ownership on a company's capital structure is the increase in a company's access to external funds on more favourable terms, leading to a lower cost of debt (Gurunlu and Gursoy, 2010).

Previous corporate governance studies are based on non-UK data, and highlight an under-researched variable in the UK literature on capital structure. Therefore, the relationship is expected to follow a study of Turkish non-financial listed companies over the period 2007-2008 (Gurunlu and Gursoy, 2010).

The hypothesis is:

H14: There is a negative relationship between the percentage of foreign ownership and leverage.

3.4 Summary of Hypotheses

Table 3.1 below summaries the predicted relationship of the independent variable with the dependent variables, based upon prior research in the field and the theory/theories (Discussed in detail in Chapter 2). Agency theory (Jensen and Meckling, 1976) remains the key theory in this area, companies are trying to attain the balance between the owners and the managers. The natural difference within the goals of the manager and the owner led to agency costs materialising; companies aim to mitigate these and encourage the two parties to work in the same direction. The ability to consider the ownership structure in this study enables one solution to reducing agency costs to be assessed as to the impact on the capital structure. The ability to solve one issue may lead to another issue being created. The heavy dominant on Agency theory is due to the focus in this study on the relationship between Capital Structure and Corporate Governance. Where there are instances of inconclusive relationships based upon previous studies, it is the aim of this study to provide support for a relationship, or provide reasons on why this could be seen as key to how capital structure decisions are made. There is an assumption made that there is a preference for low gearing. However, there are advantages of high gearing which include no loss of control of ownership, the ability to benefit from the tax shield, and the opportunity to take out lower costs of debt in comparison to equity.

Table 3.1: For each independent variable the Table provides a summary of the relevant theory, the theoretical findings of previous studies, and the prediction of this study.

Variable	Theory	Previous studies	Country/countries studied	Impact of the study	Results	Prediction
CEO age	Agency theory	Bertrand and Schoar (2003)	United States	Corporate performance	Positive	Negative
					Mixed	
		Frank and Goyle (2009)	United States	Capital structure	Negative	
		Malmendier *et al*. (2010)	United States	Capital structure	Negative	
		Serfling (2012)	United States	Capital structure	Negative	
		Yim (2013)	United States	Corporate decisions	Negative	
		Li *et al*. (2014)	United States	Corporate risk		
Duality	Agency theory Entrenchment theory	Boyd (1995)	United States	Company performance	Mixed	Negative
CEO tenure	Agency theory	Malmendier *et al*. (2010)	United States	Capital structure	Negative	Negative

CEO compensation	Agency theory	John and John (1993) Berger *et al*. (1997) Bryan *et al*. (2000) Ortiz-Molina (2005) Eisdorfer *et al*. (2013)	United States Unites States United States United States United States	Capital structure Capital structure CEO Stock options Capital structure Capital structure	Positive Positive Positive Positive Positive	Positive
CEO nationality	Behavioural theory	Jalbert *et al.* (2007)	United States	CEO compensation	Inconclusive	Unclear
CEO gender	Behavioural theory	Adams and Ferrerira (2009) Faccio *et al*. (2012) Graham *et al.* (2013)	United States Europe United States	Governance and Performance Efficiency of capital allocation Corporate Financial policies	Negative Negative Negative	Negative
Percentage of female board	Behavioural theory	Faccio *et al*. (2012)	Europe	Efficiency of capital allocation	Negative	Negative

members						
Board size	Agency theory	Berger *et al*. (1997) Vafeas and Theodorou (1998) Faccio and Lasfer (1999) Al-Najjar and Hussainey (2011)	Unites States United Kingdom United Kingdom United Kingdom	Capital structure Company performance Company valuation Capital structure	Negative Inconclusive Inconclusive Negative	Negative
Number of board meetings	Agency theory	Vafeas (1999) Adams *et al*. (2005) Brick and Chidambaran (2010)	United States United States United States	Company performance Company performance Company valuation	Negative Negative Negative	Negative
Board meeting attendance	Agency theory	Adams and Ferreira (2009)	United States	Governance and performance	Inconclusive	Negative

Board independence	Agency theory	Dalton *et al*. (1998) Wagner *et al.* (1998) Rhoades *et al*. (2000) Weir *et al.* (2002)	United States United States United States United Kingdom	Company performance Company performance Company performance Company performance	Inconclusive U shaped Positive Inconclusive	Negative
Institutional ownership	Agency theory	Chaganti and Damanpour (1991) Bathala *et al.* (1994) Grier and Zychowicz (1994) Berger *et al.* (1997) Al-Najjar (2011)	United States United States United States United States Jordan	Company performance Capital structure Capital structure Capital structure Capital structure	Negative Negative Negative Negative Negative	Negative
Managerial ownership	Agency theory Managerial	Leland and Pyle (1977) Berger *et al.* (1997)	United States United States	Capital structure Capital structure	Positive Positive	Negative

	entrenchment	Chen and Steiner (1999)	United States	Capital structure	Negative	
Foreign ownership	Agency theory	Li *et al*. (2009) Gurunlu and Gursoy, (2010)	United States Istanbul	Corporate risk Capital structure	Negative Negative	Negative

3.4 Firm specific variables

Previous studies (see amongst others Booth *et al*., 2001; Bevan and Danbolt, 2002; Panno, 2003) focus on the relationship between the firm specific variables, and capital structure. This study will use the firm specific variables as control variables.

3.4.1 Profitability

The first key capital structure variable is profitability; early theories (Modigliani and Miller, 1963) argue that the tax deductibility that is generated through companies making interest payments can result in companies preferring debt to equity. Previous studies (Booth *et al*., 2001; Ozkan, 2001; Bevan and Danbolt, 2002) find for UK companies that there is support for the pecking order theory. A company's profitability can have a negative impact on the companies' borrowing decisions, with internal finance being preferred over external finance. Companies try to avoid the costs associated with external financing, while using retained earnings first, which supports the Agency theory.

3.4.2 Asset structure

The second variable is tangibility, the ratio of fixed to total assets. Consistent results have been found in previous research for the relationship between asset structure and debt levels. Companies who have high levels of fixed assets, particularly tangibles ones, are able to secure high levels of debt by providing security on these assets.

With research in UK companies (see amongst others Michaelas *et al.,* 1999; Bevan and Danbolt, 2002; Charalambakis and Psychoyios, 2012) the relationship between leverage and asset structure is found to be positive for long-term debt, which indicates that agency problems and information asymmetries are affected by the size of the company. The

process of taking out debt requires high levels of collateral in the form of assets; issuance of long-term debt is preferred over short-term debt.

3.4.3 Size

Company size is a determinant of capital structure which has previously been researched, defined by the natural logarithm of company sales. There is no theory in relation to the impact that size would have on levels of leverage in companies; therefore, we are led by previous studies. Rajan and Zingales (1995) comment that: 'The effect of size on equilibrium leverage is more ambiguous'. In line with pecking order theory, larger companies are expected to have a higher amount of debt in their capital structure because of the ability to be more diversified, having lower transaction costs and being less exposed to bankruptcy risk. The credit rating of larger companies is likely to be higher, thus the availability of non-bank debt finance is higher in comparison to smaller companies.

UK studies to date (Michaelas *et al.,* 1999; Bevan and Danbolt, 2002; Charalambakis and Psychoyios, 2012) find significant positive relationships between company size and levels of leverage; meanwhile Ozkan (2001) finds limited support for a positive relationship between the two variables. A reason behind this limited support is the degree of asymmetric information between the firm and outside investors (Rajan and Zingales, 1995). The preference for equity over debt may increase, resulting in a negative relationship between size and leverage, which is inconsistent with previous studies. In line with Panno (2003) size will be measured as the natural log of total assets.

3.4.4 Growth

One common variable used in previous studies to measure growth is the market to book ratio (MTBV). This is measured as the ratio of the book value of total assets, less the book value of the equity capital and reserves plus the market value of equity, to the book value of total assets. MTBV is used as a proxy for the level of growth opportunities that are available to companies.

A study (Bevan and Danbolt, 2002) of listed UK companies, following the last recession in the UK, find a positive relationship between MTBV and total liabilities. Companies with growth opportunities will hold more debt, in line with previous studies (Chittenden *et al.*, 1996; Michaelas *et al.*, 1999). Debt can be split into long and short-term borrowings. Current liabilities are found to be positively related to growth opportunities, in particular debt in the form of trade credit (or equivalent), and securitised debt that is short-term. However, another UK study of listed companies (Ozkan, 2001) find a significant negative relationship, to support the view that companies with more growth opportunities will have lower levels of leverage.

3.4.5 Business Risk

The risk of a company is measured through the company's beta. Financial theory drives the relationship between levels of risk, and the percentage of debt in a company's capital structure. Companies with higher levels of risk are more likely to issue equity rather than debt, due to the levels of uncertainty and the monthly commitment that debt requires. High levels of debt can increase levels of risk for bankruptcy, leading to rises in equity risk, which is priced through the market, and could lead to lower share prices.

A UK study (Panno, 2003) over a short-term period of time, four years, supports a negative relationship between levels of debt and business risk. Studies to date have not contained data over a ten-year period, which includes an economic downturn, to consider whether the economic factors have a role in the relationship between risk and leverage.

3.4.6 Liquidity

Liquidity ratios are calculated as the ratio of current assets to current liabilities, a standard ratio to assess a company's ability to meet its short-term liabilities. Studies to date find how liquidity ratios have a mixed response to a company's level of leverage. Companies that have high levels of liquidity ratios may have high leverage levels due to the ability to service the short-term liabilities, indicating a positive relationship. While companies with high levels of liquid assets may use these assets to fund current and future investments, indicating a negative relationship.

Findings for the relationship for liquidity are not consistent with each other, a previous study (Ozkan, 2001) finds that the liquidity of firms has a negative impact on a company's borrowing decisions, which could be due to the agency conflict between debtholders and shareholders. The degree to which current assets are manipulated by shareholders at the expense of shareholders, further complicates the relationship. Meanwhile Voulgaris *et al.* (2004) find inconclusive findings for Greek companies. The study finds liquidity does not affect the debt leverage of large companies, whilst it does have an impact for small and medium sized companies. The relationship for liquidity is mixed (Panno, 2003) and suggests that there may be conflicts between the debtholders and shareholders.

3.4.7 Control variables expected signs

Table 3.2 below summaries the expected relationship of the control variables that will be used in this study, on the basis of prior research in the field.

Table 3.2 Control variables in this study with the expected sign of the relationship.

Variable	Sign of relationship
Profitability	Negative
Asset Structure	Positive
Size	Positive
Growth	Negative
Business Risk	Negative
Liquidity	Negative

3.5 Conclusion

The increase in the availability of corporate governance variables is enabling researchers to extend the list of capital structure determinants. The collection of additional variables does not necessarily ensure a relationship will exist, however the relationship can be tested to identify the significance level. The corporate governance variables in this study may also have relationships will each other; the focus is the impact on the dependent variable which is leverage. Several definitions will be used for leverage in this study. Variables that have been under-researched in a UK context will be tested in this study, these include the gender of the CEO, the nationality of the CEO and the number of female directors on the Board of Directors. The study focuses on listed UK companies and seeks to use the single and dynamic modelling. The use of dynamic equation modelling enables the simultaneous control of both endogeneity, and independent variables. Previous studies in the area of capital structure and corporate governance have not used this methodology (Berger *et al.*, 1997; Fosberg, 2004; Malmendier *et al.*, 2011; Ahern and Dittmar, 2012; Yim, 2013). Therefore, differences may become apparent due to the different methodology and the results will be compared to single equation modelling (OLS, FEM and REM). Previous research finds consistent results for a negative relationship between leverage and CEO age (Malmendier *et al.*, 2011; Serfling, 2012; Yim, 2013; Li *et al.*, 2014), female CEO (Adams and Ferrerira, 2009; Faccio *et al.*, 2012; Graham *et al.*, 2013), CEO tenure (Berger *et al.*, 1997; Wen *et al.*, 2002; Malmendier *et al.*, 2011) and board size (Berger *et al.*, 1997). Previous research finds consistent positive results between leverage and CEO compensation (John and John, 1993; Berger *et al.*, 1997; Eisdorfer *et al.*, 2013). Previous research finds mixed relationships between leverage and CEO duality (Boyd, 1995; Brickley *et al.*, 1997; Elsayed, 2007), CEO nationality (Jalbert *et al.*, 2007), board independence (Dalton *et al.*,

1998; Wagner *et al.*, 1998; Rhoades *et al.*, 2000), and ownership structure (Berger *et al.*, 1997; Al-Najjar, 2011). There is a lack of studies for the following variables; number of board meetings, board meeting attendance and managerial ownership.

Chapter 4 Research Design, Methodology and Data Description

4.1 Introduction

This chapter contains four Sections; Section one discusses the data collection process and the reason behind choosing the sample and time period. The second Section of the chapter demonstrates the analysis process, along with the techniques that will be used and why. The third Section discusses the advantages and disadvantages of the two models that will be used in this study. The fourth Section identifies the operational definition of the variables that will be used in this study, along with a summary of the theoretical findings of previous studies for each independent variable.

The first model that will be used is single equation modelling using panel data, and the clustering of errors. Single equation modelling can create endogeneity issues; in order to overcome these issues a second model can be used, which dynamic is modelling; GMM will be used to model the behaviour of companies over a time period of ten years, this is the time period of this study.

4.2 Data description

The selection of FTSE 350 companies in this study is due to the degree of ambiguity between UK companies, and the corporate governance environment. In the UK, the high levels of freedom and the inadequate external discipline by the market for corporate control, enables directors to have a high level of discretion over their corporate decisions. One such decision is capital structure, which is the dependent variable in this study (Florackis and Ozkan, 2009). The high levels of discretion incorporate disparity between companies; combined with the existence of differences within the capital structure

decisions provides questions as to why companies have chosen a specific mix of debt and equity.

The main source of data is secondary data from DataStream, a database that contains published accounting data for listed companies. The database contains financial statements that include the balance sheet, income statement and cashflow statement. In addition, the database provides accounting ratios such as current ratio and debt divided by equity. A second source of data is BoardEx; a 'Relationship Capital Management' database that contains data on board members for listed and non-listed companies across the globe. The data is inconsistent for individuals, and is controlled to some extent by the individual and their profile in the public domain (Schmidt, 2014).

The initial source of all of the data is company's financial statements (through DataStream and Boardex). The combination of the databases presents some gaps in the dataset. Complete and balanced data is often a challenge to find; data that is not contained within the two databases is hand collected from the financial statements. The annual reports for the year 2002 are rarely available; on average company websites only contain financial statements for the five previous years. Therefore, the period for which the financial statements are collected is limited to 2003-2012; data is collected up to the end of the financial year end of 2012. In line with financial reporting regulations, companies have nine months in which to prepare, and then release their financial statements (in accordance with the FRC). Therefore, for those companies with a December year end of 2013, the financial statements would not be released until the end of September 2014.

In this study, those companies that were relatively new to the stock market and have recently issued an IPO are excluded from the study, the period of time in which this was

deemed to be sufficient is 2 years. The majority of IPO's occur with a simultaneous share offering to investors (London Stock Exchange, 2012). Additional capital is raised through issuing new shares to new or existing shareholders (primary offering). Existing shareholders can sell their shares to new or existing shareholders (secondary offering), or companies can use a combination of both options. Baker and Wurgler (2002) study the market timing effect on the issuance of debt and equity, IPO's can result in short-term changes to a company's capital structure. Companies without at least two years of financial statements between 2003-2012 are excluded from the sample; this is in line with a previous study (Ozkan and Ozkan, 2004), who required data for a minimum of a six year period out of a total of sixteen years. This condition will be imposed to ensure changes in capital structure and corporate governance are not affected as a result of a new listing on the LSE. An IPO is undertaken through the issue of equity; therefore, during the first few years the capital structure may consist of a heavier weighting of equity at the expense of debt, this is not a reflection of a company's capital structure. Secondly, this study is over a ten-year period to avoid short-term decisions being reflected in the results, two years of data is not a true reflection of a company and the removal of these companies ensures short-termism is avoided.

The UK is the focus of this study, which is further split into companies listed on the FTSE 100 and FTSE 250, these combine to form the FTSE 350. The financial, banks, insurance, and utilities companies are removed from the study, leaving a total of 231 companies for the UK sample. The reason for excluding financial, banks and insurance companies is due to the different capital structures that exist because of the nature of the industry they operate in. This is because the debt in financial companies cannot be compared to non-financial companies (Rajan and Zingales, 1995). The exclusion of the

utility companies is due to the high level of regulation in the industry, and is in line with a previous study (Ozkan, 2001).

The final sample is composed of 231 UK listed companies[8] across the period 2003-2012, which consists of approximately 2,200 observations and an unbalanced data set. The companies in the sample are those that were listed on the FTSE350 as at 2012. Therefore, the study allows the entrance and exist of companies during the sample, and this results in an unbalanced dataset. Survivorship bias occurs when studies are conducted on databases that have eliminated all companies that have ceased to exist (often due to bankruptcy). The findings from such studies most likely will be upwardly biased, since the surviving companies will look better than those that no longer exist. For example, many mutual fund databases provide historical data about only those funds that are currently in existence. As a result, funds that have ceased to exist due to closure or a merger do not appear in the databases. Generally, funds that have ceased to exist have lower returns relative to the surviving funds. Therefore, the analysis of a mutual fund database with survivorship bias will overestimate the average mutual fund return because the database only includes the better performing funds. Due to the difficult in collecting information on delisted companies, who often have poor performance, we hope after allowing firms to enter and exit the market freely the bias will be minimised.

In order to reduce the risk of outliers, the data is winsorised at the 1% level using a STATA programme. The process of winsorising the data ensures that the data is not distorted due to outliers in the data. In this study, dummy variables are not winsorised as they are bound between 0 and 1. In relation to other adjustments, companies who have nonsensical results, for example excessive gearing ratios and negative book values were excluded from the analysis to avoid distorting the data due to errors in the database. An

[8] The names of all the companies can be found in the Appendices, Table 10.1 and 10.2.

There are two alternative methods to winsorising. Firstly, there is the interquartile method, which is a graphical approach that displays the distribution of data and indicates which observations might be outliers. However, the most popular alternative to winsorising is DFBETA (Baum, 2006). DFBETA is where a measure is found for each observation in the dataset. The DFBETA for an observation is the difference between the regression coefficient for each independent variable which is calculated for all of the data, and the regression coefficient that is calculated with the observation deleted, scaled by the standard error calculated with the observation deleted.

4.3 Balanced and unbalanced Panel data analysis

The data used in this study is unbalanced panel data; therefore it is important to discuss the differences between balanced and unbalanced panel data. In unbalanced panel data the individuals (companies in this study) are observed at various times (Greene, 2011). There is a distinction between randomly missing data and non-randomly missing data, unbalanced panel data is the norm (Baltagi, 2005). A fixed panel, as is the case in this study, is one in which the same set of individuals are observed throughout the duration of the study period. Converting an unbalanced panel data into a balanced panel data leads to a large loss in efficiency, this process is therefore discouraged, and statistical packages are able to deal with unbalanced panel data sets without causing inconsistent estimators (Baltagi, 2005). For the unbalanced one-way error component model, GLS can be used as a least squares regression. A previous study (Chowdhury, 1994) demonstrates that for the fixed effects error component model, using the within estimator on an unbalanced panel data is efficient in comparison to using within estimators on balanced data. The unbalanced one-way error component model can be extended into a two-way model that includes time effects, this is used in a previous study (Wansbeek and Kapteyn, 1989). A

regression model with two-way error component disturbances can be expressed as follows:

$$Y_{it} = X_{it}\beta + \mu_{it}$$

Where $\mu_{it} = \mu_i + \lambda_t + V_{it}$

"*In panel data the same cross-sectional unit (say a family or a firm or a state) is surveyed over time. In short, panel data have space as well as time dimensions*." (Gujarati and Porter, 2009:591). Balanced panel data occurs when each cross-sectional unit has the same number of time series observations, in unbalanced panel data the number of observations differs among the panel units (Gujarati and Porter, 2009). "*Panel data can enrich empirical analysis in ways that may not be possible if we use only cross section or time series data*" (Gujarati and Porter, 2009:593).

There are several advantages of using panel data over cross-section or time series data, Gujarati and Porter (2009) state the following:

1. Panel data methods consider and control for individual heterogeneity as it is able to consider individuals, companies and countries as heterogeneous. Other data techniques such as time series data are unable to control for this, resulting in biased results.

2. Panel data combines both time series and cross-section data. The large number of data points enable more informative data with higher levels of freedom, efficiency and more variability, all whilst reducing collinearity between variables.

3. The nature of panel data allows the researcher to analyse important issues that are unable to be identified through cross-sectional or time series data. Panel data can detect and measure effects that can't be observed through cross-sectional and time series data. Panel data is more suitable for studying the dynamics of change, provided the panel data is long enough.

4. Panel data has the ability to be able to detect and measure effects better than pure cross-sectional, or pure time series data.

5. Panel data allows the use of the more complicated behavioural models to be tested, there are few restrictions compared to cross-sectional and time series data.

6. Panel data is often collected at the micro-level and supports the accuracy of the variables measured. The higher level of accuracy that panel data creates, results in the ability to minimise the bias that could be created if firms are aggregated into broad aggregates, resulting in minimising the bias.

There are several disadvantages associated with panel data (Gujarati and Porter, 2009); these are discussed as follows;

1. Design and data collection problems can include coverage issues or non-response. In particular, the problem of attrition whereby subjects of the panel data drop out over time, leading to future surveys containing fewer subjects.

   For this study, data is downloaded from the DataStream and Boardex databases; the company websites will be used to collect the remaining data from the annual statements of companies. Listed companies are the focus of the study and the companies (subjects) have to have been listed on the LSE for at least two years,

those companies who are new to the LSE listing are removed from the sample period.

2. Measurement errors or distortions may occur due to the mis-recording of data.

   For this study, all the measured indicators are from annual audited financial statements, therefore the chance of measurement errors are reduced.

3. Panels typically include annual data that cover a short period of time for each individual (company).

   For this study, panel modelling is required for the data set. Several models will be used to test the data which are drawn from a large population.

4.4 The Models

Panel data models can be classified into pooled ordinary least squares (POLS), fixed effects model (FEM) and random effects model (REM).

4.4.1 Pooled ordinary least squares

POLS is an estimation method that considers a constant intercept among all the cross-sectional units. The regression coefficients, i.e. the slope and the intercept, are equal for all units (in this study units translate to companies). The heterogeneity can be observed for all individuals; the constant term is present for all units and the model is an ordinary linear model and fit by least squares (Greene, 2011):

$$Y_{it} = \alpha + \beta_1 X_{it} + \varepsilon_{it}$$

This model assumes that the explanatory variables are strictly exogenous. "*A variable is said to be strictly exogenous if it does not depend on current, past, and future values of*

the error term ε_{it}". (Gujarati and Porter, 2009:594). A major disadvantage of this model is individuality and uniqueness can be camouflaged, the individuality of each company is subsumed in the disturbance term ε_{it}. The implications of losing the levels of individuality is the error term may be correlated with some of the regressors in the model, leading to biased and inconsistent estimated coefficients. One of the assumptions behind the classical linear regression model is there is no correlation present between the regressors, and the disturbance/error term (Gujarati and Porter, 2009).

Previous UK capital structure studies that have used pooled methods to analyse the determinants of capital structure are Ozkan (2001), and Bevan and Danbolt (2002). Bevan and Danbolt (2002) find the POLS results to be consistent with previous studies in the area (Titman and Wessels, 1988; Barclay *et al*., 1995; Rajan and Zingales, 1995; Berger *et al*., 1997). However, the study identifies how previous studies may be biased due to a failure to control for firm specific, time-invariant heterogeneity. Bevan and Danbolt (2002) compare their results using the POLS technique and using fixed effects panel estimation; significant differences are found, as discussed in Section 4.4.2. Ozkan (2001) uses POLS and GMM as a second method (discussed in Section 4.7.1). In line with Bevan and Danbolt (2002), other methods in addition to POLS will be used in this study, to ensure the firm specific and time invariant heterogeneity is controlled for.

4.4.2 Fixed Effects Least-Squares Dummy Variable (LSDV) Model

The second model is the fixed effects (regression) model; the main advantage over the POLS model is the ability of the model to overcome heterogeneity, the main disadvantage in the POLS model. This model assumes that the differences across the units can be expressed as constant terms (Greene, 2011), it can be expressed as follows:

$$Y_{it} = \alpha, + \beta_1 X_{it} + \varepsilon_{it}$$

Where:

ε_{it} = error term that captures the difference between time and companies

The model expects an intercept to vary between cross-sectional units; each unit has a fixed and unique intercept with the differences in the intercept reflecting the unobserved difference between the cross-sectional units.

Fixed effects model is also known as Least Squares Dummy Variable Model (LSDV) (Gujarati and Porter, 2009). This model is "*appropriate in situations where the individual specific-intercept may be correlated with one or more regressors. A disadvantage of LSDV is that it consumes a lot of degrees of freedom when the number of cross-sectional units, N, is very large, in which case we have to introduce N dummies (but suppress the common intercept term).*" (Gujarati and Porter, 2009:613). The model can be expressed as follows:

$$Y_{it} = \alpha_i + \beta_1 X_{it} + \mu_{it}$$

This model is widely used due to the simplistic nature of use and understanding, the 'within effect model' is used in situations whereby many groups in the panel data exists (Gujarati and Porter, 2009). The within effect model is particularly useful where dummies are used within the data. The variables are transformed using the group mean to avoid the use of dummies, and therefore a large degree of freedom from error. Another function of this model is the 'between effects' model, which uses group means of the variables; the analysis is performed on groups or subjects rather than individuals. This model is made up of the POLS model with the addition of dummy variables, these are used to represent each unit and a dummy variable is coded either 0 or 1 (Gujarati and Porter, 2009). There are several dummy variables in relation to the CEO characteristics

in this study, with 1 representing whether the answer to the question is yes. For example, is the CEO female? If the CEO is female the dummy variable is coded 1, while if the CEO is male the dummy variable is coded 0. One issue with the use of dummy variables is the instance of perfect collinearity, the avoidance of the dummy variable trap is vital to ensure the validity of the model. There are three ways to avoid this issue (Gujarati and Porter, 2009):

1. POLS drop a dummy variable (LSDV1).
2. POLS including all dummies but drops the intercept, resulting in producing an incorrect R squared (LSDV2).
3. POLS including all dummies and intercept, the model includes a restriction that the sum of parameters of all the dummies is zero (LSDV3).
4. Clustering of errors (discussed in Section 4.4.4)

Using POLS that drop a dummy variable is the most frequently used as it produces the correct statistics (Greene, 2011).

However, there are several disadvantages of the LSDV Model (Gujariti and Porter, 2009):

1. If there are too many dummy variables in the model the degrees of freedom will increase, the number of observations will decrease and the statistical analysis will be reduced. Models that contain a lot of dummy variables increase the risk of multicollinearity, enabling difficulty in the precise estimation of the parameters.

   Dummy variables are created in relation to this research surrounding CEO personal characteristics, for example, gender. However, dummy variables will be kept to the key ones to avoid the dummy variable trap.
2. LSDV may be unable to identify the impact of time-invariant variables in particular situations, often called nuisance variables or lurking variables.

For example, Graham *et al*. (2013) consider the impact of the gender of the CEO, and find that this does not change over time for an individual subject. The LSDV model may not be able to identify the impact of this time-invariant variable on leverage.

3. The error term μ_{it} requires careful consideration, there are several possibilities. The following options are available:
    1. Assume the error variable is the same for all cross-sectional units, or assume that the error variance is heteroscedastic.
    2. Assume that there is no autocorrelation over time.
    3. Assume that there is no such correlation between the error term of company 1 versus the error term of company 2.

In addition to using POLS in one previous study, Bevan and Danbolt (2002) use a second method, called fixed effects (FEM). Bevan and Danbolt (2002) find significant differences between these two methods in their study of UK company's capital structure, which contradicts many of the theories in relation to the determinants of capital structure. FEM is able to overcome the heterogeneity that is associated with the POLS method, Bevan and Danbolt (2002) highlight the importance of controlling for the fixed effects in their study. In another UK based study, Michaelas *et al*. (1999) use FEM with the inclusion of dummy variables. The UK data covers ten industries; therefore, the industry studies cannot be classified as a small sample of a larger population, indicating the REM would be inappropriate in this case. The use of FEM is demonstrated in the study by Michaelas *et al*. (1999), seven time and nine industry dummy variables are used. The study finds that time and industry specific have an impact on the capital structure of small companies in the UK. In this study, the method will follow previous studies in the capital structure field; however, the number of dummy variables will be restricted.

4.4.3 Random Effects Model

The inclusion of dummy variables does lead to a reduction in the number of degrees of freedom, posing the question of whether the dummy variables are necessary. The reasoning behind the use of dummy variables is the failure to include relevant explanatory variables that do not change over time, and through the use of dummy variables in the model we are able to improve the model (Gujarati and Porter, 2009). If dummy variables do present a lack of knowledge about the model, this ignorance can be expressed through the disturbance term. This model is called the error components model (ECM) or the random effects model (REM) (Gujarati and Porter, 2009). The model is similar to the fixed effects model in that the intercept is allowed to vary between units; the variation is randomly determined and therefore there is a loss of freedom in comparison to the fixed effects model. The error term consists of two components: $\varepsilon_{i,}$is the cross-section or individual specific error component, while μ_{it} is the time series and cross-sectional error component (idiosyncratic term). The ECM is named because of the two error components (Gujarati and Porter, 2009), it can be expressed as follows:

$$Y_{it} = \alpha + \beta_1 X_{it} + (\varepsilon_{it} + \mu_i)$$

The composite error is made up of two elements. The first element is the cross section, or company specific, error component, ε_{it}. The second element is the combined time series and cross-sectional error component, μ_i. The error term ε_{it} is indirectly observable. A random effect model assumes the individual effect (heterogeneity) is not correlated with any regressor, and estimates the error variance that is specific to groups. The intercept and slopes of the regressors are the same across each individual, the difference within the individuals lies within their individual specific errors, as opposed to in their intercepts (Greene, 2011). A random model is estimated by generalised least squares (GLS), in

situations whereby the covariance structure of an individual is known. The feasible generalised least squares (FGLS), and estimated generalised least squares (EGLS) can be used to estimate the variance-covariance matrix (Greene, 2011).

This model is applicable to situations in which individuals are drawn randomly from a large population. Al-Najjar and Hussainey (2011) use the FEM and REM methods for a study of UK companies in the field of capital structure and corporate governance, the choice between the random and fixed effects model is determined through applying the Hausman test, discussed in Section 4.5.2.

Panel data can consist of group effects, time effects or a mixture of the two effects, these effects can be fixed or random. Fixed effect models assume differences in the intercepts between the time or group periods, the random effect model analyses the differences in error variances (Gujarati and Porter, 2009). Panel data is able to be used to control for any correlated, time-invariant heterogeneity without observing it (Arellano, 2003). The unobserved effect can be correlated with the explanatory variables (Wooldridge, 2002). Gujarati and Porter (2009) criticise the panel data approach, stating that "*despite its increasing popularity in applied research, and despite the increasing availability of such data, panel data regressions may not be appropriate in every situation. One has to use some practical judgement in each case*" (Gujarati and Porter, 2009:613).

Previous research for capital structure panel data in the UK has used all the methods discussed so far; POLS, FEM and REM. In this research, all methods will be used, conducting the Hausman test to distinguish whether to use the FEM or REM approach. The combination of FEM and clustering of errors (Discussed in Section 4.4.4) provides an alternative to the issues that occur following the use of POLS and REM.

4.4.4 Clustering of errors

One solution to avoid the dummy trap variable is through using the clustering of errors. Data are often collected in clusters, in particular to reduce the costs involved in the collection of data. A two-level model may arise in data that are grouped by industry. A typical panel data contains observations across multiple companies, and across multiple time periods (Thompson, 2011). For example, market wide shocks will impact the correlation between companies at a specific point in time; persistent firm specific shocks will have an impact on correlation across time. Persistent common wide shocks, such as the economic crisis in 2008, could have an impact on the correlation between different companies in different years (Thompson, 2011). Failure to control for within-cluster error correlation can lead to misleading small standard errors; leading to narrow confidence levels, large t-statistics and low p-levels (Cameron *et al*., 2008).

There are several techniques that are used to adjust standard errors for correlation along a single dimension. These include Fama and MacBeth (1973), the procedure produces standard errors that are robust to correlations between companies at a moment in time. Other techniques by Huber (1967) and Rogers (1983) produce clustered standard errors that are robust to either correlations across companies at a moment in time, or correlation within a company across time. Clusters that are calculated by time enable observations that are correlated within each time period. Clusters that are calculated by companies enable observations to be correlated across companies, these are independent across the companies. These techniques are used to calculate standard errors across one dimension and not simultaneous. The nature of panel data requires correlation across two dimensions; time and company.

There are several techniques that are used to control for clustered errors in the linear regression model (Cameron *et al.,* 2008), the first is to specify a model for the within-cluster error correlation. Parameters of the error correlation model are estimated, followed by estimating the original model using FGLS, as opposed to OLS. For example, the use of random effects estimators, random coefficients and hierarchical models. The use of this model creates valid statistical inferences, estimates of the parameters that are based on the original model, are more efficient in comparison to OLS. To enable the use of this model the within-cluster error correlation model has to be correctly specified. A second method is firstly to control for the clustered errors through estimating the regression model, with reduced control for within-cluster error correlation. Secondly, using post-estimation to obtain 'cluster-robust' standard errors for OLS models that contain multivariate dependent variables (White, 1984). The model can also be used on linear and nonlinear models (Liang and Zeger, 1986), and fixed effects estimator in linear panel models (Arellano, 1987). These models do not require the specification of the model; however, it is assumed that the number of clusters, rather than the number of observations, goes to infinity. Cluster-robust standard errors are growing in popularity, Rogers (1993) and Bertrand *et al*. (2004) demonstrate how previous studies have failed to control for clustered errors. There is a programme within STATA to address these errors, which will be used in this study. Before commencing the use of standard errors, the data needs to be considered for the distribution of the errors, regressors and the number of observations across the two dimensions (Thompson, 2011).

The standard error formulas are estimates of true, unknown standard errors. Those formulas are more robust but have less bias, whilst more estimation of variance. The reduction in the bias enables improvement in the performance of the test statistics, however, the increase in the variance can lead to size distortions. In situations where the

sample size is small the robust standard error formulas can find statistical significances, even when it does not exist (Thompson, 2011).

The use of panel data does present biased OLS standard errors; these can either over or under estimate the actual variability of the coefficient estimates (Petersen, 2009). In papers published in the Journal of Finance, the Journal of Financial Economics and the Review of Financial Studies between 2001 and 2004, 45% of the papers did not report adjusting the standard errors for possible dependence on the residuals (Petersen, 2009). Other alternatives that were used include the use of dummy variables for each cluster (i.e. the company), use of the Fama-MacBeth (1973) procedure, Rogers (1993) standard errors and the Newey-West procedure (1987) (Petersen, 2009). The use of clustering of errors in the area of capital structure has previously been used in a study by Frank and Goyal (2009) for US data, using two-dimension clustering of errors - company and year. One previous study uses clustering of errors for CEO and board characteristics to incorporate company level clustering, observations are taken every three years (Linck *et al.*, 2008).

4.5 How to select between panel models

The decision on which model to use when using panel data is decided through using two STATA based tests; breusch-pagan lagrange multiple (LM) and the Hausman test.

4.5.1 Breusch-Pagan Lagrange Multiplier (LM) Test

The F test is based upon the goodness of fit of the model, which measures the degree to which the fitted model can explain the variation of the dependent variable. The F test is designed to compare an OLS model with the FEM. STATA produces the analysis of variance (ANOVA), which includes the F statistic. The F statistic is a test of the null hypothesis that the slope coefficients in the model is jointly zero (Baum, 2006).

The test statistic is given as (Brooks, 2008):

Test statistic = $\frac{RRSS-URSS}{URSS}$ x $\frac{T-k}{m}$

Where URSS = RSS from unrestricted regression

RRSS = RSS from restricted regression

m = number of restrictions

T = number of observations

K = number of regressor in unrestricted regression including a constant in the unrestricted regression (or the total number of parameters to be estimated).

The null model:

$y_i = \mu + \mu_i$

This is as successful as describing y as the regression alternative (Baum, 2006). Alongside the F test the p value (significance) is considered, if the p value of the observed F is sufficiently low, the null hypothesis can be rejected (Gujarati and Porter, 2009).

The LM test is for the REM, and tests if the REM is able to deal with heterogeneity better than the pooled OLS model. The null hypothesis assumes that there are no random effects, if the hypothesis is rejected the REM is chosen over the OLS. If the null hypothesis is accepted the OLS is used (Gujarati and Porter, 2009).

4.5.2 Hausman Test

In situations whereby simultaneity exists, OLS is not applicable. However, in studies that wish to continue with this method the Hausman test can be used to test for simultaneity, to identify if an endogenous regressor is correlated with the error term (Gujarati and Porter, 2009). If a simultaneity problem exists, there are alternatives to OLS that can be used, if not then OLS can be used. Whilst it is a matter of judgment to decide whether a variable is endogenous or exogenous, the Hausman test can be used to determine if a variable, or a group of variables, are endogenous or exogenous. The Hausman Test (1978), also known as the Hausman test of endogeneity, is used to determine whether FEM or REM model of analysis should be used. The Hausman test is able to test the null hypothesis, that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. If they are, then it is safe to use random effects. If you get a statistically significant P-value, however, you should use FEM (Gujarati and Porter, 2009). One disadvantage of the Hausman test is the difference of covariance matrices may not be positively definite, indicating the null hypothesis is not rejected (Greene, 2011).

H_0 : μ_i are not correlated with X_{it}

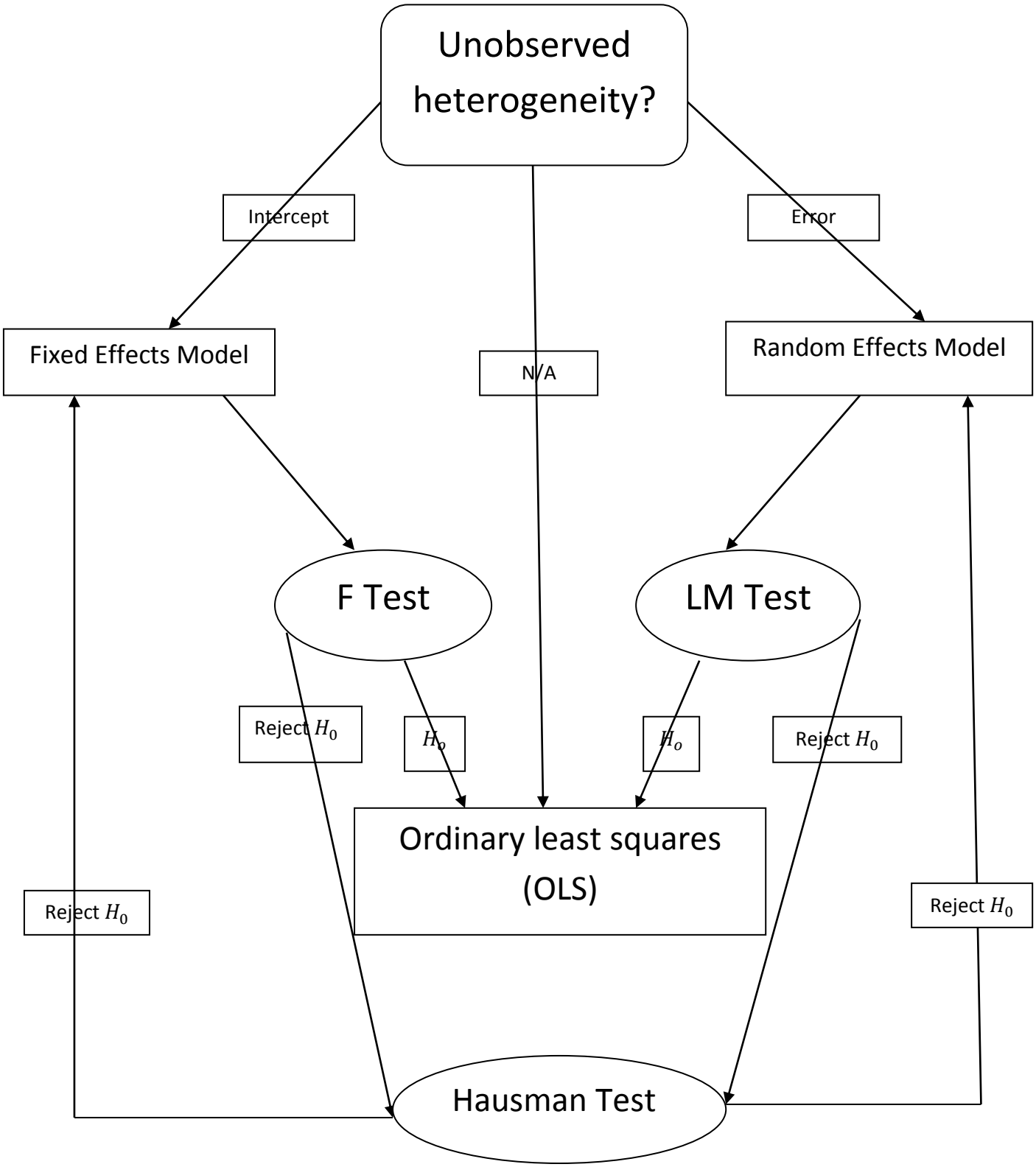
H_1 : μ_i are correlated with X_{it}

The Hausman test uses a test statistic:

$$(\hat{\beta}_F - \hat{\beta}_R)^T (\mathrm{V}(\hat{\beta}_F) - V(\hat{\beta}_R))^{-1} (\hat{\beta}_F - \hat{\beta}_R) \sim x^2(\mathrm{k})$$

Where $\hat{\beta}_F$ is fixed effects estimator with the variance-covariance matrix V ($\hat{\beta}_F$). The $\hat{\beta}_R$ is the random effects estimator with the variance-covariance matrix V ($\hat{\beta}_R$). The null hypothesis states that the random effects model is preferred to the fixed effects model.

The following Figure 1 describes the options available regarding heterogeneity:



4.6 Problems in multiple regressions

There are two main issues within multiple regression, multicollinearity and endogeneity. Multicollinearity occurs in situations whereby the independent variables are highly correlated with each other, it can be perfect or imperfect. The implications of multicollinearity, is it becomes difficult to distinguish the effect of one variable on another because you are unable to separate the effect of two or more independent variables on the dependent variable. Collinearity is the linear relationship between two independent variables; multicollinearity indicates that there are two or more independent variables having an impact on the dependent variable. The Gauss-Markov theorem states that among all linear unbiased estimators, the least square estimator has the smallest variance (Greene, 2011).

Multicollinearity will always be present in the data; there are two ways to identify whether multicollinearity exists within the data. The first method is a correlation matrix, correlations of 0.8 or higher indicate that multicollinearity exists between two independent variables. The second measure is the variance inflation factor (VIF); this test measures the increase in the variance of a coefficient as result of multicollinearity. Values of 10 or above in the VIF test indicate high levels of multicollinearity. VIF is directly related to the tolerance (TOL) value and VIF is measured by dividing 1/TOL (Greene, 2011). Gujarati and Porter (2009) state that "*As a rule of thumb, if the VIF of the variable exceeds 10, which will happen if* R_j^2 *exceeds 0.90, that variable is said be highly collinear*." (Gujarati and Porter, 2009: 340).

Endogeneity states there is a relationship between the dependent variables and/or the independent variables, which is in addition to the relationship being tested. Multicollinearity indicates that there are one or more independent variables that are

linearly related; however, no real casual relationship exists between the independent variables.

4.7 Dynamic Modelling

The econometric model that is used to interpret the relationship between the leverage of UK companies and each variable is GMM dynamic panel data estimation (Arellano and Bond, 1991). Data that contain time series data, which contain one or more lagged values of the dependent variable amongst the explanatory variables is called an autoregressive model, an alternative name is dynamic model (Gujarati and Porter, 2009). The ability of the model to *"portray the time path of the dependent variable in relation to its past value(s)"* (Gujarati and Porter, 2009:617) is a key advantage of this technique.

4.7.1 Generalised method of moments (GMM)

The classical theory of the method of moments was started by Fisher in 1935, the use of sample moments as part of estimating equations are a fundamental part of econometrics (Greene, 2011). GMM is an extension of the method of moments (MM), one example of MM is OLS, and the estimators are derived from the so-called moment conditions. The number of assumptions required to produce estimators are less in comparison to the OLS model, the estimates that are generated are more robust but less efficient. In GMM there are more sample moment conditions than parameters, in MM the number of sample conditions and parameters are the same. GMM reduces to MM in situations whereby the number of parameters equals the number of moment conditions. GMM estimators choose the estimates that minimise the quadratic form of the moment conditions (Greene, 2011).

GMM provides an estimation framework that includes least squares, nonlinear least squares, instrumental variables and maximum likelihood (Greene, 2011). GMM is more than a theoretical umbrella and provides a method to formulate models and estimators

without the use of strong assumptions. The use of additional information that is beyond what is necessary to identify the model is a key advantage, with some critics stating GMM is too relaxed; however, if used in the correct model it can enable the incorporation of more variables. GMM is able to overcome the issues surrounding the FEM; these include controlling for the presence of unobserved company specific effects, and the endogeneity of the explanatory variables.

The GMM technique has been used in previous corporate governance research (Conyon and Peck, 1998) and in econometric analysis; it has the benefits of taking account of the lag adjustments in companies leverage over time. Firstly, GMM is able to control for variable simultaneity and unobserved heterogeneity. Ozkan (2001) find that GMM is able to deal with highly persistent data, such as ownership data, one variable that is included in this study. Secondly, GMM allows for control for the firm-specific fixed effects, which are unobservable, yet can affect a company's financial decisions. Thirdly, the endogeneity issue can be overcome through choosing more efficient instruments (Ozkan, 2001).

Dynamic equation:

$$Y_{it} = \alpha + \beta_1 X_{it} + \gamma Y_{t-1} + \mu_i$$

The relationship between the dependent variable (Y) and independent variable (X) is rarely instantaneous (Gujarati and Porter, 2009). The dependent variable responds to the independent variable with a time lapse, called a lag. There are three main reasons for why the lagged phenomena occur. Firstly, psychological reasons. People do not change their habits immediately following a price change. For example, companies may not respond immediately to corporate governance guidelines suggested by The Code (1998:2009). The change that does eventually occur may either be permanent or

transitory, studies over a long period of time are able to identify between the two. For example, an increase in the percentage of debt in the capital structure will depend upon whether the increase is permanent or not. If it is a nonrecurring increase, future periods may see debt levels return to their previous level. The second reason for lags is for technological reasons; imperfect knowledge is a key driver behind why lags occur. If a change is expected to be temporary, companies will be unlikely to respond to the change. Particularly if it is expected that after the temporary change, a further drop is expected that reduces it below its previous level. This reason is linked to expectation theory, encouraging a delay in behaviour due to companies hesitating when making decisions surrounding their capital structure. The last reason is for institutional reasons, covenants can be attached to loans which may prevent companies from changing the percentage of debt for a period of time, once the covenant has expired, the company is no longer 'locked into' a particular type of debt or equity. Similarly, with regard to equity, shareholders may prevent future issues of shares in a financial year to avoid diluting their ownership (Gujarati and Porter, 2009).

The length of the lag is defined by how far back into the past the model will go. There are two types; infinite model and finite (lag) distributed-lag model (shown below), in this study the time period will be specified and the second model will be used.

$$Y_{it} = \alpha + \beta_0 X_t + \beta_1 X_{t-1} + \beta_2 X_{t-2} + \ldots + \mu_{it}$$

Endogeneity can present two key issues in analysing corporate governance panel data (Wintoki *et al.*, 2012). Firstly, unobserved heterogeneity can be present; this can occur when capital structure and a specific corporate governance variable are jointly determined by a company specific variable that is observed. Secondly, when a specific corporate governance variable and capital structure may be simultaneously determined, leading to

simultaneous endogeneity. Eisenberg *et al*. (1998) employ instrumental variables to overcome these issues; defining the instrumental variable is difficult in practise (Wintoki *et al*., 2012). The use of FEM in the area of corporate governance can lead to bias; therefore, Wintoki *et al*. (2012) suggest the use of the GMM model.

Ozkan (2001) uses GMM in a study of UK companies, and finds that GMM can be used to estimate a dynamic capital structure model. However, GMM only provides consistent estimates if valid instruments are set up and used. Ozkan (2001) finds evidence of a partial adjustment mechanism; companies adjust their leverage levels to move towards a target level.

4.8 Empirical Models

In this study, the independent variables will be split into three areas, these will be CEO characteristics (Chapter 5), board characteristics (Chapter 6) and ownership structure (Chapter 7). The control variables will be included in all of the models. The use of different estimation techniques could lead to conflicting results, the results will be discussed in this context. The use of three measures of leverage, combined with single and dynamic modelling could lead to difficulty interpreting the results.

There are two stages of the analysis that will be used in this research, the first stage is the linear regression model:

$$Y=X\beta + \mu$$

The second stage, is the dynamic model, as follows;

$Y_{it} = \alpha + \beta_1 X_{it} + {}_{\gamma}Y_{t-1} + \mu_i$

Where;

Y_{it} = Dependent variable

${}_{\gamma}Y_{t-1}$ = Change in the lagged dependent variable

α = Intercept in the pooled and random effect model.

β_1 = Row vector of slope coefficients of the regressors.

μ_i = Actual mean value for ith treatment.

X_{it} = Is a matrix of independent variables that include the following;

4.8.1 Dependent and independent variables

The next section describes the dependent and independent variables, with the inclusion of their source and codes that will be used in this study.

Variables collected: The following Tables; 4.1, 4.2 and 4.3 identify the list of variables, split into sections, showing where the data has been obtained from. Table 4.1 lists the dependent variables. Table 4.2 lists the control variables. Table 4.3 lists the independent variables, with the abbreviations, source and DataStream code if necessary.

Table 4.1: Dependent variables Y_{it} used in this study, with the abbreviations, source and DataStream code.

Variable	Description and Formula	Abbreviation	Source	Code
Leverage 1	Total Debt/Total Assets	Model 1	DataStream	WC03255/WC02999
Leverage 2	Short term Debt/Total Assets	Model 2	DataStream	WC03051/WC02999
Leverage 3	Long term Debt/Total Assets	Model 3	DataStream	WC03251/WC02999

Table 4.2: Control variables - firm specific variables X_{it} used in this study, with the abbreviations, source and DataStream code.

Variable	Description and Formula	Abbreviation	Source	Code
Asset tangibility	PPE/Total Assets	Tang	DataStream	WC02501/WC02999
Risk	Beta	Beta	DataStream	458E
Size	Log of Total Assets	Size	DataStream	LOG WC02999
Growth	Market to book value	MTBV	Datastream	MTBV
Liquidity	Current assets/current liabilities	CR	DataStream	WC08106

Table 4.3: Independent variables X_{it} used in this study, with the abbreviations, source and DataStream code.

Variable	Description and Formula	Abbreviation	Source	Code
CEO Age	Age of CEO in years	CEOAge	Financial statements/BoardEx	
CEO Tenure	Number of years CEO has been in the role	CEOTen	Financial statements/BoardEx	
Duality	Is the CEO role separate from the Chairman	DUAL	DataStream/financial statements	CGBS009V
CEO gender	Is the CEO female or not?	CEOFem	Financial statements/BoardEx	
CEO nationality	Is the CEO British or not?	CEOBrit	Financial statements/BoardEx	
Percentage of females on the board	Number of female directors/total board members (excluding the CEO)	Gender	DataStream/BoardEx	CGBS017V
CEO remuneration as a % of total board remuneration	CEO remuneration/Total board remuneration	CEOP	BoardEx	
No of board meeting	Across a 12-month period	BM	DataStream/financial statements	CGBFDP024
Board meeting attendance	Number of board meetings attended by all members/Number of meetings multiplied by board members	BA	DataStream/financial statements	CGBFDP027
Size of the Board	During a 12-month period	BSize	DataStream/financial statements	CGBSDP060
Percentage of NEDs	Number of NEDs/total board members	NEDs	DataStream/financial statements	CGBSO06V
5% concentration	Percentage of shares held by all insiders and 5% owners	Owner	DataStream/financial statements	CGSR003S
Institutional ownership	Percentage of shares held by	IO	DataStream	NOSHIC

	investors			
Managerial ownership	Number of ordinary shares owned by the board of directors/number of outstanding ordinary shares	BO	Financial statements/BoardEx	
Foreign ownership	Percentage of shares in holdings of 5% or more held by institutions domiciled in a country other than that of the issuer	FO	DataStream	NOSHFR

4.9 Conclusion

Previous studies that have included several of the independent variables find a mixture in the sign of the relationship (Table 3.1); this could be due to the period studied, and the country where the study was based. The contradiction in the signs of several of the independent variables are also dependent on the dependent variable, for example, there is no universal definition for what constitutes leverage. Therefore, comparisons could be difficult between previous studies and this research. Secondly, several of the independent variables that have previously been studied have led to inconclusive results, for example CEO nationality and board meeting attendance. The inclusion of more detailed data for all the variables in this study enable a contribution to the field on the relationship between capital structure and corporate governance for UK companies.

Chapter 5 Effect of CEO personal characteristics on capital structure

5.1 Introduction

The need for this research stems from the variation that still exists in the capital structure puzzle, following the identification of the firm specific variables that have been carried out in previous studies (Titman and Wessels, 1988; Rajan and Zingales, 1995; Ghosh *et al.*, 2000; Booth *et al.*, 2001). If one or more variables are found to represent some of the outstanding variation, the regulation surrounding the age of the CEO, for example, could form part of new advice reforms to all listed UK companies.

The debate over the importance of capital structure in companies is still ongoing; the first theorists M&M (1959:1963) still underpin the discussions. The independent variables in this study have previously been researched in previous time periods, in the UK and non-UK countries. However, the contribution of this research is split three-fold. Firstly, the ability to re-examine the potential determinants of capital structure in a UK context across the time period 2003-2012 for FTSE 350 companies, which has previously been under-researched in this context. For example, gender of the CEO and nationality of the CEO. Secondly, through the use of three definitions of leverage the relationship between leverage and CEO characteristics can be considered. The dependent variable is leverage; three measures of leverage will be used that combine short, long-term and total debt. Lastly, prior research has been as a whole, limited in the area to the use of single equation modelling, the use of single and dynamic modelling techniques in this study enables a lag period to be included to explore whether this could contribute to differences within a company's capital structure.

A total of six CEO variables will be collected in this study; these are CEO age, duality, tenure, percentage of compensation received as a proportion to total board compensation, gender and nationality. In this chapter, the six CEO variables will be combined with the five control variables, and used as the independent variables. The implications of this research encompass a wide number of parties; these include existing shareholders, potential shareholders and managers.

Capital structure in itself attracts attention because companies that have high levels of gearing are susceptible to financial distress costs; direct and indirect, with liquidation and bankruptcy following if a company is unable to service its debt. The advantages and disadvantages of debt and equity is not a new phenomenon, a company's objective is to maximise the advantages that are attached to debt and equity. A company is rarely entirely financed through equity; it is not possible for a company to be financed through 100% debt due to companies having to have a minimum of £50,000 share equity. Therefore, balancing the weighting of debt and equity is the ultimate goal of companies in order to maximise the advantage of each component in their capital structure; an incorrect balance could lead to liquidation and bankruptcy, and failure to benefit from savings generated through the tax shield. In the study period of the research, the UK experienced an economic downturn, the cause of the financial crisis in the UK in 2008 has numerous reasons attached to it. One of the reasons includes companies becoming over geared through taking out high levels of debt, leading to the inability to measure the risk levels that are attached to debt. There is no correct allocation of debt and equity that companies aspire to; however, the aim of this research is the identification of whether independent variables that are linked to the CEO can have an impact on the choice between debt and equity, and if they do what is the impact for the company.

There have been studies already carried out in the UK, these include Girma *et al*. (2007); Ozkan, (2001:2007). Girma *et al*. (2007) focus on the relationship between CEO pay, post Cadbury report (1991), and the performance of the company as opposed to the capital structure of the company. However, Girma *et al*. (2007) exclude the equity component of compensation and use static equation modelling. This is overcome in part by Ozkan (2007) who incorporates the equity component of compensation, in addition to cash, however Ozkan also applies static equation modelling. In this study, static and dynamic modelling will be applied to the dataset. These studies have established the key factors in relation to CEO compensation; this study will consider new variables and test if a relationship exists between CEO compensation and the company's capital structure. This study seeks to combine both components of compensation, cash and equity, and create a new independent variable that tests the relationship between CEO compensation in relation to the total board compensation. The lack of a definite definition of what constitutes CEO compensation, combined with the increase in the level of information now available per executive, enables a broader study to be conducted to determine whether the compensation of the CEO and the Board of Directors is a determinant of the capital structure puzzle. The focus on compensation levels is because increases in compensation could be being paid out at the expense of servicing debt through interest payments. Alternatively, directors could choose equity instead of debt because it decreases the monitoring of their compensation levels. These are two plausible reasons behind the capital structure choice, which make this research controversial.

5.2 Descriptive Statistics

This Section provides an initial analysis of the data in this study, providing the descriptive statistics, the correlation matrix and the variance influencing factor (VIF).

Table 5.1 shows the sample characteristics for the period 2003-2012. CEOAge is the age of the current CEO. DUAL is a measure of whether the roles of CEO and Chairman are one, or if they are split into two roles. CEOTen is the length of time the CEO has been in the role. CEOP is the percentage of total board compensation that the CEO receives as compensation in proportion to total board compensation. CEOFem measures whether the CEO is female or not. CEOBrit measures whether the CEO is British or not. Tang is the ratio measured by property, plant and equipment (PPE) divided by total assets. Size is the log of total assets. Mtbv is the market to book value. Beta is measuring the risk of the company. CR is the current ratio, measuring the short-term liquidity of the company.

Table 5.1: The descriptive statistics for the three dependent variables, CEO characteristics and the control variables.

Variable	Mean	Std. Dev.	Min	Max
Lev1	0.22	0.17	0.00	0.97
Lev2	0.04	0.07	0.00	0.86
Lev3	0.18	0.16	0.00	0.99
CEOAge	51.54	6.45	32.00	76.00
DUAL	0.04	0.20	0.00	1.00
CEOTen	5.56	5.78	0.00	36.40
CEOP	0.39	0.13	0.00	0.90
CEOFem	0.03	0.17	0.00	1.00
CEOBrit	0.65	0.48	0.00	1.00
Tang	0.29	0.23	0.00	0.95
Size	6.10	0.75	3.02	8.28
Mtbv	2.87	1.92	0.11	10.92
Beta	1.04	0.58	0.00	5.83
CR	1.49	0.92	0.16	5.87

Notes: Lev 1 – Total Debt/Total Assets, Lev 2 – Short-Term Debt/Total Assets, Lev 3 – Long-Term Debt/ Total Assets.

From Table 5.1 we can provide some preliminary analysis of the data, in comparison to previous studies that have included CEO variables. Lev1 is calculated as total debts divided by the total assets; debt is often taken out through securing it on the company's assets, and this is one ratio that has been commonly used in previous studies (Berger *et al*., 1997; Ozkan, 2001; Bevan and Danbolt, 2002; Frank and Goyal, 2009). This measure of leverage for FTSE 350 companies is on average 22%; this is in line with Berger *et al.* (1997), where the same leverage definition is used and the debt level is 24%. Lev1 is found to be lower in comparison to Bevan and Danbolt (2002) that find mean levels of debt to total assets to be 42% for the period 1991-1997 for UK companies, indicating that a decrease over the past ten years has occurred. In this study, leverage can be split into short and long-term debt. The ratio Lev2 is measured by short-term debt as a percentage of total assets, indicating in this study that FTSE 350 companies contain 4% of short-term debt as a percentage of total assets. The Lev3 ratio is calculated as long-term debt as a percentage of total assets, the mean in this study is 18% and reflects that long-term debt reflects 18% of the value of the total assets. The finding is in line with a previous US based study (Fosberg, 2012) that monitors debt levels throughout the time period 2001-2010. In this study, long-term debt reflects 18%, which is in line with the debt ratio in 2001; however, it decreases over a similar period in comparison to this study to become 15.4% in 2010.

With regard to the characteristics of the CEO there is a high range for the variable age of the CEO. The age of the CEO varies from 32 years to 76 years, with the average being 51 years old; this is slightly lower than findings by Brick and Chidambaran (2010) and Yim (2013) for US companies, and provides a source of comparison. The finding indicates that the age of the CEO is altering; the increase in younger CEOs could pose some questions regarding experience and how this could have an impact on capital

structure. However, the comparison is not with another UK study, and the wide age range in this study provides evidence that there is no minimum or maximum age with regard to CEO age that companies have to adhere to.

There is a low percentage of female CEOs; there are several reasons behind the low incidence of female representation on boards. Female CEO's account for 3% in the FTSE 350 companies, this is lower in comparison to 9.4% of CEOs being women that is found in a previous study by Faccio *et al*. (2012) in Eastern European countries.

There is a low incidence of duality; in this study, instances whereby the CEO and the Chairman occupy the same role account for 4% of the sample. This is in line with the Higgs report (2003) which recommends that the roles of Chairman and CEO should be separated; the data indicate that FTSE 350 companies have taken the recommendations on board. The cases of duality relate to early periods in the data covered, i.e. 2003-2005. Out of the 231 companies in this study, the 4% instances of duality relate to 23 companies, of which 4 companies have consistent duality over the ten-year period. Therefore, in 91% of the companies in this study, the two roles have been split, in line with the Higgs report (2003). The implications of splitting the two roles are control, power and decision-making are no longer controlled by one person within a company, and capital structure is one such decision-making process. Decision-making involves having discussions and agreeing on which source of capital the company should take out. The increase in the level of discussion could alter the final decision, ultimately altering the balance between debt and equity in the company's capital structure. The instances of duality have fallen significantly since the introduction of the guidelines in the Higgs report (2003) as expected, in comparison to a previous study over the period 1984-1991 when only 38% of US companies split the roles of CEO and Chairman (Brickley *et al*.,

1997). Therefore, this initial finding is not in line with previous studies; however, it is in line with the Higgs report (2003).

There is a wide variation in the length of the time the CEO has been in the role. The tenure of the CEO role varies between 0 years and 36 years, with the mean tenure occurring at 5.56 years. The extreme of the range is 36 years in the CEO role, which occurs for the company Renishaw, reinforcing that a lack of rules with regard to rotation of the individual in the CEO role could prevent CEOs being replaced. The finding in this study is slightly below the mean of 7 years which is found in a study of US companies (Yim, 2013), and covers half of the same time period in comparison to this study (2003-2007).

In two thirds of companies used in this study the nationality of the CEO is British, indicating that in the majority of companies in this study the CEO is of British origin, and in line with expectations as the study is based on UK companies. Therefore, using the measure nationality of the CEO as being British or not is not in line with previous studies. The implications are, if this study finds evidence of a link between CEO nationality and leverage levels, it provides an additional attribute that CEOs must possess when companies replace their CEOs.

The final variable related to the CEO is the compensation that the CEO receives. The results indicate a high percentage of total compensation is allocated to the CEO. CEO compensation on average consists of 39% of the total compensation that is paid to all the board members, over the financial year for companies in this study. In comparison to a US based study where the percentage is 52% (Adams and Ferreira, 2009), the percentage in this study is lower. Previous studies (John and John, 1993; Berger *et al.*, 1997; Bryan *et al.*, 2000; Ortiz-Molina, 2005; Eisdorfer *et al.*, 2013) use different variations to

measure the compensation of the board members; therefore, it is difficult to identify any consistency between previous research due to the wide variation of how compensation is measured. The ability to include the cash and equity components of director's compensation enables a broader study to be undertaken that is not only specific to the CEO. The Turnbull report (1999:2005) highlights director compensation; this is further amended in 2013 to include more detail that is required by law on changes to director compensation, and why these decisions have been made. Secondly, the equity that forms part of director's compensation will have to contain an estimation of the value, as opposed to the number of shares and share options. Lastly, the role of shareholders approving director compensation has grown in importance. The high percentage of compensation that is awarded to the CEO could provoke questions from shareholders, leading to a cap being enforceable that ensures that CEO compensation is reasonable and is comparable to other directors on the board.

The initial descriptive statistics highlight consistencies between this study and previous studies, the lack of comparability ensures because of the differences within the time period and companies that are used in this study. However, there are identified similarities, in particular CEO age, the percentage of female directors and CEO tenure. The variation in results to previous studies for duality is not surprising as the guidelines have since recommended against companies operating a dual system, while the wide variation in how compensation is measured presents valid reasons for inconsistencies within the results in comparison to previous studies.

Table 5.2: The correlation matrix between the dependent variable (Lev1) with the CEO independent variables, and the VIF result

	Lev1	CEOAge	DUAL	CEOTen	CEOP	CEOFem	CEOBrit	Tang	Size	mtbv	Beta	CR
Lev1	1											
CEOAge	0.0329	1										
	0.14											
DUAL	-0.0062	0.1829*	1									
	0.78	0.00										
CEOTen	-0.1091*	0.3645*	0.1986*	1								
	0.00	0.00	0.00									
CEOP	-0.0377	0.0306	-0.0497	-0.0195	1							
	0.09	0.17	0.0258	0.3818								
CEOFem	-0.0378	-0.0299	-0.0367	-0.039	0.0890*	1						
	0.09	0.18	0.10	0.08	0.00							
CEOBrit	0.0662*	-0.0063	-0.0485	0.1138*	-0.0876*	-0.0328	1					
	0.00	0.78	0.03	0.00	0.00	0.14						
Tang	0.2641*	0.0121	0.1000*	0.0183	-0.0870*	-0.0566	-0.1246*	1				
	0.00	0.59	0.00	0.41	0.00	0.01	0.00					
Size	0.2423*	0.1903*	-0.0666*	-0.1246*	-0.0405	0.0142	-0.1865*	0.1786*	1			
	0.00	0.00	0.00	0.00	0.07	0.52	0.00	0.00				
mtbv	0.0746*	-0.0645*	0.0441	0.0054	0.0212	0.0131	0.0387	-0.1174*	-0.1784*	1		
	0.00	0.01	0.06	0.82	0.36	0.57	0.09	0.00	0.00			
Beta	-0.0776*	-0.005	0.0158	-0.0750*	-0.054	-0.0058	0.0616	-0.0543	-0.0344	-0.0188	1	
	0.00	0.84	0.51	0.00	0.02	0.81	0.01	0.02	0.14	0.45		
CR	-0.2579*	-0.0045	0.0796*	0.0493	0.0262	0.0065	-0.1173*	-0.1519*	-0.1746*	-0.0615*	0.0541	1
	0.00	0.84	0.00	0.03	0.24	0.77	0.00	0.00	0.00	0.01	0.02	
	VIF	1.29	1.13	1.34	1.04	1.02	1.12	1.11	1.2100	1.05	1.03	1.1
	1/VIF	0.78	0.89	0.74	0.96	0.98	0.89	0.90	0.8232	0.95	0.97	0.91

*Correlation is significant at the 0.01 level.

Table 5.2 presents the correlation matrix and considers the relationship between the dependent variable of leverage, and the CEO characteristics that form the independent variables, with the VIF score per independent variable. There are no instances of strong correlation between any of the independent variables, this occurs when the relationship between two variables has a correlation of 0.8 or above (Gujarati and Porter, 2009). However, there are several instances of significant correlation at the 1% level. The variable CEOTen has a significant relationship with Lev1, CEOAge and DUAL. While

Lev1 also has a relationship with CEOBrit. CEOBrit has a significant relationship with CEOTen. One interesting positive relationship materialises between CEOFem and CEOP. Gender and compensation remains as a topical area, despite the Equal Pay Act in 1970, which is meant to ensure that regardless of gender, two people doing the same role will receive the same level of compensation; gender imbalance still remains. The pay of the CEO is a controversial topic as there are no guidelines; companies often rely on the pay of the previous CEO to set the compensation level.

Table 5.2 above shows the VIF for the dependent variable of leverage (Lev1). Gujarati and Porter (2009) state that "*As a rule of thumb, if the VIF of the variable exceeds 10, which will happen if* R_j^2 *exceeds 0.90, that variable is said be highly collinear.*" (Gujarati and Porter, 2009:340). The results indicate that all the coefficients have a VIF of below 10; therefore, there is no initial evidence of multicollinearity occurring.

5.3 The Models

In order to increase levels of robustness, three models will be used in this study to assess the impact on the dependent variable, leverage. In line with Bevan and Danbolt (2002), the determinants of leverage and the level of gearing depend on the measure of gearing that is used. There are several different definitions of leverage that have been used in previous studies. One of the first measures of leverage that was used is debt as a proportion to total assets (Rajan and Zingales, 1995; Michaelas *et al*., 1999; Bevan and Danbolt, 2002); this still remains a frequently used ratio in research. Other measures include long and short-term debt levels as a percentage of the book values of equity (Titman and Wessels, 1999), or in relation to total assets (Michaelas *et al*., 1999). More recently, the ratio book value as a percentage of debt, plus the book value of equity has been used (Charalambakis and Psychoyios, 2012).

In this study, there are three measures of leverage. The three measures of leverage are in line with Michaelas *et al*., (1999) who use short and long-term debt in the study of UK companies, while for US companies Fosberg (2012) uses long-term debt as a proportion of total assets. In this study, leverage will be calculated as follows:

Lev1 – Total Debt/Total Assets (Model 1)

Lev2 – Short-Term Debt/Total Assets (Model 2)

Lev3 –Long-Term Debt/Total Assets (Model 3)

In order to seek the possibility of investigating before the crisis and after the crisis, the data is split into two five year periods (pre-crisis is between 2003-2007, and post crisis is 2008-2012), to assess if the economic crisis in the UK has had an impact on the leverage of the companies. The data is assessed for structural stability, to avoid structural bias. Structural change can be tested by running a CHOW test in STATA. This test examines whether parameters of one group of data are equal to those of the other two groups (Greene, 2011).

The total variance is split into SSresidual and SSModel, the combination of these figures explains how the independent variables explain the model. The CHOW test takes the SSresidual figures. The results, (See Tables 10.3 and 10.4 in the Appendix) show that the results are generated from STATA for the residual SS, which is produced by running the regressions using the following independent variables: CEO age, CEO tenure, duality, CEO gender, CEO nationality, CEO compensation, tangibility, size, mtbv, risk and current ratio, with the dependent variable LEV1.

The P value is generated with the use of a calculator which informs you of the probability value of the F test, through using the F value, numerator degrees of freedom, and denominator degrees of freedom. The statistically significant p value, see Table 10.4 in Appendix, indicates that the null hypothesis of equal slope and intercept is rejected. Splitting the data into pre-crisis and during the crisis is not statistically possible due to the lack of structural stability, preventing the comparison of the two data sets to identify if the economic crisis has an impact on companies leverage levels. Therefore, the implication is the data will be considered for the whole period in the study, i.e. 2003-2012. Year dummies will be created for the period during the crisis: 2008-2012.

In line with previous studies, financial companies (banks, insurance companies, and investment trusts) are excluded because of the differences within the capital structure of financial and non-financial companies (Rajan and Zingales, 1995). In addition, the utilities sector (companies who provide a public service, for example gas, electricity and telephone) are excluded due to the high level of regulation present within the industry. Capital structure could be affected by the impact of high levels of, and therefore create artificially high, or low levels of debt/equity. The exclusion of utility companies is in line with a previous study (Ozkan, 2001).

Two stages of analysis will be conducted on the data in this study; these are single equation modelling and dynamic modelling. The use of two types of modelling could present differences within the results dependent on which modelling technique is used. The first model to be used in this study is single equation modelling, using panel data and the clustering of errors. Single equation modelling can create endogeneity issues; in order to overcome these issues a second model will be used which is GMM. The data will be tested for instances of endogeneity. Lag periods of one, two and three years will be tested to establish whether past decisions have an impact on current leverage levels,

and to identify the correct lag period to use in this study, see Tables 10.7, 10.10 and 10.13 in the Appendix.

5.4 Regression methods

The first part of the analysis is the use of single equation modelling. Single equation modelling considers the relationship between the dependent variable, and a number of independent variables. The dependent variable, leverage, can be measured in several different ways. The main model adopted is:

$$Lev_{it} = \alpha_0 + \alpha_1 \ CEOage_{it} + \alpha_2 \ CEOTen_{it} + \alpha_3 \ DUAL_{it} + \alpha_4 \ CEOFem_{it} + \alpha_5 \ CEOBrit_{it} + \alpha_6 \ CEOP_{it} + \alpha_7 \ Tang_{it} + \alpha_8 \ Beta_{it} + \alpha_9 \ Size_{it} + \alpha_{10} \ mtbv_{it} + \alpha_{11} \ CR_{it} + \varepsilon_{it}$$

A summary of previous studies is provided in Table 5.3, along with the expected prediction and those studies who find similar findings. This can be compared to the actual findings of this research following the analysis (Table 8.1). For some variables there is a lack of comparable studies in the field of capital structure in the UK.

Table 5.3: A summary of the sign of the hypotheses for the CEO characteristics based on empirical evidence, and relevant theory.

Independent variable	Prediction	Previous studies that find similar findings on Capital Structure	Theory
CEO Age (CEOAge)	Negative	Malmendier *et al*. (2010) Frank and Goyal (2009) Serfling (2012)	Agency theory/Managerial Signaling Model
CEO Duality (DUAL)	Negative		Agency theory
CEO tenure (CEOTen)	Negative	Berger *et al*. *(*1997) Malmendier *et al*. (2010)	Agency theory/Entrenchment Theory
CEO compensation (CEOP)	Positive	John and John (1993) Berger *et al*. (1997) Ortiz-Molina (2005)	Entrenchment Theory

		Eisdorfer *et al*. (2013)	
CEO gender (CEOFem)	Negative		Behavioural Theory
CEO nationality (CEOBrit)	Inconclusive	Jalbert *et al*. (2007)	Behavioural Theory

5.5 Regression using dynamic modelling

The results of the Hausman test, see Table 10.5 in the Appendix, indicate that in Models 1 and 3 the FEM should be used over the REM. While in Model 2 REM should be used over FEM.

In this study the first stage of regression is applying the OLS analysis, and identifying any endogeneity issues by utilising the Durbin-Wu-Hausman test and the fixed-effects model. The Durbin-Wu-Hausman is a common test that is applied to detect endogeneity of individual regressors. The avoidance of endogenous variables in the models is very important, endogenous variables occur whereby one of the independent variables has a relationship with the error term. In this study, all the independent variables are tested in STATA to identify if they are endogenous or not, variables that are classified as endogenous are shown in Table 10.6 in the Appendix. An endogenous variable is a dependent variable whose value is changed (determined) by one of the functional relationships in the model. A regression is carried out which includes the residuals of each endogenous right-hand side variable, as a function of all exogenous variables, in a regression of the original model (Gujarati and Porter, 2009). If a small p-value is generated then it means that OLS is not consistent, and the variable is endogenous. In this study the Durbin-Wu-Hausman test demonstrates that several of the independent variables in this study are endogenously determined. Therefore, the results reported from OLS are inconsistent, which implies it is because of the endogeneity issues. Due to the fixed-effects failing to capture dynamic endogeneity, a second stage of modelling is applied which is the GMM model.

There are four control variables that are consistently endogenous across all three measures of leverage; liquidity, tangibility, size of the company and growth. This study uses STATA software and commands to apply the GMM model to deal with endogeneity, demonstrating how the robust technique is able to control for the different types of endogeneity issues to enable unbiased estimates to be created. There are three CEO variables that remain endogenous across the three measures of leverage; the age of the CEO, the nationality of the CEO, and the tenure of the CEO. The high number of endogenous variables evident in this study provides strong evidence that the use of dynamic modelling is more suitable to the panel data, as opposed to the use of single equation modelling.

One advantage of using panel data is the increase in the number of instruments from which you can choose to control for endogeneity (Ozkan, 2001). The combination of observable and unobservable shocks can affect the capital structure decision, which can also affect the firm specific characteristics. The combination of panel data and GMM allows the issue of endogeneity to be mitigated by choosing the most efficient instruments to control for endogeneity (Ozkan, 2001). A previous study (Bhagat and Jefferies, 2002) find the issue of endogeneity increases for corporate governance variables. GMM incorporates lags into the data analysis, to identify if a change in corporate governance variables, such as a change in the CEO, can contribute to changes in a company's capital structure. Previous studies (Glen *et al*., 2001; Gschwandtner, 2005; Wintoki *et al*., 2012) suggest that to identify how the past decisions have an impact on the current data, a lag of one is sufficient. To establish whether one lag is sufficient, the data is tested by estimating the regression of current leverage using two and three lags, including other control variables; any lag that is sufficient at the 1% level will be selected.

A previous UK based study Ozkan (2001) finds evidence of a partial adjustment process taking place; a lag is identified to adjust to changes in the optimal target debt ratio. The findings from the study indicate that a company's costs of being away from their target debt ratio, and the costs involved to moving towards the target ratio are of great importance to companies. Therefore, there is a trade-off between the costs of being in disequilibrium, and the costs of making the adjustment to their target ratio

A lag of one year provides significant results to examine the dynamic relationship between leverage and CEO characteristics; the data is tested for lag periods of two and three years, and finds insignificant results, see Table 10.7 in the Appendix. This study is in line with Wintoki *et al*. (2012) who find that one lag is significant at the 1% level. The main assumption behind GMM is that all variables, except for the industry and year dummies are endogenous. GMM regression is tested for first-order AR (1) and second-order AR (2) serial correlation in the first differenced residual, see Table 5.5, under the null hypothesis of no serial correlation.

The models that will be used are as follows:

$$Lev1_{it} = \gamma_1 \mathrm{Lev1}_{\mathrm{it-1}} + \gamma_2 \mathrm{CEOAge}_{\mathrm{it}} + \gamma_3 \mathrm{CEOTen}_{\mathrm{it}} + \gamma_4 \mathrm{DUAL}_{\mathrm{it}} + \gamma_5 \mathrm{CEOFem}_{\mathrm{it}} + \gamma_6 \mathrm{CEOBrit}_{\mathrm{it}} + \gamma_7 \mathrm{CEOP}_{\mathrm{it}} + \gamma_8 \mathrm{Tang}_{\mathrm{it}} + \gamma_9 \mathrm{Beta}_{\mathrm{it}} + \gamma_{10} \mathrm{Size}_{\mathrm{it}} + \gamma_{11} \mathrm{mtbv}_{\mathrm{it}} + \gamma_{12} \mathrm{CR}_{\mathrm{it}} + \alpha_i + \alpha_t + \mu_{\mathrm{it}}$$

(Equation 1.1)

$$Lev2_{it} = \gamma_1 \mathrm{Lev2}_{\mathrm{it-1}} + \gamma_2 \mathrm{CEOAge}_{\mathrm{it}} + \gamma_3 \mathrm{CEOTen}_{\mathrm{it}} + \gamma_4 \mathrm{DUAL}_{\mathrm{it}} + \gamma_5 \mathrm{CEOFem}_{\mathrm{it}} + \gamma_6 \mathrm{CEOBrit}_{\mathrm{it}} + \gamma_7 \mathrm{CEOP}_{\mathrm{it}} + \gamma_8 \mathrm{Tang}_{\mathrm{it}} + \gamma_9 \mathrm{Beta}_{\mathrm{it}} + \gamma_{10} \mathrm{Size}_{\mathrm{it}} + \gamma_{11} \mathrm{mtbv}_{\mathrm{it}} + \gamma_{12} \mathrm{CR}_{\mathrm{it}} + \alpha_i + \alpha_t + \mu_{\mathrm{it}}$$

(Equation 1.2)

$$Lev3_{it} = \gamma_1 \text{Lev3}_{\text{it}-1} + \gamma_2 \text{CEOAge}_{\text{it}} + \gamma_3 \text{CEOTen}_{\text{it}} + \gamma_4 \text{DUAL}_{\text{it}} + \gamma_5 \text{CEOFem}_{\text{it}} + \gamma_6 \text{CEOBrit}_{\text{it}} + \gamma_7 \text{CEOP}_{\text{it}} + \gamma_8 \text{Tang}_{\text{it}} + \gamma_9 \text{Beta}_{\text{it}} + \gamma_{10} \text{Size}_{\text{it}} + \gamma_{11} \text{mtbv}_{\text{it}} + \gamma_{12} \text{CR}_{\text{it}} + \alpha_i + \alpha_t + \mu_{\text{it}}$$

(Equation 1.3)

The inclusion of year dummies that cover the financial crisis (2008, 2009, 2010, 2011 and 2012) enable the impact of the financial crisis to be considered in this study.

The following Tables; 5.4A, 5.4B and 5.5 show the results for single and dynamic modelling. The R squared values across both types of modelling are low, this is normal within the use of panel data.

Table 5.4A: OLS results for CEO characteristics and the control variables.

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CEOAge	0.00212***	0.000729***	0.00133**	0.00212***	0.000729***	0.00133**
	(0.000563)	(0.000196)	(0.000551)	(0.000571)	(0.000213)	(0.000553)
DUAL	0.0108	0.00411	0.00655	0.0108	0.00411	0.00655
	(0.0164)	(0.00571)	(0.0161)	(0.0153)	(0.00409)	(0.0163)
CEOTen	-0.00412***	-0.000947***	-0.00314***	-0.00412***	-0.000947***	-0.00314***
	(0.000651)	(0.000227)	(0.000637)	(0.000615)	(0.000223)	(0.000616)
CEOP	0.00929	-0.00197	0.0109	0.00929	-0.00197	0.0109
	(0.0251)	(0.00875)	(0.0246)	(0.0255)	(0.0106)	(0.0243)
CEOFem	-0.0306*	0.00695	-0.0380**	-0.0306*	0.00695	-0.0380**
	(0.0182)	(0.00634)	(0.0178)	(0.0169)	(0.00794)	(0.0175)
CEOBrit	0.0483***	-0.00862***	0.0563***	0.0483***	-0.00862***	0.0563***
	(0.00716)	(0.00249)	(0.00701)	(0.00723)	(0.00276)	(0.00689)
Tang	0.162***	-0.0107**	0.172***	0.162***	-0.0107**	0.172***
	(0.0140)	(0.00487)	(0.0137)	(0.0155)	(0.00430)	(0.0154)
Size	0.0517***	0.00553***	0.0467***	0.0517***	0.00553***	0.0467***
	(0.00490)	(0.00171)	(0.00480)	(0.00498)	(0.00166)	(0.00462)
Mtbv	0.00865***	0.00167***	0.00695***	0.00865***	0.00167***	0.00695***
	(0.00127)	(0.000441)	(0.00124)	(0.00145)	(0.000564)	(0.00151)
Beta	-0.0127**	-0.00373*	-0.00879	-0.0127**	-0.00373*	-0.00879
	(0.00564)	(0.00196)	(0.00552)	(0.00617)	(0.00197)	(0.00602)
CR	-0.0179***	-0.00691***	-0.0109***	-0.0179***	-0.00691***	-0.0109***
	(0.00237)	(0.000825)	(0.00232)	(0.00288)	(0.00106)	(0.00230)
Constant	-0.271***	-0.0117	-0.259***	-0.271***	-0.0117	-0.259***
	(0.0418)	(0.0146)	(0.0409)	(0.0458)	(0.0157)	(0.0423)
Observations	1,579	1,579	1,579	1,579	1,579	1,579
R-squared	0.266	0.098	0.233	0.266	0.098	0.233

NOTE: *** 1% significance ** 5% significance * 10% significance

Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets, Model 4 - Total Debt/Total Assets using clustering of errors, Model 5 – Short-Term Debt/Total Assets using clustering of errors, Model 6 – Long-Term Debt/ Total Asset using clustering of errors.

Table 5.4B FEM/REM results for CEO characteristics and the control variables.

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CEOAge	-0.00135**	0.000467*	-0.00163***	-0.00135	0.000247	-0.00163**
	(0.000541)	(0.000245)	(0.000553)	(0.000844)	(0.000357)	(0.000803)
DUAL	0.0222	0.00275	0.0218	0.0222	4.16e-05	0.0218
	(0.0169)	(0.00768)	(0.0173)	(0.0313)	(0.0115)	(0.0286)
CEOTen	-0.000264	-0.000970***	0.000738	-0.000264	-0.00102*	0.000738
	(0.000738)	(0.000311)	(0.000756)	(0.000987)	(0.000527)	(0.00103)
CEOP	-0.0868***	-0.0163*	-0.0728***	-0.0868***	-0.0157	-0.0728***
	(0.0195)	(0.00986)	(0.0199)	(0.0261)	(0.0140)	(0.0249)
CEOFem	0.0105	-0.00328	0.0201	0.0105	-0.00962	0.0201
	(0.0197)	(0.00882)	(0.0201)	(0.0222)	(0.00933)	(0.0162)
CEOBrit	-0.00232	-0.00714**	0.00114	-0.00232	-0.00364	0.00114
	(0.00756)	(0.00335)	(0.00774)	(0.0143)	(0.00449)	(0.0139)
Tang	-0.0111	-0.0153*	0.0135	-0.0111	-0.0320*	0.0135
	(0.0286)	(0.00834)	(0.0292)	(0.0421)	(0.0189)	(0.0451)
Size	0.0720***	0.00432	0.0683***	0.0720***	0.00258	0.0683***
	(0.00972)	(0.00284)	(0.00995)	(0.0158)	(0.00895)	(0.0163)
Mtbv	0.0100***	0.000885*	0.00930***	0.0100***	0.000696	0.00930***
	(0.00108)	(0.000522)	(0.00111)	(0.00187)	(0.000894)	(0.00216)
Beta	0.00149	-0.00392*	0.00589	0.00149	-0.00393	0.00589
	(0.00409)	(0.00211)	(0.00419)	(0.00610)	(0.00281)	(0.00624)
CR	-0.0105***	-0.00839***	-0.000957	-0.0105***	-0.00963***	-0.000957
	(0.00197)	(0.000947)	(0.00202)	(0.00294)	(0.00256)	(0.00253)
Constant	-0.151**	0.0214	-0.188***	-0.151	0.0486	-0.188*
	(0.0671)	(0.0210)	(0.0687)	(0.103)	(0.0613)	(0.110)
Observations	1,579	1,579	1,579	1,579	1,579	1,579
R-squared	0.123	0.059	0.090	0.123	0.059	0.090

NOTE: *** 1% significance ** 5% significance * 10% significance

Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets, Model 4 - Total Debt/Total Assets using clustering of errors, Model 5 – Short-Term Debt/Total Assets using clustering of errors, Model 6 – Long-Term Debt/ Total Asset using clustering of errors.

5.5.1 CEO Age

In line with the managerial signaling model (Prendergast and Stole, 1996), and more recent previous non-UK studies (Malmendier *et al.,* 2011; Serfling, 2012; Yim, 2013; Li *et al.,* 2014), a negative relationship is expected between CEO age and the level of debt in a company's capital structure. Agency theory is built on the differences between the owners (shareholders) and the managers (led by the CEO); CEO's who are older are focusing on ensuring their income is protected against any reductions, this includes their pension income once they leave their post. The impact on the capital structure is due to the payment structure of debt, the preference to take out equity is preferred, leading to a negative relationship.

The use of single equation modelling (OLS) demonstrates a positive relationship in all six models, see Table 5.4A, at the 1% significance level in Models 1, 2, 4 and 5. The significance levels reduces to 5% in Models 3 and 6. This is in not in line with the predicted hypothesis. The positive relationship indicates that Agency theory is not holding true when static modelling is applied, and companies who are run by older CEOs have a higher level of debt within their capital structure.

Applying FEM/REM to the data in this study identifies negative relationships in Models 1, 3, 4 and 6, see Table 5.4B, and allows the hypothesis to be accepted. However, the significant levels alter, depending on the choice of model. In Model 1 a negative and significant (at the 5% level) relationship is identified, while the significance is removed following the clustering of errors. In Model 3 the relationship is negative and significant at the 1% level; however, the significant levels alters to 5%, following the clustering of errors, see Table 5.4B.

The negative relationship endorses the concept that CEOs who are older, and therefore have a breadth of experience in their current role and previous roles, are risk adverse and wary of increasing a company's debt levels. Risk levels also vary depending on why the leverage is required in a company; R&D has higher levels of risk attached to it in comparison to capital expenditure. Therefore, in this study the exclusion of the purpose for which companies are taking out short or long-term debt, encourages the level of subjectivity and prevents a more detailed understanding of the decision-making process to occur. CEOs who have low tenures in the role seek to prove their ability in the role; one way this is noticeable is through the stock market, and through making good future investment decisions. The requirement of capital to allow the uptake of future projects, often through debt rather than equity because it is seen as cheaper and quicker to obtain, often entails that the relationship begins to get complicated.

However, the use of a second static estimation technique (FEM/REM) changes the sign from positive to negative in Models 1 and 3. While the relationship remains positive in relation to short term debt, regardless of which static estimation technique is applied. The positive relationship indicates that older CEOs are preferring to take out short term debt at the expense of long term debt, indicating how CEOs view the risk levels of short term and long term debt differently. Whilst the positive relationship isn't statistically significant following the clustering of errors, it does identify how a change in the gearing definition could contribute towards the difference in the sign of the relationship.

5.5.2 CEO Duality

The existence of duality enables CEOs to become entrenched in the company, and thus the Boards of Directors find it challenging to monitor and discipline the CEO if necessary (Finkelstein and D'Aveni, 1994). The study is expecting to contain companies who have

nonduality due to the recent reforms by The Code (1998:2009); therefore, the relationship between leverage levels is expected to be negative and in line with a US study (Fosberg, 2004).

Under static modelling there is a lack of significant relationships identifiable when OLS and FEM/REM are applied, see Tables 5.4A and 5.4B. The relationship, although insignificant, is positive which is not in line with the hypothesis development.

It is now assumed for UK companies that the separation of the CEO and Chairman roles is expected, as opposed to being recommended. One of the earlier recommendations from the Corporate Governance reports is the separation of the two roles to ensure power is not centred on one person. The lack of a significant relationship doesn't provide support or discourage duality. Duality is centred upon Agency theory (Jensen and Meckling, 1976), to ensure no one person is able to influence aspects such as CEO compensation, or prevent the discussion of key corporate finance decisions coming to the Boardroom.

5.5.3 CEO Tenure

Entrenchment theory (Bebchuk and Fried, 2005) indicates that the longer the CEO has been in the position, the less likely they are to take on riskier projects, which require capital. Therefore, the payment of existing debt and not replacing this with new debt leads to a reduction in the debt levels. In line with previous US studies who use the OLS modelling technique (Berger *et al.,* 1997; Wen *et al.,* 2002; Malmendier *et al.,* 2011), a negative relationship is expected.

There is a consistent negative and significant (at the 1% level) relationship across all three models under OLS, see Table 5.4A, this is in line with the hypothesis. As CEO

tenure increases, there is evidence from this study of a reduction in the level of risk taking, a preference for avoiding the uptake of debt, and CEOs perceptions becoming restricted. As the tenure of the CEO increases, the board becomes more relaxed and less independent, which results in a reduced level of vigilance (Lorsch and MacIver 1989; Coles *et al.,* 2001). The monthly servicing of debt means it is associated with the requirement to ensure cashflows are more heavily monitored by the Board of Directors, in comparison to other sources of capital, such as equity. The findings indicate that as the tenure of the CEO increases, either the uptake of positive net present value projects is reduced, or finance is being sought from alternatives sources, other than through the uptake of debt. The company's growth prospects depend upon the uptake of positive net present value projects, leading to CEOs with long tenure periods developing short-termism.

The implication of the increase in the tenure of the CEO is it can lead to CEO entrenchment. The combination of the separation of the CEO and Chairman role can help alleviate this, while having a maximum time period that one individual can serve as a CEO prevents the issues occurring that surround entrenchment. CEOs with high levels of tenure are unlikely to desire the uptake of riskier projects, which could lead to CEOs losing their position, and the compensation that is tied into the role.

In comparison to OLS there is a lack of a significant and consistent relationships when FEM/REM is applied, see Table 5.4B. There is one significant (at the 1% level) and negative relationship in Models 2 and 5, which use the short-term measure of debt. These two models assess the uptake of short-term debt in relation to the CEO tenure; the findings indicate that as CEO tenure increases, there is a greater reliance on the issuance of short-term debt, as opposed to long-term debt. The implication of the finding is short-term debt is seen as less risky in comparison to long-term debt, CEOs with long tenure

periods are seeing short-term debt as a solution to avoiding the increase in risk levels. However, the avoidance of long-term projects could have a detrimental impact on the long-term health of the company.

5.5.4 CEO compensation

The relationship with leverage levels under the entrenchment theory (Bebchuk and Fried, 2005) is expected to follow that CEO compensation increases as the leverage levels decrease, indicating a positive relationship should exist. The expected positive relationship is in line with previous studies (John and John, 1993; Berger *et al*., 1997; Bryan *et al*., 2000; Ortiz-Molina, 2005; Eisdorfer *et al*., 2013).

There is a lack of any significant relationships when OLS is applied, see Table 5.4A. However, this changes when a second static modelling technique is applied. The findings between CEO compensation in Models 1, 3, 4 and 6 is negative, see Table 5.4B, and significant at the 1% level. In Models 2 and 5, REM is applied as opposed to FEM, the relationship remains negative; however, it is insignificant following the clustering of errors. The negative relationship is not in line with previous studies where positive relationships have been found. Previous studies on CEO compensation have included only the cash component of compensation; very few studies have included the equity component.

The transparency of CEO compensation has increased during the period of this study and enables a greater quantity of data to be collected on the various components that make up CEOs compensation. The variable can be linked to CEO power which is linked to CEO tenure, one independent variable in this study. The consistent negative relationship contradicts previous studies and rejects the hypothesis of a positive relationship. However, the consistent negative relationship for long-term debt and total debt indicates

that as CEO compensation levels increase, the debt levels reduce. The interest payments on debt and remuneration for directors are deducted in the same location in the income statement; therefore, the payment of one does not prevent the payment of the other. However, the payment of high remuneration packages will result in a lower availability of cashflows to service the debt, leading to the Board of Directors choosing other forms of capital other than debt.

Previous studies on CEO compensation have included only the cash component of compensation; very few studies have included the equity component. The transparency of CEO compensation has increased during the period of this study, and enables a greater quantity of data to be collected on the various components that make up CEOs compensation. The variable can be linked to CEO power which is linked to CEO tenure, one independent variable in this study. However, the consistent negative relationship for long-term debt indicates that as CEO compensation levels increase, the debt levels reduce. The interest payments on debt and compensation for directors are deducted in the same location in the income statement; therefore, the payment of one does not prevent the payment of the other. However, the payment of high compensation packages will result in a lower availability of cashflows to service the debt, possibly leading to the Board of Directors choosing other forms of capital other than debt.

The Code (1998:2009) focuses on disclosure of CEO compensation, and this has seen an increase in the level of detail presented in the annual statements. However, the regulation of CEO compensation is not a recommendation from the study due to the lack of a relationship. However, CEO compensation forms part of corporate governance, and the prevention of power being centered on one person. Therefore, the increase in disclosures surrounding compensation of the Board of Directors, combined with an increase in the levels of transparency encourage compensation levels to be more widely disclosed.

5.5.5 CEO Gender

In line with behavioural theory and previous studies (Adams and Ferrerira, 2009; Faccio *et al*., 2012; Graham *et al*., 2013) a negative relationship is expected between the gender of the CEO and leverage levels.

In line with the hypothesis, a negative relationship is identified in Models 1, 3, 4 and 6, which is significant (at the 10% and 5% respectively) when OLS is applied, see Table 5.4A, while positive yet insignificant in Models 2 and 5. The impact on capital structure concerns the differences between the risk levels of debt and equity, due to the inherent nature that debt has a higher risk attached to it because of the default risk. The finding indicates that if capital is required debt is not the preferred source of capital. However, there could be other reasons behind the avoidance of debt. For example, capital is simply not required in the company at the current time, debt capacity may have already been exhausted, or debt is not available. The use of a second static modelling technique (FEM/REM), see Table 5.4B, identifies no significant relationships between the gender of the CEO in all three models. Therefore, suggesting that the selection of the estimation technique can dictate the sign of the relationship. Prior studies in relation to gender have used the OLS technique, and the negative relationship is in line with these studies (Adams and Ferrerira, 2009; Faccio *et al*., 2012; Graham *et al*., 2013).

Previous studies identify evidence of gender impacting corporate decisions, for the US (Adams and Ferreira, 2009) and for companies in Norway (Ahern and Dittmar, 2012). Ahern and Dittmar (2012) consider the impact of companies in Norway having to conform to a percentage of female directors. For example, for a 20% increase in female board representation, the leverage level increases by 6.4%, therefore increasing the company's financial risk. However, there is very little evidence that the different

characteristics of men and women filter through to the corporate decisions, such as determining the level of debt in a company's capital structure. Debt has a lower risk level in comparison to equity; in line with these findings the relationship is negative between female CEOs and debt levels, in line with Adams and Ferrerira (2009), Faccio *et al.* (2012) and Graham *et al.* (2013).

The number of female CEOs is in the minority for UK companies; this is further fueled by the reduced availability of females with experience at CEO level. The Davis Report has seen increases in the percentages of female directors between 2011 and 2014; however, the absolute numbers still remain small.

5.5.6 CEO Nationality

Jalbert *et al.* (2007) considers the relationship between CEO nationality and compensation, the relationship between CEOs nationality and a company's capital structure was found to be inconclusive.

The application of OLS modelling, see Table 5.4A, finds a positive and significant (at the 1% level) relationship in Models 1, 3, 4 and 6, while negative and significant (at the 1% level) in Models 2 and 6. The significant relationships are removed through the second static modelling (FEM/REM) in Models 1, 3, 4 and 6. There is a negative and significant (at the 5% level) relationship in Models 2, the implication is the presence of a British CEO reduces the level of short-term debt. The difference between the significance of relationship depends on whether the debt is of a short or long-term nature, indicating that the presence of a British CEO reduces the level of short-term debt, replacing this debt with longer-term debt. This is in line with the hypothesis, which states that there is a relationship; however, in this study the relationship has not been found to be significant.

5.6 Similarities and differences between the two types of static modelling techniques

The use of static modelling, see Tables 5.4A and 5.4B, provides a lack of consistent and significant relationships within the dataset. One similarity is for the variable CEO duality, regardless of which static modelling technique is applied the relationship remains positive, yet insignificant. There are a number of differences between the sign of the relationship and the significance level in the six models, which are dependent on whether OLS, see Table 5.4A, or FEM/REM, see Table 5.4B, is applied. For example, the relationship between CEO age and leverage is positive and significant when OLS is applied in all Models, while the application of FEM/REM changes the relationship to a negative one which is insignificant. In some instances, for example CEO tenure, the sign of the relationship remains the same, however the relationship changes from being significant under OLS, to insignificant when FEM/REM is applied.

5.7 Dynamic Modelling Results

The following section applies dynamic modelling (GMM) to the same dataset. The results are expected to differ due to the different modelling techniques, and these differences will be discussed in Section 5.8.

Table 5.5 presents the results of using GMM with a lag of one for all models.

Table 5.5: The results of GMM for the CEO characteristics using a lag of one year.

Independent Variables	Model 1	Model 2	Model 3
Lev_{t-1}	0.503***	0.0450***	0.462***
	(0.00421)	(0.00250)	(0.00185)
CEOAge	-0.000595***	-0.000362***	0.000634***
	(8.56e-05)	(1.71e-05)	(8.42e-05)
DUAL	-0.0148***	0.0234***	-0.0662***
	(0.00263)	(0.00115)	(0.00445)
CEOTen	-0.000226**	-0.000357***	-0.00119***
	(0.000115)	(6.4A9e-05)	(0.000111)
CEOP	0.00667**	0.0145***	-0.0102***
	(0.00299)	(0.00135)	(0.00171)
CEOFem	0.0182***	0.0267***	-0.00284
	(0.00305)	(0.00190)	(0.00497)
CEOBrit	0.00201***	-0.00638***	0.00539***
	(0.000689)	(0.000401)	(0.000969)
Tang	-0.0236***	-0.0282***	0.0158***
	(0.00371)	(0.00119)	(0.00264)
Size	0.0672***	0.0102***	0.0610***
	(0.00135)	(0.000671)	(0.00107)
Mtbv	0.00730***	0.00111***	0.00642***
	(0.000142)	(5.4B9e-05)	(0.000106)
Beta	-0.00131	-0.00764***	0.00292***
	(0.000897)	(0.000281)	(0.000805)
CR	-0.00704***	-0.00805***	-0.000150
	(0.000113)	(4.47e-05)	(0.000100)
2008	0.00483***	0.000828***	0.00794***
	(0.000432)	(0.000231)	(0.000493)
2009	-0.0150***	-0.00358***	-0.00686***
	(0.000590)	(0.000263)	(0.000489)
2010	-0.0314***	-0.0103***	-0.0216***
	(0.000564)	(0.000263)	(0.000425)
2011	-0.0241***	-0.00595***	-0.0229***
	(0.000729)	(0.000250)	(0.000470)
2012	-0.0242***	-0.0129***	-0.0146***
	(0.000741)	(0.000312)	(0.000527)
Constant	-0.282***	0.0170***	-0.332***
	(0.0101)	(0.00392)	(0.00816)
AR1	0.000	0.000	0.000
AR2	1.00	1.00	1.00

NOTE: *** 1% significance ** 5% significance * 10% significance.

Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets.

The Sargan tests for overidentifying restrictions, the test indicates that the instruments that are used in the GMM are valid and not correlated with the error term. AR1 and AR2 are tests for first and second-order correlation in the first-differenced residuals, see Table 5.5. In line with Arellano-Bond (1991), the GMM estimation technique states that there must be first order serial correlation (AR1), while there is no second order correlation (AR2) in the residuals. The null hypothesis states that there is no first or second order correlation (AR1 and AR2); therefore, you need to reject the null hypotheses for AR1 and accept it for AR2 in order for GMM to be valid. Table 5.5 demonstrates that with a lag of one, all three models' AR1 are insignificant and the errors are uncorrelated with each other; therefore, you can reject the null hypotheses, while for AR2 the null hypotheses can be accepted.

5.7.1 CEO Age

The analysis of all the data using GMM indicates a negative and significant (at the 1% level) relationship between CEO age in Models 1 and 2, when a lag of one is used, see Table 5.5. This is in line with managerial signaling model (Prendergast and Stole, 1996), and recent previous non-UK studies (Malmendier *et al.*, 2011; Serfling, 2012; Yim, 2013; Li *et al.*, 2014), and in line with static modelling (FEM) in Model 1, See Table 5.4B. However, in Model 3 a positive and significant relationship exists when a lag of one (at the 1% level) is used. The positive relationship in Model 3, whereby long-term debt is considered in relation to CEO age, indicates CEO who are young are taking out higher levels of long-term debt.

The use of the dynamic model results in firstly a change in the sign of the relationship in some models, and secondly the significance level in comparison to the results from the static models used in this research, see Tables 5.4A and 5.4B. The negative relationship

under GMM indicates that as the age of the CEO increases the level of short and total debt decreases, this is in line with Agency theory (Jensen and Meckling, 1976) that CEOs who are risk adverse are at risk of becoming entrenched as their age increases. CEOs are demonstrating a difference in risk levels between short and long-term debt, with the uptake of short-term debt being seen riskier in comparison to long term debt. However, for total debt and short-term debt measures, there is a consistent negative and significant relationship, providing support for the concept of how debt sends signals to the market about the future prospects of the company, and their ability to perform as the CEOs of the company.

Research findings highlight the difference in the relationship between short and long-term debt. Short term debt has the disadvantage that the uptake of debt for less than one year prevents companies growing in the long term. However, it has the advantage that CEOs are able to demonstrate to the Board of Directors, shareholders, the stock market and often future employees, that they have the ability in the role and can manage the servicing of debt. If companies have a history of not defaulting on the servicing of their debt then the uptake of debt results in positive, however not significant, growth for the company.

Therefore, the relationship between CEO age and long-term debt levels is significant and positive. However, the relationship between CEO age and short-term debt becomes negative and significant. Splitting the data based on the term of the debt presents an interesting finding, it highlights that as the age of the CEO increases the level of long-term debt increases. The implications of this finding are short-term debt will have a higher interest rate applied to it as opposed to long-term debt. Secondly, the use of short-term debt prevents the long-term growth in a company as long-term capital projects require long-term capital investment. This study suggests that whilst total debt decreases as the age of the CEO increases, levels of long-term debt increase.

5.7.2 CEO Duality

The application of GMM to the data finds a negative and significant (at the 1% level) relationship between duality in Models 1 and 3 using a lag of one year; the relationship is consistent with a previous study (Fosberg, 2012). While a positive and significant (at the 1% level) relationship in Model 2 is identified using a lag of one, see Table 5.5. Model 3 considers long-term debt as a proportion of total assets, which is in line with a previous study (Fosberg, 2012), which considers the impact of the economic downturn on a company's capital structure. Research findings support the negative relationship between duality in Model 3, which is in line with an earlier study by Fosberg (2004). The findings are inconclusive in this study, as the results vary depending on the choice of model and the choice of analysis method; one consistent finding is the majority of companies in this study split the role of CEO and Chairman into two, which is in line with recommendations from The Code (1998:2009).

In instances where duality still remains, the uptake of short-term debt is higher, whilst there is a negative relationship between long-term debt. The finding provides support that in instances of duality, riskier short-term debt is taken out; however, the reasons behind why are beyond the scope of this doctorate. However, short-term debt has the advantage that is it is easier to obtain and does not require lengthy debate at the Board of Directors meetings, but it often has a higher cost attached to it. The research finds support that instances of duality is not leading to high levels of long-term debt being taken out, the opposite is true.

5.7.3 CEO Tenure

The lack of a significant relationship identified through static modelling, see Tables 5.4A and 5.4B, is overcome through applying GMM. A negative and significant relationship

(At the 5% level in Model 1, and at the 1% level in Models 2 and 3) is identified between CEO tenure in all three of the Models when a lag of one year is used; this is in line with previous US studies (Berger *et al.,* 1997; Wen *et al.,* 2002; Malmendier *et al.,* 2011).

Research findings indicate that the levels of short and long-term debt are reduced as the tenure period of the CEO increases. The implication of the finding is CEOs with longer tenure periods are at risk of becoming entrenched, leading to a lower risk level occurring. The lower risk level has an impact on the capital structure decisions, leading to lower levels of debt being taken out as the tenure of the CEO increases. The findings could encourage the Board of Directors to review the maximum tenure period that is allowed by all of their directors, not just their NEDs, to avoid CEOs building up power and restricting the capital structure decisions. At this stage, the finding can lead to guidance being recommended to companies. The Code (1998:2009) provides companies with guidance, and non-compliance does not result in any fines or penalties for companies. However, this could be implemented indirectly through imposing gearing limits, or capital requirements on companies in a similar way that banks have regulation.

5.7.4 CEO compensation

In line with FEM/REM, see Table 5.4B, there is further evidence of a negative and significant (at the 1% level) relationship, see Table 5.5, in Model 3, between the percentage of CEO compensation and leverage when the GMM approach is used with a lag of one year. In Model 1 and 2 the relationship is positive and significant (at the 5% and 1% level) when a lag of one year is used, this is in line with previous studies (John and John, 1993; Berger *et al*., 1997; Bryan *et al*., 2000; Ortiz-Molina, 2005; Eisdorfer *et al*., 2013). There is a lack of consistency between all three of the models in the sign of the relationship, this is because short-term debt is separated to identify if variations are

evident. Model 2 considers short term-debt, and the findings indicate that as the proportion of CEO compensation increases, so does the level of short term debt, potentially providing a source of capital to fuel the increase in the CEO compensation. However, the findings indicate that whilst short-term debt increases as CEO compensation increases, the level of long-term debt falls. The combination of these two findings indicate that companies could be at risk of short-termism, choosing to reject projects as these require long-term debt.

There is no one common ratio that is used in relation to CEO compensation, some studies include equity, while others analyse the top five directors on the board. The ratio in this study compares the CEO compensation to the total board compensation; the use of a different ratio could explain the differences within the findings for long-term debt.

5.7.5 CEO Gender

The use of GMM finds significant relationships between the variable CEO gender, as opposed to insignificant relationships that are identified through static modelling, see Tables 5.4A and 5.4B, in this study. In Models 1, and 2 the relationship is positive and significant when a lag of one year is applied. Therefore the presence of a female CEO increases the level of total and short term debt, which is not in line with previous studies (Adam and Ferrerira, 2009; Faccio *et al*., 2012; Graham *et al*., 2013).

In Model 3 there is a negative and insignificant relationship between long-term debt and gender of the CEO. The findings provides an initial argument that CEOs consider short term debt and long term debt differently. Previous studies (Malmendier *et al.,* 2011; Faccio *et al.,* 2012) have focused on the relationship between confidence levels risk and levels with the gender of the CEO. The relationship between risk levels and gender poses an interesting question, the risk level of debt is higher than the risk level of equity, this is

based around the servicing that debt entails. Research findings indicate that the presence of a female CEO increases the level of short-term debt, and total debt. However, there is no statistically significant relationship for levels of long-term debt. The relationship indicates that CEOs who are female are choosing to take out short-term debt at the avoidance of long-term debt. However, the instances of female CEOs in this study prevent any recommendation being proposed, the ongoing focus on CEO gender will enable future studies to identify whether there is a relationship.

The Davis Report contains targets and is purely for guidance. The number of female CEOs is in the minority for UK companies; this is further fueled by the reduced availability of females who have experience at CEO level. The Davis Report has seen increases in the percentages of female directors between 2011 and 2014; however, the absolute number still remains small.

5.7.6 CEO Nationality

The lack of significant relationships identified through static modelling is overcome through using GMM, which finds a positive and significant (at the 1% level) relationship between nationality of the CEO in Models 1 and 3, see Table 5.5. This is not in line with the hypothesis, and indicates that the presence of a British CEO increases the level of total and long term debt. While in Model 2 a negative and significant (at the 1% level) relationship exists when a lag of one year is used, indicating that the presence of a British CEO reduces the short term-debt levels of companies in the study. Dynamic modelling provides a mixed relationship, which depends on the model chosen. However, the relationship using GMM is significant in comparison to using FEM/REM, see Table 5.4B, in this study.

Previous studies surrounding the relationship between the nationality of the CEO and leverage have been scarce and inconclusive (Jalbert *et al.*, 2007). The difference between the significance of relationship depends on whether the debt is of a short or long-term nature, indicating that the presence of a British CEO reduces the level of short-term debt, replacing this debt with longer-term debt. The implication of nationality having a role in the capital structure decision encourages the Board of Directors to consider this recruitment aspect in line with the strategy of the company. The reasons are not conclusive from this one study alone. Possible reasons include how the relationship between British CEOs and UK banks could be closer in comparison to non-UK CEOs. Secondly, the geography of the situation of UK companies will lead to a higher percentage of British CEOs in the study.

5.8 Summary of differences within the use of estimation techniques and gearing definitions

There are differences between the application of two different types of static modelling, which is discussed in Section 5.6. The application of dynamic modelling creates several similarities, and differences, between the application of static and dynamic modelling to this dataset. Table 5.6 below shows the results of the significant relationships per independent variable, according to the estimation technique that is applied.

Table 5.6 The results of the relationships according to different modelling techniques for CEO characteristics.

Independent variable	OLS Lev1	OLS Lev2	OLS Lev3	FEM Lev1	REM Lev2	FEM Lev3	GMM Lev1	GMM Lev2	GMM Lev3
CEO age	+++	+++	++			++	---	---	+++
Duality							---	+++	---
CEO tenure	---	---	---		-		---	---	---
CEO compensation				---		----	++	+++	---
CEO gender	-		--				+++	+++	
CEO nationality	+++	---	+++				+++	---	+++

Notes: +++ significantly positive at 1% level, ++ significantly positive at 5% level, + significantly positive at 10% level. --- significantly negative at 1% level, -- significantly negative at 5% level, - significantly negative at 10% level.

Notes: Lev 1 – Total Debt/Total Assets, Lev 2 – Short-Term Debt/Total Assets, Lev 3 – Long-Term Debt/ Total Assets.

The positive relationship found when OLS is applied for the variable CEO age provides evidence that Agency theory is not holding true when static modelling is applied. Therefore, the finding indicates that companies who are run by older CEOs have a higher level of debt within their capital structure. The positive relationship is not in line with prior non UK studies (Malmendier *et al.*, 2011; Yim, 2013; Li *et al.*, 2014) who use OLS as a method of analysing the data, indicating the country of study could have an impact upon the sign of the relationship. However, the use of a second static estimation technique (FEM/REM) changes the sign from positive to negative, while the relationship remains positive in relation to short term debt. Whilst the positive relationship isn't statistically significant following the clustering of errors, it does identify how a change in the gearing definition could contribute towards the difference in the sign of the relationship. The positive relationship indicates that older CEOs are preferring to take

out short term debt at the expense of long term debt, indicating how CEOs view the risk levels of short term and long term debt differently.

The use of GMM highlights differences in the results which depend upon the gearing definition. A negative relationship is identified in Model 1, which in line with the FEM technique, and in line with prior OLS studies (Malmendier *et al.*, 2011; Yim, 2013; Li *et al.*, 2014). However, there is a difference in the sign of the relationship in Model 2, which changes from positive to negative when GMM is applied. Lastly, in Model 3 the use of GMM identifies a positive relationship, which is in line with the findings of OLS.

The application of the GMM technique to the data finds a negative, and significant (at the 1% level), relationship between duality in Models 1 and 3 using a lag of one year; the relationship is consistent with a previous study (Fosberg, 2012). However, the sign changes to become positive in Model 2, which considers short term debt. The finding provides support that in instances of duality, riskier short-term debt is taken out; however, the reasons behind why are beyond the scope of this doctorate. However, short-term debt has the advantage of being easier to obtain, and does not require lengthy debate at the Board of Directors meetings, but it often has a higher cost attached to it. The research finds support that instances of duality is not leading to high levels of long-term debt being taken out, the opposite is true.

For the variable CEO tenure, regardless of estimation technique or gearing definition, the relationship is negative and significant, and in line with prior OLS studies (Berger *et al.*, 1997; Wen *et al.*, 2002; Malmendier *et al.*, 2011). Research findings indicate that the levels of short and long-term debt are reduced as the tenure period of the CEO increases. The implication of the findings is it could encourage the Board of Directors to review the maximum tenure period that is allowed by all of their directors, not just their NEDs, to

avoid CEOs building up power and restricting the capital structure decisions. At this stage, the findings can lead to guidance being recommended to companies. The Code (1998:2009) provides companies with guidance, and non-compliance does not result in any fines or penalties for companies. However, this could be implemented indirectly through imposing gearing limits, or capital requirements, on companies in a similar way that banks have regulation.

It is difficult to compare the results of this study to prior studies in relation to CEO compensation, due to the lack of a uniform definition of how to calculate CEO compensation. The increase in the level of detail regarding the equity component, enable this study to fully consider all the components of CEO compensation. The sign of the relationship is dependent on which modelling is applied, with the application of OLS providing insignificant relationships. Under single equation modelling (FEM only) the relationship is significant and negative in all three models. The negative relationship remains through the use of dynamic modelling in Model 3, which consider long term debt levels. In Models 1 and 2 the relationship changes to become positive and significant when dynamic modelling is applied, which is in line with prior studies (John and John, 1993; Berger *et al.*, 1997; Bryan *et al.*, 2000; Ortiz-Molina, 2005; Eisdorfer *et al.*, 2013). Model 2 considers short term-debt, and the findings indicate that as the proportion of CEO compensation increases, so does the level of short term debt, potentially providing a source of capital to fuel the increase in the CEO compensation. However, the findings indicate that whilst short-term debt increases as CEO compensation increases, the level of long-term debt falls. The combination of these two findings indicate that companies could be at risk of short-termism, choosing to reject projects which require long-term debt.

Inconsistent relationships are evident for the variable CEO gender which depend upon the estimation technique applied, and the measure of gearing. The relationship changes, from being negative when OLS is applied, to positive when GMM is applied. However, in Model 3 the relationship remains as negative regardless of the estimation technique applied, while the relationship isn't significant when GMM is applied. Research findings indicate that the presence of a female CEO increases the level of short-term debt, and total debt. However, there are no statistically significant relationships for the level of long-term debt. The relationship indicates that CEOs who are female are choosing to take out short-term debt, at the avoidance of long-term debt.

For the variable CEO nationality, where there are significant relationships, there is consistency between the estimation models. However, there is a difference in the sign of the relationship which is dependent upon the gearing definition that is applied. In Models 1 and 3 the relationship is positive and significant, irrespective of whether OLS or GMM is applied. However, in Model 2, which measures short term debt, the relationship changes from being positive to negative, and significant, under OLS and GMM. The difference between the sign of the relationship depends on whether the debt is of a short or long-term nature, indicating that the presence of a British CEO reduces the level of short-term debt, replacing this debt with longer-term debt. The implication of nationality having a role in the capital structure decision is it encourages the Board of Directors to consider this recruitment aspect, in line with the strategy of the company.

5.9 GMM Partial adjustment

In this study, the signs and significance levels of the relationships vary for some of the variables depending on which measure of leverage is applied. The adjustment coefficient can be measured to identify the speed of the adjustment to the target capital structure, this

is in line with a previous UK study (Ozkan, 2001). Table 5.5 demonstrates that when applying a lag of one year the adjustment coefficient is relatively large, positive and significant (at the 1% level) in all three models. The adjustment coefficient is relatively large (greater than 0.5 in Model 1), and provides evidence of companies in this study adjusting their leverage ratios towards a target debt ratio. Several reasons behind why companies are taking steps to move towards their target debt ratio is because deviating from it is costly; secondly companies have a preference for debt in their capital structure over equity.

5.10 Impact of the financial crisis

At the end of 2007 in the UK the financial crisis that started in the subprime credit market ensured that a liquidity crisis was created in the short-term money markets. In 2008 the collapse of Lehman Brothers in September 2008 deepened the crisis, implicating the UK. The immediate impact is banks were required to issue additional equity to ensure the capital ratios were maintained.

In the UK, the financial crisis occurred on the 15th September 2008. In this study year dummies have been created for 2008,2009,2010,2011 and 2012 and applied using GMM with a lag of one year. Table 5.5 presents the findings in all three models. In Models 1, 2 and 3 there is a positive and significant (at the 1% level) relationship between leverage and the year 2008. The sign of the relationship changes from positive to negative (remaining at the 1% significant level), from the year 2009 onwards, regardless of which model is applied. Research findings provide strong evidence that the financial crisis is reducing the levels of total, short and long-term debt. The reasons behind the finding could be attributable to a lack of available debt due to the restrictions that were imposed shortly following the financial crisis. Secondly, companies may be choosing to avoid

debt because of an increased awareness of financial distress costs, both direct and indirect.

5.11 Conclusion

A variety of tools have been used to analyse the data. The three measures of leverage enable robustness checks to be conducted; there is a wide variation in the definitions of leverage that are used in prior research. The use of financial modelling (including OLS, FEM/REM, and GMM) assumes that there is a lag to adjusting to changes to the CEO; this is the adjustment process, which a previous study (Ozkan, 2001) identifies how partial adjustment occurs.

Research findings conclude that the following independent variables agree with prior research; CEO age and CEO tenure. There are several key contributions of this doctorate. There is evidence that CEOs are demonstrating a difference in risk levels between short-term and long-term debt levels. The implications on the long-term view of a company's capital structure is companies who have a younger CEO will have a different composition of debt, in comparison to a companies that are being run by older CEOs. The age that constitutes a CEO being young is classified as subjective, and likely to depend on several factors that are unable to be measured in this study. The link between the relationship of age and leverage levels could have implications on a company's future choice of CEO, companies that are seeking to increase their use of long-term debt will consider applications from CEOs who are older. However, age discrimination rules are likely to prevent the collection of this data, as companies will seek to avoid stating how a CEOs age was a contributor factor in the decision-making process when appointing a new CEO.

As CEO tenure increases, they will seek to avoid the additional monitoring from shareholders that occurs with the uptake of equity, preferring to take up debt instead of

equity. There are two possible reasons behind the negative relationship. Firstly, the longer a CEO is in the position the more time they have to learn to issue risky capital more appropriately; indicating that CEOs are taking out equity instead of debt when capital is required. Secondly, CEOs may have exhausted their companies' debt capacity early on in their tenure (Malmendier *et al.,* 2011), when additional capital is required, debt is removed from the list of options. Research findings identify that the variable CEO tenure is endogenous in all three models, therefore indicating strong support for the use of using GMM in this study. The results move from a negative insignificant relationship under FEM, see Table 5.4B, to a negative significant relationship under GMM, see Table 5.5, at the 1% significance level in all three models. This is in line with previous studies (Berger *et al.*, 1997; Wen *et al.*, 2002; Malmendier *et al.,* 2011), and enables conclusive findings to be generated from this research.

The consistent negative relationship, see Tables 5.4A and 5.5, which is regardless of the analysis technique, provides strong support of how the tenure period of the CEO can influence a company's capital structure. The implication of this finding for companies is to review the tenure period of CEOs to ensure transparency, and ensure they are meeting the objectives of the role.

The instances of duality existing in this study are very low; this is due to the recommended changes in the roles of the CEO and the Chairman as a result of The Code (1998:2009). The separation of the roles CEO and Chairman enables a more diverse discussion of the alternatives to debt, the impact is that in companies where the roles are not separated, the levels of short-term debt increase, while long-term debt decrease. The lack of significant relationships under static modelling and the inconsistent sign of relationships in the three models in this research under GMM, mean it is difficult to identify the impact that duality has on a company's capital structure. The high

percentage of companies that now adhere to the recommendations from The Code (1998:2009) could mask the impact that CEO duality is able to have on capital structure decisions.

Inconsistent relationships are identified between leverage, and the proportion of CEO compensation that is paid in relation to the total board compensation level. Possible reasons behind the difference within the relationship lies with the definition of the variable. CEOs compensation consists of many components; in this study, the variable is considering the relationship between the pay of the CEO in proportion to the compensation of the rest of the board members. Information in relation to compensation for all members of the Board of Directors in companies is now very transparent; companies can no longer hide this information from shareholders and stakeholders. The implications of the significant negative relationship between the proportion of CEO compensation and leverage, is companies will be more mindful of their compensation levels. Compensation has a more material impact on debt levels because of the impact that compensation has on cashflows levels, in comparison to equity levels which have no impact on cashflow levels. The Code (1998:2009) is currently focused on increasing disclosure levels; in the future it could include guidelines on compensation levels for all members of the Board of Directors. For example, the CEO compensation can't be greater than 25% of the total board compensation.

Research findings indicate that there is a relationship between leverage levels and the gender of the CEO, and as the number of female board members increase, the level of total debt and long-term debt increases. The variable has been included in this study due to the increase in the attention that is being placed upon the gender of the board members.

In line with the Davis report (2011_a: 2014_b)[9] the gender of directors is becoming a key influencer in UK companies for capital structure decisions, and this research further supports the notion that gender does play a key role in the choice between debt and equity. The implications of this research are centred on the recruitment process when a company is replacing their CEO. This is underpinned heavily by the Equal Diversity Act that is operational in the UK, and prevents companies from using gender to discriminate in existing and future roles. For example, during the recruitment process for a new CEO, rejecting an applicant based on gender is illegal. However, how gender is controlled for within companies is beyond this doctorate.

In addition to the gender of CEO, the nationality of the CEO is collected in this study. There is a lack of previous studies to indicate firstly whether there is a relationship, and secondly whether it is positive or negative. There are inconsistencies between the models in relation to the sign of the relationship. Research findings indicate that a higher level of total debt exists if the CEO is British, while there are lower levels of short-term debt. The implications centre on how the finding could guide the future CEO recruitment process; nationality information is contained within the applicant's CV and companies may seek out British applicants depending on their long-term capital structure plans.

[9] 2011_a Davis Report 2011, 2014_b Davis Report 2014

Chapter 6 Effect of Board characteristics and corporate governance on capital structure

6.1 Introduction

The Board of Directors was originally set up as a solution to the agency issue that is created through the separation of ownership from control that UK listed companies suffer from (Jensen and Meckling, 1976).

The focus of this chapter concerns the impact that the Board of Directors has on the capital structure decision, as opposed to the CEO characteristics in Chapter 5. The independent variables in this study have previously been researched in previous time periods, and in UK and non-UK countries. However, the contribution of this research is split three-fold. Firstly, the ability to re-examine the potential determinants of capital structure in a UK context across the time period 2003-2012 for FTSE 350 companies, which has previously been under-researched in this context. Secondly, through the use of three definitions of leverage, the relationship between capital structure and board characteristics can be considered. The dependent variable is leverage; three measures of leverage will be used that combine short, long-term and total debt in a UK context. The opportunity to consider short term debt enables differences to potential materialise, to identify whether companies are viewing short and long term debt in a different manner. Lastly, prior research has been as a whole, limited in the area to the use of single equation modelling. The use of single and dynamic modelling techniques in this study enables a lag period to be included, to explore whether this could contribute to differences within a company's capital structure.

The Code (1998:2009) is the combination of several previous corporate governance reports, and now forms the recommendations in relation to corporate governance for UK

listed companies. The report contains guidelines for companies to follow in relation to the composition of the Board of Directors, for example, the percentage of EDs and NEDs. However, The Code (1998:2009) forms a level of guidance for companies, and is not mandatorily enforceable. This is further compounded by the lack of a universal format; therefore, comparability between companies is often difficult. However, the link between good corporate governance and good corporate performance is well documented, and the very nature of not disclosing information can lead users of the financial statements to believe the company is hiding information. Therefore, the simple nature of one company deciding to disclose additional information has led to other companies following suit, and enabling good practice to occur.

The level of detailed information increasingly available in the financial statements does present a lack of comparability existing as the disclosures remain as voluntary. One universal act is the SOX Act (2002), which the UK has adopted following implementation in the US, the role of the Act is to provide guidance (OECD, 2004). The Board of Directors has become a form of regulation between state incorporation laws, and the stock exchange governance requirements (Hermalin and Weisbach, 2003). This has led to an increase in the level of disclosure, and enables more extensive research to be conducted. The overall aim of this research is to assess the impact that several key board characteristics could have on the capital structure puzzle, to explain the variation that still exists following the identification of the key variables established in previous UK and non-UK studies.

The financial statements of companies now contain profiles of all members of the board, including their age, gender, qualifications and previous work experience. There has been an increase in disclosures, which has seen an increase in the level of detail now provided in the financial statements for each member of the Board of Directors. The first

additional disclosure in relation to the Board of Directors is in relation to the attendance level at board meetings. The attendance level at each board meeting per director, that is scheduled, is available. In addition, some companies are going beyond the basic attendance records. Instances such as, providing reasons for non-attendance at meetings, and the mode of attendance, for example via Skype. The nature of disclosing information per director could lead to attendance levels increasing, as poor attendance could prevent board members gaining new board seats in other companies. It is expected that the higher attendance levels allow a greater degree of discussion to occur, which could lead to the uptake of equity instead of debt.

The number of members on the board has been the focus of previous studies (Berger *et al.*, 1997; Faccio and Lasfer, 1999; Hermalin and Weisbach, 2001), with large board sizes relating to a decrease in the speed of decision-making because of the increase in the level of discussion that large boards create. Previous UK studies have found inconsistent findings (Vafeas and Theodorou, 1998; Faccio and Lasfer, 1999; Al-Najjar and Hussainey, 2011). This research seeks to establish if there is a relationship between the size of the board and the capital structure in a company. The Board of Directors splits members into those that are independent and those that are not; the role that NEDs play has been seen as a key focus of previous corporate governance research. The relationship between the EDs and the NEDs can either aid or prevent decision-making, the subjectivity of the relationship makes it difficult to ascertain the impact on decision-making that NEDs have. One study (Weir *et al*., 2002) for UK public listed companies does find a negative relationship, which is due to the extra monitoring that debt entails. The study covers a three-year period (1994-1996); the aim of this study is to cover a ten-year period, and consider a longer time period than three years. The opportunity to consider a ten year period allows the chance to see if there are patterns, or trends

occurring within the UK dataset. The increase in the importance of having at least 50% of the board as independent is one driver in this research, there is a lack of previous studies that consider the impact, if any, on capital structure.

The intensity of board activity has been measured by previous studies as the number of board meetings held. The lack of guidance as to the minimum and maximum number of board meetings a company should hold per year can create wide variations between companies. The increase in disclosure of the number of board meetings has seen an increase in how important companies are now viewing this corporate governance measure, it is rumoured that disclosing the number of board meetings has resulted in an increase in the number of meetings being held. Companies that are being seen as proactive, are viewed in a positive manner by the stock market. The use of the stock market, which is used by several key stakeholders to make decisions such as whether to invest or divest in a company, can be a key influencer on capital structure decisions. The issue of equity is dependent on the stock market and the current share price, whilst it is not as critical for the issue of debt. The stock market's reaction to the uptake of debt is an indication of whether the market views the decision in a positive, or negative way. The nature or agenda of the meeting is never disclosed beyond the members of the board; however, this is a disclosure that is being requested. The minimum information that is being requested is the reason for the board meeting, for example to discuss the issue of new shares. Previous research focuses on the relationship between board characteristics and company performance (Klein, 2002; Farber, 2005; Larcker *et al.*, 2007), in this study, the focus is upon the relationship between board characteristics and capital structure.

There are two key aims of this research, firstly the identification of the impact on the capital structure choices available to companies. Secondly, the identification of key corporate governance variables that require attention from companies. The study

considers the composition of the board in the context of the impact that having NEDs, or an all-male board, could have on the choice between debt and equity. The inclusion of the independent variable gender of the EDs and NEDs, enables the research to consider the impact that male and female directors could have on the capital structure decisions of a company. The Davis Report (2011_a:2014_b)[10] advocates the increase in female board members; this study seeks to overcome the lack of evidence as to why the gender mix of the Board of Directors could impact the choice between debt and equity. The differences between debt and equity are well documented. The key difference in relation to this study surrounds the differences within the level of monitoring that are associated with debt, this could lead to a higher number of board meetings, an increase in the number of NEDs and an increase in the size of the board.

In the UK, there is a gender imbalance in the board room. The first Davis Report in 2011 seeks to establish what the current mix of male and female directors is over the period 2004-2010, leading to the establishment of the creation of targets for 2014. Whilst companies are encouraged to meet these targets set by the Davis Report, there are no penalties for not adhering to the targets. The appointment of women to the Board of Directors, in roles they are not suitable for, creates additional costs for the companies; therefore, the reasons behind the appointment of women board members has to be in the best interests of the company. Whilst the benefit of female directors is not established, neither are the disadvantages, posing the question of whether the gender of the board members is a valid variable in the capital structure decision. Previously there has been difficulty in obtaining the information regarding gender, which has prevented more extensive studies; however the availability of the information has increased the degree of attention that is now placed on the gender diversity of the boardroom. The disclosure of

[10] 2011_a Davis Report 2011, 2014_b Davis Report 2014

the gender of board members has forced companies to consider the gender of new appointments to the board. A key previous study (Graham *et al.*, 2013) relates to the gender of the EDs in relation to their attitude to risk and confidence levels. Therefore, leading to gender potentially having an impact on the risk of capital structure decisions. Gender studies can be inherently controversial and often implicit, which has led to a gap within the capital structure research. A further issue, is the degree to which decisions can be wholly dependent on the gender of the board members, the difficulty in measuring individual attitudes to risks and how this leads to a corporate decision does prevent conclusive findings from previous research.

6.2 Descriptive Statistics

The following Section provides an initial analysis of the data in this study, providing the descriptive statistics, the correlation matrix and the VIF.

Table 6.1: The descriptive statistics for the three dependent variables, Board characteristics and the control variables.

Variable	Mean	Std. Dev.	Min	Max
Lev1	0.22	0.17	0.00	0.97
Lev2	0.04	0.07	0.00	0.86
Lev3	0.18	0.16	0.00	0.99
Gender	0.07	0.09	0.00	0.44
BSize	9.07	2.53	4.00	20.00
BM	8.81	3.00	0.00	33.00
BA	0.95	0.05	0.55	1.00
NEDs	0.62	0.14	0.22	1.00
Tang	0.29	0.23	0.00	0.95
Size	6.10	0.75	3.02	8.28
Mtbv	2.87	1.92	0.11	10.92
Beta	1.04	0.58	0.00	5.83
CR	1.49	0.92	0.16	5.87

Notes: Lev 1 – Total Debt/Total Assets, Lev 2 – Short-Term Debt/Total Assets, Lev 3 – Long-Term Debt/ Total Assets.

The Table above shows the sample characteristics for the period 2003-2012.

Gender is the percentage of directors, executive directors (EDs) and NEDs on the board that are female, excluding the gender of the CEO. BSize is the size of the board, including EDs and NEDs. BM is the number of board meetings held per year. BA is the percentage of board meetings that are attended by all board members. NEDs is the percentage of non-executive directors as a percentage of total board members. Tang is the ratio measured by property, plant and equipment (PPE) divided by total assets. Size is the log of total assets. Mtbv is the market to book value. Beta is measuring the risk of the company. CR is the current ratio, measuring the short-term liquidity of the company.

From Table 6.1 we can provide some preliminary analysis of the data in comparison to previous studies that have included board variables.

In our sample, female board members (excluding CEOs) consist of 7% of all board members. This is in line with the Davis Report (2011), which states that 7.8% of directors on the FTSE 250 companies in 2011 are women; however, the report does not split female CEOs from the data. The finding is in line with a previous study that finds 8.1% of directors are female (Adams and Ferreira, 2009). The implication of this finding is the process of appointing new directors will become more robust and transparent, encouraging companies to look beyond the obvious pool of female candidates through more innovative recruitment processes. The use of social media to encourage a higher number of applications from women, combined with an increase in the availability of the roles and responsibilities that are attached to being on the Board of Directors, could increase the level of interest from women for board roles. The use of online marketing tools enables a greater reach to be obtained in comparison to advertising the role within the circle of the business, and the world they exist in. Potentially companies could be encouraged to look at successful academics, civil servants, and women with charity backgrounds, as opposed to those few women who have industry backgrounds.

The Higgs report (2003) recommends a reduction in the number of EDs and NEDs on the board. The range of board members in this study is from 4 to 20 board members, which includes EDs and NEDs. The average board size is 9 members in this study, which is lower in comparison to a study by Yermack (1996) who find a mean board size of 12 board members. The finding is in line with the findings from the Davis report (2011), who find board size varies between 6 and 18 members, which is a large range. A previous study in the UK finds a board size of 8 (Vafeas and Theodorou, 1998), this is in line with this study which uses more recent data. The implication of the comparison is the size of the board is stable and companies are not constrained to operate with a fixed board size, which enables flexibility to operate.

The Higgs report (2003) recommends that at least 50% of board members should be NEDs; this study finds that on average 62% of board members are NEDs. This is slightly higher than a previous UK study, which finds 55.5% of directors are independent (Vafeas, 1999). However, in this study the range varies between 22% and 100%, indicating that not all companies are complying with the recommendations proposed by the Higgs report (2003). The instances of non-compliance with the recommendations vary across the ten-year period of this study, as opposed to falling within the earlier period. The finding provides evidence of companies responding to a delay in altering the number of board members in response to the Higgs report (2003). The implication is the role of an NED varies depending on the company; one change observed whilst collecting the data is the movement towards an independent Chairman in latter periods of the study. The impact of this observation is companies can increase their independence levels without appointing an additional board member. However, additional board members bring additional compensation, which companies may wish to avoid.

The intensity of board activity is often measured as the number of board meetings per year; in this study the mean number of board meetings is 8.81. This is slightly higher than a previous UK study (Vafeas, 1999) that finds the average number of board meetings is 7.45 per year. The range of board meetings is wide and varies between 0 and 33 meetings per year. The implication of an increase in board meetings is the cost, whilst there is not a cost per board meeting, the compensation of board members is linked to the expected work that is required by the role. Linked to the variable number of board meetings is the attendance at board meetings. This disclosure has become available through the annual financial statements and information is available per director, in this study, attendance at board meetings is high at 95%. The implication of high attendance is an increase in efficiency, which could lead to the avoidance of additional meetings. The

high level of consistency of board members enables a lack of repetitive material occurring on the agenda, and a greater depth can be achieved at the meetings as board members do not have a lack of knowledge due to missed meetings.

Table 6.2: The correlation matrix between the dependent variable (Lev1) with the Board independent variables, and the VIF result

	Lev1	Gender	BSize	BM	BA	NEDs	Tang	Size	mtbv	Beta	CR
Lev1	1.00										
Gender	0.0693*	1.00									
	0.00										
BSize	0.0899*	0.1676*	1.00								
	0.00	0.00									
BM	0.00	-0.01	-0.1104*	1.00							
	0.89	0.77	0.00								
BA	0.00	0.04	-0.1334*	-0.1191*	1.00						
	0.87	0.10	0.00	0.00							
NEDs	0.0790*	0.1890*	0.1767*	-0.02	-0.0781*	1.00					
	0.00	0.00	0.00	0.28	0.00						
Tang	0.2641*	0.05	0.0776*	-0.03	0.00	0.02	1.00				
	0.00	0.04	0.00	0.27	0.85	0.36					
Size	0.2423*	0.2742*	0.5908*	0.00	-0.06	0.4355*	0.1786*	1.00			
	0.00	0.00	0.00	0.88	0.01	0.00	0.00				
mtbv	0.0746*	0.0839*	-0.03	-0.06	0.00	0.02	-0.1174*	-0.1784*	1.00		
	0.00	0.00	0.25	0.02	0.96	0.32	0.00	0.00			
Beta	-0.0776*	-0.01	-0.02	0.0892*	-0.03	-0.0686*	-0.05	-0.03	-0.02	1.00	
	0.00	0.73	0.46	0.00	0.29	0.00	0.02	0.14	0.45		
CR	-0.2579*	-0.1709*	-0.1177*	-0.1264*	-0.02	-0.05	-0.1519*	-0.1746*	-0.0615*	0.05	1.00
	0.00	0.00	0.00	0.00	0.41	0.04	0.00	0.00	0.01	0.02	
	VIF	1.11	1.78	1.07	1.05	1.31	1.06	2.29	1.09	1.02	1.10
	1/VIF	0.90	0.56	0.93	0.95	0.76	0.94	0.44	0.91	0.98	0.91

*Correlation is significant at the 0.01 level.

There are no instances of strong correlation between any of the independent variables, this occurs when the relationship between two variables has a correlation of 0.8 or above. However, there are several instances of significant correlation at the 1% level. There is a

positive relationship between the variables board size and size of the company of 0.59, indicating that the size of the board increases as the size of the company increases. The relationship indicates companies appoint additional board members as the size of the company increases.

Table 6.2 above shows the VIF for the dependent variable of leverage (Lev1). Gujarati and Porter (2009) state that "*As a rule of thumb, if the VIF of the variable exceeds 10, which will happen if* R_j^2 *exceeds 0.90, that variable is said be highly collinear.*" (Gujarati and Porter, 2009:340). The results indicate that all the coefficients have a VIF of below 10; therefore, there is no initial evidence of multicollinearity occurring.

6.3 The Models

In this study, three measures of leverage will be used, and these are calculated as follows:

Lev1 – Total Debt/Total Assets (Model 1)

Lev2 – Short Term Debt/Total Assets (Model 2)

Lev3 –Long Term Debt/Total Assets (Model 3)

There are two stages of analysis that will be conducted on the data in this study; these are single equation modelling and GMM.

6.4 Regression of the pooled method

The first model to be used in this study is single equation modelling, using panel data and the clustering of errors. In this study, OLS and FEM/REM will be used. Single equation modelling can create endogeneity issues, to overcome these issues a second model will be used, which is the GMM. The data will be tested for instances of endogeneity; if variables are found to be endogenous, the GMM model will be adopted to overcome this

issue. Lag periods of one, two and three years will be tested, see Table 10.10 in the Appendix, to establish whether past decisions have an impact on current leverage levels.

In this study, the board characteristics will be combined with the control variables.

The models that will be used are as follows:

$LEV1_{it} = \alpha_0 + \alpha_1 \text{Gender} + \alpha_2 \text{BSize} + \alpha_3 \text{BM} + \alpha_4 \text{BA} + \alpha_5 \text{NEDs} + \alpha_6 \text{Tang} + \alpha_7 \text{Beta} + \alpha_8 \text{Size} + \alpha_9 \text{mtbv} + \alpha_{10} \text{CR} + \varepsilon_{it}$

$LEV2_{it} = \alpha_0 + \alpha_1 \text{Gender} + \alpha_2 \text{BSize} + \alpha_3 \text{BM} + \alpha_4 \text{BA} + \alpha_5 \text{NEDs} + \alpha_6 \text{Tang} + \alpha_7 \text{Beta} + \alpha_8 \text{Size} + \alpha_9 \text{mtbv} + \alpha_{10} \text{CR} + \varepsilon_{it}$

$LEV3_{it} = \alpha_0 + \alpha_1 \text{Gender} + \alpha_2 \text{BSize} + \alpha_3 \text{BM} + \alpha_4 \text{BA} + \alpha_5 \text{NEDs} + \alpha_6 \text{Tang} + \alpha_7 \text{Beta} + \alpha_8 \text{Size} + \alpha_9 \text{mtbv} + \alpha_{10} \text{CR} + \varepsilon_{it}$

Table 6.3 shows the expected sign of the relationship based on previous empirical studies that have been conducted in relation to each hypothesis, with the relevant theory.

Table 6.3: A summary of the sign of the hypotheses for the Board characteristics based on empirical evidence, and relevant theory.

Independent variable	Prediction	Previous studies that find similar findings on Capital structure	Theory
Percentage of female executives	Negative	Malmendier *et al*. (2011)	Behavioural theory
Board size	Negative	Berger *et al*. (1997) Al-Najjar and Hussainey (2011)	Agency theory
Board meetings	Negative		Agency theory
Board attendance	Negative		Agency theory
Percentage of non-executives	Negative		Agency theory/Stewardship Theory

Table 6.3 above identifies several negative relationships associated with the board characteristics, indicating how an increase in board activity can lead to a reduction in the uptake of debt. Table 6.3 also identifies a lack of studies in relation to these variables, in the case of the variable board attendance there are no comparative studies. Previous studies indicate a gap in the relationship between board characteristics and capital

structure in the UK context, with the focus being upon the relationship between board characteristics and company performance.

6.5 Regression using GMM

The results of the Hausman test, see Table 10.8 in the Appendix, indicate that when applying Models 1 and 3, the FEM should be used over the REM. While in Model 2, REM should be used over FEM as the results are significant.

The existence of endogenous variables, see Table 10.9 in the Appendix, in all three measures of leverage indicates that the use of static modelling in this study is not applicable; and the dynamic modelling is preferred over single equation modelling. The use of the GMM model assumes that all independent variables are endogenous.

The identification of the endogenous variables does vary, depending on the choice of model; however Models 1 and 3 have identical endogenous variables. The only board characteristic that is endogenous across all three models is the size of board, while with regard to the control variables tangibility, the size of the company, growth and liquidity are found to be endogenous, regardless of the model used.

Therefore, in line with Bhagat and Jefferies (2002) who find the issue of endogeneity does increase for corporate governance variables, the applicability of using dynamic modelling in this study is justified.

Testing the data using a lag of one, two and three, see Table 10.10 in the Appendix, identifies varying significance levels across the three models. In Model 2 no lag is required, while in Models 1 and 3, a lag of one is significant. Therefore, for GMM, a lag of one year will be used across all three models.

The models that will be used are as follows:

$$Lev1_{it} = \gamma_1 \text{Lev1}_{\text{it}-1} + \gamma_2 \text{Gender}_{\text{it}} + \gamma_3 \text{BSize}_{\text{it}} + \gamma_4 \text{BM}_{\text{it}} + \gamma_5 \text{BA}_{\text{it}} + \gamma_6 \text{NEDs}_{\text{it}} + \gamma_7 \text{Tang}_{\text{it}} + \gamma_8 \text{Beta}_{\text{it}} + \gamma_9 \text{Size}_{\text{it}} + \gamma_{10} \text{mtbv}_{\text{it}} + \gamma_{11} \text{CR}_{\text{it}} + \alpha_i + \alpha_t + \mu_{\text{it}}$$

(Equation 1.1)

$$Lev2_{it} = \gamma_1 \text{Lev1}_{\text{it}-1} + \gamma_2 \text{Gender}_{\text{it}} + \gamma_3 \text{BSize}_{\text{it}} + \gamma_4 \text{BM}_{\text{it}} + \gamma_5 \text{BA}_{\text{it}} + \gamma_6 \text{NEDs}_{\text{it}} + \gamma_7 \text{Tang}_{\text{it}} + \gamma_8 \text{Beta}_{\text{it}} + \gamma_9 \text{Size}_{\text{it}} + \gamma_{10} \text{mtbv}_{\text{it}} + \gamma_{11} \text{CR}_{\text{it}} + \alpha_i + \alpha_t + \mu_{\text{it}}$$

(Equation 1.2)

$$Lev3_{it} = \gamma_1 \text{Lev1}_{\text{it}-1} + \gamma_2 \text{Gender}_{\text{it}} + \gamma_3 \text{BSize}_{\text{it}} + \gamma_4 \text{BM}_{\text{it}} + \gamma_5 \text{BA}_{\text{it}} + \gamma_6 \text{NEDs}_{\text{it}} + \gamma_7 \text{Tang}_{\text{it}} + \gamma_8 \text{Beta}_{\text{it}} + \gamma_9 \text{Size}_{\text{it}} + \gamma_{10} \text{mtbv}_{\text{it}} + \gamma_{11} \text{CR}_{\text{it}} + \alpha_i + \alpha_t + \mu_{\text{it}}$$

(Equation 1.3)

Tables 6.4A, 6.4B and 6.5 show the results using single equation and dynamic modelling with a lag of one year.

Table 6.4A: OLS results for board characteristics and the control variables.

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Gender	-0.0761*	-0.0227*	-0.0546	-0.0761*	-0.0227	-0.0546
	(0.0393)	(0.0136)	(0.0387)	(0.0393)	(0.0160)	(0.0393)
BSize	-0.0124***	-0.00148**	-0.0109***	-0.0124***	-0.00148**	-0.0109***
	(0.00180)	(0.000621)	(0.00177)	(0.00186)	(0.000735)	(0.00186)
BM	0.000255	-0.000637	0.000874	0.000255	-0.000637	0.000874
	(0.00124)	(0.000428)	(0.00122)	(0.00140)	(0.000456)	(0.00140)
BA	0.00813	-0.0526**	0.0601	0.00813	-0.0526**	0.0601
	(0.0696)	(0.0241)	(0.0685)	(0.0720)	(0.0251)	(0.0721)
NEDs	-0.107***	0.00696	-0.113***	-0.107***	0.00696	-0.113***
	(0.0325)	(0.0113)	(0.0320)	(0.0346)	(0.0115)	(0.0337)
Tang	0.135***	-0.0111**	0.145***	0.135***	-0.0111**	0.145***
	(0.0146)	(0.00503)	(0.0143)	(0.0158)	(0.00432)	(0.0157)
Size	0.0898***	0.0127***	0.0776***	0.0898***	0.0127***	0.0776***
	(0.00722)	(0.00250)	(0.00711)	(0.00750)	(0.00273)	(0.00728)
Mtbv	0.00988***	0.00207***	0.00777***	0.00988***	0.00207***	0.00777***
	(0.00135)	(0.000467)	(0.00133)	(0.00154)	(0.000610)	(0.00163)
Beta	-0.00738	-0.00456**	-0.00264	-0.00738	-0.00456**	-0.00264
	(0.00605)	(0.00209)	(0.00596)	(0.00625)	(0.00195)	(0.00617)
CR	-0.0224***	-0.00667***	-0.0156***	-0.0224***	-0.00667***	-0.0156***
	(0.00248)	(0.000859)	(0.00245)	(0.00387)	(0.00105)	(0.00315)
Constant	-0.219***	0.0365	-0.258***	-0.219***	0.0365	-0.258***
	(0.0796)	(0.0275)	(0.0784)	(0.0829)	(0.0293)	(0.0813)
Observations	1,451	1,451	1,451	1,451	1,451	1,451
R-squared	0.254	0.090	0.213	0.254	0.090	0.213

NOTE: *** 1% significance ** 5% significance * 10% significance. Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets, Model 4 - Total Debt/Total Assets using clustering of errors, Model 5 – Short-Term Debt/Total Assets using clustering of errors, Model 6 – Long-Term Debt/ Total Asset using clustering of errors.

Table 6.4B: FEM/REM results for board characteristics and the control variables.

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Gender	-0.0624*	-0.0280*	-0.0299	-0.0624	-0.0325	-0.0299
	(0.0322)	(0.0159)	(0.0333)	(0.0460)	(0.0214)	(0.0508)
BSize	-9.97e-05	-0.000996	0.000271	-9.97e-05	-0.000539	0.000271
	(0.00154)	(0.000735)	(0.00159)	(0.00197)	(0.000961)	(0.00191)
BM	0.00216**	-0.000133	0.00209**	0.00216	0.000122	0.00209
	(0.000938)	(0.000477)	(0.000968)	(0.00136)	(0.000530)	(0.00129)
BA	-0.102**	-0.0640***	-0.0393	-0.102**	-0.0636**	-0.0393
	(0.0439)	(0.0240)	(0.0453)	(0.0455)	(0.0270)	(0.0481)
NEDs	-0.113***	-0.0152	-0.0836***	-0.113***	-0.0284*	-0.0836***
	(0.0254)	(0.0127)	(0.0262)	(0.0289)	(0.0163)	(0.0297)
Tang	-0.0340	-0.0141*	-0.00531	-0.0340	-0.0381*	-0.00531
	(0.0311)	(0.00806)	(0.0321)	(0.0468)	(0.0200)	(0.0514)
Size	0.0858***	0.0110***	0.0783***	0.0858***	0.00565	0.0783***
	(0.0113)	(0.00342)	(0.0116)	(0.0183)	(0.0101)	(0.0193)
Mtbv	0.0103***	0.00115**	0.00968***	0.0103***	0.000534	0.00968***
	(0.00111)	(0.000533)	(0.00115)	(0.00191)	(0.00102)	(0.00222)
Beta	0.00192	-0.00434*	0.00588	0.00192	-0.00348	0.00588
	(0.00428)	(0.00223)	(0.00442)	(0.00706)	(0.00305)	(0.00741)
CR	-0.00751***	-0.00760***	0.00107	-0.00751***	-0.00864***	0.00107
	(0.00203)	(0.000984)	(0.00210)	(0.00223)	(0.00279)	(0.00216)
Constant	-0.202***	0.0675**	-0.298***	-0.202*	0.111*	-0.298**
	(0.0777)	(0.0301)	(0.0802)	(0.116)	(0.0634)	(0.126)
Observations	1,451	1,451	1,451	1,451	1,451	1,451
R-squared	0.129	0.055	0.095	0.129	0.055	0.095

NOTE: *** 1% significance ** 5% significance * 10% significance. Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets, Model 4 - Total Debt/Total Assets using clustering of errors, Model 5 – Short-Term Debt/Total Assets using clustering of errors, Model 6 – Long-Term Debt/ Total Asset using clustering of errors.

6.5.1 Percentage of female executives and non-executives

The gender of EDs and NEDs is the subject of a UK based report (Davis, 2011_a:2014_b)[11]; the key objective is to increase the percentage of female representation on the Board of Directors. The reason behind the objective is those boards that are inclusive and diverse have a higher likelihood of being effective, with the goal being to improve decision-making (Davis, 2011). One such decision is in relation to capital structure, which forms the basis of this thesis. The goal of an optimal capital structure is the end goal in a company. However, in the short term ensuring that the mix of debt to equity is appropriate for the company at a particular point in time is fundamental. In addition to the key goal, other advantages include the ability to benefit from new ideas and fresh viewpoints, and the ability to challenge decisions and broaden experience. Previous research (Bruce and Johnson, 1994; Johnson and Powell, 1994) surrounds the differences between men and women and their attitudes to risk, and it is not a new area of research.

However, previous research focuses on how gender can have an impact on corporate decisions (Adams and Ferreira, 2009; Ahern and Dittmar, 2012; Faccio *et al.*, 2012). Indicating that the gender of board members is linked to levels of overconfidence, which can result in lower leverage levels in companies whose Board of Directors has a high presence of female directors. Previous research has not yet identified an ideal number of female directors on the Board of Directors; the Davis report provides recommendations for female representation on the board as a target for 2014. The data in this study goes up to, and includes the year 2012; therefore, companies are being seen as increasing their number of female directors. Reasons behind the increase could be in response to the Davis Report, or due to an increase in the number of suitable female candidates for the

[11] 2011_a Davis Report 2011, 2014_b Davis Report 2014`

role. In this study, the gender of the CEO is one variable that is considered in Chapter 5; therefore, for this variable, the gender of the CEO is excluded and only the gender of the remaining members of the Board of Directors is considered. The relationship is expected to be negative, in line with behavioural theory (Malmendier *et al.*, 2011), and previous studies (Graham *et al*., 2013; Malmendier *et al*. 2011).

The use of single equation modelling, see Tables 6.4A and 6.4B, provides a lack of a significant and consistent relationship. Whilst the relationships are negative, yet insignificant, which is in line with the hypothesis.

The Davis report (2011_a:2014_b)[12] has seen a small increase in the percentage of female directors between the 2011 and 2014 report. However, the small percentage of female directors currently on the Board of Directors in this study prevents wider conclusions from being established. At the current rate, the Davis report (2011_a:2014_b)[13] predicts it will take 70 years to achieve gender balance in the boardroom of UK companies.

6.5.2 Board size

In the UK, there are no recommendations on how many executives should make up the Board of Directors; however, the Higgs (2003) report provides some guidelines to reduce the size of the board. There is no definition of what constitutes a large or small board; it often depends on the size of the company. Previous research focuses on the increase in the level of communication and discussion that is a result of a large board size, indicating a negative relationship exists between board size and leverage levels. The relationship between the size of the board and capital structure is based upon Agency theory (Jensen and Meckling, 1976) and Entrenchment Theory (Bebchuk and Fried, 2005) and is

[12] 2011_a Davis Report 2011, 2014_b Davis Report 2014
[13] 2011_a Davis Report 2011, 2014_b Davis Report 2014

expected to be negative and in line with previous research (Berger *et al*., 1997; Al-Najjar and Hussainey, 2011).

There is a consistent negative and significant (at the 1% level) relationship, see Table 6.4A, identified through the use of OLS, which is in line with Berger *et al*. (1997). The application of a second static modelling technique, see Table 6.4B, provides slightly different results and removes the significant relationship. However, the negative relationship remains for all the models, except those that measure long-term debt.

A large board size can impact the speed in which decisions are made as there is an increase in the level of discussion for future decisions, and the monitoring of past decisions. The increase in the size of the board increases the level of discussion per board members, leading to a diverse range of opinions in relation to the decision being made. The research focus is on the choice of capital, and whether debt should be taken out to fund future positive net present value projects. The finding indicates that both short and long-term debt is reduced as the size of the board increases. The frequent servicing of debt requires companies to ensure they are able to monitor their debt levels, and provide status reports to the Board of Directors on the terms, interest rates and repayment schedule of the total debt the company has taken out. The additional time that this requires in board meetings may prevent future uptakes of debt, with equity being chosen instead due to the lower levels of monitoring that are attached to it.

6.5.3 Board meetings

A key measure of board activity is the number of board meetings that are held per year; however, there are no guidelines issued by The Code (1998:2009) that state how many board meetings a company should hold per year. This is one variable that has benefited from an increase in the level of disclosure surrounding how many board meetings

companies are holding, signalling a demand from shareholders for this type of information. The number of board meetings is linked to the level of discussion surrounding decision-making, such as the choice between the capital alternatives, and the monitoring of the decisions in future board meetings. The financial situation of a company could lead to an increase in the number of meetings. For example, if the company is in financial distress due to high levels of gearing from previous decisions, this could lead to an increase in the number of meetings. It is difficult to distinguish between cause and effect.

In line Agency theory (Jensen and Meckling, 1976), and previous studies (Vafeas, 1999; Adams *et al*., 2005; Brick and Chidambaran, 2010) a negative relationship is expected. Agency theory (Jensen and Meckling, 1976) drives the relationship between the number of board meetings and capital structure, driven by the inability of shareholders who do not have access to all the information, and ultimately decisions being made. The requirement of monthly servicing of the debt indicates a negative relationship should exist between leverage levels and the number of board meetings, which is in line with Agency theory. However, reverse causality could occur due to a company having high levels of gearing, which require additional board meetings to ensure the default risk is minimised.

The relationship between board meetings in the six models is inconsistent, and there is a lack of significant relationships through applying single equation modelling, see Tables 6.4A and 6.4B.

This is inconsistent with expectations, debt requires a higher level of monitoring in comparison to equity, and therefore an increase in the number of board meetings is expected. The variable is a good measure of board level intensity because it improves the

effectiveness of the board. The increase in the frequency of the board meetings is a good indication that directors are more likely to conduct their duties in line with shareholders' interests (Vafeas, 1999). However, this does depend upon the agenda of the board meetings, agenda items can be split into reactive or proactive, if the latter approach is adopted board meetings can be highly effective. The relationship between the number of board meetings and leverage levels has proven to be inconclusive in previous studies. Research findings indicate that an increase in the number of board meetings held does not decrease leverage levels, the opposite occurs and leverage levels increase. The increase in the number of board meetings leads to an increase in the time available to consider the alternatives to debt. While the expectation is this leads to debt not being chosen, the opposite occurs and debt is taken up over and above the alternatives. The reasons as to why is confined within the board minutes. However, there could be instances of reverse causality with the relationship, an increase in the number of board meetings could be as a result of excessive gearing in the capital structure already, and therefore an increase in the risk of financial distress.

6.5.4 Meeting attendance

Meeting attendance measures attendance per director at the Board of Director meetings. The impact of increases in disclosures, which are now seen as standard in financial statements, enable the collection of this variable. Disclosures still vary in the level of detail due to the lack of a standard format. Table 6.1 shows that attendance levels at board meetings are on average 95% which is very high; the disclosure of attendance levels per director could have an impact on increasing attendance levels.

The relationship between board meeting attendance and leverage is strongly linked to Agency theory. There is a lack of previous studies in the UK for the relationship between board meeting attendance and leverage levels. An increase in meeting attendance could

result in a greater discussion with regard to the capital structure options available to the company, which could lead to a reduction in the leverage levels, indicating a negative relationship is expected.

There is only one negative and significant relationship identified through the application of OLS in Models 2 and 6, see Table 6.4A, which is in line with the hypothesis. When FEM/REM is applied, there is a significant (at the 5% level) and negative relationship between board meeting attendance in Models 1, 2, 4 and 5, see Table 6.4B. The negative relationship is in line with Agency theory (Jensen and Meckling, 1976); an increase in meeting attendance could result in a greater discussion with regard to the capital structure options available to the company, which could lead to a reduction in the leverage levels. The opportunity for all members of the board to discuss the current capital structure enables a more varied number of opinions, and therefore discussions to be held on existing and future debt levels.

Levels of attendance can be linked to the level of discussion surrounding key decisions, leading to a reduction in leverage levels, indicating a negative relationship exists for both variables. How board attendance levels affect the capital structure decision appertains to whether these types of decisions are being made at the board meetings, or merely reported. The lack of board minutes available in the public domain prevent this question being answered. The information surrounding the options for capital will be prepared by managers, with the decision being finalised, based on the recommendations of managers. Therefore, the Board of Directors has the final decision, typically via a voting system, on the choice of capital. If a Director doesn't attend the Board meeting, their vote will not count. Therefore, board attendance could have an impact on the final capital decision.

6.5.5 Percentage of non-executive directors

NEDs have had a key role in companies for many years and are not as a result of The Code (1998:2009). The Higgs report (2003) recommends at least 50% of board should be independent. The reason behind the quota is, as the board increases its independence, the level of monitoring increases, and control is not held by one or more directors.

The hypothesis is in line with the stewardship theory, where an increase in NEDs will lead to an increase in monitoring, and a reduction in leverage levels. Agency theory drives the relationship between the independence of the board and capital structure to avoid control of the decisions being held by one person, thus ensuring capital efficiency occurs. Therefore, in line with Rhoades *et al*. (2000) and Weir *et al*. (2002), to avoid the pressures and increases in monitoring levels associated with servicing debt, a negative relationship is expected.

In line with the hypothesis, a negative and significant relationship is identified in Models 1, 3, 4 and 6 when single equation is applied (OLS, FEM/REM). One difference is apparent in the relationship between short-term debt (Models 2 and 6) and the modelling technique applied. There is a positive and insignificant relationship when OLS is applied, and a negative and significant (at the 10% level) relationship when FEM/REM is applied.

The finding provides strong evidence that increases in independence are leading to a reduction in leverage levels. The increases in NEDs enable a more diverse array of opinions and ideas; the nature of NEDs is they have experience in companies outside the industry on which they sit on as Board Directors. This enables a more detailed discussion to occur on the capital requirements of the company. The main role of NEDs is to prevent power being centred on one person (i.e. the CEO), in order to prevent

tunnel vision from developing in those board members whose main role is associated with the company.

6.6 Similarities and differences between the two types of static modelling

The use of static modelling, see Tables 6.4A and 6.4B, provides a lack of consistent and significant relationships within the dataset. The relationship between board meetings and leverage is positive and insignificant in Model 1, regardless of which static modelling technique is applied. In Model 1 the relationship between the percentage of NEDs and leverage is negative and significant, when OLS and FEM/REM is applied. However, differences materialise for the variables gender composition of the board, board size and board attendance. In Model 1 the relationship for the variables gender and board size is negative for both types of static modelling, however the relationship changes from being significant under OLS, see Table 6.4A, to insignificant, see Table 6.4B, for both relationships. For the variable board attendance the sign and significance levels change depending on which static model is applied. In the case of OLS, see Table 6.4A, the relationship is positive yet insignificant, while negative and significant when FEM/REM is applied, see Table 6.4B.

6.7 Dynamic Modelling Results

The following section applies dynamic modelling (GMM) to the same dataset. The results are expected to differ due to the different modelling techniques, and these differences will be discussed in Section 6.8.

Table 6.5: The results of GMM for the Board characteristics using a lag of one year.

Independent Variables	Model 1	Model 2	Model 3
Lev_{t-1}	0.464***	0.0731***	0.445***
	(0.00388)	(0.00192)	(0.00286)
Gender	0.0369***	-0.0226***	0.0399***
	(0.00761)	(0.00367)	(0.00317)
BSize	-0.00276***	-0.000949***	-0.00106***
	(0.000184)	(9.89e-05)	(0.000189)
BM	0.00246***	-4.61e-05	0.00219***
	(0.000123)	(4.00e-05)	(0.000129)
BA	-0.0528***	-0.0762***	0.0460***
	(0.00462)	(0.00322)	(0.00597)
NEDs	-0.0498***	-0.0154***	-0.0387***
	(0.00291)	(0.00146)	(0.00259)
Tang	0.00695	-0.0180***	0.0152***
	(0.00497)	(0.000596)	(0.00395)
Size	0.0802***	0.00614***	0.0864***
	(0.00134)	(0.000704)	(0.00201)
Mtbv	0.00805***	0.00113***	0.00756***
	(0.000113)	(5.13e-05)	(0.000136)
Beta	-5.4B8e-05	-0.00670***	0.00124***
	(0.000598)	(0.000253)	(0.000397)
CR	-0.00573***	-0.00805***	0.00174***
	(0.000133)	(6.13e-05)	(8.05e-05)
2008	0.00880***	0.00339***	0.00744***
	(0.000728)	(0.000304)	(0.000621)
2009	-0.0107***	0.000799**	-0.00993***
	(0.000596)	(0.000385)	(0.000537)
2010	-0.0227***	-0.00458***	-0.0205***
	(0.000567)	(0.000339)	(0.000522)
2011	-0.0193***	0.000215	-0.0242***
	(0.000688)	(0.000452)	(0.000693)
2012	-0.0194***	-0.00555***	-0.0174***
	(0.000555)	(0.000399)	(0.000654)
Constant	-0.320***	0.109***	-0.501***
	(0.00817)	(0.00342)	(0.0110)
AR1	0.00	0.00	0.00
AR2	1.00	0.99	1.00

NOTE: *** 1% significance ** 5% significance * 10% significance.

Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets.

The Sargan tests for overidentifying restrictions, indicate that the instruments used in the GMM are valid and not correlated with the error term. AR1 and AR2 are tests for first and second-order correlation in the first-differenced residuals, see Table 6.5. In line with Arellano-Bond (1991), the GMM estimation technique states that there must be first order serial correlation (AR1), while there is no second order correlation (AR2) in the residuals. The null hypothesis states that there is no first or second order correlation (AR1 and AR2); therefore, you need to reject the null hypotheses for AR1 and accept it for AR2 for GMM to be valid.

Table 6.5 demonstrates that in all three models AR1 is insignificant and the errors are uncorrelated with each other and therefore reject the null hypotheses, while for AR2 the null hypotheses can be accepted. The first observation identified through using the dynamic modelling over the static modelling is the increase in the number of variables exhibiting significant relationships.

6.7.1 Percentage of female executives and non-executives

There is a change in the sign and an increase in the significance level when the relationship between gender and leverage is analysed using GMM. The use of a lag of one year finds a positive and significant (at the 1% level) relationship, see Table 6.5, for the percentage of female board members in Models 1 and 3, while a negative and significant relationship is identified in Model 2. The finding is not in line with previous research (Malmendier *et al.,* 2011; Graham *et al.,* 2013). The presence of female EDs and NEDs has the impact of increasing levels of total and long-term debt, while decreasing short-term debt. The link to the impact of differing risk levels is a new area in this thesis that requires more extensive research, which is beyond this doctorate. Assessing board members attitude to risk, based on their gender, is very stereotypical, and one that is unlikely to be correct in all the cases. The

impact of the gender on the board members' level of confidence is another aspect; however, it is difficult to quantity and therefore measure.

6.7.2 Board size

In contrast to the lack of significant relationships identifiable under FEM/REM, see Table 6.4B, the relationship between the size of the board in all three models is negative and significant (at the 1% level) when a lag of one year is used, see Table 6.5. This is in line with previous studies (Berger *et al.*, 1997; Vafeas and Theodorou, 1998; Faccio and Lasfer, 1999; Al-Najjar and Hussainey, 2011), and OLS, see Table 6.4A.

The consistent finding across all three measures of leverage is in line with the hypothesis, and provides conclusive evidence that board size can be linked to leverage levels. Jensen (1993) states that 'when boards go beyond seven or eight people they are less likely to function effectively and are easier for the CEO to control.' Alternatively, larger board sizes bring experts from various functional areas, particularly through the use of NED's. The impact of this finding on companies surrounds whether it is a deliberate or an accidental connection. The lack of guidelines surrounding board size make identifying whether companies aim for a minimum or maximum number of board members, or whether the relationship between board size and leverage is accidental.

6.7.3 Board meetings

When GMM is applied, the relationship between the number of board meetings and leverage levels is positive and becomes significant (at the 1% level) in Models 1 and 3, when a lag of one year is used. The relationship remains positive but not significant in Model 2, which considers the relationship between short-term debt and the number of board meetings. The finding is not in line with expectations; however, the additional monitoring that the servicing

of debt requires could be an advantage of the increase in the number of board meetings, and is one possible reason behind the positive relationship. The increase in the frequency of the number of board meetings is allowing board members to increase their confidence levels in relation to past decisions, which is fuelling the increase in the uptake of debt. Previous studies indicate that increases in the number of board meetings were thought to decrease the levels of debt. Research findings indicate the reverse is actually occurring, and the ability to monitor the servicing of the current debt levels in the company through the frequent board meetings is a positive outcome.

However, the two key advantages of debt, the tax shield and control aspect, could be what is fuelling the decision to take out debt over equity. The key alternative to debt is equity, which could result in a large number of owners in comparison to debt. The increase in shareholders, and the existing demand from them towards companies to increase their transparency could result in an increase in disclosures surrounding corporate governance information. One such piece of information is the number of board meetings, irrespective of the content discussed, shareholders will feel reassured if companies are holding more board meetings. In addition to shareholders, it also applies to banks; whilst control is different to shareholders, the risk of companies being unable to pay back the debt that has been taken out is a risk that requires management and monitoring. The economic crisis in the UK in 2008 further fuels this risk, and has resulted in closer monitoring by banks in comparison to previous years.

6.7.4 Board Meeting attendance

In Models 1 and 2 the relationship is negative and significant (at the 1% level), which is in line with the predicted hypothesis and FEM/REM, see Table 6.4B. An increase in attendance by members at the board meetings enables a more detailed discussion to occur that considers the risk levels, current commitments and covenants in place, leading to a reduction in the uptake of debt. The application of GMM in Model 3 changes the relationship from negative to become positive and significant when long term debt is considered, indicating a difference in the sign of the relationship, which depends on whether short or long-term debt is considered. The finding indicates that greater attendance levels can lead to an increase in long-term debt levels.

Aattendance at board meetings leads to an increase in total and short-term debt levels. An increase in board meeting attendance can lead to an increase in the level of discussion, and other forms of capital being chosen over the uptake of debt. High attendance levels lead to a greater level of discussion, therefore the risks of debt can be discussed fully, leading to the avoidance of debt. The finding indicates that attendance at board meetings decreases short-term debt levels, while it does not have a significant impact on long-term debt levels. The evidence points to a disparity between short and long-term debt levels, with short-term debt providing a significant relationship. Reasons behind the lower short-term debt levels are associated with increases in board attendance, which could be associated with the Board of Directors' outlook on the economy. In an economy that is in a boom period, companies will not be concerned with taking out short-term debt, as they are confident that they will be able to repay this within the next twelve months. In the UK in 2008, the economy suffered an economic downturn; this is half way through the period of this study. Therefore, the

economy could have had an impact on the short-term debt levels of the companies in this study.

6.7.5 Percentage of non-executive directors

In line with single equation modelling, see Tables 6.4A and 6.4B, there is a consistent negative relationship, which becomes significant (at the 1% level) in all three models using GMM with a lag of one year; this is in line with the hypothesis. The increase in the level of independence of the Board of Directors enables an increase in the diversity of opinions, which allows a greater level of discussion to be conducted and prevents one or a few board members controlling the key corporate decisions.

The implication is, directors are seeking to avoid a high level of monitoring and pressure associated with servicing debt, choosing other forms of capital over debt. The main alternative to debt is equity, of which the risk is lower. The additional costs associated with it, along with the increase in the number of owners of the business, create different issues, which may need monitoring in a different way in comparison to debt.

6.8 Summary of differences within the use of estimation techniques and gearing definitions

The selection of modelling technique in this study does provide similarities between static and dynamic modelling. Table 6.6 shows the results of significant relationships for each independent variable, according to the estimation technique.

Table 6.6 The results of the relationships according to different modelling techniques for Board characteristics.

Independent variable	OLS Lev1	OLS Lev2	OLS Lev3	FEM Lev1	REM Lev2	FEM Lev3	GMM Lev1	GMM Lev2	GMM Lev3
Gender	+						+++	---	+++
Board Size	---	--	---				---	---	---
No of Board meetings							+++		+++
Board meeting attendance		--		--	--		---	---	+++
Percent of NED's	---		---	---	-	---	---	---	---

Note: +++ significantly positive at 1% level, ++ significantly positive at 5% level, + significantly positive at 10% level. --- significantly negative at 1% level, -- significantly negative at 5% level, - significantly negative at 10% level.

Notes: Lev 1 – Total Debt/Total Assets, Lev 2 – Short-Term Debt/Total Assets, Lev 3 – Long-Term Debt/ Total Assets.

There is a lack of significant relationships through applying static modelling between the gender of the Board of Directors, and all three gearing definitions. Prior research finds a negative relationship (Adams and Ferreira, 2009; Ahern and Dittmar, 2012; Faccio *et al.*, 2012) through the application of OLS. Significant relationships are identified through the application of dynamic modelling in Models 1 and 3. However, when short term debt is considered the relationship is negative and significant, regardless of the estimation technique applied. The study finds that the presence of female EDs and NEDs has the impact of increasing the level of total and long-term debt, while decreasing short-term debt. Therefore, indicating there are differences in the duration of debt that is taken out. However, reasons behind the difference are unable to be captured in this thesis, and provide a starting point for further research in this field.

The variable board size demonstrates a consistent negative relationship, which is regardless of estimation technique or gearing definition chosen. The consistent finding across all three

measures of leverage is in line with the hypothesis, and provides conclusive evidence that board size can be linked to leverage levels. The impact of this finding on companies surrounds whether it is a deliberate or an accidental connection, which is beyond the scope of this doctorate.

The relationship between the number of board meetings is consistently positive, however only significant when dynamic modelling is applied for total and long term debt. The positive relationship generated through GMM is not in line with prior studies (Vafeas, 1999; Adams *et al*., 2005), however the use of OLS in prior studies could provide a reason behind the difference. However, for the measure of short term debt the relationship changes to become negative, but insignificant regardless of the estimation technique applied. Financial distress does have an impact on the number of board meetings. A company who is in financial distress, a period of crisis or facing major challenges, is more likely to have a higher number of board meetings. However, it is not clear whether independent boards meet more frequently because of the increased monitoring efforts, or whether as Vafeas (1999) suggests more time is required to educate the non-executive directors. The contribution of this study is through the difference in the sign of the relationship when GMM is applied instead of OLS being applied.

Board meeting attendance is an internal corporate governance mechanism. Where the relationship is significant for the variable board attendance it is negative under FEM, and GMM. The increase in board meeting attendance could result in an increase in the level of discussion surrounding the capital structure, and options for further uptake of capital. There is a difference in the sign of the relationship in Model 3, it becomes positive under OLS and GMM, however, it is only significant under GMM.

Where there are significant relationships between NED's and gearing levels it is consistently negative, regardless of the estimation technique applied or gearing definition selected. The finding is in line with the hypothesis and prior studies (Rhoades *et al*. 2000; Weir *et al*. 2002). The implications of this study is directors are seeking to avoid a high level of monitoring and pressure that is associated with servicing debt, choosing other forms of capital over debt. The main alternative to debt is equity, equity has a lower risk attached to it. The additional costs associated with it, along with the increase in the number of owners of the business, creates different issues, which may need monitoring in a different way in comparison to debt.

6.9 GMM Partial adjustment

Evidence of partial adjustment existing in companies was identified through a UK based study in 2001 (Ozkan). The adjustment coefficient is measured as 1 - $\gamma_{0.}$ Table 6.5 demonstrates that when applying a lag of one year the adjustment coefficient is relatively large, positive and significant (at the 1% level) in all three models.

6.10 Impact of the financial crisis

Table 6.5 presents the findings in all three models. In Models 1, 2 and 3 there is a positive and significant (at the 1% level) relationship between leverage and the year 2008. The sign of the relationship changes from positive to negative (remaining at the 1% significant level), from the year 2009 onwards in Model 1 and 3. There is one exception in Model 2 when short-term debt is considered. The application of a lag of one year creates a positive, as opposed to negative relationship, is identified for the years 2010 and 2012, significant at the 1% level. Reasons behind this anomaly could be attributed to companies choosing to take out short-term debt in the years 2010 and 2012 as it has a lower risk level attached, and it could be more easily available in comparison to long-term debt. The finding provides strong evidence that in this research the financial crisis is reducing the levels of total, short and long-

term debt. The reasons behind the finding could be attributable to a lack of available debt due to the restrictions that were imposed shortly following the financial crisis. Secondly, companies may be choosing to avoid debt because of an increased awareness of financial distress costs.

6.11 Conclusion

The sign and significance of the relationship for several of the corporate governance variables is dependent on the Model and analysis chosen, comparisons between the models and analysis methods does provide nonsensical results in several cases. The existence of endogenous variables indicates dynamic modelling, GMM, is the preferred tool.

The consistent significant and negative relationships in Models 1 and 3 when applying GMM, lead us to the finding that total debt and long-term debt levels decrease as the board size increases. The implication is companies will need to ensure that the size of the board does not become too large, for fear of preventing decisions from being made; the increase in the level of discussion is a positive aspect of a large board size. However, some decisions are time dependent and the delay in making a decision could result in a missed opportunity or an increase in the cost of taking out the debt. The discussion of decisions that are made by the Board of Directors also extends to past decisions, to enable this information to aid future decisions. The board minutes are not available outside of the board room, therefore the time spent discussing decisions, such as the choice between capital, are never disclosed. The availability of such information could provide additional disclosures and enable a more informed reason behind the relationship to be developed.

The relationship between leverage and the variable percentage of NEDs is negative and significant (at the 1% level) under FEM and GMM, see Tables 6.4B and 6.5, the finding is in line with a previous UK study (Weir *et al*., 2002). The role of NEDs is primarily to

encourage a diverse array of opinions in the decision-making process. The relationship with leverage levels indicates that total debt, short-term debt and long-term debt reduce as the number of NEDs increases. Companies need to be mindful that as NEDs increase, the level of discussion increases, which could result in delays in the decision-making process. A diverse array of opinions is critical to companies, however too many opinions could be counterproductive. The implication is an additional layer of caution is applied to prevent companies developing tunnel vision, and the ability to assess the internal and external risks from various perspectives.

For the variable board meeting attendance levels and leverage levels, where there is a significant relationship, the sign is negative in Models 1 and 2, see Table 6.5. The withholding of a percentage of a director's compensation because of non-attendance is one strategy that companies could adopt; however, forced attendance could create directors who are non-participative, which creates different issues. In this study, board meeting attendance levels are very high, technology has a key role to ensure board members are able to attend despite not being in the country when the meeting is occurring. In Model 3 the relationship changes to become significant and positive.

Those relationships that are not in line with previous studies, include the percentage of female executives, and the number of board meetings.

The composition of the board of directions in relation to gender is a topical area within this research field; however, adhering to a target as stipulated through the Davis Report (2011_a:2014_b)[14], or a strategy adopted by the company is not purely a gender numbers game. The different skills and experiences that female directors are able to bring to the board is the focus of the gender imbalance situation that companies in the UK are suffering from. The

[14] 2011_a Davis Report 2011, 2014_b Davis Report 2014

increase in the number of initiatives that are aimed at getting women ready for board roles demonstrates a company's commitment to address this organisational issue. A company's ultimate goal is to increase shareholder wealth through increased profits, the link between a gender diverse Board of Directors and key financial ratios is very strong. For example, companies where the Board of Directors contain women, outperform their competitors with a 42% higher return on sales, a 66% higher return on invested capital and a 53% higher return on equity (Joy *et al*., 2007). However, the change is occurring too slowly, there are instances of companies in this study where the Board of Directors contain no female board members. Achieving better corporate governance is one of the four key dimensions in the Davis Report (2011). A Canadian study called 'Not just the right thing, but the bright thing,' finds that boards that contained three or more women exhibited different governance behaviours, in comparison to those boards that were 100% male (Brown *et al.*, 2002). The implications of the positive relationship identified in Models 1 and 3 through applying GMM, signify how important companies are valuing this finding. The Davis Report (2011_a:2014_b)[15] has been setting targets in relation to gender diversity in boardrooms; however, there is no optimal level of female directors. The advantages of debt could be reduced through the increase in the number of female board members; on the flipside, during periods of financial distress, those companies with high levels of debt get into difficulty at a much greater speed, in comparison to those companies that are able to service their debt levels.

The relationship between the number of board meetings and leverage levels is positive for total debt and long-term debt, regardless of whether static or dynamic modelling is used, see Tables 6.4A, 6.4B and 6.5. The positive relationship is not in line with expectations, whereby a negative relationship is expected. The one instance of a negative and significant relationship is when short-term debt is considered in Model 2. The implication of this finding

[15] 2011_a Davis Report 2011, 2014_b Davis Report 2014

concerns companies ensuring that they are holding the correct number of board meetings, to allow sufficient time to discuss each point on the agenda. The appropriate number of board meetings to be held per year will depend on the length of the agenda, which can depend on the challenges facing the company at the time. Therefore, The Code (1998:2009) will want to avoid imposing guidelines regarding the number of board meetings a company must hold per year.

There are several factors other than the variables in this study that could be indicators of levels of uptake of debt. These factors include the level of entrenchment of all members of the Board of Directors, the presence of a new CEO, the availability of debt, existing debt covenants and the long-term strategy of the company. The length of time the board members have sat on the Board of Directors could have an impact on levels of entrenchment; EDs and NEDs may be less reluctant to increase the leverage levels due to the impact this could have on their compensation and job security. The length of time the CEO has been in the position is another aspect that could have an impact on entrenchment, possibly the adoption of a new direction and strategy that could alter the weightings of debt and equity. This can also be impacted by the existence of a long-term strategy of the company when the CEO is appointed; the ability to change this in the short-term is often limited from previous leverage decisions. Therefore, there is often a time delay following the appointment of a new CEO before the impact of change is seen on the key corporate decisions. The availability of debt is impacted by two aspects. Firstly, existing debt levels in the company and the covenants that are in place. Secondly, the current state of the economy in terms of the restrictions on companies taking out debt, and the repayment terms which are linked to the interest rates.

Chapter 7 Effect of Ownership Structure and corporate governance on capital structure

7.1 Introduction

The separation of ownership from control that is typical in UK listed companies today, means two parties exist; this has allowed for the formation of Agency theory (Jensen and Meckling, 1976), which has driven the creation of the concept corporate governance. Previously, the owners and the employees of a company were one and the same party; rarely does this exist today in companies that are listed on the stock exchange (Jensen and Meckling, 1976). The existence of two parties is now the norm for companies in this study; however, there is a degree of cross over emerging in relation to equity. The use of equity based compensation packages enable higher level management, i.e. members of the Board of Directors, to hold shares in the company. Therefore, individuals can be both an employee and an owner of the company. It is the existence of the two parties instead of one party that has brought about the creation of The Code (1998:2009).

The aim of The Code (1998:2009) is to ensure both parties are protected, and power is not centred on one person. The existence of two parties with different goals creates agency costs (Jensen and Meckling, 1976). In order to align the goals of both parties, companies are required to create compensation packages that include shares in the company. In the UK, John Lewis is a rare example whereby every single employee, regardless of their position in the company, owns a percentage in the company. The rationale behind compensation packages that contain shares, is an employee's actions can have an impact on the share price, as seen in the Enron scandal (Coates, 2007). If decisions made by the employee have a direct impact on their compensation, it enables employees to view their position in the bigger picture. Thus avoiding any actions which could have an impact on the share price, in a

positive or negative way. In the case of Enron, employees were able to artificially increase the share price to their benefit through illegal actions; the share price dropped following a large number of shares being sold by those same employees. The implications of the Enron scandal prompted the development of The Code (1998:2009), which companies are recommended to adhere to today in the UK. A second alternative to using equity packages for the Board of Directors is the use of external debt. Therefore, both strategies can be used in order to reduce the agency conflicts, and ultimately increase the value of the company (Jensen and Meckling, 1976).

Companies are heavily focused on the reduction of agency costs to ensure decisions are made more efficiently and effectively. The independent variables in this study have previously been researched in previous time periods, and in UK and non-UK countries. However, the contribution of this research is split three-fold. Firstly, the ability to re-examine the potential determinants of capital structure in a UK context across the time period 2003-2012 for FTSE 350 companies, which has previously been under-researched in this context. For example, board share ownership, and foreign ownership. Secondly, through the use of three definitions of leverage, the relationship between leverage and ownership characteristics can be considered. The dependent variable is leverage; three measures of leverage will be used that combine short, long-term and total debt. Lastly, prior research has been as a whole, limited in the area to the use of single equation modelling, the use of single and dynamic modelling techniques in this study enables a lag period to be included, to explore whether this could contribute to differences within a company's capital structure.

In this Chapter four ownership variables will be combined with the five control variables to form the independent variables, the dependent variables will be identical to those used in Chapters 5 and 6. The focus of this chapter concerns the impact that the ownership variables

could have on the capital structure, as opposed to the CEO characteristics (Chapter 5) and the Board of Directors characteristics (Chapter 6).

The collection of several ownership variables, including shares held by management and foreign companies, enable a more detailed study into the relationship between ownership and capital structure. The existence of debt in a company's capital structure encourages the Board of Directors to become more efficient in the management of their cashflow, to avoid the threat of bankruptcy and to avoid future issuance of equity, which will alter their control weightings (Grossman and Hart, 1982). One dimension of this research is in relation to the ownership held by the Board of Directors, as part of making decisions based on the best interests of the owners of the company (Jensen and Meckling, 1976). In the UK, the responsibility for the decision-making process of the choices between debt and equity, lies with the Board of Directors.

The changes to The Code (1998:2009) concerning the level of disclosure for director compensation, conducted by Stephen Haddrill, came into effect on the 1st October 2014, including in that disclosing equity stakes in the company for all members of the Board of Directors. There are agency costs associated with employee share ownership. However, the high level of regulation (The Code, 1998:2009) surrounding the issuance of shares, along with an increase in the disclosure of ownership, enable greater transparency to be created for companies within this study. Previous studies (Bathala *et al.*, 1994; Grier and Zychowicz, 1994; Berger *et al.*, 1997), find a negative relationship between ownership and leverage levels due to the increases in the level of monitoring that debt over equity creates.

The lack of a definition in previous studies as to what constitutes ownership, makes comparing the results of this study to previous studies difficult. Previously, there has been a lack of transparency in relation to the equity component of director's compensation; however,

additional disclosure enables ownership data to be collected per director in this study. One risk associated with high levels of board ownership is that directors can become susceptible to managerial entrenchment, which can lead to poor corporate governance existing because of a reduction in the level of monitoring carried out by the Board of Directors (Morck *et al.,* 1988). A previous study (McConnell and Servaes, 1990) identifies how the relationship between managerial ownership and company performance increases at low levels of ownership, while falling at high levels of ownership.

The majority of shares held in companies are through the use of institutional investors. The role they are able to play as external monitors is the key advantage, and the impact on the relationship they have on debt levels in companies is a key question of this research. How the choice between debt and equity impact the value of the company is well documented, and forms the capital structure puzzle (Myers, 1984). The main focus of companies is the alignment of debtholder and shareholders goals. There will be two measures of institutional ownership applied in this study. Firstly, those investors who own 5% or greater in the company are classified as 5% concentrated owners of the company. The presence of major shareholders can have an impact of a company, 5% is considered a significant interest in the company. The second measure of institutional ownership is shares that are owned by investors.

Ownership variables in this study will be categorised into three components. Several previous studies (Chen and Steiner, 1999; Short and Keasey, 1999) have analysed board ownership, in this study, the number of shares held by the Board of Directors will be considered in relation to the number of shares outstanding. In addition to the managerial ownership variable and two institutional ownership variables, the percentage of shares held by foreign investors will make up the third ownership variable. The existence of all companies in the study being listed on the LSE enables shares to be purchased from investors

outside of the UK, the research seeks to identify whether foreign ownership has a role in the capital structure decision.

The addition of new variables into the capital structure puzzle enables a broader study into the relationship between ownership and capital structure. The inclusion of a managerial ownership variable contributes to an emerging focus upon the ownership structure of the Board of Directors in UK companies. Previously the focus has been upon institutional ownership, and the influence they are able to generate due to their high levels of ownership. The shift towards the focus on the equity component, as opposed to the cash component, enables this research to present analysis of an emerging new dimension to the compensation packages of UK Board of Directors.

7.2 Descriptive Statistics

The following Section provides an initial analysis of the data in this study, providing the descriptive statistics (Table 7.1), and the correlation matrix and the VIF (Table 7.2).

Table 7.1: The descriptive statistics for the three dependent variables, Ownership characteristics and the control variables.

Variable	Mean	Std. Dev.	Min	Max
Lev1	0.22	0.17	0.00	0.97
Lev2	0.04	0.07	0.00	0.86
Lev3	0.18	0.16	0.00	0.99
Owner	0.29	0.23	0.00	0.99
BO	0.07	0.15	0.00	0.99
FO	0.01	0.05	0.00	0.75
IO	0.18	0.17	0.00	0.83
Tang	0.29	0.23	0.00	0.95
Size	6.10	0.75	3.02	8.28
Mtbv	2.87	1.92	0.11	10.92
Beta	1.04	0.58	0.00	5.83
CR	1.49	0.92	0.16	5.87

Notes: Lev 1 – Total Debt/Total Assets, Lev 2 – Short-Term Debt/Total Assets, Lev 3 – Long-Term Debt/ Total Assets.

Table 7.1 shows the sample characteristics for the period 2003-2012.

Owner is the percentage of shares that are owned by those who own a minimum of 5% of the equity in the company. BO is the ownership held by the Board of Directors in proportion to the number of shares outstanding (The definition is in line with a previous study by Berger *et al*., 1997). FO is the percentage of shares held by foreign ownership. IO is the percentage of shares held by institutional companies. Tang is the ratio measured by property, plant and equipment (PPE) divided by total assets. Size is the log of total assets. Mtbv is the market to book value. Beta is measuring the risk of the company. CR is the current ratio, measuring the short term liquidity of the company.

From Table 7.1 we can provide some preliminary analysis of the data, in comparison to previous studies that have included ownership variables.

The variable owner is defined as those shareholders who own more than 5% equity in the company, often called the 5% concentration. In this study, the average percentage of shares held by the 5% concentration is 29%. Ownership through institutional investments is 18%. The finding indicates a shift has occurred in the level of institutional investment, regardless of which definition is used, as the results are much lower in comparison to a previous US study, where the percentage is 38% (Bathala *et al.*, 1994). Research findings indicate that the shares of companies are being held by other parties, other than the institutional investors, such as the Board of Directors.

Board ownership is on average 7%; this is in line with a previous study (Chen and Steiner, 1999), where managerial ownership is 8.3% in a US study for the year 1994. The finding indicates that companies are choosing to use equity based components as part of UK director's compensation packages. The implication of this finding is the continual use of an equity based form of compensation could have an impact on the capital structure decision making process; this research seeks to identify the existence of a relationship.

The average foreign ownership is 1% in this study, in comparison to previous studies (Li *et al*., 2009; Gurunlu and Gursoy, 2010) this in not in line, where the average foreign ownership is 18%. The finding indicates a lack of investment in UK listed non-financial companies by foreign companies in this study. One surprising finding from an in-depth analysis of the data is that instances of foreign ownership range from 75% to 1%, and occur in the years 2003 and 2004. This could be due to companies choosing other forms of capital instead of foreign ownership. The finding is of a concern, and indicates UK companies are not actively pursuing foreign ownership.

Table 7.2: The correlation matrix between the dependent variable (Lev1) with the Ownership independent variables, and the VIF result

	Lev1	Owner	BO	FO	IO	Tang	Size	mtbv	Beta	CR
Lev1	1									
Owner	-0.0926*	1								
	0.00									
BO	-0.1037*	0.1539*	1							
	0.00	0.00								
FO	0.0495	-0.0304	-0.0629*	1						
	0.025	0.1732	0.0059							
IO	-0.0289	0.1937*	-0.0479	0.2257*	1					
	0.1907	0.00	0.0361	0.00						
Tang	0.2641*	0.1141*	-0.0153	0.0619*	0.0196	1.00				
	0.00	0.00	0.5008	0.0051	0.3748					
Size	0.2423*	-0.3453*	-0.1808*	0.0552	-0.2511*	0.1786*	1			
	0.00	0.00	0.00	0.0124	0.00	0.00				
mtbv	0.0746*	-0.0849*	0.0497	-0.0003	-0.033	-0.1174*	-0.1784*	1		
	0.0011	0.0002	0.0353	0.989	0.1487	0.00	0.00			
Beta	-0.0776*	0.0339	0.0186	-0.0607	0.0082	-0.05	-0.03	-0.0188	1	
	0.0008	0.1568	0.4497	0.0108	0.7309	0.02	0.14	0.4464		
CR	-0.2579*	0.1826*	0.0879*	0.0029	0.0148	-0.1519*	-0.1746*	-0.0615*	0.0541	1
	0.00	0.00	0.0001	0.8962	0.5045	0.00	0.00	0.007	0.0193	
	VIF	1.26	1.05	1.09	1.22	1.12	1.37	1.07	1.02	1.09
	1/VIF	0.80	0.95	0.92	0.82	0.89	0.73	0.94	0.98	0.92

*Correlation is significant at the 0.01 level.

There are no instances of strong correlation between any of the independent variables; this occurs when the relationship between two variables has a correlation of 0.8 or above. However, there are several instances of significant correlation at the 1% level.

Table 7.2 above shows the VIF for the dependent variable of leverage (Lev1). Gujarati and Porter (2009) state that "*As a rule of thumb, if the VIF of the variable exceeds 10, which will happen if* R_j^2 *exceeds 0.90, that variable is said be highly collinear.*" (Gujarati and Porter,

2009:340). The results indicate that all the coefficients have a VIF of below 10, therefore there is no initial evidence of multicollinearity occurring.

7.3 The Models

In this study, three measures of leverage will be used, and these are calculated as follows:

Lev1 – Total Debt/Total Assets (Model 1)

Lev2 – Short Term Debt/Total Assets (Model 2)

Lev3 –Long Term Debt/Total Assets (Model 3)

There are two stages of analysis that will be conducted on the data in this study; these are single equation modelling and dynamic modelling.

7.4 Regression of the pooled method

The first model that will be used in this study is single equation modelling, using panel data and the clustering of errors. In this study, OLS and FEM/REM will be used. Single equation modelling can create endogeneity issues which indicate the use of these models is not appropriate, to overcome these issues a second model will be used, which is GMM. Lag periods of one, two and three years will be tested, see Table 10.13 in the Appendix, to establish whether past decisions have an impact on current leverage levels.

The ownership variables will be combined with the control variables.

The models that will be used are as follows:

$LEV1_{it}$= α_0 + α_1 Owner + α_2BO + α_3FO + α_4IO + α_5Tang + α_6Beta + α_7Size + $\alpha_8$mtbv+ α_9CR + ε_{it}

$LEV2_{it}$= α_0 + α_1 Owner + α_2BO + α_3FO + α_4IO + α_5Tang + α_6Beta + α_7Size + $\alpha_8$mtbv+ α_9CR + ε_{it}

$LEV3_{it}$= α_0 + α_1 Owner + α_2BO + α_3FO + α_4IO + α_5Tang + α_6Beta + α_7Size + $\alpha_8$mtbv+ α_9CR + ε_{it}

Table 7.3 shows the expected sign of the relationship based on previous empirical studies that have been conducted in relation to each hypothesis, along with the relevant theory.

Table 7.3: A summary of the sign of the hypotheses for the Ownership characteristics based on empirical evidence, and relevant theory.

Independent variable	Prediction	Previous studies that find similar findings on Capital Structure	Theory
5% concentration	Negative	Bathala *et al.* (1994) Grier and Zychowicz (1994) Berger *et al. (*1997)	Agency theory
Board ownership	Negative	Chen and Steiner (1999)	Agency theory Managerial entrenchment
Foreign ownership	Negative	Gurunlu and Gursoy (2010)	Agency theory
Institutional ownership	Negative	Bathala *et al.* (1994) Grier and Zychowicz (1994) Berger *et al.* (1997)	Agency theory

7.5 Regression using GMM

The results of the Hausman test, see Table 10.11 in the Appendix, indicate that in Models 1 and 3, the FEM should be used over the REM. While in Model 2, measuring short-term debt, REM should be used over FEM as the P-value is significant.

The existence of endogenous variables, see Table 10.12 in the Appendix, in all three measures of leverage indicates that the use of static modelling in this study is not applicable however enables comparability with prior studies in the field; GMM assumes that all independent variables are endogenous and are suitable for this study.

The identification of the endogenous variables does vary, depending on the choice of model; however Models 1 and 3 have identical endogenous variables. None of the ownership variables are found to be endogenous across all three models; only in Models 1 and 3 is the variable board ownership endogenous. However, with regard to the control variables, the size of the company, growth and liquidity are found to be endogenous, regardless of the model used.

Therefore, in line with a previous study (Bhagat and Jefferies, 2002) that finds the issue of endogeneity does increase for corporate governance variables, the applicability of using dynamic modelling in this study is justified.

A lag of one year is sufficient in Models 1 and 3, see Table 10.13 in the Appendix. In Model 2 the lags are irrelevant. Therefore, a lag of one year will be used which is in line with a previous study (Wintoki *et al*., 2012).

The models that will be used are as follows:

$$Lev1_{it} = \gamma_1 \text{Lev1}_{it-1} + \gamma_2 \text{Owner}_{it} + \gamma_3 \text{BO}_{it} + \gamma_4 \text{FO}_{it} + \gamma_5 \text{IO}_{it} + \gamma_6 \text{Tang}_{it} + \gamma_7 \text{Beta}_{it} + \gamma_8 \text{Size}_{it} + \gamma_9 \text{mtbv}_{it} + \gamma_{10} \text{CR}_{it} + \alpha_i + \alpha_t + \mu_{it}$$

(Equation 1.1)

$$Lev2_{it} = \gamma_1 \text{Lev2}_{it-1} + \gamma_2 \text{Owner}_{it} + \gamma_3 \text{BO}_{it} + \gamma_4 \text{FO}_{it} + \gamma_5 \text{IO}_{it} + \gamma_6 \text{Tang}_{it} + \gamma_7 \text{Beta}_{it} + \gamma_8 \text{Size}_{it} + \gamma_9 \text{mtbv}_{it} + \gamma_{10} \text{CR}_{it} + \alpha_i + \alpha_t + \mu_{it}$$

(Equation 1.2)

$$Lev3_{it} = \gamma_1 \text{Lev3}_{it-1} + \gamma_2 \text{Owner}_{it} + \gamma_3 \text{BO}_{it} + \gamma_4 \text{FO}_{it} + \gamma_5 \text{IO}_{it} + \gamma_6 \text{Tang}_{it} + \gamma_7 \text{Beta}_{it} + \gamma_8 \text{Size}_{it} + \gamma_9 \text{mtbv}_{it} + \gamma_{10} \text{CR}_{it} + \alpha_i + \alpha_t + \mu_{it}$$

(Equation 1.3)

Table 7.4A: OLS results for ownership characteristics and the control variables.

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Owner	-7.96e-05	-0.00220	0.00325	-7.96e-05	-0.00220	0.00325
	(0.0166)	(0.00579)	(0.0164)	(0.0181)	(0.00562)	(0.0179)
BO	-0.0775***	0.0104	-0.0884***	-0.0775***	0.0104	-0.0884***
	(0.0252)	(0.00876)	(0.0248)	(0.0260)	(0.00850)	(0.0259)
FO	0.00423	0.00796	0.00445	0.00423	0.00796	0.00445
	(0.0669)	(0.0233)	(0.0657)	(0.0841)	(0.0198)	(0.0876)
IO	0.0234	0.0218***	-0.000495	0.0234	0.0218***	-0.000495
	(0.0221)	(0.00769)	(0.0217)	(0.0235)	(0.00736)	(0.0228)
Tang	0.154***	-0.0105**	0.163***	0.154***	-0.0105**	0.163***
	(0.0147)	(0.00511)	(0.0144)	(0.0161)	(0.00450)	(0.0159)
Size	0.0496***	0.0102***	0.0399***	0.0496***	0.0102***	0.0399***
	(0.00553)	(0.00192)	(0.00543)	(0.00597)	(0.00176)	(0.00564)
Mtbv	0.00959***	0.00183***	0.00773***	0.00959***	0.00183***	0.00773***
	(0.00134)	(0.000467)	(0.00132)	(0.00152)	(0.000606)	(0.00160)
Beta	-0.00549	-0.00484**	-0.000478	-0.00549	-0.00484**	-0.000478
	(0.00590)	(0.00205)	(0.00580)	(0.00633)	(0.00194)	(0.00616)
CR	-0.0214***	-0.00678***	-0.0144***	-0.0214***	-0.00678***	-0.0144***
	(0.00262)	(0.000912)	(0.00258)	(0.00356)	(0.00108)	(0.00288)
Constant	-0.135***	-0.0175	-0.120***	-0.135***	-0.0175	-0.120***
	(0.0391)	(0.0136)	(0.0384)	(0.0434)	(0.0129)	(0.0409)
Observations	1,497	1,497	1,497	1,497	1,497	1,497
R-squared	0.231	0.082	0.194	0.231	0.082	0.194

NOTE: *** 1% significance ** 5% significance * 10% significance

Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets, Model 4 - Total Debt/Total Assets using clustering of errors, Model 5 – Short-Term Debt/Total Assets using clustering of errors, Model 6 – Long-Term Debt/ Total Asset using clustering of errors.

Table 7.4B: FEM/REM results for ownership characteristics and the control variables.

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Owner	0.0198*	-0.00414	0.0296**	0.0198	-0.00775	0.0296**
	(0.0114)	(0.00605)	(0.0116)	(0.0156)	(0.00888)	(0.0142)
BO	-0.0418**	0.00587	-0.0452**	-0.0418	0.000640	-0.0452
	(0.0201)	(0.00970)	(0.0205)	(0.0254)	(0.0113)	(0.0309)
FO	0.0596	0.00990	0.0542	0.0596	0.0116	0.0542
	(0.0364)	(0.0207)	(0.0372)	(0.0426)	(0.0226)	(0.0382)
IO	0.0339**	0.0158**	0.0187	0.0339*	0.0133	0.0187
	(0.0139)	(0.00746)	(0.0142)	(0.0205)	(0.00948)	(0.0197)
Tang	-0.00352	-0.0152*	0.0361	-0.00352	-0.0477**	0.0361
	(0.0301)	(0.00812)	(0.0307)	(0.0487)	(0.0202)	(0.0493)
Size	0.0868***	0.00722**	0.0861***	0.0868***	-0.000455	0.0861***
	(0.0106)	(0.00294)	(0.0108)	(0.0174)	(0.00965)	(0.0177)
Mtbv	0.0118***	0.000968*	0.0111***	0.0118***	0.000616	0.0111***
	(0.00111)	(0.000535)	(0.00113)	(0.00201)	(0.000975)	(0.00231)
Beta	0.00140	-0.00444**	0.00580	0.00140	-0.00394	0.00580
	(0.00411)	(0.00217)	(0.00420)	(0.00604)	(0.00284)	(0.00621)
CR	-0.00876***	-0.00819***	0.00106	-0.00876***	-0.00994***	0.00106
	(0.00214)	(0.00103)	(0.00219)	(0.00302)	(0.00335)	(0.00258)
Constant	-0.364***	0.00897	-0.425***	-0.364***	0.0701	-0.425***
	(0.0687)	(0.0197)	(0.0702)	(0.114)	(0.0643)	(0.117)
Observations	1,497	1,497	1,497	1,497	1,497	1,497
R-squared	0.121	0.053	0.100	0.121	0.053	0.100
Number of company	212	212	212	212	212	212

NOTE: *** 1% significance ** 5% significance * 10% significance

Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets, Model 4 - Total Debt/Total Assets using clustering of errors, Model 5 – Short-Term Debt/Total Assets using clustering of errors, Model 6 – Long-Term Debt/ Total Asset using clustering of errors.

7.5.1 Institutional ownership

The definition of institutional ownership varies; in this study, two definitions are used. The first definition includes all those owners with a minimum of a 5% stake in the company which is the percentage of shares held by all insiders and 5% owners; the second definition includes shares that are held by investors. Agency theory (Jensen and Meckling, 1976) is the main theory underlying studies that analyse the relationship between the percentages of shares held by institutional shareholders, and the impact of this on key corporate finance decisions. A negative relationship is found in non-UK studies by Chaganti and Damanpour (1991); Bathala *et al.* (1994); Grier and Zychowicz (1994); Berger *et al. (*1997). In line with Agency theory (Jensen and Meckling, 1976) the UK is expected to follow these US studies that find a negative relationship between institutional ownership and leverage levels.

The relationships when applying OLS are inconsistent and insignificant, see Table 7.4A, in all the Models. However, a significant and positive relationship is identified when FEM/REM is applied, see Table 7.4B, using the 5% concentration of ownership in Models 1, 4 and 6. Following the clustering of errors, significant relationships remain in Model 6 (at the 5% significance level). The findings indicate that for long-term debt levels, an increase in institutional ownership leads to an increase in debt levels. Whilst in Models 2 and 5, the relationship is negative for the measure of short term debt, however it is not significant. The relationship remains as consistently positive in Model 1 when the second measure of institutional ownership is applied, using shares held by investors, see Tables 7.4A and 7.4B. The difference in the sign of the relationship identified through single equation modelling could be attributable to a difference within the country of study.

The reasons behind the positive relationship is firstly, institutional investors could possibly diversify away the higher risk associated with debt, through ensuring their portfolio is

weighted appropriately. Secondly, institutional investors are keen to achieve the highest return in the long run, and are able to avoid the issues surrounding short-termism. The consistent and significant positive relationships indicate institutional investors are using their increased level of knowledge, and are promoting the use of debt in a company's capital structure. However, when shares held by investors are considered, differences materialise, depending on the model applied.

The increase in the level of transparency of information, which is created through the increase in the level of disclosures, is evident in annual financial statements. The increase in risk that occurs due to increasing levels of debt can lead to an increase in returns, in line with the risk return relationship. The demand for greater clarity of information, as opposed to more information, has been spurred on from the LSE, demanding an increase in the level of detail of disclosures submitted by companies. The combination with The Code (1998:2009) is leading to the decision-making process slowly being made available in the public domain. The challenging of decisions is not something companies wish the additional disclosures to create; however, the discussion process that has occurred is fundamental in order for the risk level to be assessed accurately by investors. Macroeconomic aspects, such as the economic downturn in 2008, is an unpredictable factor; however, the risks of financial distress associated with debt enable this to be factored into the risk levels.

7.5.2 Board ownership

In this study, managerial ownership is measured through board share ownership. Agency theory (Jensen and Meckling, 1976) is the main theory underlying studies that analyse the relationship between the percentages of shares held by the Board of Directors, and the impact of this on key corporate finance decisions. In line with managerial entrenchment (Bebchuk and Fried, 2005) and a US study (Chen and Steiner, 1999), a negative relationship is expected

in this study. The higher levels of managerial ownership enable managerial entrenchment to occur, and therefore the impact is on lower leverage levels.

In Models 1, 3, 4 and 6, the relationship is in line with the hypothesis and identifies a negative and significant (at the 1% level) relationship when OLS is applied. The relationship remains negative and significant in Models 1 and 3, see Table 7.4B, following the application of FEM/REM, however insignificant following the clustering of errors.

Board members are involved in the capital structure discussion; the research findings provide evidence that the high percentage of shares owned by the Board of Directors creates a decrease in the level of total debt. The finding is indicative of Agency theory (Jensen and Meckling, 1976), whereby a reduction in debt leads to a reduction in interest payments, and allows directors to receive any free cashflows as bonuses or compensation increases. In instances when capital is required and debt has not been taken up or has been exhausted, the alternative is equity. The main issue with equity is in relation to the control aspect, and the dilution of control. The issuance of equity dilutes control for the existing shareholders; therefore, in relation to board ownership this could have an impact on the board members concentration of ownership.

7.5.3 Foreign ownership

Agency theory (Jensen and Meckling, 1976) is the main theory underlying studies that analyse the relationship between the percentages of shares held by foreign investors, and the impact of this on key corporate finance decisions. A negative relationship is expected to follow a study of Turkish non-financial listed companies over the period 2007-2008 (Gurunlu and Gursoy, 2010).

The relationships are positive yet insignificant when single equation modelling (OLS, FEM/REM) is applied in this study, see Tables 7.4A and 7.4B.

7.6 Similarities and differences between the two types of static modelling

The use of static modelling, see Tables 7.4A and 7.4B, provides a lack of consistent and significant relationships within the dataset. There are similarities in the sign and significance between the application of OLS and FEM/REM in the dataset. For example, for the variable foreign ownership the relationship remains as positive and insignificant in Model 1, regardless of which static model is applied. Instances where differences become apparent include the relationship between institutional ownership and leverage, it is positive regardless of which static modelling is applied. However, the insignificant relationship when OLS is applied changes to become significant following the application of FEM. The use of the 5% measure of ownership provides inconsistent and insignificant relationships when the two types of static modelling is applied. In relation to the variable board ownership the sign of the relationship remains negative in Model 1 when OLS and FEM is applied, however the relationship becomes significant only through the application of OLS.

7.7 Dynamic Modelling Results

The following section applies dynamic modelling (GMM) to the same dataset. The results are expected to differ due to the different modelling techniques, and these differences will be discussed in Section 7.8.

Table 7.5: The results of GMM for the Ownership characteristics using a lag of one year

Independent Variables	Model 1	Model 2	Model 3
Lev_{t-1}	0.506***	0.0853***	0.460***
	(0.00211)	(0.00119)	(0.00338)
Owner	0.0121***	0.00606***	0.00186**
	(0.000999)	(0.000429)	(0.000949)
BO	-0.0104***	-0.0139***	-0.0221***
	(0.00159)	(0.00156)	(0.00285)
FO	-0.0226***	-0.0221***	0.0611***
	(0.00695)	(0.00383)	(0.00802)
IO	-0.0100***	0.00828***	-0.0287***
	(0.00201)	(0.000766)	(0.00197)
Tang	0.00529*	-0.0211***	0.0368***
	(0.00295)	(0.000720)	(0.00213)
Size	0.0701***	0.00621***	0.0665***
	(0.00124)	(0.000437)	(0.00126)
Mtbv	0.00721***	0.00165***	0.00581***
	(0.000159)	(2.61e-05)	(0.000128)
Beta	-0.00430***	-0.00614***	-0.00751***
	(0.000462)	(0.000286)	(0.000663)
CR	-0.00451***	-0.00998***	0.00351***
	(0.000139)	(9.04e-05)	(0.000112)
2008	0.00564***	0.00319***	0.00775***
	(0.000541)	(0.000203)	(0.000527)
2009	-0.0159***	-0.000389	-0.00977***
	(0.000520)	(0.000351)	(0.000559)
2010	-0.0342***	-0.00794***	-0.0257***
	(0.000585)	(0.000266)	(0.000641)
2011	-0.0246***	-0.00177***	-0.0254***
	(0.000551)	(0.000418)	(0.000799)
2012	-0.0257***	-0.00936***	-0.0194***
	(0.000629)	(0.000344)	(0.000575)
Constant	-0.336***	0.0165***	-0.333***
	(0.00783)	(0.00301)	(0.00726)
AR1	0.00	0.00	0.00
AR2	0.99	0.76	0.99

NOTE: *** 1% significance ** 5% significance * 10% significance.

Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets.

The Sargan tests for overidentifying restrictions indicates that the instruments used in the GMM are valid and not correlated with the error term. AR1 and AR2 are tests for first and second-order correlation in the first-differenced residuals, see Table 7.5. In line with Arellano-Bond (1991) the GMM estimation technique states that there must be first order serial correlation (AR1), while there is no second order correlation (AR2) in the residuals. The null hypothesis states that there is no first or second order correlation (AR1 and AR2); therefore, you need to reject the null hypotheses for AR1 and accept it for AR2 in order for GMM to be valid.

Table 7.5 demonstrates that in all three models AR1 is insignificant and the errors are uncorrelated with each other; therefore it rejects the null hypotheses, while for AR2 the null hypotheses can be accepted.

7.7.1 Institutional ownership

In line with the static modelling, see Table 7.4B, the relationship between the institutional owners (when measured using the 5% concentration) and leverage is consistently positive and significant (at the 1% level), in Models 1, 2 and 3 when GMM is applied with a lag of one year. Institutional owners are able to achieve a higher diversification of risk through holding a portfolio of investments.

The use of the second definition of ownership presents conflicting results due to the use of two different measures of institutional ownership. Firstly, there is a difference in the sign of the relationship in Models 1 and 3, see Table 7.5, the relationship changes from positive to negative (at the significance level 1%). Therefore, levels of total debt and long term debt reduce as levels of institutional ownership increase, indicating highly active shareholders. However, the relationship remains as positive and significant for short-term debt, regardless of the definition chosen. The finding indicates that there is a difference within the duration of

the type of debt that is being taken out, with short term debt being taken out instead of long term debt. Reasons behind this difference within duration are difficult to explain within this doctorate, without knowing the shareholder base it becomes hard to analyse whether shareholders are having an influence on gearing levels.

The increase in the level of information for existing debt enables the impact on future gearing can be discussed in a more comprehensive way. The finding suggests that they make up the largest percentage of ownership of companies in this study, and are able to influence the capital structure decision. Reasons behind this finding could lie in the degree to which institutional investors are privy to having an increase in access to information concerning the capital structure decision. The assumption that institutional investors are able to influence the capital structure decision in a positive, as opposed to the expected negative way, due to the high level of ownership is supported in this study.

7.7.2 Board ownership

In line with FEM, see Table 7.4B, the relationship between leverage and board ownership is negative in Models 1, 2 and 3, becoming significant at the 1% level and is in line with previous studies (Chen and Steiner, 1999; Short and Keasey, 1999).

The Board of Directors discuss capital structure choices, and therefore have a higher degree of information to enable decisions to be made. The finding poses the question of whether the share ownership held by the Board of Directors is having an impact on the uptake of debt. Alternatively, is the future strategy of the business dictating the capital choices? It is very difficult to ascertain the reasons behind the capital structure choices because the connection between board ownership and capital decisions is very subjective, and reasons behind capital choices remain within the board room. However, the consistent negative finding when long-term and total debt is considered, provides strong support for entrenchment theory. The

influence that the Board of Directors is able to have on the capital structure choices is leading to a reduction in the uptake of debt; the implication on the company is growth may be prevented due to a lack of finance available.

7.7.3 Foreign ownership

In contrast to the insignificant relationships seen when applying the static modelling in this study, see Tables 7.4A and 7.4B, the relationship between foreign ownership and leverage is negative and significant (at the 1% level) in Models 1, 2 and 3. The presence of foreign ownership, albeit very low in the study, leads to a decrease in the level of debt and is in line with expectations. The uptake of foreign investment is an alternative to obtaining capital through debt and/or equity, the negative relationship identified in the study confirms that foreign investment is a source of finance for companies.

The low incidence of foreign ownership of the companies in this study indicate a low issuance of shares in UK companies outside of the UK; the decrease in the percentage of foreign ownership since 2004 further highlights the lack of significance in foreign ownership during the whole period of this study. For example, in the study there are 315 instances of foreign ownership, and these occur in the years 2003 and 2004. The finding indicates that foreign ownership is concentrated in the early years of the study period selected, and is declining as the study progresses. Therefore, we can conclude that in the majority of companies within this study there is a lack of foreign ownership, as it represents 13.6% of the sample. Therefore, due to the low representation of shares held by foreign investors, this independent variable lacks any weighting in whether ownership has an impact on the leverage levels in companies.

7.8 Summary of differences within the use of estimation techniques and gearing definitions

As discussed in Section 7.6 differences materialise dependent on the type of modelling techniques that is applied to the dataset. The use of dynamic modelling provides some similarities and differences in comparison to the static modelling, which is also applied in this study. Table 7.6 shows the results of significant relationships for each independent variable, according to the estimation technique that is applied.

Table 7.6 The results of the relationships according to different modelling techniques for Ownership characteristics.

Independent variable	OLS Lev1	OLS Lev2	OLS Lev3	FEM Lev1	REM Lev2	FEM Lev3	GMM Lev1	GMM Lev2	GMM Lev3
Ownership						++	+++	+++	++
Board	---		---				---	---	---
Foreign							---	---	+++
Institutional		+++		+			---	+++	---

Note: +++ significantly positive at 1% level, ++ significantly positive at 5% level, + significantly positive at 10% level. --- significantly negative at 1% level, -- significantly negative at 5% level, - significantly negative at 10% level.

Notes: Lev 1 – Total Debt/Total Assets, Lev 2 – Short-Term Debt/Total Assets, Lev 3 – Long-Term Debt/ Total Assets.

The relationship between institutional ownership and gearing depends on the gearing definition that is applied, and the use of two measures of institutional ownership. In Model 2 the relationship is significant and positive under OLS and dynamic modelling. While in Models 1 and 3 the relationship is significant and negative under GMM only. The results indicate a difference within the duration of debt that is being taken out by companies within this study, with short term debt being taken out instead of long term debt. When a different

definition is considered for institutional ownership, the 5% measure of ownership, the relationships remain positive and significant regardless of whether GMM or FEM is applied.

The implications for companies surround how they conduct their relationship with their institutional investors, whether it is an active or passive relationship. The difference within the duration of the debt requires more extensive research, however indicates that short term debt is treated differently to long term debt. Whilst both types of debt have monthly commitments, and therefore monitoring, the difference between the two is evident from this study.

Where there are significant relationships between board ownership and gearing levels it is negative, regardless of which estimation technique is applied. The highly consistent negative relationship between board ownership and all durations of debt levels, could indicate that there is less need for debt in companies due to better management. The implications for companies is focused upon whether board ownership is having an impact on the levels of gearing within the company in a detrimental effect. For example, are the Board of Directors avoiding the use of debt because their ownership is linked to the profit after taxation, which could be distributed in the form of dividends. However, lower debt levels could be attributable to a more efficient management as the owners and managers of the company are the same. Whilst it is difficult to identify the reasons behind the negative relationship it does signal an area to focus upon to ensure there isn't a conflict of interest.

There is a lack of significant relationships identified under single equation modelling for the relationship between foreign ownership and gearing. However, the application of dynamic modelling creates a difference in the sign of the relationship, which depends upon the gearing definition applied. In Models 1 and 2 the relationship is negative, however it is positive in Model 3, indicating a difference within the duration of debt levels. However, in terms of

implications for companies, the low incidence of foreign ownership in this study prevent any conclusive findings.

7.9 GMM Partial adjustment

In line with a previous UK based study (Ozkan, 2001) the coefficient of the lagged leverage is positive and significant (at the 1% level). The adjustment coefficient is relatively large (greater than 0.5 in Model 1), and provides evidence of companies in this study adjusting their leverage ratios towards a target debt ratio. Several reasons behind why companies are taking steps to move towards their target debt ratio is because deviating from it is high, secondly companies have a preference for debt in their capital structure over equity.

7.10 Impact of the financial crisis

In Models 1, 2 and 3 there is a positive and significant (at the 1% level) relationship between leverage and the year 2008, see Table 7.5. The sign of the relationship changes from positive to negative (remaining at the 1% significant level), from the year 2009 onwards. The finding provides strong evidence that in this study the financial crisis is reducing the levels of total, short and long-term debt. The reasons behind the finding could be attributable to a lack of available debt due to the restrictions that were imposed shortly following the financial crisis. Secondly, companies may be choosing to avoid debt because of an increased awareness of financial distress costs.

7.11 Conclusion

The sign and significance of the relationship for several of the corporate governance variables is dependent on the Model and the analysis method chosen, comparisons between the models and analysis methods does provide nonsensical results in several cases (See Section 7.8). The existence of endogenous variables indicates dynamic modelling, GMM, is the preferred tool. Several of the corporate governance variables are in line, irrespective of the model chosen.

Inconsistent relationships are identified, which depend upon the type of modelling used, and the choice of definition or ownership.

The positive relationship identified through using the 5% concentration is not replicated when ownership is measured through shares held by institutional investors in Model 1 and 3. However, the negative relationship is in line with previous US studies (Chaganti and Damanpour, 1991; Bathala *et al.*, 1994; Grier and Zychowicz 1994; Berger *et al.*, 1997). One reason behind the relationship could be attributable to the increased level of transparency within the information supplied to institutional investors, enabling an improved decision-making process. Decisions are based upon the quantity and quality of information, leading to more informed decision-making. A lack of transparency can lead to levels of uncertainty, and the inability to assess all the options with regard to the capital structure decision. The implication of the research findings surround how companies interact with their institutional investors, an activity that is costly in times of administration time and physical time. The level of interaction with the institutional investors is dependent on a company's long-term plan in relation to their future uptake of debt.

A consistent negative relationship is identified between the independent variable board ownership and all three measures of leverage; when applying FEM, see Table 7.4B, and GMM, see Table 7.5. The robust findings provide support that as shares owned by the Board of Directors increase, it reduces the impact on debt, which is in line with the hypothesis. Reasons behind the negative relationship identified in the study can be attributed to managerial entrenchment, which leads to a lack of monitoring; the finding is consistent with a previous UK study (Short and Keasey, 1999). Alternatively, an improved management could contribute to a lower reliance on debt. The level of diversification of the Board of Directors is another factor, whilst this information is unobtainable; directors may choose to reduce the level of debt in the company in order to protect their own wealth.

There is a lack of any significant relationships between leverage and foreign ownership when static modelling is applied. The low incidence of foreign ownership in this study could be one reason behind the lack of any significant relationships. The mean foreign ownership is 1%, which suggests that companies in this study are choosing alternative ownership structures, for example, institutional and managerial ownership. However, significant relationships are identified through applying GMM with a lag of one year. The significant relationship highlights that whilst foreign ownership is extremely low in companies in the study, it provides evidence of reducing total and short-term debt levels. The implication for companies is very marginal in comparison to shares held by institutional and board ownership.

The analysis in relation to ownership variables indicates that there is evidence of significant relationships identified when GMM with a lag of one is applied to the data, despite evidence of endogenous variables. The two ownership variables that are endogenous are shares held by the Board of Directors and institutional investors. One key finding points to the level of managerial ownership, as the percentage increases, the level of leverage decreases. In this study, the average board ownership is 7%. The implication is companies need to consider the impact on aligning owners and agents needs together; the concern is the increase in board ownership may be a deterrent on a company's long-term growth potential. The disadvantages surrounding debt are well documented; however, the cost of not taking on a positive net present value project due to lack of capital is much harder to identify and measure in the short term, even more difficult in the long-term.

The research findings highlight that one of the key influencers in the capital structure decision is the Board of Directors. The key decisions concerning capital structure are made by the EDs and NEDs, combined with their level of ownership provides evidence of the control the Board of Directors have when deciding upon the debt level of the company.

There is strong support for high levels of managerial ownership reducing the level of debt in UK companies. The implication of this finding could lead to the Board of Directors following a risk avoidance strategy in relation to the capital choices. The preference for alternatives to debt when capital is required could lead to the advantages of debt not being taken advantage of. The increase on the reliance of equity, instead of cash, as a form of compensation indicates that members of the Board of Directors have a personal interest in the capital structure decision, preferring equity over debt because of the servicing requirements and higher risk level associated with debt.

Chapter 8 Conclusion

8.1 Research Goals

Capital structure remains a debatable area within the research field; previous linkages include the relationship between capital structure and dividend policy (Al-Najjar, 2011), cash holding (Ozkan and Ozkan, 2004), and ownership structure (Bathala *et al*., 1994). The focus of this research has been to re-examine the debate by introducing new dimensions, such as CEO gender, CEO nationality, percentage of female directors, number of board meetings, board meeting attendance, and board share ownership. A company has the flexibility to choose among many alternative capital structures; prior research indicates there is no ideal percentage of debt or equity that companies should aspire to. The main objective of companies is to minimise their cost of capital in order to maximise the value of their company, and therefore, shareholder wealth is the focus in the UK where share appreciation is dominant (Arnold, 2012). There are several options available to companies if they wish to take out debt; these include convertible bonds, warrants and swaps. The main alternative to debt is equity; options for equity include rights issues and share splits. The explanation of the variation that exists after controlling for the firm specific characteristics has been the focus of this research, to try and identify which variables influence the choices in the capital structure puzzle (Myers, 1984), and the magnitude of their impact.

Research indicates approximately 90% of papers that are published in premier journals have not addressed the endogeneity bias adequately (Hamilton and Nickerson, 2003; Antonakis *et al.*, 2010). Based on a study of 100 articles, Antonakis *et al.*, 2010 claim '*researchers fail to address at least 66% and up to 90% of design and estimation conditions that make casual claims invalid.'* The use of dynamic modelling in this study, in addition to single equation modelling, enable the endogeneity issue to be overcome. The nature of corporate governance

variables transpires that changes in the CEO and/or Board of Directors is unlikely to have an immediate impact on a company's capital structure. Therefore, in this study, the opportunity to incorporate a time lag, of one year in this case, enables the study to investigate the relationship between the independent variables and capital structure. While the inclusion of single equation modelling enables comparability to prior studies to identify if the study agrees or disagrees with previous research findings.

Along with the use of several estimation techniques the study has also used three different definitions of gearing; long term debt, short term debt and total debt levels. The use of three types of gearing definitions enables the thesis to consider whether companies in the UK are making different choices in relation to the duration of the debt that they are taking out.

Moreover to academic researchers, the research is of particular importance to existing shareholders, potential shareholders, managers and regulators. The identification of fundamental variables that influence the capital structure decision could lead to changes occurring. Information in the public domain is continuing to increase, and the Board of Directors is facing an increase in the level of scrutiny in its decision-making processes. This further fuels the demand for timely more transparent information to be produced from companies.

A Board of Directors is a fundamental element of corporate governance that has become the focus of media attention following the global corporate scandals, which include Enron and WorldCom (Coates, 2007). The aim of corporate governance is to prevent corporate scandals and instances of fraud; however, the complexity surrounding the scandals has merely meant a reduction in the magnitude and number of scandals that occur. More recently, the economic crisis in the UK that occurred in 2008, has sparked concerns regarding the composition of the Board of Directors and their purpose (OECD, 2009).

For example, shareholders may demand additional information on the Board of Directors' levels of compensation, leading to further increases in disclosures regarding why compensation levels have increased. In the same way that companies have to adhere to a percentage of NEDs, there could be more detailed guidelines on the percentage of female board members. The impact on managers is they may be faced with a reduction in their decision-making ability, an increase in transparency and punishments if they do not adhere to guidelines. Lastly, the role that regulators have with companies could change. This could put additional pressure on existing regulators, and encourage companies to develop closer relationships with them.

8.2 Theoretical and Practical Implications of the Findings

The different modelling techniques used in this study can lead to differences in results which is dependent upon the choice of the estimated model, which can lead to contradicting results. Also, the use of three definitions of leverage make the comparison of the results of the study when compared to previous studies challenging. It is important to note that capital structure is seen as a puzzle as we do not know what exactly determines this decision nor do we know why exactly firms go for debt financing; this is the capital structure puzzle. This study adds to the puzzle by arguing that different definitions and statistical techniques might lead to different results, which can be seen as another part of the capital structure puzzle. Hence, our contribution is to provide a holistic-approach in investigating the capital structure puzzle within the UK context. Firstly, the use of single and dynamic modelling enable the results of the study to be comparable to prior studies in the field of capital structure, and the use of dynamic modelling enables a lag of one year to be incorporated which enables consideration that changes to corporate governance variables could have a delayed impact on a company's capital structure. Secondly, the use of previously studied

independent variables combined with additional independent variables enable the thesis to consider the impact of CEO characteristics, Board characteristics and Ownership structure on capital structure for UK companies during a period of economic uncertainty.

Table 8.1 provides a summary of the results in this study for all the independent variables in Model 1 using GMM, against the predicted hypotheses that are based upon previous studies. OLS is used widely in prior research within this field, therefore this method is applied to enable comparability of previous results to results identified in this study. The avoidance of endogenous variables in the models is very important, endogenous variables occur whereby one of the independent variables has a relationship with the error term. In this study the Durbin-Wu-Hausman test demonstrates that several of the independent variables in this study are endogenously determined. Therefore, the results reported from OLS are inconsistent, which implies it is because of the endogeneity issues. Due to the fixed-effects failing to capture dynamic endogeneity, a second stage of modelling is applied which is the GMM model. The use of a dynamic modelling in addition to single equation modelling in this study enables the endogeneity issue to be incorporated into the results. Two types of modelling have been carried out in this research; the differences surround the increase in the number of significant relationships under dynamic modelling, hence the GMM model is more preferable based on such statistics.

The results of applying single equation modelling (OLS, FEM/REM) identified a lack of consistent significant results; therefore, only the results of the dynamic modelling have been compared to the predicted hypotheses in the Table below. The appropriate lag period has been tested in this study, see Tables 10.7, 10.10 and 10.13 in the Appendix. For the analysis of CEO, board and ownership characteristics, a lag period of one is used. In this thesis, several definitions of leverage are used, in comparison to previous studies the most common measure is calculated as total debt divided by total assets (Model 1).

Table 8.1: Comparison of each independent variable in the study, using the dependent variable LEV1, in relation to the hypothesis, previous studies and the results of this study.

Independent variable	**Hypothesis**	**Previous studies in line with hypothesis on Capital Structure**	**Hypothesis accepted or rejected**
CEO Age (CEOAge)	Negative	Frank and Goyle (2009) Malmendier *et al*. (2010) Serfling (2012)	Accepted
CEO Duality (DUAL)	Negative		Rejected
CEO tenure (CEOTen)	Negative	Malmendier *et al*. (2010)	Accepted
CEO compensation (CEOP)	Positive	John and John (1993) Berger *et al*. (1997) Ortiz-Molina (2005) Eisdorfer *et al*. (2013)	Rejected
CEO gender (CEOFem)	Negative		Inconclusive
CEO nationality (CEOBrit)	Inconclusive	Jalbert *et al.* (2007)	Inconclusive
Percentage of female executives	Negative		Inconclusive
Board size	Negative	Berger *et al*. (1997) Al-Najjar and Hussainey (2011)	Accepted

Board meetings	Negative		Rejected
Board attendance	Negative		Accepted
Percentage of non-executives	Negative		Accepted
5% concentration	Negative	Bathala *et al*. (1994) Grier and Zychowicz (1994) Berger *et al*. (1997)	Rejected
Board ownership	Negative	Chen and Steiner (1999)	Accepted
Foreign ownership	Negative	Gurunlu and Gursoy (2010)	Accepted
Institutional ownership	Negative	Bathala *et al.* (1994) Grier and Zychowicz (1994) Berger *et al.* (1997)	Inconclusive

There are several key contributions identified from this thesis to the field of research that consider the relationship between capital structure, and corporate governance. The research findings do provide several relationships for the independent variables, which have the same sign in comparison to previous studies.

There is evidence that CEOs are demonstrating a difference in risk levels between short-term, and long-term debt levels. The implications on the long-term view of a company's capital structure is companies who have a younger CEO will have a different composition of debt, in comparison to companies that are being run by older CEOs.

Research findings indicate that the levels of short and long-term debt are reduced as the tenure period of the CEO increases. As CEO tenure increases, they will seek to avoid the additional monitoring from shareholders that occurs with the uptake of equity, preferring to take up debt instead of equity. The implication of this finding for companies is to review the tenure period of CEOs to ensure transparency, and ensure they are meeting the objectives of the role.

Research findings indicate that there is a relationship between leverage levels and the gender of the CEO, the level of total debt and long-term debt increases. However, the inconsistencies between the sign and significance of the relationship in this study prevent any strong findings materialising, but does highlight an area for future research. The implications of this research are centred on the recruitment process when a company is replacing their CEO. For example, during the recruitment process for a new CEO, rejecting an applicant based on gender is illegal. However, how gender is controlled within companies is beyond this doctorate.

The consistent negative relationship between board size and all forms of gearing enables the study to conclude this is a key variable in the capital structure decision. The implication is companies will need to ensure that the size of the board does not become too large, for fear of preventing decisions from being made; the increase in the level of discussion is a positive aspect of a large board size. The board minutes are not available outside of the board room, therefore the time spent discussing decisions, such as the choice between capital, are never disclosed. The availability of such information could provide additional disclosures and enable a more informed reason behind the relationship to be developed.

The relationship between number of NEDs and leverage levels indicates that total debt, short-term debt and long-term debt reduce as the number of NEDs increases. Companies need to

be mindful that as NEDs increase, the level of discussion increases, which could result in delays in the decision-making process. A diverse array of opinions is critical to companies, however too many opinions could be counterproductive. The implication is an additional layer of caution is applied to prevent companies developing tunnel vision, and the ability to assess the internal and external risks from various perspectives.

One possible implication of these two variables in this study is the speed of the decision-making; larger boards that are created through adhering to the target number of NEDs could lead to a slower speed of decision-making in companies. The difficulty of how the speed of decision-making is measured, prevents this being incorporated into this research, or future research. One new variable in this study, which provides a contribution to the corporate governance field is the attendance levels at the Board of Director meetings. The identification of a negative relationship provides support for an increase in discussion that is generated through the high levels of attendance, 95% in this study, leading to lower leverage levels.

The positive relationship identified for total and long term debt, and the number of board meetings highlights a difference in relation to prior studies. The implication of this finding concerns companies ensuring that they are holding the correct number of board meetings, to allow sufficient time to discuss each point on the agenda. Therefore, The Code (1998:2009) will want to avoid imposing guidelines regarding the number of board meetings a company must hold per year.

The research findings highlight that one of the key influencers in the capital structure decision is the Board of Directors. The key decisions concerning capital structure are made by the EDs and NEDs, combined with their level of ownership provides evidence of the control the Board of Directors have when deciding upon the debt level of the company.

There is strong support for high levels of managerial ownership reducing the level of debt in UK companies. Alternatively, an improved management could contribute to a lower reliance on debt, and less monitoring is required. The implication of this finding could lead to the Board of Directors following a risk avoidance strategy in relation to the capital choices. The preference for alternatives to debt when capital is required could lead to the advantages of debt not being taken advantage of. The increase on the reliance of equity, instead of cash, as a form of compensation indicates that members of the Board of Directors have a personal interest in the capital structure decision, preferring equity over debt because of the servicing requirements and higher risk level associated with debt.

Lastly, the relationship between foreign ownership and debt levels is negative, the uptake of debt is not required as the required capital is gained through foreign investors.

There is a difference within the sign of the relationship between duality and leverage levels; this can partly be explained due to the change in the guidelines that advise against two roles (CEO and Chairman) being undertaken by one individual.

The positive relationship identified for total and long term debt and the number of board meetings highlights a difference in relation to prior studies, one possible reason behind the difference could be due to the different estimation techniques that are applied. The increase in the number of board meetings could lead to a greater level of exploration into the alternative capital options available, enabling the negativity surrounding debt to be fully explored and compared to the alternatives. Alternatively, could the increase in the number of board meetings be due to high levels of debt already within the capital structure, which requires additional meetings to ensure existing levels of debt are closely monitored. The implication of this finding concerns companies ensuring that they are holding the correct number of board meetings, to allow sufficient time to discuss each point on the agenda.

Therefore, The Code (1998:2009) will want to avoid imposing guidelines regarding the number of board meetings a company must hold per year.

Differences have become apparent in this study between the relationship with key corporate governance variables, and the length of time that debt is taken out. In the case of the variable duality, levels of short-term debt increase, while long-term debt decreases.

Research findings indicate a lack of a consistent relationship between institutional ownership and debt levels. The lack of a relationship between institutional investors, despite having the highest percentage of ownership in UK companies in this study, indicates there are other parties who are able to influence the choice of capital. The research highlights the control that the Board of Directors has on the capital structure decision, providing concern that there is evidence of weak corporate governance in operation, despite the advancement of The Code (1998:2009) since its introduction. There is strong evidence of one solution being put in place to reduce the costs associated with Agency theory; however, this could be at the detriment to the long-term growth prospects of the companies in this study, and shareholders returns will reduce as a result. The implication is those shareholders, other than those on the Board of Directors, may choose to divest in the company and reinvest in a company with a higher risk level in order to achieve a higher return on their investment.

The development of The Code (1998:2009) has led to an increase in the quantity and level of detailed guidelines that companies are suggested to follow. For example, the percentage of NEDs in proportion to the rest of the Board of Directors. The gender of all of the Board of Directors, including the CEO, and the degree of board diversity has become a focus of

attention in the UK, with the creation of targets for female representation through the Davis Report (2011_a:2014_b)[16].

There is evidence from this study that the Board of Directors are responding to the recommendations of the Davis Report, which supports the encouragement of female board members. When the gender of the CEO is separated from the data there is also evidence which supports the concept that there is a relationship between the gender of the Board of Director roles, and leverage levels of a company. The advancement of more detailed recommendations for the age of the CEO, and the maximum time the CEO is able to undertake the role are two key implications of this research. The inclusion of these recommendations, whilst not enforceable, does enable companies to make more informed decisions based upon current research. The adoption of the separation of the CEO and Chairman roles is one such guideline, as its introduction has seen large changes existing within the structure of the Board of Directors. The instances of duality in this study are minimal, and those cases represent 23 companies. In our study of 231 companies only 4 companies have constant duality across the ten-year time period, representing 1.7% of companies in this study. Therefore, whilst the guideline is not enforceable, companies are being seen as following advice on corporate governance that is being recommended to them.

In relation to the board characteristics, there is strong evidence from this research that the size of the board is one aspect that can have an impact on the leverage levels of the company. At the moment, there are no guidelines on the size of the board. The notion that increases on the size of the board leads to increased discussion, and therefore an avoidance of debt, is proven in this study. Companies need to be aware that increasing their level of independence through increasing the number of NEDs could create the opposite effect, and delay efficient decision-making. The provision of more detailed guidelines on the size of the board could

[16] 2011_a Davis Report 2011, 2014_b Davis Report 2014

create an increase in efficiency within UK companies. One solution that is evident in several of the companies within this study is the transfer of the Chairman role to an independent role, therefore artificially increasing their percentage of independent board members without increasing the size of the Board of Directors.

Agency theory (Jensen and Meckling, 1976) is the key theory in relation to Corporate Governance; there are options to mitigate the costs of agency costs. One solution to agency costs is the increase in the level of board share ownership within the sample, and the implication that the solution to one issue creates other concerns. The use of equity based compensation instead of cash, and the payment of controversial bonus payments is one solution that is being used in UK companies. However, the highly negative and significant relationship identified in this study between board share ownership and leverage levels, demonstrates a fundamental variable in the capital structure decision. Therefore, highlighting how board ownership requires closer monitoring and potentially more guidelines to prevent avoidance in the uptake of debt, and the risks to a company that this presents as equity is chosen over debt.

8.3 Research Limitation and Future Research

Although the thesis has been designed to provide a comprehensive and complete analysis to meet the original research goals, it remains incomplete and subject to a number of limitations. The availability of complete data presents challenges to the collection of data in any doctorate, in particular the corporate governance variables. At the time of the start of the research the publication of corporate governance variables remained a relatively new area, impacting the earlier periods in this study. The inclusion of corporate governance variables in DataStream is increasing year on year; this limitation has partly been overcome in this study through the use of hand collecting the missing data from a company's financial

statements. The hand collecting of the data presents a challenge to the resources required and the creation of user error; this is partly overcome through double checking the data collected against previous years as a sense check. Where possible, the data is collected from Boardex and DataStream, however contained within these databases there may be errors, and a sense check was undertaken as the information was collected.

As with any academic research, there are limitations surrounding the sample chosen. The companies in the study were taken from the FTSE 350; the list changes on a frequent basis to include new listings or delisting, and due to the time constraints of completing a doctorate the list of companies does not reflect the changes. The practicalities surrounding adjusting the sample for these changes presents one limitation.

The subjectivity surrounding several of the independent variables in this study make providing conclusive reasons behind the significant relationships problematic. For example, CEO nationality, and CEO gender. One solution to the subjectivity surrounding several variables is through the collection of more detailed data from in-depth interviews with the CEO, to identify additional reasons behind their capital structure choices and provide more specific examples. The in-depth interviews would enable a greater level of detail behind the decision-making process to be generated, and enable the identification of variables that have not previously been considered, and therefore researched. However, there are several disadvantages surrounding the conducting of interviews with CEOs. Firstly, gaining access to CEOs willing to actively participate. Secondly, the issue of confidentially is generated; companies may be unwilling to divulge their future capital structure decisions for fear of competitors gaining private information regarding their future growth plans, and companies losing their competitive edge. Thirdly, the increase in the time it would take to undertake the interviews would mean the sample is greatly reduced in comparison to the collection of data from financial databases, preventing the findings being able to be applied more widely.

Two variables in this study relate to the gender diversity of the Board of Directors. The focus on the mix of male and female board members has only become apparent since the first Davis Report in 2011. In this thesis, the data collected only incorporates the years 2011 and 2012; therefore, the full impact of the 2011 and 2014 Davis Report has yet to be fully researched. Future research would involve the continuation of the collection of the data on the gender of the Board of Directors, to identify whether the relationship remains as negative and significant. Secondly, in addition to the gender of the CEO, a second variable that could be collected is the percentage of foreign non-executive directors to total non-executive directors.

Previously in the UK, there has been an increase in the level of attention placed upon bonuses, the shift towards an equity rather than cash based system creates a new focus. In this study, a negative and significant relationship is identified between board ownership and leverage levels. A future area of research would consider the individual risk profiles of the Board of Directors, with the aim being to identify their level of personal risk diversification. Board members may choose to reduce the debt levels in the companies because they have a significant proportion of their wealth invested in the company, to enable a reduction in their personal risk levels. The link with behavioural finance could identify linkages between independent variables in this study. For example, CEO age and levels of board ownership. As the age of the CEO increases and they approach retirement, they may choose to increase their level of risk through the uptake of additional shares in the company. Alternatively, the CEO may choose to minimise their risk and reduce their number of shares in the company.

Another area of future research is the investigation of whether differences materialise within the capital structure due to the industry sectors. The data can be split into eight industry dummies following the exclusion of the financial, non-financial and utility companies. The exploration of a further sub industry sectors could enable differences to materialise. Secondly, an analysis could be conducted on the financial, non-financial and utility

companies that have been excluded in this sample, to identify whether differences materialise between the two sets of companies. Do financial companies have a different level of short-term debt, or have higher levels of long-term debt in comparison to non-financial companies?

The focus of this research has been on the internal corporate governance mechanisms; future research could include the external mechanisms. For example, these could include stock markets and their reactions to announcements surrounding the capital structure of companies. The use of event studies to track the price of the share in relation to such announcements is one area for future research. All the companies in the study are listed on the LSE, future data collection on how the stock exchange responds to the issuance of debt, or changes to the CEO of the company could be conducted to identify whether companies need to focus on external corporate governance factors in addition to internal ones. How investors react to announcements regarding the uptake of debt or equity is one area for a future research, behavioural finance being the fundamental theory. Do companies make their decisions to ensure the share price doesn't fluctuate, for example, does the timing of the announcement have more of an impact in comparison to the content of the announcement? This would enable a complete view of how capital decisions are made; however, the quantity of data that would be required to be collected makes it impossible to include within this doctorate.

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10 Appendices

Table 10.1: List of FTSE 100 companies used in the study

1. Aggreko	20. Compass Group	39. Johnson Matthey	58. Sage group
2. Amec	21. CRH	40. Kingfisher	59. Sainsburys
3. Anglo American	22. Croda International	41. Marks and Spencer Group	60. Serco group
4. Antofagasta	23. Diageo	42. Meggitt	61. Shire
5. Arm Holdings	24. Easyjet	43. Melrose Industries	62. Smith and nephew
6. Associated Brit foods	25. Eurasian Natres Group	44. Morrisons	63. Smiths group
7. Astrazeneca	26. Evraz	45. Next	64. Tate and lyle
8. Babcock Int.	27. Experian	46. Pearson	65. Tesco
9. BAE systems Ltd	28. Fresnillo	47. Petrofac	66. TUI
10. BG Group	29. G4S	48. Polymetal	67. Tullow oil
11. BHP Billiton	30. GKN	49. RandGold Resources	68. unilever
12. BP	31. Glaxosmithkline	50. Reckitt	69. Vedanta resources
13. British American Tobacco	32. Glencore Xstrata	51. Reed	70. Vodafone group
14. British Sky Broadcasting	33. IMI	52. Rexam	71. Weir group
15. BT Group	34. Imperial Tobacco	53. Rio Tinto	72. Whitbread
16. Bunzl	35. InterContinentel	54. Rolls Royce	73. William Hill
17. Burberry Group	36. International consolidated airlines	55. Royal dutch shell A	74. Wolseley
18. Capita	37. Intertek Group	56. Royal dutch shell B	75. Wood group
19. Carnival	38. ITV	57. Sabmiller	76. WPP

Table 10.2: List of FTSE 250 companies used in the study

1. Afren	40. Dialight	79. Invensys	118. Redrow
2. African Barrrick Gold	41. Dignity	80. Ite group	119. Regus
3. Anite	42. Diploma	81. Kazakhmys	120. Renishaw
4. Ashtead Group	43. Dixons retail	82. Kcom group	121. Rentokil initial
5. Atkins	44. Domino printing sciences	83. Keller	122. Restaurant group
6. Aveva Group	45. Dominos pizza group	84. Kenmare	123. Rightmove

7. AZ electronics mat	46. Dunelm group	85. Kentz	124. Rotork
8. Balfour beauty	47. Electrocomp	86. Kier	125. RPC group
9. Barr	48. Elementis	87. Ladbrokes	126. RPS group
10. Barrett developments	49. Enquest	88. Laird	127. Salamander energy
11. BBA Aviation	50. Enterprise Inns	89. Lonmin	128. SDL
12. Bellway	51. Essar energy	90. Marstons	129. Senior
13. Berendsen	52. Euromoney	91. Menzies	130. SIG
14. Berkeley Group	53. Fenner	92. Michael page	131. Smith
15. Betfair group	54. Ferrexpo	93. Micro focus	132. Soco international
16. Bodycote	55. Fidessa group	94. Millenium	133. Spectris
17. Booker group	56. Filtrona	95. Mitchells and Butlers	134. Spirax Sarco
18. Bovis homes group	57. First group	96. Mitie group	135. Spirent communications
19. Britvic	58. Fisher and sons	97. Mondi	136. Sports direct
20. Brown group	59. Galliford Try	98. Money supermarket	137. Stagecoach group
21. BTG	60. Genus	99. Morgan advanced material	138. Supergroup
22. Bumi susp	61. Go ahead group	100. National express	139. Synergy health
23. Bwin party digital	62. Greene King	101. New world resources	140. Synthomer
24. Cable and wireless	63. Greggs	102. NMC health	141. Talktalk telecom
25. Cairn energy	64. Halfords group	103. Ocado group	142. Taylor Wimpey
26. Carillion	65. Halma	104. Ophir energy	143. Ted Baker
27. Carpetright	66. Hays	105. Oxford instruments	144.Telecity group
28. Centamin	67. Hertiage oil	106. Pace	145. Telecom plus
29. Chemring group	68. Hikma Pharmaceuticals	107. Paypoint	146. Thomas cook group
30. Cobham	69. Hochschild mining	108. Perform group	147. Travis perkins
31. Colt group	70. Home retail group	109. Perisimmon	148. UBM
32. Computacenter	71. Homeserve	110. Petra diamonds	149. Ultra electronics
33. Cranswick	72. Howden joinery	111. Petropavlovsk	150. United drug
34. CSR	73. Hunting	112. Playtech	151. Vesuvius
35. Dairy crest	74. Imagination	113. Premier Farnell	152. Victrex
36. De la rue	75. Inchape	114. Premier oil	153. Wetherspoons
37. Debenhams	76. Informa	115. PZ cussons	154. WHSmith
38. Dechra	77. Inmarsat	116. Qinetiq group	155. 888 Holdings

Pharmaceuticals			
39. Devro	78. Interserve	117. Rank group	

Table 10.3: Residual SS values

DV	All data (SSE)	Pre-crisis (SSE_1)	During the crisis (SSE_2)
Model 1	25.59	11.82	13.61

$$F= \frac{(SSE-SSE_1-SSE_2)/J}{\frac{(SSE_1+SSE_2)}{(n_1+n_2)}-2K}$$

Where J = the number of restrictions (often equal to K – all parameters), n = observations.

The calculation below is when Model 1 is used as the dependent variable:

$$F = \frac{(25.59 - 11.82 - 13.61)/2}{\frac{(11.82+13.61)}{(720+859)- 2*2}}$$

Table 10.4: F and p values in Model 1

DV	F	P
Model 1	8.05	0.000

Table 10.5: Hausman test to identify the use of FEM or REM for each measure of the three dependent variables.

Dependent variable	All data	Model?
Model 1	50.71 (0.00)	FEM
Model 2	**8.64 (0.65)**	**REM**
Model 3	54.10 (0.00)	FEM

Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets.

Table 10.6: Endogenous variables identified through testing the CEO independent variables (F scores when the p value is significant) for each of the three Models.

Model 1	Model 2	Model 3
CR (55.20)	**CR (69.25)**	**CR (21.52)**
Tang (134.32)	**Tang (4.84)**	**Tang (157.72)**
Size (100.75)	**Size (10.48)**	**Size (84.62)**
Mtbv (46.4B5)	**Mtbv (14.28)**	**Mtbv (31.34)**
CEOAge (14.10)	**CEOAge (13.83)**	**CEOAge (5.86)**
CEOBrit (45.4A5)	**CEOBrit (11.96)**	**CEOBrit (64.45)**
CEOTen (39.96)	**CEOTen (17.4A4)**	**CEOTen (24.25)**

Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets.

Table 10.7: Testing all three Models using the CEO characteristics for a lag period of one, two and three years.

Model	1	1	1
Lag 1	**0.533*** **	**0.546*** **	**0.521** **
	(0.0594)	**(0.179)**	**(0.204)**
Lag 2		0.00175	-0.0206
		(0.0537)	(0.0775)
Lag 3			0.0307
			(0.0688)
Model	2	2	2
Lag 1	0.0560	0.0309	0.0147
	(0.0459)	(0.109)	(0.138)
Lag 2		-0.0316	-0.0377
		(0.0896)	(0.111)
Lag 3			-0.0414
			(0.0857)
Model	3	3	3
Lag 1	**0.497*** **	**0.513*** **	**0.484*** **
	(0.143)	**(0.168)**	**(0.164)**
Lag 2		0.0180	0.0188
		(0.0609)	(0.0509)
Lag 3			0.00134
			(0.0495)

NOTE: *** 1% significance ** 5% significance * 10% significance

Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets.

Table 10.8: Hausman test to identify the use of FEM or REM for each measure of the three dependent variables.

Dependent variable	All data	Model ?
Model 1	40.28 (0.00)	FEM
Model 2	11.87 (0.29)	REM
Model 3	38.06 (0.00)	FEM

Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets.

Table 10.9: Endogenous variables identified through testing the Board independent variables (F scores when the p value is significant) for each of the three Models.

Model 1	Model 2	Model 3
Board size (49.32)	**Board size (4.83)**	**Board Size (40.54)**
NEDs (6.84)		NEDs (7.4B8)
Tang (89.87)	**Tang (5.24)**	**Tang (107.4B9)**
Size (143.92)	**Size (24.53**	**Size (110.81)**
Mtbv (54.90)	**Mtbv (17.80)**	**Mtbv (36.26)**
CR (80.73)	**CR (62.97)**	**CR (40.59)**

Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets.

Table 10.10: Testing all three Models using the Board characteristics with the clustering of errors, for a lag period of one, two and three years.

Model	1	1	1
Lag 1	**0.464*** **	**0.468***	**0.486**
	(0.156)	**(0.258)**	**(0.341)**
Lag 2		-0.0160	-0.0353
		(0.0853)	(0.140)
Lag 3			0.0350
			(0.0518)
Model	2	2	2
Lag 1	0.0731	0.0507	0.477*
	(0.0622)	(0.0724)	(0.255)
Lag 2		-0.0362	-0.0311
		(0.0399)	(0.105)
Lag 3			0.0211
			(0.0441)
Model	3	3	3
Lag 1	**0.445*** **	**0.444*** **	**0.451***
	(0.134)	**(0.132)**	**(0.274)**
Lag 2		-0.00470	-0.00446
		(0.0455)	(0.149)
Lag 3			0.0103
			(0.166)

NOTE: *** 1% significance ** 5% significance * 10% significance

Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets.

Table 10.11 Hausman test to identify the use of FEM or REM for each measure of the three dependent variables.

Dependent variable	All data	Model ?
Model 1	27.23 (0.00)	FEM
Model 2	10.63 (0.30)	REM
Model 3	32.13 (0.00)	FEM

Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets.

Table 10.12: Endogenous variables identified through testing the Ownership independent variables (F scores when the p value is significant) for each of the three Models.

Model 1	Model 2	Model 3
BO (9.47)		BO (12.74)
	IO (8.05)	
Tang (109.62)		**Tang (127.98)**
Size (80.55)	**Size (27.90)**	**Size (53.94)**
Mtbv (51.06)	**Mtbv (15.30)**	**Mtbv (34.31)**
CR (64.06)	**CR (54.66)**	**CR (30.58)**

Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets.

Table 10.13: Testing all three Models using the Ownership characteristics for a lag period of one, two and three years.

Model	1	1	1
Lag 1	**0.534*** **	**0.539*** **	**0.520*** **
	(0.180)	**(0.170)**	**(0.0622)**
Lag 2		-0.0272	-0.0260
		(0.0510)	(0.0547)
Lag 3			-0.00299
			(0.0534)
Model	2	2	2
Lag 1	0.0910	0.0827	0.0585
	(0.0623)	(0.107)	(0.125)
Lag 2		-0.0279	-0.0489
		(0.0943)	(0.103)
Lag 3			-0.0489
			(0.0598)
Model	3	3	3
Lag 1	**0.481*** **	**0.476*** **	**0.443*** **
	(0.145)	**(0.109)**	**(0.118)**
Lag 2		-0.00370	0.00897
		(0.0507)	(0.0653)
Lag 3			-0.0116
			(0.0822)

NOTE: *** 1% significance ** 5% significance * 10% significance.

Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets.

Table 10.14: OLS for all independent variables, and the control variables.

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CEOAge	0.00228***	0.000647***	0.00157***	0.00228***	0.000647***	0.00157**
	(0.000612)	(0.000217)	(0.000604)	(0.000631)	(0.000222)	(0.000617)
DUAL	0.0458**	-0.000216	0.0457**	0.0458**	-0.000216	0.0457**
	(0.0199)	(0.00704)	(0.0196)	(0.0200)	(0.00518)	(0.0210)
CEOTen	-0.00249***	-0.000938***	-0.00151**	-0.00249***	-0.000938***	-0.00151**
	(0.000747)	(0.000265)	(0.000738)	(0.000698)	(0.000241)	(0.000700)
CEOP	-0.0811**	-0.00652	-0.0751**	-0.0811**	-0.00652	-0.0751**
	(0.0333)	(0.0118)	(0.0329)	(0.0351)	(0.0150)	(0.0346)
CEOFem	-0.0184	0.00935	-0.0280	-0.0184	0.00935	-0.0280
	(0.0186)	(0.00658)	(0.0183)	(0.0171)	(0.00783)	(0.0175)
CEOBrit	0.0442***	-0.00769***	0.0511***	0.0442***	-0.00769***	0.0511***
	(0.00767)	(0.00272)	(0.00757)	(0.00770)	(0.00283)	(0.00751)
Gender	-0.0545	-0.0127	-0.0431	-0.0545	-0.0127	-0.0431
	(0.0420)	(0.0149)	(0.0414)	(0.0418)	(0.0157)	(0.0410)
BSize	-0.0147***	-0.00164**	-0.0130***	-0.0147***	-0.00164**	-0.0130***
	(0.00196)	(0.000695)	(0.00193)	(0.00200)	(0.000804)	(0.00200)
BM	-0.00170	-0.000556	-0.00115	-0.00170	-0.000556	-0.00115
	(0.00128)	(0.000453)	(0.00126)	(0.00155)	(0.000458)	(0.00157)
BA	0.0199	-0.0479*	0.0670	0.0199	-0.0479*	0.0670
	(0.0705)	(0.0250)	(0.0696)	(0.0754)	(0.0272)	(0.0756)
NEDs	-0.0105	0.00219	-0.0118	-0.0105	0.00219	-0.0118
	(0.0357)	(0.0126)	(0.0352)	(0.0376)	(0.0154)	(0.0365)
Owner	0.00215	-0.00295	0.00613	0.00215	-0.00295	0.00613
	(0.0173)	(0.00614)	(0.0171)	(0.0189)	(0.00597)	(0.0186)
BO	-0.0529**	0.0147	-0.0683***	-0.0529*	0.0147*	-0.0683**
	(0.0253)	(0.00899)	(0.0250)	(0.0277)	(0.00867)	(0.0276)
FO	-0.0110	0.000825	-0.00236	-0.0110	0.000825	-0.00236
	(0.0693)	(0.0246)	(0.0684)	(0.0897)	(0.0204)	(0.0956)
IO	0.0439*	0.0173**	0.0243	0.0439*	0.0173**	0.0243
	(0.0231)	(0.00819)	(0.0228)	(0.0244)	(0.00772)	(0.0238)
Tang	0.142***	-0.0134**	0.154***	0.142***	-0.0134***	0.154***
	(0.0150)	(0.00531)	(0.0148)	(0.0167)	(0.00465)	(0.0165)
Size	0.0894***	0.0110***	0.0789***	0.0894***	0.0110***	0.0789***
	(0.00800)	(0.00284)	(0.00789)	(0.00841)	(0.00285)	(0.00830)
mtbv	0.0112***	0.00198***	0.00922***	0.0112***	0.00198***	0.00922***
	(0.00138)	(0.000490)	(0.00136)	(0.00162)	(0.000642)	(0.00169)
Beta	-0.00970	-0.00498**	-0.00446	-0.00970	-0.00498**	-0.00446
	(0.00618)	(0.00219)	(0.00610)	(0.00639)	(0.00213)	(0.00635)
CR	-0.0206***	-0.00741***	-0.0131***	-0.0206***	-0.00741***	-0.0131***
	(0.00271)	(0.000962)	(0.00268)	(0.00354)	(0.00130)	(0.00291)
Constant	-0.348***	0.0226	-0.369***	-0.348***	0.0226	-0.369***
	(0.0913)	(0.0324)	(0.0901)	(0.100)	(0.0351)	(0.0978)
Observations	1,367	1,367	1,367	1,367	1,367	1,367
R-squared	0.289	0.113	0.251	0.289	0.113	0.251

NOTE: *** 1% significance ** 5% significance * 10% significance.

Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets, Model 4 - Total Debt/Total Assets using clustering of errors, Model 5 – Short-Term Debt/Total Assets using clustering of errors, Model 6 – Long-Term Debt/ Total Asset using clustering of errors.

Table 10.15: FEM/REM results for all the variables and the control variables.

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CEOAge	-0.00230***	0.000425	-0.00279***	-0.00230***	0.000425	-0.00279***
	(0.000597)	(0.000267)	(0.000613)	(0.000850)	(0.000269)	(0.000788)
DUAL	0.0452**	-0.000891	0.0497**	0.0452*	-0.000891	0.0497**
	(0.0189)	(0.00872)	(0.0194)	(0.0254)	(0.00820)	(0.0229)
CEOTen	0.000869	-0.00101***	0.00230***	0.000869	-0.00101***	0.00230**
	(0.000794)	(0.000340)	(0.000815)	(0.000967)	(0.000343)	(0.000935)
CEOP	-0.0780***	-0.0124	-0.0730***	-0.0780***	-0.0124	-0.0730***
	(0.0225)	(0.0121)	(0.0231)	(0.0244)	(0.0135)	(0.0230)
CEOFem	0.0169	0.000569	0.0240	0.0169	0.000569	0.0240
	(0.0198)	(0.00880)	(0.0203)	(0.0213)	(0.00929)	(0.0165)
CEOBrit	-0.00901	-0.00711**	-0.00607	-0.00901	-0.00711*	-0.00607
	(0.00778)	(0.00349)	(0.00799)	(0.0148)	(0.00381)	(0.0144)
Gender	-0.0356	-0.0202	-0.00773	-0.0356	-0.0202	-0.00773
	(0.0332)	(0.0168)	(0.0341)	(0.0458)	(0.0191)	(0.0506)
BSize	-0.00181	-0.00138*	-0.00105	-0.00181	-0.00138	-0.00105
	(0.00165)	(0.000801)	(0.00169)	(0.00204)	(0.000867)	(0.00192)
BM	0.00201**	-6.55e-05	0.00191*	0.00201	-6.55e-05	0.00191
	(0.000980)	(0.000505)	(0.00101)	(0.00151)	(0.000456)	(0.00144)
BA	-0.128***	-0.0656***	-0.0615	-0.128***	-0.0656**	-0.0615
	(0.0453)	(0.0248)	(0.0465)	(0.0476)	(0.0268)	(0.0480)
NEDs	-0.0414	-0.00733	-0.0190	-0.0414	-0.00733	-0.0190
	(0.0274)	(0.0140)	(0.0281)	(0.0281)	(0.0156)	(0.0297)
Owner	0.0191	-0.000775	0.0229*	0.0191	-0.000775	0.0229
	(0.0122)	(0.00646)	(0.0125)	(0.0160)	(0.00756)	(0.0154)
BO	-0.0155	0.00837	-0.0174	-0.0155	0.00837	-0.0174
	(0.0210)	(0.0101)	(0.0216)	(0.0262)	(0.0102)	(0.0315)
FO	0.0880**	0.00364	0.0905**	0.0880**	0.00364	0.0905**
	(0.0390)	(0.0223)	(0.0401)	(0.0418)	(0.0237)	(0.0376)
IO	0.0246*	0.00877	0.0173	0.0246	0.00877	0.0173
	(0.0147)	(0.00801)	(0.0151)	(0.0207)	(0.00878)	(0.0192)
Tang	-0.0401	-0.0192**	-0.00775	-0.0401	-0.0192**	-0.00775
	(0.0324)	(0.00842)	(0.0332)	(0.0470)	(0.00770)	(0.0477)
Size	0.105***	0.0101***	0.0912***	0.105***	0.0101**	0.0912***
	(0.0125)	(0.00376)	(0.0128)	(0.0196)	(0.00452)	(0.0197)
Mtbv	0.0118***	0.00114**	0.0110***	0.0118***	0.00114	0.0110***
	(0.00118)	(0.000560)	(0.00121)	(0.00195)	(0.000784)	(0.00222)
Beta	0.00343	-0.00529**	0.00846*	0.00343	-0.00529*	0.00846
	(0.00452)	(0.00236)	(0.00464)	(0.00659)	(0.00273)	(0.00697)
CR	-0.00807***	-0.00862***	0.00204	-0.00807***	-0.00862***	0.00204
	(0.00233)	(0.00111)	(0.00240)	(0.00259)	(0.00241)	(0.00277)
Constant	-0.174*	0.0673*	-0.225**	-0.174	0.0673	-0.225*
	(0.0933)	(0.0353)	(0.0958)	(0.135)	(0.0440)	(0.132)
Observations	1,367	1,367	1,367	1,367	1,367	1,367
R-squared	0.159		0.131	0.159		0.131

NOTE: *** 1% significance ** 5% significance * 10% significance.

Notes: Model 1 – Total Debt/Total Assets, Model 2 – Short-Term Debt/Total Assets, Model 3 – Long-Term Debt/ Total Assets, Model 4 - Total Debt/Total Assets using clustering of errors, Model 5 – Short-Term Debt/Total Assets using clustering of errors, Model 6 – Long-Term Debt/ Total Asset using clustering of errors.