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Characterisky?

A quantitative study of the relationship between CEOs' and CFOs' characteristics and financial risk-taking

by

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Abstract

Title: Characterisky? – A quantitative study of the relationship between CEOs' and CFOs' characteristics and financial risk-taking

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Key Words: CEO, CFO, financial risk, upper echelon, solidity, gearing ratio, interest coverage ratio, debt/EBITDA ratio.

Purpose: The purpose of this thesis is to investigate how financial risk-taking within companies is related to the CEOs' and CFOs' personal characteristics.

Theoretical framework: Using the Upper Echelons Theory (UET) (Hambrick & Mason, 1984) and a literature review of previous studies of the UET, hypotheses are built with the aim to investigate the relationship between the UET characteristics and financial risk.

Methodology: The research is carried out with a quantitative method, with a deductive approach to theory. A panel data set consisting of 83 companies is observed over a five-year period. 830 CEOs and CFOs age, education, gender and career experiences are gathered, and financial data for the companies' solidity, gearing, interest coverage and debt/EBITDA ratios as proxys for financial risk. To identify whether there is a relation between the Upper Echelon characteristics and financial risk, the data is tested through panel regressions with fixed effects.

Results: The statistical analyses showed several statistically significant relationships between the UET characteristics and the financial risk measures. Statistically significant relationships are found for all the characteristics in all the regressions except one, and in six of eight regressions position specific work experience is statistically significant.

Conclusions: Based on the regression analyses, the study found both significant and insignificant results. Therefore, the study cannot fully disregard that CEOs' and CFO's characteristics can influence the financial risk in a company. Thus, the study finds some evidence that the UET theory is effective in explaining financial risk taking.

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1. Introduction

The introduction chapter presents the background of the chosen research topic and gives a problematization of the research gap that aims to be investigated. The problematization argues for why the specific research is needed, and ends with the study's purpose.

1.1. Background

The decision-making process is an activity performed to evaluate and choose between different alternatives. Decisions are constantly made by citizens all around the world, and have widely varied impacts. The process can be anything from deciding which morning magazine to purchase, to how to finance a new project. All decisions have an impact, and depending on who is making the decision and with which aim, the affected variables vary. According to Hammond, Keeney and Raiffa (1998), decision-making is the principal job of any executive, and includes both risky and tough tasks. Bad outcomes of decisions are often a result of how and by whom decisions were made, and can for example be unclearly defined alternatives or collecting the wrong information.

Additionally, there are factors affecting our decision-making process that only our mind can explain. These factors are known as heuristics, and are mental shortcuts enabling less complicated distance judgements required to navigate the world and everyday choices (Hammond et al., 1998). When our mind fails to draw conclusions based on heuristics, it can sometimes result in cognitive biases, which are cases where the human cognition creates representations that are distorted compared to the objective reality (Haselton, Nettle & Murray, 2016). According to Hambrick (2007), one of two founders of the Upper Echelons Theory (UET), the apprehending of organizations' actions comes from understanding the biases and dispositions of top executives. Further, the UET states that personal interpretations of strategic situations are a function of executives' personalities, values and experiences (Hambrick, 2007). Accordingly, even management accounting is viewed as an aspect of organizational structure or organizational outcome (Chenhall, 2003; Strauß & Zecher, 2013), where the latter can be a result of managerial background, traits and characteristics. Since personal characteristics have been proven to affect

individual perceptions and rationality, and since perceptions are the basis of decision-making, it is of interest to investigate what effects various characteristics have (Hambrick & Mason, 1984).

Investigating managers' characteristics and its relation to accounting and accounting measures has been done before, but with various results (He & Huang, 2011). Several studies have been made using the UET to explain executives' interpretations in different contexts, and hence how their actions affect financial and accounting decisions. An example is the study made by Ge, Matsumoto and Zhang (2011) investigating the effect of Chief Financial Officers' (CFO) style on accounting choices, using some of the UET characteristics as a measure of style. A second example is a study made by Ting, Azizan and and Kweh (2015), investigating Chief Executive Officers' (CEO) financial leverage decisions of Malaysian companies, from a upper echelons perspective. They state that when analyzing companies' choices of leverage, the effects of the human factors have seldom been taken into consideration (Ting et al., 2015). According to these studies, decision makers' personal characteristics affect the decisions made within companies and it is hence of importance to be aware of how managers' perception affects strategic choices (Ge et al., 2011; Ting et al., 2015).

1.2. Problematization

Despite certain research and knowledge about how the upper echelon characteristics' affect strategic choices, there are still areas within the subject of UET that has not been investigated. Ting et al. (2015) examine how financial leverage decisions are affected based on the upper echelon characteristics, and hence investigate the choices of capital structure. Financial leverage is presented as one of the strategic choices that is affected by the upper echelon characteristics (Hambrick & Mason, 1984), and is according to Ting et al. (2015) used to measure financial risk. However, measuring financial risk can be done using several other measures, such as solidity, interest coverage ratio (Marton, Sandell & Stockenstrand, 2015), gearing ratio (Linsley & Shrives, 2006) and debt/EBITDA ratio (Standard & Poor's, 2012). Hence, this study will investigate how upper echelon characteristics affect financial risk-taking, by using the recently mentioned measures. Using four different measures, this study will contribute to research with a broad perspective of financial risk. To specify on executives that with certainty make decisions regarding financial risks, the research will focus on CEOs' and CFOs', since these executives influence capital structure (Chava & Purnanandam, 2010) and financial risk-taking (EY,

2015; EY, 2016). During complex decisions, it is proved that the personal characteristics of the decision makers are increasingly important (Hambrick & Mason, 1984), and hence, it is of importance that the effects of these characteristic are further investigated and researched.

Due to the ever increasing digitization and the compulsory reporting of companies' sustainability work (Global Reporting, 2018), the monitoring of companies is becoming more common. Thereof, for a company to make best possible strategic decisions, it can be assumed that there are great needs for executives that have characteristics matching the corporate strategies. To investigate CEO and CFO characteristics relation to financial risk, this study will use the companies listed at OMX Stockholm Large Cap. As of today, there are no published research comparing risk-propensity between CEOs and CFOs, using the same sample of companies. As stated before, the research about upper echelon characteristics' effect on financial risk-taking is also scarce, and hence need to be further investigated. By looking further into how personal characteristics of CEOs and CFOs within OMX Stockholm Large Cap effect financial risk-taking, this study will contribute to the knowledge of upper echelons characteristics and its corporate financial effects.

1.3 Purpose

The purpose of this study is to investigate how financial risk-taking within companies is related to the CEOs' and CFOs' personal characteristics.

2. Theoretical framework

The theoretical framework provides knowledge of the theory used in the study, and gives the reader a deeper understanding of the background and relevant previous research.

2.1. Upper Echelons Theory (UET)

The Upper Echelons theory was first interpreted by Hambrick and Mason in 1984. They argue that strategic choices can be predicted based on an individual's cognitive base, values and observable characteristics. These are called an organization's "upper echelons". Thus, they mean that the characteristics of the company leaders, as they cite in their article; "Executives matter" (Hambrick & Mason, 1984, p. 184).

Hambrick and Mason (1984) were the first to combine organizational actions and outcomes, based on the concept of bounded rationality. They argued that individuals who are making strategic choices are faced with situations too complex to fully process them rationally. Simon (1955) mean that bounded rationality means that the individual have to simplify the situation in order to grasp it. Thereof, individuals create constraints to a situation's details by putting up a screen between the individual perception and the real unbiased situation. This lead to personal interpretation that can affect the decision, such as a company's strategy (Hambrick & Snow, 1977).

In other words, the perceived situation's correctness is bounded due to a limited field of vision, and additionally the decisions maker's cognitive base and values. The collected demographic factors affect the filtering process of a situation and create a managerial perception, which in turn affect the evaluation of alternatives, strategic choices, and in the end the corporate outcomes (Hambrick & Mason, 1984).

Therefore, it is important to take the characteristics of top managers into account when trying to understand how organizations' work. According to the UET's founders, the perspective of the upper echelons can help organizations to predict performance. Hambrick (2007) mean that managers and directors will act in accordance to their backgrounds in business situations based on their experience, values and personality. By observing these characteristics, it is possible to reach an increased understanding of organizations. The characteristics used within the UET are

divided into psychological and observable characteristics. The former subgroup includes the cognitive 5 base and values, and the latter subgroup includes age, education, socioeconomic roots, financial position, group characteristics, functional tracks, and other career experiences. All of these upper echelon characteristics help organization observe the situation they are facing, and are seen as determinants of strategic choices that lead to organizational performance. Nielsen (2010) agrees and states that executives' characteristics affect their decisions regarding structure and strategy, and will therefore directly affect the organizational performance and strategic choices of the specific company. The UET suggest that the more complex a decision is, the more important are the personal characteristics possessed by the decision makers. In addition, Ge et al., (2015) state that the UET suggests that decision making processes will be grounded on psychological, cognitive and social characteristics, among the executives who are affected by bounded rationality.

Although, the theory also presents possibilities to attain a non-significant result, as Hambrick and Mason (1984) was presenting an untested theory at the time. They mean that it might be difficult to reflect somebody's personality as the human is more complex than what is able to measure. Also the concept of causality can confuse the results as some positions have specific demands, and only a certain type of people are applying for these positions.

2.1.1. CEO and CFO risk-taking

A study made by Chava and Purnanandam (2010) proved that CFOs with risk decreasing incentives (risk-averse) are associated with higher earnings-smoothing through accounting accruals and safer debt maturity choices. On the other hand, CFOs with risk increasing incentives (risk-seeking) are associated with lower earnings-smoothing through accounting accruals and riskier debt maturity choices. The authors also conduct that CFOs' and CEOs' personal option- and stock holdings within the company affect the determination of the company's financial policies (including capital structure, debt maturity, and cash holdings). CFOs' preferences of risk are crucial when it comes to explaining accrual decisions and debt-maturity structure, while CEOs' preferences of risk affect leverage and cash-holding. Similar to Chava and Purnanandam (2010), Kim, Li and Zhang (2011) also find that CFO incentives are more influential than CEO incentives in situations with need for financial expertise. Hence, CFOs' equity incentives can be assumed to have a greater effect on future company-specific stock price crash risk, compared to CEOs' equity incentives. This since CFOs generally have greater financial expertise and

possess the authority of processing and spreading financial information about the company (Kim et al., 2011).

In 2015, Ting et al. made a study of how Malaysian CEOs' personal characteristics' affect the company-specific use of leverage, as a measure of risk-taking. Results showed, among other things, that CEO tenure and education level are positively related to leverage, and that younger CEOs are risk-seekers and more aggressive (Ting et al., 2015).

2.2. Corporate risk-taking

Risk and risk-taking are central terms, used within financial theory to reflect variations in a situation's feasible outcomes, as well as the outcomes' probability and biased value. Hence, risk and risk-taking means that the result of a situation can be both positive and negative in comparison to which outcomes that were expected. Nevertheless, managers tend to interpret risk in a different way; only focusing on the possibility of a result negatively deviated from expected result. When making a decision, managers take on a pessimistic role to analyze potential negative outcomes and risks, to examine how large a potential loss could be. This means that managers seldom use risk as a definition to explain positive outcomes in relation to expected results (March & Shapira, 1987).

According to Bertrand and Schoar (2003), members of management teams can influence the specific company's capital structure, which is the leverage ratio. They also state that the amount of liquid assets a company has correlates with the management team's risk-propensity. A team choosing to have a larger amount of liquid assets can therefore be seen as risk-averse, while a team choosing to have a smaller amount of liquid assets can be categorized as risk-seeking. (Bertrand & Schoar, 2003) Further, Hackbarth (2008) state that risk-seeking managers tend to choose a capital structure with a higher degree of leverage, meaning that they rather finance projects with debt than equity, which induce a larger risk for the company owners. By choosing to finance a project with debt before equity, a manger want to demonstrate that the project is of high quality. If a financed project later proves to be a success story, the owners will earn more money if the project is financed by debt than by equity (Blazenko, 1987). However, financing a project with debt instead of equity could in worst case lead to debt overhang and risk of default (Ogden, Jen & O'Connor, 2003).

2.2.1. Financial risk-taking

According to The Treasurer (2012), the enterprise risk can be divided into financial risk and business risk, where the former refers to how risky a company's capital structure is, and the latter refers to the volatility of a company's cash flows or earnings. Regardless the source of a specific risk, investors should be rewarded with a higher return if the risk of the company is higher. Hence, shareholders can find financial returns from both financial risk and business risk. One of the main reasons why companies increase their risk, in terms of taking on more debt in relation to equity, is to increase the returns to shareholders. At a given business risk, taking on a higher risk will generally lead to higher equity returns (The Treasurer, 2012).

Measuring a company's capital strength generates information regarding the company's long term financial stability, and is thereby related to the financial risk. To evaluate companies' capital strength and hence financial risk, Marton et al. (2015) present three key performance indexes; solidity, gearing ratio and interest coverage ratio. Additionally, Standard & Poor's (2014) presents the ratio debt/EBITDA, which also can be used to assess financial risk.

2.2.2. Financial risk measures

To assess financial risk-taking within the companies of OMX Stockholm Large Cap, the four measures solidity, gearing ratio, interest coverage ratio and debt/EBITDA ratio will be used. Involving more than one variable, these measures can also be termed ratios. According to Gardiner (1995), ratio analysis is one of the most versatile and powerful tools for quantitatively analyzing a company's financial statements.

Solidity as a risk measure

A company's solidity describes its long term solvency and can therefore describe financial risk. More specifically, solidity means evaluating how large part of a company's total assets that are financed by equity. The more equity a company has in relation to its total assets, the less of its assets are financed by debt. An increasing amount of assets financed by equity instead of debt, results in reduced obligations to repay, as well as a reduced amount of short-term requirements of interest requirements. The cardinal rule therefore is that the higher the percental solidity, the better the companies' long term payments abilities. In other words, if the percental solidity increases, the financial risk decreases. To a large extent, the solidity measure is industry depending, meaning that a company's solidity often depends on which industry the company acts

within. Hence, an industry with less operational risk allows a company to have a lower solidity than a company acting within an industry with higher operational risk (Marton et al., 2015). The ratio used to measure solidity is presented in the methodology chapter.

Gearing ratio as a risk measure

One of the commonly used ratios to assess financial risk is gearing ratio, which is a measure evaluating a company's capital structure and the risk of bankruptcy (Gardiner, 1995).When using this ratio as a measure of risk, the ratio normally has to be interpreted within the specific industry context, meaning that control variables has to be applied to each ratio (Linsleya & Shrivesb, 2006).

Previous studies within the area of measuring risk have focused on how various factors, such as market to book, price earnings ratio, and size are used to predict returns that varies from the normal. However, these risk studies have often ignored the consideration of including gearing as a risk factor (Muradoglua, Bakke & Kvernesc, 2005).

The definition of gearing ratio is the relation between a company's total debt to the total equity. The higher the total debt is in relation to the total equity, the higher is also the gearing ratio. This means that if a company increases its amount of total debt and the total equity is unchanged, the gearing ratio will also increase. A higher gearing ratio also means higher financial risk (Schmidt & Terberger, 1996; Akhtar, Ali & Sadaqat, 2011; Situm, 2014, Marton et al., 2015).

According to Situm (2014), gearing ratio is an efficient indicator when describing a company's financial viability. If a company increases its gearing ratio, higher interest charges from borrowers will follow together with increased claims on the company's cash flow (Saunders & Cornett, 2011). According to the trade-off theory, a company's capital structure will be optimized in order to minimize the cost of capital. To reduce the risk of financial distress or bankruptcy, it is beneficial to substitute expensive equity with cheaper debt. This until a specific point where the tax benefits outweigh eventual costs appearing from financial distress or bankruptcy (Leland & Toft, 1996; Hennessy & Whited, 2005; Hackbarth, Miao & Morellec, 2006). The ratio used to measure gearing ratio is presented in the methodology chapter.

Interest Coverage ratio as a risk measure

To measure risk in a more dynamic way, interest coverage ratio is often presented and used. Comparing EBIT and interest income with the cost of interest, results in how good the interest coverage is, meaning how likely it is for a company to be able to pay its costs of capital. The measure also provides a possibility to find out how much EBIT and interest income can decrease before it will become difficult to pay the costs of capital. In comparison to the gearing ratio, the interest coverage ratio measures a company's capital strength based on the company's ability to earn capital, instead of examining the capital structure. The measure should be interpreted as followed: the higher the interest coverage ratio, the lower the financial risk (Marton et al., 2015). The ratio used to measure interest coverage ratio is presented in the methodology chapter.

Debt/EBITDA ratio as a risk measure

To get a wider perspective on financial risk, the last measure used to evaluate risk-propensity includes one variable from the balance sheet, and one variable from the income statement. Presented by Standard & Poor's (2012) as a financial risk indicative ratio, this measure makes it possible for the user to analyze the ratio with the help of different predetermined levels of financial risks. The cardinal rule is that the higher the debt in relation to EBITDA, the higher the financial risk. According to Procasky, Ujah and Raja (2014), the debt/EBITDA ratio is a simplification of the ratio FFO(Funds from Operation)/debt. Both of these ratios are combining variables from the balance sheet and cash flow, and hence give a more accurate picture of the financial risk situation. By using the debt/EBITDA ratio, the user can measure and benchmark financial risk (Procasky et al., 2014).

2.3. Previous research and hypotheses

2.3.1. The relationship between CEOs' and CFOs' gender and financial risk-taking

Comparing the risk-propensity among the male and female gender, it has been proven that men are less risk-averse than women within the profession of CEO. This varied risk-propensity among men and women has also been proven to affect corporate financial decisions (Vandergrift & Brown, 2005; Wei, 2007). Another study made by Khan and Vieito (2013) proves that publicly traded companies with male CEOs are more risky than companies with female CEOs,

using the Black Scholes formula. As for CFOs, it has been proven that women make less risky incentives than men and that they reduce the gearing ratio, which indicate lower risk of default (Strahan, 1999). Huang and Kisgen (2010) agree to the fact that female CFOs are less likely to increase the gearing ratio compared to male CFOs, and also state that companies with female CFOs are less likely to issue long term debt than companies with male CFOs. In situations of making financial decisions, the study indicates that male CFOs are less risk-averse than female CFOs (Huang & Kisgen, 2010).

- *Hypothesis 1: Male CEOs are less risk-averse than female CEOs.*
- *Hypothesis 2: Male CFOs are less risk-averse than female CFOs.*

2.3.2. The relationship between CEOs' and CFOs' age and financial risk-taking

According to the UET, there is a significant negative relationship between executives' age and risk-propensity. This means that younger top managers are more likely to be aggressive and take on a large risk, which is financial leverage. Hence, a project needing investment would more likely be finance through external capital than internal (Hambrick & Mason 1984). Another research made by MacCrimmon and Wehrungs (1990) shows that younger Canadian and American executives take on risk to a greater extent than older executives, which complies with the UET. This can according to Bertrand and Schoar (2003) be a result of conservatism that generally often is expressed by older people.

- *Hypothesis 3: CEOs' ages are negatively correlated with financial risk.*
- *Hypothesis 4: CFOs' ages are negatively correlated with financial risk.*

2.3.3. The relationship between CEOs' and CFOs' years of company specific and position specific experience and financial risk-taking

According to the UET, an executives' prior experiences affect the decision-making process, although they are expected to have a general view not distorted from experiences in each of the executives' functional areas. This means that decisions are affected to favor a decision maker's functional part of the organization (Hambrick & Mason, 1984). Fischer and Pollock (2004) argue that a CEO's prior experiences positively will affect a company's efficiency and survivorship, and thereby the strategy plan and decision-making process. Ting et al. (2015) agree

and state that a CEO's prior experiences are negatively related to leverage, meaning that a CEO with more experience rather finance a project with equity than debt.

As for CFOs, studies examining how experience affect financial risk, are rare. Likewise are the studies about how company and position specific experiences affect financial risk. Previous research focus more on general experiences and CEOs, and the following hypotheses are therefore based on this existing research.

- *Hypothesis 5: CEOs' company specific experiences are negatively correlated with financial risk.*
- *Hypothesis 6: CFOs' company specific experiences are negatively correlated with financial risk.*
- *Hypothesis 7: CEOs' position specific experiences are negatively correlated with financial risk.*
- *Hypothesis 8: CFOs' position specific experiences are negatively correlated with financial risk.*

2.3.4. The relationship between CEOs' and CFOs' level of education and financial risk-taking

The education level of CEOs has been proven to be significantly and positively related to companies' leverage ratio, which means that CEOs with higher educational level take on more debt than CEOs with a lower degree of educational level (Ting et al., 2015). According to Barker and Mueller (2002), the UET advocate that CFOs with a higher degree of education are less risk-averse, and more open minded towards investment opportunities and changes within the organization. Hence, a higher degree of educational level is positively related to leverage (Rakhmayil & Yuce, 2011).

- *Hypothesis 9: CEOs' educational level is positively correlated with financial risk.*
- *Hypothesis 10: CFOs' educational level is positively correlated with financial risk.*

3. Methodology

The methodology chapter presents the sample, the research design and holds a discussion regarding the OLS assumptions that need to be met when designing a regression analysis. The chapter ends with discussing how a panel regression is best performed, based on diagnostic testing.

3.1 Research strategy and approach

As this research aim to examine if there is a relationship between financial risk-taking within companies and top managers' personal characteristics, the quantitative research strategy is used. A quantitative research strategy should be used when the problem formulation carries a purpose to investigate whether a phenomena is widespread (Eliasson, 2013) or when general conclusions are to be extracted from the results (Eliasson, 2013; Hussey & Hussey, 1997; Jacobsen, 2002). A larger number of observations, which can be attained with the quantitative research approach is argued to make a research more reliable (Bryman & Bell, 2013; Trost, 2005), which also leads to objectivity according to Bryman and Bell (2013). Another benefit of using a quantitative research strategy is that it can handle a large amount of data (Saunders et al., 2009). It has also been used in similar research before, which further strengthen the arguments in its favor. As an example, Song (1982) used the quantitative method in order to investigate the relationship between the characteristics of the CEO and the company's diversifying strategy. A second example is Moressi (2017), who used quantitative method in order to investigate CEOs' educational levels and its relation to firm performance.

According to Bryman and Bell (2013), a research executed with a quantitative research strategy is preferably performed with a deductive research approach towards theory. Therefore, it is appropriate to use the deductive approach. The deductive research approach is performed by using previous research and current theories in order to build hypotheses regarding relationships between phenomenon, and is thus applicable on hypothesis testing (Bryman & Bell, 2013). They are further supported by Jacobsen (2002), who mean that researchers suggest that the deductive research approach is the best way to build expectations based on a theory base, to be able to see whether the theory is applicable in real environments. Thus, the theoretical framework constitute expectations which aim to be tested empirically to explore whether relationships between the variables are existent.

Qualitative research strategy could have been used to get a deeper insight in the underlying issues and to investigate whether causality could be determined between the studied variables (Bryman and Bell, 2013), which is a drawback of this study. However the quantitative method seems more appropriate based on that it is expected to find significant relationships between the variables and that the generalizability aims to be attained.

The research process of this study is inspired by Bryman and Bell's (2013) idea of the quantitative research process, thus it has been translated and reconstructed to custom fit this research. The figure below has been designed to organize the methodology chapter and thus the whole research design of this research.

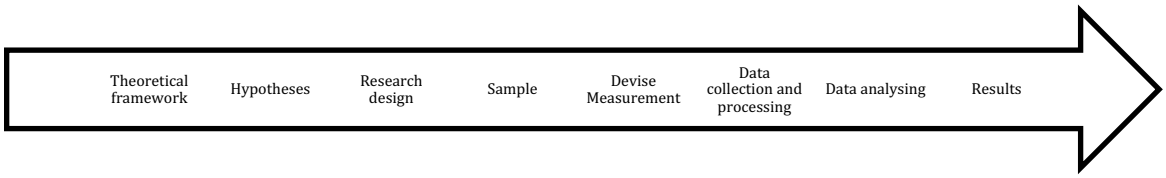

Figure 3-1. Research composition.

In order to find the research gap this study aims to fill, a literature review has been performed. Published articles are used in the largest extent to find a relevant research gap, and goal search is used in order to find these articles. Search words such as *upper echelons theory, financial risk, CEO, CFO, personal characteristics* and *financial risk level* is used. Based on previous studies, hypotheses take form and will be tested.

3.2. Research design

To conclude whether there is a relationship between the dependent and the independent variables, the hypotheses built from theory will be statistically tested through regression analyses. As the research is built on a panel data set, pooled OLS, fixed effects and random effects models are generally used (Greene, 2012), and the most fitting one will be evaluated and chosen later on in the methodology chapter. The panel data set has several advantages over cross-sectional

and time-series data sets in economic research (Hsiao, 1986). Panel data can provide a big amount of data points, which is advantageous as it increases the degrees of freedom. It decreases the collinearity between the independent variables (Hsiao, 1986). By this, it improves efficiency of econometric estimates. Baltagi (2005) mean that the panel data set can also study dynamics of adjustment, and is more effective in identifying effects that cannot be found in pure cross-sections or time-series data Discussing the research design of a regression model, Hair, Black, Babin and Anderson (2010) highlight sample size, unique elements of the dependence relationship, and the nature of independent variables as crucial in establishing a suitable research design when performing regression analyses. This study's sample design has been chosen and presented in order to meet requirements and suggestions of Bryman and Bell (2013) and Hair et al (2010). Hair et al. (2010) mean that at any given alpha level, larger samples always produce higher level of power for statistical tests. For multiple regressions, at least 100 observations is suggested in order to gain statistical power. Above 1000 observations may make it over-sensitive, meaning an increased risk of any relationship this is being statistically significant (Hair et al., 2010), and therefore the sample size has been designed to meet these assumptions. The sample will be further discussed in the following sample chapter.

By the unique elements of the dependence relationship and the nature of independent variables, it is stressed that independent variables are metric and have a linear relationship with the dependent variable, based on the product-moment correlation (Hair et al., 2010). This is further discussed in the following devise measurements chapter. As regressions are normally limited to metric data, non-metric data must be modified to be incorporated in the regressions. This can be done by creating dummy variables; a data derived transformation, which is done for some of the non-metric independent variables. To begin with, the educational variable is categorial data, and hence it belongs to the non-metric data based on the definition by Hair et al., (2010). It is then handled by theoretical data transformation by classifying the degree as a number already in the data collection step. All other data collected is metric and no further adjustments are thus needed to execute the regressions.

3.3. Sample

The sample used for this research are the companies listed on Nasdaq OMX Stockholm Large Cap. It is a cluster sample, which according to Bryman and Bell (2013) also makes it a population of companies as it incorporates all companies listed on Large Cap. Cluster sampling is a

cost-effective method (Aczel, 1999) that fits the scope of the research. It is a non-random sample, but since the research objects have to fit the requirements of this research, and because the data is possible to retrieve, it is considered to be the most effective method (Saunders et al., 2009). Bryman and Bell (2013) highlights that sampling errors cannot be avoided fully in cluster sampling, but the risk is limited since the cluster has close to 100 research objects (Hair et al., 2010).

Swedish listed companies have been chosen for two reasons, namely that data is available in a greater extent than for non-listed companies, since listed companies have to follow several laws that non-listed companies are not a subject for (SFS 2007:528; SFS 1991:980). Also, the companies that are listed are of a certain size which increases the probability of them having both a CEO and a CFO, and according to Granberg and Wallenholm (2012) it is likely that companies of a larger size has chief executives, thus leading to a reduce loss of observations for this study. The decision to investigate all the companies on Stockholm Large Cap also gives the research a width which increases the generalizability (Bryman & Bell, 2013).

The data was retrieved the on the 29th of March 2018. At this point in time, Nasdaq OMX Large Cap consisted of 93 companies. The companies are observed under a 5-year period reaching from 2012-01-01 to 2016-12-31, giving this study 465 observations. Previous research investigating characteristics of CEO and CFOs and its effect on accounting decisions or performance measures have been conducted using panel data (Ge et al., 2011; Ting et al., 2015), but there does not seem to be any specific confirmed time period as preferred observation period. Most studies range between 3 and 10 years which makes the choice of a 5-years observation period theoretically viable. Joecks, Pull and Vetter (2012) also used a panel data set during a 5-year period in their study of gender diversity in board rooms.

This study exclude banks in the sample due to a high leverage that does not imply financial risky business. According to Fama and French (1992), high leverage in banks does not have the same meaning as for other type of companies, and it does not work as an indication of distress. If banks were included in the sample of this study, it would give an unrealistic view of the financial risk-propensity of top managers. Bertrand and Schoar (2003) also exclude banks and financial institutions in their study.

Further, companies that were founded during the observation period has also been excluded from this research, due to the inability to find both executive and financial data for the missing years. This exclusion was made in order to make the sample more homogenous.

The final sample consists of 83 companies, divided upon 9 industries. The division between industries are shown in the diagram below. The final sample consist of 166 top managers per year, equaling 830 CEO/CFO observations over the 5-year period. Concerning the four risk measures, there are 3320 observations over how the financial risk level of companies is connected to the characteristics of the CEOs/CFOs.

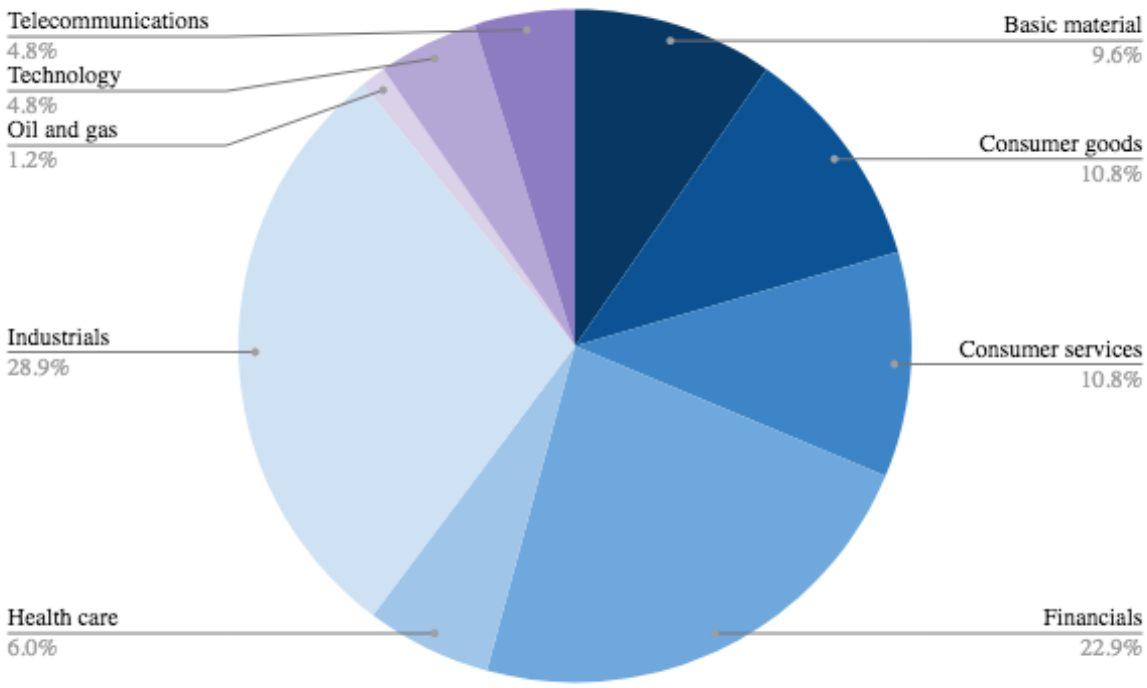

Figure 3-2. Industry belongings.

3.3.1. Loss of data

Even though listed companies are required by law to release certain information regarding their executives (SFS 2007:528; SFS 1991:980), most data is voluntary to present. For example, executives' education is not required to be presented and hence, there is a risk of loss of data. The CEO sample consists of 363 full observations, and the CFO sample consists of 350 full observations. The losses in data appears from that some of the information regarding the top managers, in some or all characteristic variables of age, education and company specific experience, was unavailable. This reduces the sample size from 415 to 393 CEO observations and

from 416 to 379 CFO observations. There is also an observation loss due to that companies with negative ratios of interest coverage and gearing are excluded from the sample, due to the logarithm of the ratios that fort statistical purposes is used. Hence,, the observations for CEO fell from 393 to 363, and the CFO observations from 379 to 350. The systematic loss of this research are dealt with by excluding it from the data material. Table 3-1 presents the systematic losses from this research. The goal was to have a balanced panel data set, but since four observations for the CEO data set, and one observation for the CFO data set were lost due to unavailability of data, the panel data is unbalanced but fixed. This since the individuals (in this case the companies) are fixed, but the observations (periods studied) somewhat differ. However, this should not be a problem as most statistical software can handle this type of data (Verbeek, 2004).

Systematic CEO loss	
Observations	415
No unfound CEOS	4
% unfound CEOS	0.96%
Age loss	4
% Age loss	0.96%
Edu loss	9
% Edu loss	2.17%
Gender loss	4
% Gender loss	0.96%
Position start loss	4
% Position start loss	0.96%
Company start loss	4
% Company start loss	0.96%

Systematic CFO loss	
Observations	415
No unfound CFOS	1
% unfound CFOS	0.24%
Age loss	2
% Age loss	0.48%
Edu loss	20
% Edu loss	4.82%
Gender loss	1
% Gender loss	0.24%
Position start loss	3
% Position start loss	0.72%
Company start loss	2
% Company start loss	0.48%

Systematic risk measure loss	
Observations	415
Solidity loss	3
% Solidity loss	0.72%
Gearing loss	9
% Gearing loss	2.17%
Interest Coverage loss	41
% Interest Coverage loss	9.88%
Debt/EBITDA loss	4
% Debt/EBITDA loss	0.96%

Table 3-1. Loss of data divided upon categories, adapted by the authors (2018).

3.3.2. Sample reflection

The sample is homogenous, consisting of only listed companies that face similar regulations (SFS 2007:528; SFS 1991:980). It is considered to be even more homogenous concerning that banks and credit institutes are excluded from the research. This since they are subject to other regulations, and that their capital structure are different than other companies, meaning that the measures of risk is not applicable to them according to Fama and French (1992). Large companies are also interesting to study as they are affecting the business climate in a great extent, thus affecting the chief executives appointment. This research is important to investigate whether

the characteristics is related to the financial risk level of the companies, implying that personality does matter to the risk reporting.

The choice of the geographical limitations of this research are supported by that it is considered to be a need of research on the following sample, as previous studies does not regard evidence from the Nordic market. No prior research has been found that studies top managers characteristics has been previously made on the sample which motivates the choice of the research objects.

The time period was set due to that a longer time period would yield a larger systematic loss of data due to unavailability of data, which is not desirable for the generalizability of the study.

3.4 Devise measurements

Bryman and Bell (2013) names the process of devising measures of concepts as operationalizing. As this study aims to investigate characteristics of top managers and its relation to financial risk in companies, there is a need to define characteristics and financial risk. As the theoretical framework is based on the Upper Echelons Theory (Hambrick & Mason, 1984), the upper echelon characteristics are used as the explanatory variables of this research. According to Hambrick and Mason (1984), there are reasons to why the observable characteristics of individuals are of interest when trying to foresee how decision-making is executed. Therefore, only observable characteristics will be used and all psychological and personal characteristics are excluded. For financial risk, four financial risk measures are used as dependent variables and needs to be defined. In addition, a couple of control variables are used in order to control for other factors that may affect the financial risk level in a company.

3.4.1. Independent variables – upper echelon characteristics

The characteristics of top managers that constitute the base of this research are; age, gender, position specific experience and company specific experience based on Hambrick and Mason (1984).

Age is defined as the number of years of age the executives possess at the point of measurement. The same definition has been used in a number of previous studies, for example Ge et al. (2011), Ting et al. (2015) and Wei et al. (2011).

Gender is defined by the categorization as either being male or female following Tacconelli's (2007) definition based on two biological genders. For the gender variable, indicator coding is used by coding males as 0 and females as 1 (Hair et al., 2010).

Education is categorized as a number following Rakhmayil and Yuce's (2011) scale range, which has also been adapted of Ting et al. (2015). The scale is ranged 1-7 depending on the level of education of the top manager.

Scale range	Educational level
1	Not graduating high school
2	High school graduate
3	Attended undergraduate school
4	Undergraduate degree
5	Attended graduate school
6	Earned graduate degree
7	Earned PhD/doctorate

Table 3-2. Education level (Rakhmayil & Yuce, 2011).

Looking at the above table, not graduating high school yields an education level of 1, being a high school graduate yields a 2, a 3 means that the top manager attended undergraduate school, 4 is that he/she earned an undergraduate degree, 5 means that he/she attended graduate school, 6 is that graduate degree has been earned and 7 is attained if he she earned a PhD/doctorate.

As this research is based on a Swedish sample, there is a further need to distinguish the Swedish "Civilekonom"-degree, as many CEOs and CFOs have earned this degree. The Civilekonom-degree is an "academic professional degree" in business and economics earned after completing 240 ECTS according to the framework implemented the 1st of July 2007 (Högskoleverket, 2007). The degree earned is called "Degree of Master of Science in Business and Economics", and is on an advanced level of education. According to the Council of Europe (2005), upper education is divided in cycles of "undergraduate" and "graduate" cycles. The Swedish translation of the cycles are "grundnivå" and "avancerad nivå", which is why the Degree of Master of Science in Business and Economics is classified as a graduate degree (6) in the scale range.

Position specific experience is defined by number of years since admission to the position until the year of measurement, and similarly the company specific experience is defined by how many years the officer has worked within the company at the point of measurement.

3.4.2. Dependent variables – financial risk-taking

As mentioned in the theoretical framework, financial risk-taking can be defined through different accounting measures. Thus the dependent variables of this research are financial risk-taking measures, defined by solidity, gearing, interest coverage and debt/EBITDA.

Marton et al. (2015) presents three key performance indexes; solidity, gearing ratio and interest coverage ratio as measures of financial risk. These measures are adapted for the purpose of this research. Additionally, Standard & Poor's (2012) presents the ratio debt/EBITDA, which also will be used to assess financial risk.

Interpreting financial risk using the solidity measure, it is said that the lower the solidity, the higher financial risk (Marton et al., 2015). Solidity is defined as:

Solidity = Total equity/Total capital

(Marton et al., 2015).

Gearing ratio is in this research defined as the total debt to total equity, a ratio that is defined by Marton et al. (2015). It has also been used in previous research by for example Schmidt & Terberger (1996), Akhtar et al. (2011) and Situm (2014).

Gearing ratio = Total debt/Total equity

(Schmidt & Terberger, 1996; Akhtar et al., 2011; Situm, 2014; Marton et al., 2015).

Interest coverage ratio is as mentioned a more dynamic way to measure financial risk. Interest coverage ratio is based on Marton et al (2015) and the formula is:

Interest coverage ratio = (EBIT + Interest income)/Interest expense

(Marton et al., 2015).

where EBIT=Earnings Before Interest and Taxes (Marton et al., 2015).

The last measure to define financial risk is the debt/EBITDA. The measure is a good complement to the others ratios, taking both a balance sheet post and an income statement post into account. debt/EBITDA is defined by the debt/EBITDA ratio, and is a widely used measure for financial risk based on Standard & Poor's (2012) and Procasky et al., (2014):

Debt/EBITDA= Total debt/EBITDA

(Standard & Poor's, 2012).

Where EBITDA= Earnings Before Interest, Taxes, Depreciation and Amortization.

3.4.3. Control variables

There is a risk that other factors affect the dependent variable, causing the regression analyses to show false relationships. Hence, it is important to control for potential indicators that also may cause the risk-taking in companies. A potential indicator may be company size, as Rajan and Zingales (2012) suggest has a relationship to leverage in their study of capital structure. According to them, company size is measured by the log of sales. The same definition of size has been used and controlled for in previous studies (Ge et al., 2011; Ting et al., 2015; Campbell & Minquez-Vera, 2008).

Both Bowen, Daley and Huber (1982) and Islam and Khandaker (2015) suggest that the industry-type of a company matters for a company's leverage decisions. Thus the financial risk and the dependent variables of this research may be affected of the industry the company belong to, which is why there is a need to control for the industry in the regressions. The industry is a dummy categorized as 0 to 8. Industry dummy has also been used as a control variable in previous studies, for example in Carter et al., (2003).

The last control variable that is added to the regressions is the return on assets ratio (ROA), as it has been suggested in previous research that it affects accounting choices (Ge et al., 2011). It is computed by dividing EBITDA by total assets (Ge et al., 2011).

3.4.4. Summary of variables

Table 3-2 contains all the variables that has been presented in this chapter, that will be further analyzed in the regressions. The table summarizes them and present their names that are used in the regression models and how they are computed.

CEO Data set variables			**CEO Data set variables**		
Name	**Original regression name**	**Description**	**Name**	**Original regression name**	**Description**
AGE	CEO_AGE	Years of age	AGE	CFO_AGE	Years of age
EDU	CEO_EDU	Education level, ranged 1-7	EDU	CFO_EDU	Education level, ranged 1-7
GENDER	CEO_GENDER	Gender, dummy 0 male 1 female	GENDER	CFO_GENDER	Gender, dummy 0 male 1 female
POS_START	CEO_STARTCEO	Years since position start	POS_START	CFO_STARTCFO	Years since position start
COMP_START	CEO_START-COMP	Years since start at company	COMP_START	CFO_STARTCOMP	Years since start at company
SOLIDITY	SOLIDITY	E/(D+E)	SOLIDITY	SOLIDITY	E/(D+E)
GEARING	GEARING	Log(D/E)	GEARING	GEARING	Log(D/E)
INT_COV	LINCOV	Log(EBIT+Interest income)/Interest expense	INT_COV	LINCOV	Log(EBIT+Interest income)/Interest expense
DEBT_EBITDA	DEBT_EBITDA	Debt/EBITDA	DEBT_EBITDA	DEBT_EBITDA	Debt/EBITDA
IND	FIRM_INDUS-TRY	Industry, dummy 0-8	IND	FIRM_INDUSTRY	Industry, dummy 0-8
SIZE	FIRM_LOG_REV-ENUE	Log(sales)	SIZE	FIRM_LOG_REVE-NUE	Log(sales)
ROA	ROA	EBITDA/assets	ROA	ROA	EBITDA/assets

Table 3-3. Summary of variables.

3.5. Data collection and data process

The data of top managers' characteristics comes from primary sources collected by hand from the companies' published annual reports, press releases and official webpages. In some cases when data was missing, Google was used to find CEOs'/CFOs' biographies, alternatively companies' SEC filings. This approach is also used by Ge et al. (2011). If a CEO's/CFO's tenure could not be identified, the specific CEO/CFO are deleted from the sample, an approach also used by Ge et al. (2011).

The data for the financial risk-taking measures was retrieved from Thomson Reuters Datastream, which is a data base that provides financial time series data to explore relationships and trends (Thomson Reuters, 2018).

The top managers were tracked over the observation period, following Bertrand and Schoar's (2003) and Ge et al.'s (2011) methodology of a CFO-firm matched panel data set. The same approach is also applied to CEOs.

To process and analyze the data from the data collection, EViews is used. EViews is a software providing "*academic researchers, corporations, government agencies and students access to powerful statistical(...) and modeling tools*" (Eviews, 2018).

3.5.1. Handling outliers

There is no standard way to handle outliers, which tend to make researchers to disregard from the issue, even though it might cause severe effects in a panel regression (Bramati & Croux, 2007), and cause a different result if they are not adjusted for (Gujarati & Porter, 2009). Therefore, it is the researchers' responsibility to decide how to handle outliers, as there is no standard procedure. In this research, residual scatter plots has been used in Eviews to discover outliers. An outlier is defined as a value crossing the standard residual line. When an outlier was found, it was removed from the sample as it did not follow the normal distribution. Neither was it considered viable to adjust it to a fictitious number, which could have been done by taking an industry average or company average as other factors could affect these numbers. By removing the outliers from the sample, it is possible to retain the reliability of this research, as it does not reflect either abnormal outliers or fictitious numbers. In total, only 7 observations were removed from the data sets.

3.5.2. Multicollinearity

When variables are strongly correlated with each other, it may cause issues in the regressions. Strong relations between the independent variables may cause the regressions some severe troubles, such as generating large standard errors (Verbeek, 2004). Variables that are strongly correlated may cause the researcher problems to distinguish the effect of the variables on the dependent variable. Multicollinearity can be investigated through a correlation analysis. Correlation is measured by the correlation coefficient r. It ranges from -1 to 1, where perfect correlation is determined by -1 or +1, either a perfectly negative or positive relationship. A strong relationship is indicated by r-values between -0.99 and -0.7 and corresponding between +0.7 and +0.99, following (Ramsey, 2011). Between +/-0.5 and +/-0.7 there is a moderate relationship, and between +/-0.3 and +/- 0.5, there is a weak relationship. If the r-value is between 0 and +/-0.3,

there is no relationship. If a strong relationship is found between two variables, separate regressions will be run in order to correct for the multicollinearity. In addition the panel data set in itself contains less collinearity between the independent variables (Baltagi, 2005).

3.6 Properties and assumptions for regressions

3.6.1. Robustness

Regression analyses is one of the most used fundamental methods, but it is probably also the most abused (Berry, 1993; Chumney & Simpson, 2006). The Ordinary Least Squares (OLS) is a common regression analysis method which is said to have been used for nearly 200 years (Chumney & Simpson, 2006). As this research has a panel data set, estimation methods that can be used are pooled OLS, the fixed effects or the random effects model (Greene, 2012). To make OLS one of the most powerful statistical methods of regression analyses, some important properties must be considered. Those properties together constitute the Gauss-Markov Theorem, or the *best linear unbiased estimator (BLUE)* of β_2 (Chumney & Simpson, 2006). The properties are:

1) "Linear – the estimator must be a linear function of a random variable.
2) Unbiased – the mean (expected value), is equal to the true value β_2.
3) It has a minimum variance in the class of all such linear unbiased estimators. An unbiased estimator with the least variance is called an efficient estimator. "

(Chumney & Simpson, 2006, p. 101)

In addition to this, there are some assumptions of OLS that should not be abused in order for the method to be effective (Chumney & Simpson, 2006), and are considered to be applicable also on pooled OLS. The assumptions are: The expected value of the error is zero; constant variance of the errors; no covariance between the errors over time; variables are non-stochastic; the errors are normally distributed (Brooks, 2014).

The expected valued of the error is zero assumption, is said to be controlled for if the regression uses an intercept (Brooks, 2014). The regressions in this study have intercept, thus the first assumption is met.

The constant variance of errors assumption implies that the OLS assumes that there is no systematic change in the error terms (Brooks, 2014). To control for possible heteroscedasticity, a *Huber-White* test can be performed and if there is indications of heteroscedasticity, a software option can be used to correct it (Chumney & Simpson, 2006), but for panel data set, there is no pre-built test (Cociorva, 2017). Since especially the fixed effects model often include heteroscedasticity (Brooks, 2014), which is why the add-in White Diagonal in the software Eviews has been used to correct the problem. This is beneficial as it controls for different types of heteroskedasticity, not only linear, which makes it a good corrector for overall heteroskedasticity.

No covariance between the errors over time is the most frequently abused assumption. It implies that if the error term and the independent variable are correlated, the individual effects on the dependent variable cannot be assessed (Chumney & Simpson, 2006). It is also called endogeneity or statistical confounding. If the assumption is violated, an effects model can be used according to Chumney and Simpson (2006). A *Hausman* test is an option to assess whether contemporaneous correlation between errors and independent variables are present. The results from the Hausman tests are discussed in the results chapter, but summarized the fixed effects model is the better option according to the tests thus the fixed effects model is used. Therefore no covariance between the errors over time assumptions is assumed to be unviolated in this research.

The variables should be non-stochastic, which means that they should not be random (Brooks, 2014). In this study, the variables of interest seem to be non-random as the values of for example education or CEO/CFO experience are certainly not random, but carefully selected of the manager in particular.

Errors should be normally distributed, but Brooks (2014) mean that even if the errors of a sample are not normally distributed, this assumption can be relaxed if the observations is of a large quantity. According to Hair et al.'s (2010), definition of a large enough sample (100-1000 observations), the observation number of this study seem large enough in order to go through with OLS, even if the assumption would show to be violated. To identify if the error terms are normally distributed, a *Jarque-Bera* test can be performed (Brooks, 2014). The results from the Jarque-Bera tests indicate that there is non-normality in the models, but at an acceptable level. The results are discussed in the results chapter and the full results can be found in Appendix C.

If the Gauss-Markov Theorem and the assumptions are not violated, the OLS is the best unbiased estimator of a variable of interest (Chumney & Simpson, 2006). Brooks (2014) mean that if the assumptions are met, the Gauss-Markow Theorem or the *BLUE* is present. If so, the OLS will be consistent and effective. As all the assumptions are met, the OLS is an effective method for estimation.

The assessment of the full regression model can be performed by looking at the R-squared value and the adjusted R-squared value of the model, and is a widely used assessing method in order to see if the regression model is effective in how well the model fits the data (Hair et al., 2010). Another option for regression model assessment is to look at the standard errors of the regression, which should have low values, as it represents the mean distance from the regression line that the observations take. Small values should be attained, as they are closer to the fitted line (Minitab, 2018).

3.6 Discussion of method

3.6.1. Validity

Bryman and Bell (2013) describe that validity is present in a research if the study measures what it aims to measure. This is also described as the internal validity by Eliasson (2013). Therefore, it is important that the correct tools to answer the research question is applied (Eliasson, 2013). As diagnostic tests of the models are performed before ending up with the final model, correct tools are chosen for the research question both from theory and then applied to the empirical data set.

Eliasson (2013) also mean that to enhance the validity of a research, several indicators of the concept of investigation should be used. To meet this criterion for validity, this research have four dependent variables as a proxy for financial risk, which aims to be investigated from the base of UET.

If a research holds external validity, the results should be able to generalize in a larger extent (Jacobsen, 2002). The results of this research can be generalized to companies of the same size or companies that operates in the same business/cultural climate as the sample is extracted from.

Therefore, external validity could be considered met in this research too. To further increase the generalizability, Hair et al. (2010) highlight the importance of sample size. As mentioned previously in the chapter, the research holds close to a sum of 3320 observations for the data sets, which means that the size of this study contributes to an enhanced validity.

3.6.2. Reliability

If a research is reliable, it should be able to attain the same results with the same method as described in the methodology chapter. This process is also called replicability (Bryman & Bell, 2013).

This research is using both primary and secondary data in the data collection. The primary data sources are published press releases, official web pages and annual reports in the greatest possible extent for finding the characteristics of the top managers. As these documents come from the responsible publishers in the companies, they are considered reliable, but as the data was retrieved manually one should take the human factor into consideration as the data was manually coded. This might affect the replicability, but even if it does, it would probably not be to a large extent (Ge et al., 2011; Joecks et al., 2012). Further, Thomson Reuters Datastream was used for retrieving financial data. Thomson Reuters Datastream is a widely used financials database for research purpose, and several peer reviewed articles use this database as a base for their research, for example Joecks et al. (2012).

Further, the methodology has been described as detailed as possible, with support from both well-proven theories but also newer sources. In order to enhance the replicability, evidence from the performed regressions in Eviews and all specification tests are presented in the Appendix.

The variables has also been chosen based on previous research (Ge et al., 2011; Ting et al., 2015) and the Upper Echelons Theory (Hambrick & Mason, 1984) that aims to be tested, to ensure continuity and comparability with similar research.

4. Results

In this chapter, the results retrieved from the data collection will be presented and analyzed through the chosen statistical method. The purpose is to give the reader an enhanced knowledge of the variables in order to understand and evaluate the findings.

4.1. Diagnostic tests

As the unbalanced panel data set includes imperfections that possibly could disregard the OLS assumptions, diagnostic tests has to be undertaken. Diagnostic tests are performed to further strengthen the validity and reliability of this research, and to make sure that the OLS assumptions are not violated.

4.1.1. Heterogeneity of the panel data set

By estimating panel regressions, the heterogeneity of the panel data set can result in inaccurate regressions. This is due to that there might be differences across the units that are studied (Woolridge, 2005), which in this research is the companies. An assumption for the OLS is that each firm and each year have equal intercepts (Brooks, 2014), which could be wrongly assumed based on organizational and periodic effects. Testing for cross-sectional and periodic effects could therefore be a way to establish more statistically valid results in the panel regression.

4.1.2. Redundant fixed effects test – pooled OLS or effects model

In Eviews, the software used for statistical analysis, the Redundant Fixed effect tests for cross sectional and period effects in the model. This test is used to see whether there is a need to apply effects to the regression model. The p-values in the output indicate if there is a presence of cross sectional effects, period effects or both. The null hypothesis states that the FE model is a better option than the original pooled OLS (Cociorva, 2017). The Redundant fixed effects test was made for all the regression models, indicating that all the regressions have cross-section effects and that all tests, except the regression for CFOs characteristics effect on debt/EBITDA for period effects, are statistically significant. As the p-values are below 0.05, the null hypothesis is rejected. Hence, the conclusion is that fixed effects are better than pooled OLS for all the regression models. However, it needs to be noticed that the industry dummy, a constant variable resulted in an error and had to be dropped in the following regressions in favor for the

fixed effects model. The results from the Redundant Fixed Effects test can be found in Appendix A.

4.1.3. Hausman test – fixed or random effects

Next step is to decide between the random and the fixed effects model, to account for the cross-sectional and period effects found in the original regression models. A common specification test is the Hausmann test, which is a test included in the Eviews software. Verbeek (2004) means that if a study that contains few time periods but more individuals, the limited amount of data per individual needs to be utilized in the best possible way. The null hypothesis of the Hausman test states that the preferred effects model is the random effects model, or that there is exogeneity in the model. The results from the Hausman tests can be found in Appendix B, but to summarize, the results show that for 6/8 models, the fixed effects model should be used in favor for the random effects model as the p-values are low. The random effects model is rarely used for time series data (Cociorva, 2017) and since the data includes this type of data, a random effects model is not a good option. Additionally, the correlation between the variables in the model are not equal to zero, thus it is not safe to conclude that the model controls for all important factor. Hence, the random effects model should not be used (Cociorva, 2017). Further, the sample did not pass the first criterion for random effects as the companies were not randomly selected from a larger sample group (Dougherty, 2011), which make the random effects model inappropriate. Therefore, the random effects model will not be chosen for the models where the Hausman test did not reject the null hypothesis, and instead the fixed effects model will be carried out. In addition, the fixed effects model has been used in previous research before (Ge et al., 2011; Ting et al., 2015; Bertrand & Schoar, 2003). All the Hausman tests can be found in Appendix B.

4.1.4. White-tests - heteroscedasticity

As discussed in the methodology chapter, the fixed effects model often include heteroscedasticity (Brooks, 2014). Because of this, the add-in White Diagonal is used to correct the problem.

4.1.5 Jarque-Bera tests – non-normality

A Jarque-Bera test presents what the distribution of the error term can look like, according to the data material. Low Jarque-Bera values should be attained in order for the OLS to be

effective. A skewness of the data between -2 and 2 is considered acceptable in order to perform regressions (Trochim & Donnelly, 2006; Field, 2000; 2009; Gravetter & Wallnau, 2014). The results of the Jarque-Bera tests are found in Appendix C. The Jarque-Bera tests shows that there is non-normality for all the models, but as the skewness lies within acceptable limits for all the performed regressions, this should not disturb the effectiveness of the fixed effects model.

4.1.6. Durbin-Watson - autocorrelation

Autocorrelation is present when error terms are correlated (Verbeek, 2004). Serial autocorrelation can be identified by looking at the Durbin-Watson stat in the regression output. According to Cociorva (2017) it should take on a value of 2 to present no autocorrelation between the variables, and according to Stamatis' (2015) values, Durbin-Watson stats above 1 means that there is no need to investigate it further. In the regression outputs, all the Durbin-Watson stats are above 1. The lowest value is 1.20 for the CEO characteristics and the effect on solidity regression, and the highest Durbin-Watson stat takes on a value of 1.95 in the CFO characteristics and the effects on debt/EBITDA regression. All regression outputs can be found in Appendix D.

4.1.7. Final estimation of the regression fixed effect models

After the diagnostic tests and adjustments, the following equation is set and will be tested eight times, four times per data set and one time per risk measure as dependent variable. The statistical hypothesis that will be tested is stated as follows:

$$\text{RISK MEASURE} = \alpha_{ij} + \beta_1 AGE_{it} + \beta_2 EDU_{it} + \beta_3 GENDER_{it} + \beta_4 POS\_START_{it} + \beta_5 COMP\_START_{it} + \beta_6 SIZE_{it} + \beta_7 ROA_{it} + h_{it} + v_{it} + \varepsilon_{it}$$

The equation tests if the regression is significant, thus meaning if the variables of interest is useful to explain the dependent variable. The null hypothesis states that there is no relationship between the independent and the dependent variable, and the alternative hypothesis states that it cannot be rejected that there is a relationship between the independent variables and the dependent variable. The variables of the model will be discussed on a 1%, 5% and 10% level of significance.

$$H0: \beta 1 = \beta 2 = \beta 3 = \beta 4 = \beta 5 = \beta 6 = \beta 7 = 0$$

$$H1: \text{At least one } \beta i \text{ is} \neq 0$$

4.2. Descriptive statistics

Data has been collected from the Nasdaq OMX Stockholm noted companies on Large Cap over a five year period between 2012 and 2016. The data was retrieved the 29th of March 2018 from Nasdaq OMX Stockholm and the sample consisted of 93 companies at the time. Due to exclusions and loss of data, the final sample consisted of 83 companies, and 415 observations of both CEOs and CFOs meaning that 830 top managers were searched for, 825 top managers were found and their characteristics are the base of the results of this thesis. Having 4 dependent variables and 8 models, there are 3320 observations of how characteristics of top managers are connected to the financial risk level of the company.

CEO data set

	AGE	EDU	GENDER	POS_START	COMP_START	INDUSTRY	SIZE	ROA	SOLIDITY	GEARING	INT_COV	DEBT_EBITDA
Mean	52.093920	5.469613	0.049724	6.273481	11.058010	3.585635	7.174441	0.121922	0.467161	0.059329	1.024222	5.703305
Median	52.000000	6.000000	0.000000	5.000000	9.000000	3.000000	7.146367	0.111033	0.450321	0.086587	1.008913	4.284947
Maximum	66.000000	7.000000	1.000000	28.000000	37.000000	8.000000	8.494871	0.556578	0.979269	1.472943	3.659365	28.570280
Minmum	37.000000	2.000000	0.000000	0.000000	0.000000	0.000000	5.542630	-0.005202	0.032560	-1.674281	-1.026028	-16.907410
Std. Dev.	5.819731	1.129025	0.217675	5.700738	8.710770	2.066649	0.650115	0.084201	0.167322	0.362103	0.689345	4.604986
Skewness	-0.180998	-1.364231	4.142878	1.201833	0.870612	0.095666	0.033505	2.098453	0.412797	-0.398075	0.742416	0.991990
Kurtosis	2.522830	3.889288	18.163440	4.426964	2.942200	2.482300	2.239232	9.320228	3.260982	6.975187	4.839756	7.321810
Jarque-Bera	5.410879	124.216300	4503.635000	117.858700	45.780910	4.594702	8.797480	868.186100	11.308210	247.909200	84.307150	341.097900
Probability	0.066841	0.000000	0.000000	0.000000	0.000000	0.100525	0.000000	0.003503	0.000000	0.000000	0.000000	0.000000

Table 4-1. Descriptive statistics for the CEO data set, adapted by the authors (2018).

A thorough explanation of the data is necessary in order to understand the data behind the regressions. The data is divided upon two data sets, where the first contains the CEOs characteristics variables and the relative risk measures, and the second shows the same data but for CFOs. In table 4-1, it is shown that the data has a wide spread, why some transformations of the dependent variables was made in order to perform regressions with a greater statistical power. The logarithm of the interest coverage ratio and the gearing ratio is used to attain acceptable normal distribution and provide a better base for further investigations in the statistical analysis. The solidity and the debt/EBITDA ratio has been left unchanged due to an already acceptable normal distribution. The solidity has a relatively low standard deviation, but the interest coverage ratio and the gearing ratio deviates more which is clear by looking at the difference between the mean and the median. From the descriptive statistics it is shown that the typical CEO is a 52-year old man, holds a master's degree and has 11.05 years of company specific experience and among them 6.27 years of experience of being a CEO.

Looking at the CFO data set the descriptive statistics shows that the average CFO is male, 49 years old with a master's degree. He has worked within the company he is currently CFO at for 7.81 years, and has been a CFO at the same company for 4.70 years.

CFO data set

	AGE	EDU	GENDER	POS_START	COMP_START	INDUS-TRY	SIZE	ROA	SOLID-ITY	GEAR-ING	INT_COV	DEBT_EBITDA
Mean	49.269340	5.292264	0.217765	4.704871	7.819484	3.585635	7.174441	0.121922	0.467161	0.059329	1.024222	5.703305
Median	49.000000	6.000000	0.000000	3.000000	5.000000	3.000000	7.146367	0.111033	0.450321	0.086587	1.008913	4.284947
Maxi-mum	67.000000	7.000000	1.000000	24.000000	38.000000	8.000000	8.494871	0.556578	0.979269	1.472943	3.659365	28.570280
Minmum	29.000000	3.000000	0.000000	0.000000	0.000000	0.000000	5.542630	-0.005202	0.032560	-1.674281	-1.026028	-16.907410
Std. Dev.	6.274992	0.997395	0.413319	4.943532	7.446288	2.066649	0.650115	0.084201	0.167322	0.362103	0.689345	4.604986
Skew-ness	0.004695	-0.557577	1.367660	1.817658	1.491499	0.095666	0.033505	2.098453	0.412797	-0.398075	0.742416	0.991990
Kurtosis	2.968634	1.539825	2.870494	6.378486	5.417710	2.482300	2.239232	9.320228	3.260982	6.975187	4.839756	7.321810
Jarque-Bera	0.015592	49.087970	109.044300	358.156800	214.396500	4.594702	8.797480	868.186100	11.308210	247.909200	84.307150	341.097900
Probabil-ity	0.992234	0.000000	0.000000	0.000000	0.000000	0.100525	0.000000	0.003503	0.000000	0.000000	0.000000	0.000000

Table 4-2. Descriptive statistics for the CFO, adapted by the authors (2018).

The tables also describe the control variables that are used in the regression analyses. Firm industry, firm size and return on assets are added to the regressions to provide a more consistent model. Firm industry was later removed in favor for the fixed effects model.

The companies that are studied over time are not of equal size, why the control variable SIZE was added to the regressions. Looking at the tables, the log of the sales of the companies ranges from 5.54 to 8.50, which implies quite a big spread. Moreover, the four measure of financial risk are all ratios, but they also differ a lot over the sample. By looking at the standard deviation, it is stated by how much. Although, all the variables seem to be fairly normally distributed as only the ROA has a skewness of more than +2 (Trochim & Donnelly, 2006; Field, 2000; 2009; Gravetter & Wallnau, 2014). For both data sets, there are also Jarque-Bera tests that further confirm the normality of the variables by rejecting the null hypothesis of the Jarque-Bera tests.

4.3 Correlation between the variables

The correlation matrixes shows the relationships between all the variables in this study's two data sets. The matrixes aim to give the reader an overview of the variables and look for potential disturbing correlation between the variables.

The correlation between the variables of this study are varying. The strongest correlation in the CEO data set is found between the variables solidity and gearing, which is expected as both the measures contain the equity and debt of the same company. The correlation between them is -0.977508, statistically significant on the 1% level. However this will not impose a problem for the regressions, as they will not be part of the same regression model. The correlation matrix finds several statistically significant relationships, but as no relation takes on a correlation coefficient of -/+0.7 for two variables in the same regression, it will not be disturbing in the regression models.

Correlation Matrix CEO data set

Correlation Probability	AGE	EDU	GENDER	POS_ST	COMP_ST	INDU	SIZE	ROA	SOLIDITY	GEARING	INT_COV	DEBT_EBITDA
AGE	1.00000											
	-											
EDU	0.05988	1.00000										
	0.25580	-										
GENDER	-0.25954	-0.06146	1.00000									
	0.00000	0.24340	-									
POS_START	0.34907	0.11728	-0.18288	1.00000								
	0.00000	0.02570	0.00050	-								
COMP_START	0.21988	-0.11460	-0.10817	0.56120	1.00000							
	0.00000	0.02930	0.03970	0.00000	-							
INDUSTRY	-0.08335	-0.15737	0.05824	0.04186	0.11505	1.00000						
	0.11340	0.00270	0.26900	0.42720	0.02860	-						
SIZE	0.13758	0.12534	-0.14894	-0.23989	0.04792	0.20107	1.00000					
	0.00880	0.01700	0.00450	0.00000	0.36330	0.00010	-					
ROA	-0.05834	0.04811	-0.15479	-0.11116	-0.16031	0.01227	0.09472	1.00000				
	0.26830	0.36140	0.00310	0.03450	0.00220	0.81600	0.07190	-				
SOLIDITY	-0.01982	0.09914	0.06240	0.09034	0.01794	-0.26596	-0.12820	0.19864	1.00000			
	0.70700	0.05950	0.23630	0.08610	0.73380	0.00000	0.01470	0.00010	-			
GEARING	0.03906	-0.05070	-0.08519	-0.05730	-0.00371	0.25564	0.13762	-0.15439	-0.97751	1.00000		
	0.45880	0.33610	0.10560	0.27690	0.94400	0.00000	0.00870	0.00320	0.00000	-		
INT_COV	-0.04252	0.10880	-0.10426	0.11146	0.02259	-0.10170	0.00911	0.60684	0.57827	-0.55233	1.00000	
	0.41990	0.03860	0.04750	0.03400	0.66840	0.05320	0.86290	0.00000	0.00000	0.00000	-	
DEBT_EBITDA	-0.05070	-0.20153	0.09588	0.11637	0.17681	0.02239	-0.27507	-0.54550	-0.54379	0.54520	-0.49981	1.00000
	0.33610	0.00010	0.06840	0.02680	0.00070	0.67120	0.00000	0.00000	0.00000	0.00000	0.00000	-

Table 4-3. Correlation Matrix - CEO data set.

For the CFO data set, the solidity and gearing variables also shows the strongest significant relationship, with a correlation coefficient of -0.979210, and is statistically significant on the 1% confidence level. As for the CEO data set, this will not cause in problems in the model as they are not a part of the same regressions. The POS_START and the COMP_START is also

highly correlated with a correlation of 0.651465. Although this correlation is significantly related, it is not considered too strong to be required to rearrange the regression models, as a strong relationship is indicated by an r-value of 0.7 according to Rumsey (2011). Thus, the regressions will remain in its original form, except from the industry variable that is dropped in favor for the fixed effect model.

Correlation Matrix CFO data set

Correlation Probability	AGE	EDU	GENDER	POS_ST	COMP_ST	INDU	SIZE	ROA	SOLIDITY	GEARING	INT_COV	DEBT_EBITDA
AGE	1.00000											
	-											
EDU	0.06223	1.00000										
	0.24630	-										
		-										
GENDER	-0.13126	0.07118	1.00000									
	0.01410	0.18460	-									
POS_START	0.32855	0.04377	-0.14144	1.00000								
	0.00000	0.41500	0.00810	-								
		-										
COMP_START	0.15061	0.04163	0.00161	0.65147	1.00000							
	0.00480	0.43820	0.97620	0.00000	-							
INDUSTRY	0.04007	0.04298	-0.20765	0.09035	0.08301	1.00000						
	0.45560	0.42350	0.00010	0.09190	0.12160	-						
		-										
SIZE	0.12245	0.11096	-0.17963	-0.04862	0.20146	0.23603	1.00000					
	0.02210	0.03830	0.00070	0.36520	0.00020	0.00000	-					
		-										
ROA	-0.12644	0.16148	0.02858	0.10766	0.01140	0.04415	0.02397	1.00000				
	0.01810	0.00250	0.59460	0.04440	0.83190	0.41100	0.65540	-				
		-										
SOLIDITY	-0.07971	0.11345	0.14909	0.07005	0.22413	-0.25186	-0.19466	0.12843	1.00000			
	0.13730	0.03410	0.00530	0.19170	0.67650	0.00000	0.00030	0.01640	-			
GEARING	0.08894	0.10790	-0.15153	-0.08868	-0.03681	0.24436	0.20250	-0.08537	-0.97921	1.00000		
	0.09710	0.04400	0.00460	0.09810	0.49300	0.00000	0.00010	0.11140	0.00000	-		
		-										
INT_COV	-0.15970	0.06664	0.10974	0.20336	0.11719	-0.08524	-0.09372	0.52593	0.54775	-0.53274	1.00000	
	0.00280	0.21430	0.04050	0.00010	0.02860	0.11190	0.08040	0.00000	0.00000	0.00000	-	
DEBT_EBITDA	0.12939	0.21344	0.07079	-0.08263	-0.05644	0.00853	-0.25114	-0.53792	-0.50866	0.50418	-0.48369	1.00000
	0.01560	0.00010	0.18700	0.12340	0.29300	0.87380	0.00000	0.00000	0.00000	0.00000	0.00000	-

Table 4-4. Correlation Matrix - CFO data set.

4.4. CEO regressions

In this chapter, the results from the regression models examining the effect of top managers' characteristics and the financial risk level in companies, are presented. The investigated material consists of observations from companies listed on Nasdaq OMX Sockholm Large Cap, and four dependent variables are used to provide a more insightful analysis and a more comprehensive framework for the financial risk a company is facing.

In the first data set which includes the observations of the CEO characteristics, the following hypotheses aims to be tested through the fixed effects model:

- *Hypothesis 1: Male CEOs are less risk-averse than female CEOs.*
- *Hypothesis 3: CEOs' ages are negatively correlated with financial risk.*
- *Hypothesis 5: CEOs' company specific experiences are negatively correlated with financial risk.*
- *Hypothesis 7: CEOs' position specific experiences are negatively correlated with financial risk.*
- *Hypothesis 9: CEOs' educational level is positively correlated with financial risk.*

In order to be able to test the hypotheses, there is a need to reformulate them to a null and an alternative hypothesis. The null hypothesis states that no significant relationship is present between any of the variables, and the alternative hypothesis state that there is a relationship. To be able to reject the null hypothesis, low p-values need to be attained in the regression output. Statistical significance can be found on a level of significance of 1%, 5% or 10% respectively, depending on how low the p-value is.

In table 4-5, the results for the first regression is shown with the dependent variable *solidity.* Looking at the p-values of the variables it is clear that the model contains several statistically significant variables. These are the intercept, EDU, POS_START, and the control variables SIZE and ROA, which all are statistically significant on the 5% significance level. By using the 10% significance level, the results also show significance for the AGE variable. This means that the nul hypothesis, of that there is no significant relationship between any of the variables and solidity, needs to be rejected. Further, the R-squared value shows an explanatory power of 90.52%, and the adjusted R-squared that controls for the number of variables, means that the full model explains 87.67% respectively. Looking at the standard errors of regression, the value is close to zero, which means that the regressors can predict the value with the average distance from the fitted line of 6.64%.

CEO DATASET

Dependent variable: SOLIDITY	**R-squared**	0.905165
Method: Panel Least Squares	**Adjusted R-squared**	0.876715
Periods included: 5	**S.E of regression**	0.066479
Cross-sections included: 83	**Durbin-Watson stat**	1.208057
Total panel (unbalanced): 404		
Cross-section fixed (dummy variables); period fixed (dummy variables)		

Variable	Coefficient	p-value
C	2.706459	0.0000
AGE	-0.004086	0.0892
EDU	-0.024228	0.0170
GENDER	-0.021628	0.4386
POS_START	0.009790	0.0157
COMP_START	-0.002563	0.1261
SIZE	-0.281022	0.0000
ROA	0.591948	0.0002

Table 4-5. Regression 1 - CEO data set – dependent variable: solidity.

The results for the next dependent variable, *gearing,* is shown in table 4-6. The results shows that none of the CEO characteristics variables are significantly related to the dependent variable gearing. However, statistical significance is found on the 1% level for both the control variables SIZE and ROA, and also for the intercept. The explanatory power of the model with gearing as dependent variable is 90.82% by looking at the R-squared, and 88.04% by looking at the adjusted R-squared. The standard errors of regression are also fairly low, taking on a value of 13.29%.

CEO DATASET

Dependent variable: GEARING	**R-squared**	0.908293
Method: Panel Least Squares	**Adjusted R-squared**	0.880448
Periods included: 5	**S.E of regression**	5.348347
Cross-sections included: 83	**Durbin-Watson stat**	1.319262
Total panel (unbalanced): 404		
Cross-section fixed (dummy variables); period fixed (dummy variables)		

Variable	Coefficient	p-value
C	-4.791600	0.0000
AGE	0.000414	0.8981
EDU	0.012608	0.3472
GENDER	0.059827	0.3231
POS_START	0.000045	0.9930
COMP_START	-0.001859	0.3646
SIZE	0.688673	0.0000
ROA	-1.215337	0.0001

Table 4-6. Regression 2 - CEO data set – dependent variable: gearing ratio.

Next table presents the results for the third dependent variable *interest coverage*. For this sample, there is a loss of observations due to that the logarithm of the interest coverage ratio was used due to that an increase of normality was desired due to the assumptions of OLS. This means that the results should be interpreted with a bit of consideration, as it does not reflect the full sample. With that in mind, there is statistically significant relationships for AGE and POS_START, in addition are the control variables SIZE and ROA significant on the 1% level. The intercept is also significant. This means that the null hypothesis should be rejected as there is a statistical significance for the model. The model R-squared and the adjusted R-squared values are 88.44% and 84.56% respectively. Here, the standard errors of regression are higher than in the previous models. This could maybe be related to that some observations are lost, due to that the logarithm of the interest coverage ratio was used.

CEO DATASET

Dependent variable: INT_COV		R-squared	0.884435
Method: Panel Least Squares		Adjusted R-squared	0.845632
Periods included: 5		S.E of regression	0.269092
Cross-sections included: 82		Durbin-Watson stat	1.85748
Total panel (unbalanced): 396			
Cross-section fixed (dummy variables); period fixed (dummy variables)			

Variable	Coefficient	p-value
C	4.217366	0.0009
AGE	-0.018447	0.4730
EDU	-0.035524	0.3516
GENDER	0.021504	0.9082
POS_START	0.031401	0.0224
COMP_START	0.005587	0.5155
SIZE	-0.374618	0.0427
ROA	3.111017	0.0005

Table 4-7. Regression 3 - CEO data set – dependent variable: interest coverage ratio.

For the last financial risk level measure for the CEO data set, the *debt/EBITDA* ratio, the results are shown in table 4-8. This model shows less statistical significant relationships, compared to the other models. The only variable that is statistically significant on a 5% level, is the variable ROA. However there are other variables that are significant on a 10% level, the intercept, the independent variables POS_START and COMP_START, and also the control variable SIZE with p-values less than 0.1. The model has explanatory power of 76.55% by looking at the R-squared, and the adjusted R-squared value is 69.21%. Even for this equation, the standard errors of regressions are low, at 0.27% from the fitted line.

CEO DATASET

Dependent variable: DEBT_EBITDA	**R-squared**	0.765502
Method: Panel Least Squares	**Adjusted R-squared**	0.694925
Periods included: 5	**S.E of regression**	2.690885
Cross-sections included: 83	**Durbin-Watson stat**	1.890488
Total panel (unbalanced): 403		
Cross-section fixed (dummy variables); period fixed (dummy variables)		

Variable	Coefficient	p-value
C	-48.70822	0.0675
AGE	0.069213	0.9790
EDU	0.38467	0.2825
GENDER	-1.241827	0.2968
POS_START	-0.28984	0.0970
COMP_START	0.147833	0.0723
SIZE	7.224804	0.0617
ROA	-20.87495	0.0158

Table 4-8. Regression 4 - CEO data set - dependent variable: debt/EBITDA.

4.5. CFO regressions

In this chapter the results for the CFO data set are presented which aims to reflect the relationship between a company's CFO's characteristics and the financial risk level. As for the CEO, four measures of financial risk are used to provide a broader base for discussion.

In order to be able to perform hypothesis testing, the following hypotheses need to be reformulated to a null and alternative hypothesis:

- *Hypothesis 2: Male CFOs are less risk-averse than female CEOs.*
- *Hypothesis 4: CFOs' ages are negatively correlated with financial risk.*
- *Hypothesis 6: CFOs' company specific experiences are negatively correlated with financial risk.*
- *Hypothesis 8: CFOs' position specific experiences are negatively correlated with financial risk.*
- *Hypothesis 10: CFOs' educational level is positively correlated with financial risk.*

As for the CEO regressions, the null hypothesis states that no significant relationship is present between the characteristics of the CFO and the financial risk level in a company, and the

alternative hypothesis thereby state that there is a significant relationship. In order to be able to reject the null hypothesis, low p-values need to be attained in the regression output. As for the CEO-regressions, statistical significance is determined on either a 1%, 5% or 10% level of significance.

Table 4-9 shows the results for the regression of CFOs' characteristics and the dependent variable *solidity*. The regression output shows evidence that the EDU variable is significant on a 5% significance level and the POS_START is significant on a 1% level. The control variables are both significant on the 1% level, and so is also the intercept. There is also a statistically significant relationship between COMP_START and solidity on a 10% significance level. The R-squared value indicates that the model has an explanation power of 92%, and the adjusted R-squared value attains a number of 89.51%. As in the CEO data set, the standard errors of regression are very low which indicates a good level of fit to the fitted line.

CFO DATASET

Dependent variable: SOLIDITY	**R-squared**	0.920045
Method: Panel Least Squares	**Adjusted R-squared**	0.89511
Periods included: 5	**S.E of regression**	0.059988
Cross-sections included: 82	**Durbin-Watson stat**	1.387288
Total panel (unbalanced): 388		
Cross-section fixed (dummy variables); period fixed (dummy variables)		

Variable	Coefficient	p-value
C	2.296153	0.0000
AGE	-0.02027	0.3154
EDU	-0.11549	0.0374
GENDER	0.017928	0.3418
POS_START	0.004599	0.0049
COMP_START	-0.00806	0.4254
SIZE	-0.24383	0.0000
ROA	0.377821	0.0014

Table 4-9. Regression 5 - CFO data set - dependent variable: solidity.

The results for the regression with *gearing* as the dependent variable is presented in table 4-10. The results suggest that the POS_START variable is significant on a 5% level of significance. Also the intercept and the two control variables SIZE and ROA shows significance on the 1% level. This regression model has explanatory power of 91.45% and an adjusted R-squared value

of 88.75%. This model also has low standard errors of regression, indicating that this is a good model as the previous regression model. The null hypothesis is rejected as the model finds significance in at least one variable.

CFO DATASET

Dependent variable: GEARING	**R-squared**	0.914515
Method: Panel Least Squares	**Adjusted R-squared**	0.887505
Periods included: 5	**S.E of regression**	0.123842
Cross-sections included: 81	**Durbin-Watson stat**	1.374014
Total panel (unbalanced): 380		
Cross-section fixed (dummy variables); period fixed (dummy variables)		

Variable	Coefficient	p-value
C	-4686177	0.0000
AGE	0.00202	0.5978
EDU	0.015414	0.1911
GENDER	-0.020866	0.5553
POS_START	-0.007373	0.0346
COMP_START	-0.000153	0.9445
SIZE	0.660716	0.0000
ROA	-1.050608	0.0001

Table 4-10. Regression 6 - CFO data set - dependent variable: gearing.

The third regression model for the CFO data set investigates the *interest coverage* as the dependent variable. As in the CEO data set, this model contains less observations due to that the logarithm of the interest coverage ratio is used in order to meet the assumption of normality. This means that it does not reflect the full population, and the results should be interpreted carefully. The model shows significance for several variables. For this model, the GENDER variable is significant on the 1% level, and so is the control variable ROA. In addition, the intercept and the POS_START is significant on a 5% level of significance. Increasing the level of significance up to 10%, the control variable SIZE is also significant. The explanatory power of this model is 86.71% and the adjusted R-square is 82.16%, indicating a good model. Similar to the previously tested models, this model also have low standard errors of regression, indicating a good fit to the fitted line. Also, the null hypothesis is rejected since the model shows significance in the variables.

CFO DATASET

Dependent variable: INT_COV	**R-squared**	0.867099
Method: Panel Least Squares	**Adjusted R-squared**	0.82162
Periods included: 5	**S.E of regression**	0.262509
Cross-sections included: 80	**Durbin-Watson stat**	1.761889
Total panel (unbalanced): 354		
Cross-section fixed (dummy variables); period fixed (dummy variables)		

Variable	Coefficient	p-value
C	2.781934	0.0303
AGE	-0.004318	0.6085
EDU	0.008282	0.8467
GENDER	0.213375	0.0038
POS_START	0.0233	0.0273
COMP_START	-0.00365	0.5429
SIZE	-0.30265	0.0825
ROA	3.706467	0.0000

Table 4-11. Regression 7 - CFO data set - dependent variable: interest coverage ratio.

The eighth and last regression is performed on the CFO data set with the dependent variable *debt/EBITDA,* and is shown below. This regression does not show any significant variables on a 1% or a 5% significance level. By increasing the significance level to 10%, the results show that control variables SIZE and ROA are significant. Thus, there is no evidence that CFO characteristics is connected to the DEBT_EBITDA ratio, and as there are no significant relationship with the ROA, the null hypothesis cannot be rejected. The model has an R-squared value of 76.58% and the corresponding adjusted R-squared value is 69.66%. The standard errors of regression are somewhat higher compared to the other regressions, but are still considered low. In this model, the Durbin-Watson stat is the highest for all regressions, indicating that there is no disturbing autocorrelation as it approaches 2.

CFO DATASET		
Dependent variable: DEBT_EBITDA	**R-squared**	0.765833
Method: Panel Least Squares	**Adjusted R-squared**	0.696683
Periods included: 5	**S.E of regression**	2.611530
Cross-sections included: 82	**Durbin-Watson stat**	1.956554
Total panel (unbalanced): 387		
Cross-section fixed (dummy variables)		

Variable	Coefficient	p-value
C	-24.76368	0.2626
AGE	-0.130056	0.1778
EDU	0.007018	0.9759
GENDER	-1.354541	0.2727
POS_START	-0.028894	0.7489
COMP_START	0.004360	0.9238
SIZE	5.479515	0.1196
ROA	-15.73875	0.0503

Table 4-12. Regression 8 - CFO data set - dependent variable: debt/EBITDA.

4.3 Conclusive results

As the aim of this thesis is to find out whether there is a relationship between upper echelons characteristics and the financial risk level of a company, regression analyses with fixed effects have been performed. The interpretation of the results is that upper echelon characteristics of the top managers are statistically significant for the financial risk level of a company, which means that the Upper Echelons Theory is applicable to financial risk.

5. Discussion

In the following chapter, the results of the empirical findings are discussed and analyzed. In order to support the regression results, connections are made between the findings and the theoretical framework.

The below table is a summary of the results from the regressions. The relationship for all eight regressions are covered and the significance for the different variables in the regressions are stated for a better overview.

	CEO					**CFO**				
	Gender	Age	Company experience	Position experience	Education	Gender	Age	Company experience	Position experience	Education
Solidity	0	0	0	+	-	0	0	0	+	-
Gearing ratio	0	0	0	0	0	0	0	0	-	0
Interest Coverage ratio	0	-	0	+	0	+	0	0	+	0
Debt/EBITDA ratio	0	0	0 (-)	0 (+)	0	0	0	0	0	0

+ = positive, significant relationship, - = negative, significant relationship, 0 = insignificant relationship, (+)= positive, significant relationship 10% level, (-)=negative, significant relationship 10% level

Table 5-1. Conclusive results.

Introduction

The aim with the gathering of empirical data was to investigate how various observable UET characteristics among CEOs and CFOs is related to financial risk-taking. In accordance to Marton et al. (2015), Linsley and Shrives (2006) and Standard & Poor's (2002), financial risk was defined, measured and evaluated through the measures solidity, gearing ratio, interest coverage ratio and debt/EBITDA ratio. Further on, the empirical results will be discussed according to the hypotheses.

As stated in the theory chapter, the UET suggests that the more complex a decisions is, the more important is the decision maker's characteristics. From a corporate financial perspective, financial risk-taking can be seen as one of the key decisions that have to be made. This is due to the fact the characteristics of the decision maker affect the perception of the alternatives, and hence it affects the decision that is finally taken. The UET state that the upper echelon characteristics can help organizations to predict performance, and hence it is important that the decision-making executives' personal characteristics are in line with the company's strategy (Hambrick & Mason, 1984).

Gender

According to previous studies, male CEOs are less risk-averse than female CEOs, which has been proven to influence financial decisions within companies (Vandergrift & Brown, 2005; Wei, 2007). This study's data collection of CEOs/CFOs can confirm this research to a limited extent. The result proves that there is no significant relationship between a CEOs' gender and the four measures of financial risk. Hence, it can be concluded that the CEOs' gender have no effect on financial risk-taking within the Large Cap companies, and therefore a CEO's gender cannot explain strategic decisions and performance in accordance to UET (Hambrick & Mason, 1984).

A reason to why few significant results were found, could possibly be explained through UET as it leaves room for insignificant results. Hambrick and Mason (1984) suggest that a human is complex, and thus the characteristics of her cannot be fully measured in a research. This goes in line with a neutral or insignificant result, proving that there are other factors that or more influential for financial risk-taking.

Furthermore, Hambrick (2007) presents in his article that there is a possibility that a certain type of people are recruited to be the CFO of a company, no matter their characteristics. Looking at the descriptive statistics it is very likely that the CFO is male, indicated by the skewness of the data. That means that the person's rationality and his ability to transform information to strategy should be the same, as the type of person is typical, simply by being male (Mishra and Jhunjhunwala, 2013). Hambrick (2007) mean that the characteristics, in this case, does not matter at all as the type will act the same.

Looking into how a CFO gender is related to financial risk-taking, the study proves that previous research stating that female CFOs are more risk-averse than male CFOs (Strahan, 1999; Huang & Kisgen, 2010), are somewhat correct. However, the results also show that there is a significant, positive relationship between the gender and the interest coverage ratio, implying that female CFOs are more-risk averse than a male CFO. This is in line with the hypothesis, and can be explained accordingly. In addition, Mishra and Jhunjhunwala (2013) suggest that female directors have a long-term perspective, indicating strategical focus and a risk management approach instead of the more male approach of attaining performance and goals. This is also in line with the results of Vandergrift and Brown (2005) and Wei (2007).

According to this study, the only financial risk measure that confirms the UET theory is interest coverage ratio. As for solidity, gearing ratio and debt/EBITDA ratio, the study proves no significant results. By only focusing on the interest coverage ratio as a financial risk measure, the UET state that the CFOs' gender can predict financial risk-taking. However, with three measures proving no significant results, it would be negligent draw conclusions for financial risk in general.

Age

According to the UET (Hambrick & Mason, 1984), age could be a factor that affects strategic performance. Therefore, the hypothesis stated that older CEOs and CFOs should be more risk-averse, meaning that they take on less financial risk compared to younger CEOs and CFOs. However, the results implies that this is not the case, and that little support from the theory is found based on the sample. For three out of four regressions, non-significant relationships is found, and for the last regression a significant, negative relationship is found, implying that financial risk is hard to predict just based on the age of the company's CEO and CFO. In the regressions for solidity, gearing ratio and debt/EBITDA, no significance was found for the age variable. The negative significance was found in relation to the interest coverage ratio, which means that the older the CEO, the lower the interest coverage ratio. This means that the UET is limited in the effectiveness of explaining financial risk-taking. A possible explanation to the negative significant results can be that an appointment of a younger CEO is a source to better stock market returns (Moressi, 2017). Moressi (2017) explains this phenomena that a younger CEO is more motivated, have more resources and talent may offset the lack of experience yielding higher returns to the company. As the interest coverage is an income-statement based financial risk measure, this could explain the result that is opposite from the hypothesis, and different from the rest of the results. However, the UET can still be effective in explaining financial performance, but from the other way around as the theory at its purest does not predict that an older CEO is take less risk (Hambrick, 2007).

The lack of significant results can also be an effect of that the largest part of the sample consists of going-concern businesses - in where "extra ordinary interventions" are not demanded (Moressi, 2017). Thus younger CEOs and CFOs get more out of their characteristics being in a more dynamic environment, which is why the research showed insignificant results.

The collected results from the regressions prove little evidence that age can explain financial risk-taking. This is due to the fact that most of the observations are non-significant, and since the only significant observation contradict the hypothesis.

Experience

As stated in the theory, Hambrick and Mason (1984) state that a manager, due to previous experiences, have a tendency to favor their own part of the organization when making decisions. Following studies proved that experience lead to increased efficiency (Fischer & Pollock, 2004) and decreased leverage (Ting et al., 2015). Hence, it was expected that this study's result would give evidence that confirmed the hypothesis of experience resulting in a lower degree of financial risk.

Company Specific Experience

Due to little previous research regarding a manager's work experience is related to financial risk-taking, a wider perspective of the characteristic was investigated. The first kind of experience measured was how long the CEO/CFO had been employed at the specific company at a specific year. In the study, the characteristic is called "Company Specific Experience", and the research proves no significant result that this kind of CEO/CFO experience is related to financial risk-taking. This result rebuts the Ting et al. (2015) findings that CEOs' experiences are negatively correlated to leverage. The same result can however not be proved by the sample of OMX Stockholm Large Cap companies, implying that the financial risk level cannot be explained by how many years the managers have been employees at the current company. However, the relationship between CEOs' company specific experiences is significant on a 10% level in the regression with the debt/EBITDA ratio as dependent variable, which implies that CEOs' company specific experiences to some extent can explain one out of four of the risk measures.

When it comes to previous research regarding experience in general, and company specific experience in particular, research is scarce. However, this study's result contributes to research and can prove that there are no significant relationships between how long a CEO/CFO has been employed at a specific company, and the financial risk taken by the same company. The UET, stating that experience can explain strategic choices and performance, can hence only explain financial risk-taking through interest coverage ratio.

Position specific experience

The second characteristic used to analyze how work experience of top managers is related to financial risk-taking is called "Position Specific Experience". This characteristic explains the amount of years that the CEOs/CFOs has been employed to the specific CEO/CFO position. Due to the limited amount of previous research regarding various forms of experiences, the same hypotheses are used to assess the study's results. Hence, the position specific experience has the same assumptions as the company specific experiences, namely that experience lead to increased efficiency (Fischer & Pollock, 2004) and decreased leverage (Ting et al., 2015).

Compared to the rest of the characteristics researched, the position specific experience has proved to be the characteristic providing the most significant results. By first reviewing the results from the CEOs' position specific experiences, significant results are found between the position specific experience and solidity, as well as for the interest coverage ratio. These results are also consistent with previous research (Hambrick & Mason, 1984; Ting et al., 2015) and with the hypothesis, stating that the longer the position specific experience is, the less financial risks are taken. No significant result is found for gearing ratio, which Ting et al. (2015) found significant in their study evaluating financial leverage. Financial leverage is often measured defined similar to the gearing ratio, and hence, it can be concluded that Malaysian CEOs' experiences have a greater impact on the capital structure than the results for CEOs working within Swedish listed companies in this research.

For the debt/EBITDA ratio the results are significant on a 10% level, which implies that the ratio to some extent can be explained by the CEOs' company specific experiences. However, this ratio proves the opposite result compared to solidity and interest coverage ratio. The result from this ratio instead proves that the more experience a CEO have, the more financial risks are taken.

To compile the results, it can be stated that two out of four of the risk measures with statistical significance can be explained by the CEOs' position specific experience. Compared to previous research proving that CEOs' experiences are negatively correlated to financial leverage (Ting et al., 2015), this study adds to the research with other varied results. This research gives a more specified version of which type of experience that is measured, as well as it proves financial risk according to two various measures. Hence, the study contributes with research regarding

how a specified version of Hambrick and Mason's (1984) upper echelon characteristic, experience, is related to financial risk.

Moving on to CFOs' position specific experiences and its relation to financial risk-taking, the study proves a significant and positive relationship with solidity and with interest coverage ratio. These results are similar to the results found for the CEO data set. Additionally, the results for CFOs' position specific experiences prove a significant and negative relationship with gearing ratio. As for debt/EBITDA ratio, no significant relationship is found with the CFOs' position specific experiences.

According to the UET, the characteristics of decision makers affect strategic choices and performance of organizations (Hambrick & Mason, 1984). Since previous research regarding how CFOs' experiences is related to financial risks are rare, this study's result contributes to the research regarding how the upper echelons theory can be applied to strategic formulation regarding financial risk-taking. Due to that the financial risk measures indicate various risk-propensity among CFOs, the UET's predictions are not crystal clear. According to the solidity and the interest coverage ratio, the position specific experience can be used to explain a certain use of financial risk, namely the decreased risk-taking. As for gearing ratio, the same kind of experience can be used to explain another use of financial risk, the increased risk-taking. Therefore, this study cannot in a unified way contribute to the research about the UET and experiences' effect on financial risk-taking.

Education

Continuing to the upper echelon characteristic education (Hambrick & Mason, 1984), the study proves the same result for both CEOs and CFOs. According to the result, the only financial risk measure that has a significant result is solidity. In accordance to Ting et al. (2015), this measure proves a negative relationship, meaning that the higher degree of education CEOs/CFOs have, the lower is the solidity. In other words, CEOs/CFOs that are more educated have been proved to take larger financial risks by decreasing the amount of total equity in relation to the total capital. Ting et al. (2015)'s study is based on a Malaysian sample, which means that the results from these two studies can be generalized to a greater crowd as the companies are competing in two very different business climates and markets.

Further, the results are in line with the hypotheses, and can be supported by Hambrick (2007) results that managers with a higher level of challenges takes faster decisions. As the descriptive statistics showed in table 4-1 and 4-2, the average CEO and CFO is highly educated and two of the highest managers in a company. Thus, they are likely to face a high level of challenges. With a high level of challenges, they are likely to take faster decisions, resulting in more risky decisions. This could result in a lower solidity of the company. If they would face a lower level of challenges, they could take more informative, complex decision taking more dimensions into account and be able to hedge for more risks, neglecting the upper echelon characteristics (Hambrick & Mason, 1984).

An alternative explanation of the bounded rationality and the interpretation of the Upper Echelon characteristics can be found in theory, that well-educated CEOs and CFOs are more informed and have more theoretical experience that can be applied to a situation they are facing. Perhaps, risk is seen as something positive that could yield the company increased returns. Thus, they take on more debt as they have theoretical knowledge of corporate finance, and rely more on other theories, such as the pecking-order theory (Miller, 1977), and less on their own cognitive base.

Education in itself is not related to financial performance of a firm, according to Rose (2007). This can be a reason to why the financial risk measures taking both earnings into account (interest coverage ratio and debt/EBITDA), shows a non-significant relationship.

Concluding, the results show that solidity can be explained by the upper echelon characteristic education, both for CEOs and CFOs. Education can however not explain the financial risk-taking through gearing ratio, interest coverage ratio and the debt/EBITDA.

6. Conclusion

The purpose of this study is to investigate how financial risk-taking within companies is related to characteristics of the CEO and the CFO. The study investigates 83 companies listed on Nasdaq OMX Large cap over a five-year period in a panel data set. Fixed effects regressions on four dependent variables proves both significant and insignificant results. A common trend in previous research is that significant results had been found between upper echelon characteristics and its effects, which led to easily formulated hypotheses and certain expectations on the result.

To ensure a high validity of the research, four measures of financial risk are used. The study proves that 19/40 of the independent variables in the eight regressions are significant, suggesting that the upper echelon characteristics can explain financial risk-taking within Swedish companies to a limited extent, but cannot be disregarded. The position specific experience is the only characteristic that with a high level of certainty is proved to affect financial risk-taking among CEOs and CFOs, which proves significant results on two respectively three measures. For the other investigated characteristics, a very limited evidence of the Upper Echelons theory is found as these characteristics are only significantly related to one out of four risk measures.

6.1. Research strengths and contributions

The study can add on to the UET debate and goes beyond the scope of previous known angles regarding financing decisions. Previously, two main theories have dominated the financing decision (Ting et al., 2015), the trade-off theory (Myers, 1984) and the pecking order-theory (Miller, 1977). As no prior study of this kind has been found, this study is unique in its kind being focused on top managers characteristics and how it may influence the choice of financing in Swedish companies. The study is useful for Swedish companies, and also larger companies as the study shows that the characteristics of the top managers CEO and CFO can affect the financial risk in a company, thus the UET is a theory to take into consideration when setting strategies for financial risk and before a new CEO or CFO is appointed.

As the study uses a quantitative methodology, the results are more generalizable than if it had been carried out with a qualitative research approach (Bryman & Bell, 2013). As fixed effects are controlled for due to the structure of the method, it can be stated that the organizational and

periodic effects that a risk-taking faces are controlled for thus making the results generalizable to any company facing the same legislation, policies and business climate as the companies in this research.

6.2. Research limitations and suggestions for further research

This study investigates how the upper echelons characteristics are connected to the financial risk-taking in Swedish companies listed on Nasdaq's OMX Stockholm Large Cap. However, it is limited to include only observable upper echelons characteristics, and not the psychological characteristics such as for example cognitive base and values of a manager (Hambrick & Mason, 1984). These psychological characteristics could be taken into account in future research, and could maybe be appropriately investigated in a qualitative study to get a deeper understanding of the underlying factors. Based on the methodology of this study, such characteristics were out of the scope for the purpose of this thesis.

This study did not distinguish between fields of education when classifying the education level of the top managers. It is possible that the field of study can affect the strategic choices a manager takes, therefore it could be a thing to control for in future research.

Further, the study did not investigate the banking sector, as they have other proxys for financial risk than a high level of leverage (Fama & French, 1992). It could be interesting to investigate whether the results of this research are applicable also in the banking sector. Perhaps is a larger sample needed to be reliable than only taking the Swedish banks into account in such a study, and could therefore include banks from other countries. Furthermore, it could also be interesting to apply the methodology of this research on SME's in Sweden, or include other companies from for example the Mid-, and Small Cap, to further increase the generalizability.

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8. Appendices

Appendix A – Redundant Fixed Effects tests

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section and period fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	33.387768	(82,310)	0.0000
Cross-section Chi-square	923.383213	82	0.0000
Period F	13.284389	(4,310)	0.0000
Period Chi-square	63.916601	4	0.0000
Cross-Section/Period F	31.975382	(86,310)	0.0000
Cross-Section/Period Chi-square	924.982085	86	0.0000

Table A-1. Redundant Fixed Effects test - Regression 1 – dependent variable: solidity.

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section and period fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	33.814374	(81,303)	0.0000
Cross-section Chi-square	913.384269	81	0.0000
Period F	18.068657	(4,303)	0.0000
Period Chi-square	84.714414	4	0.0000
Cross-Section/Period F	32.459474	(85,303)	0.0000
Cross-Section/Period Chi-square	915.991095	85	0.0000

Table A-2. Redundant Fixed Effects test - Regression 2 - gearing ratio.

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section and period fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	13.819619	(81,274)	0.0000
Cross-section Chi-square	596.876383	81	0.0000
Period F	18.343804	(4,274)	0.0000
Period Chi-square	87.080809	4	0.0000
Cross-Section/Period F	13.711697	(85,274)	0.0000
Cross-Section/Period Chi-square	608.823266	85	0.0000

Table A-3. Redundant Fixed Effects test - Regression 3 - dependent variable: interest coverage ratio.

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section and period fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	33.814374	(81,303)	0.0000
Cross-section Chi-square	913.384269	81	0.0000
Period F	18.068657	(4,303)	0.0000
Period Chi-square	84.714414	4	0.0000
Cross-Section/Period F	32.459474	(85,303)	0.0000
Cross-Section/Period Chi-square	915.991095	85	0.0000

Table A-4. Redundant Fixed Effects test - Regression 4 - dependent variable: debt/EBITDA ratio.

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section and period fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	38.540300	(81,295)	0.0000
Cross-section Chi-square	950.395881	81	0.0000
Period F	11.815049	(4,295)	0.0000
Period Chi-square	57.655208	4	0.0000
Cross-Section/Period F	36.956223	(85,295)	0.0000
Cross-Section/Period Chi-square	952.605613	85	0.0000

Table A-5. Redundant Fixed Effects test - Regression 5 - dependent variable: solidity.

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section and period fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	33.889258	(80,288)	0.0000
Cross-section Chi-square	890.385824	80	0.0000
Period F	12.725516	(4,288)	0.0000
Period Chi-square	61.845262	4	0.0000
Cross-Section/Period F	32.581612	(84,288)	0.0000
Cross-Section/Period Chi-square	893.630077	84	0.0000

Table A-6. Redundant Fixed Effects test - Regression 6 - dependent variable: gearing ratio.

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section and period fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	13.246800	(79,263)	0.0000
Cross-section Chi-square	568.256556	79	0.0000
Period F	13.197471	(4,263)	0.0000
Period Chi-square	64.754756	4	0.0000
Cross-Section/Period F	13.145761	(83,263)	0.0000
Cross-Section/Period Chi-square	580.112875	83	0.0000

Table A-7. Redundant Fixed Effects test - Regression 7 - dependent variable: interest coverage ratio.

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section and period fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	8.598048	(81,294)	0.0000
Cross-section Chi-square	470.039153	81	0.0000
Period F	1.296036	(4,294)	0.2716
Period Chi-square	6.764558	4	0.1489
Cross-Section/Period F	8.220461	(85,294)	0.0000
Cross-Section/Period Chi-square	470.935736	85	0.0000

Table A-8. Redundant Fixed Effects test - Regression 8 - dependent variable: debt/EBITDA ratio.

Appendix B – Hausman tests

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	21.893497	7	0.0027

Table B-1. Hausman test - Regression 1 - dependent variable: solidity.

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	20.764529	7	0.0041

Table B-2. Hausman test - Regression 2 - dependent variable: gearing ratio.

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	11.989846	7	0.1009

Table B-3. Hausman test - Regression 3 - dependent variable: interest coverage ratio.

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	51.304650	7	0.0000

Table B-4. Hausman test - Regression 4 - dependent variable: debt/EBITDA ratio.

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	8.880877	7	0.2613

Table B-5. Hausman est - Regression 5 - dependent variable: solidity.

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	23.669802	7	0.0013

Table B-6. Hausman test - Regression 6 - dependent variable: gearing ratio.

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	19.959564	7	0.0057

Table B-7. Hausman test - Regression 7 - dependent variable: interest coverage ratio.

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	53.676097	7	0.0000

Table B-8. Hausman test - Regression 8 - dependent variable: debt/EBITDA.

Appendix C – Jarque-Bera tests

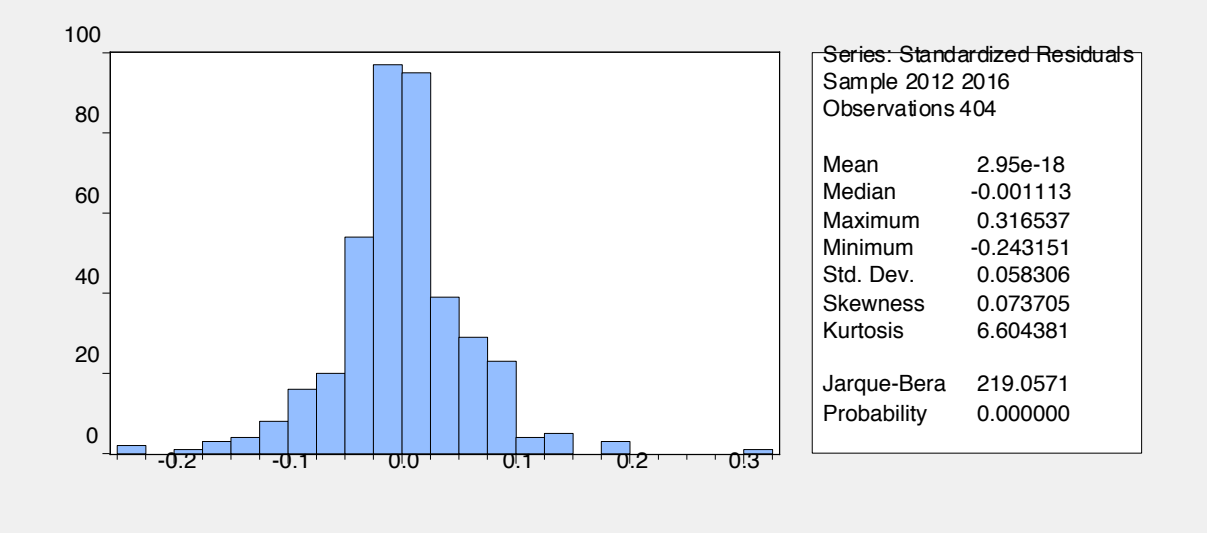

Figure C-1. Jarque-Bera test - Regression 1 - dependent variable: solidity.

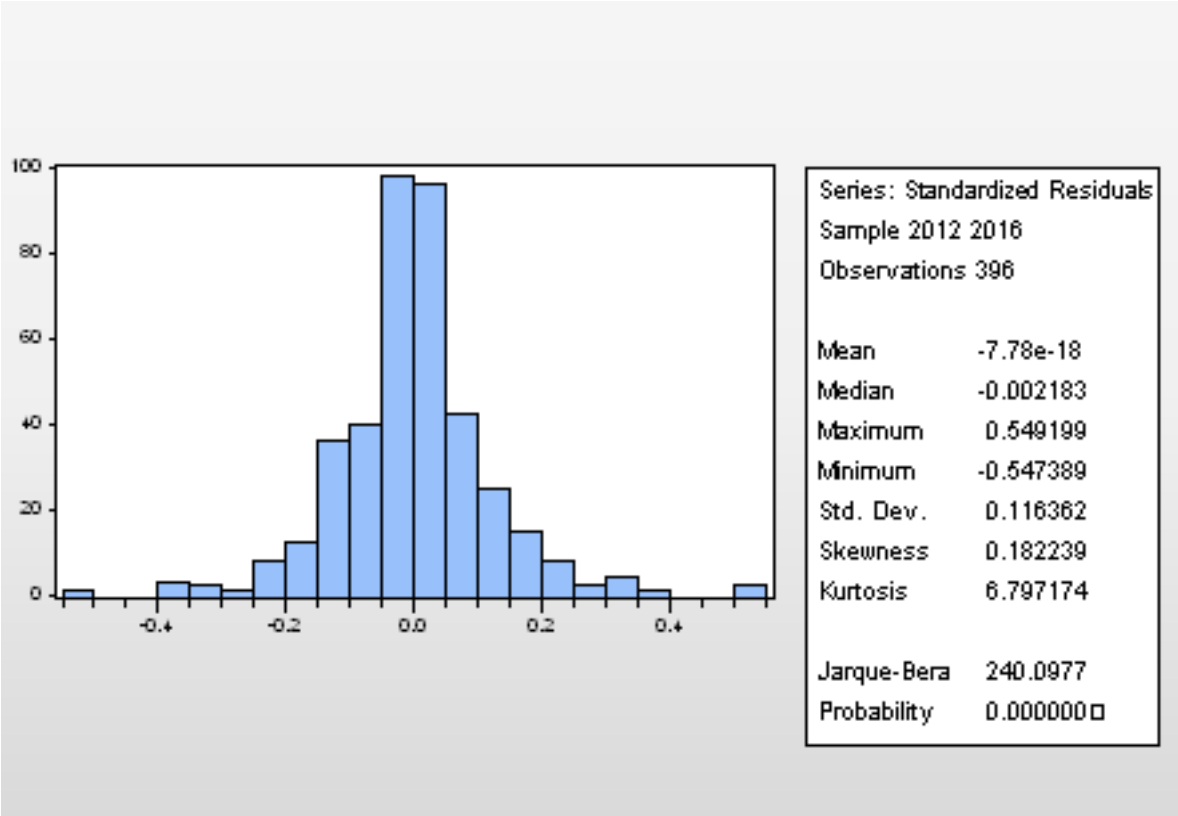

Figure C-2. Jarque-Bera test - Regression 3 - dependent variable: gearing ratio.

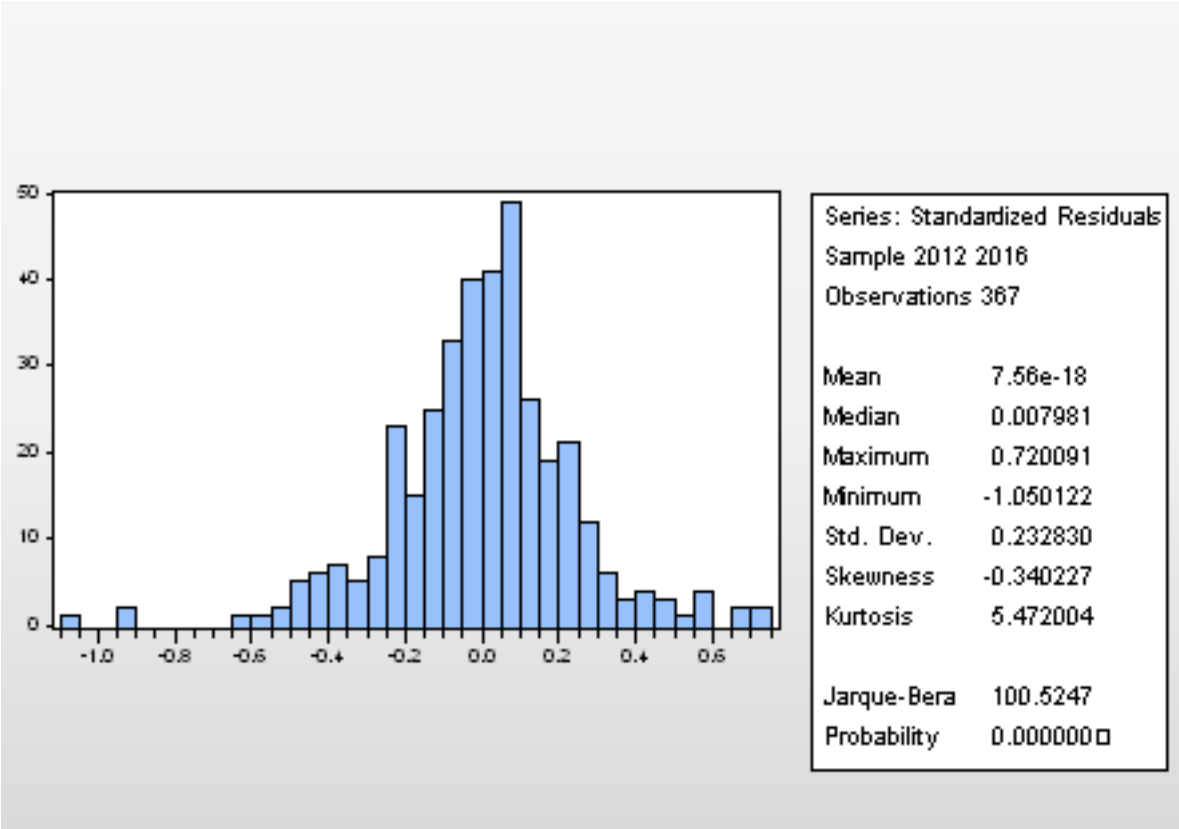

Figure C-3. Jarque-Bera test - Regression 3 - dependent variable: interest coverage ratio.

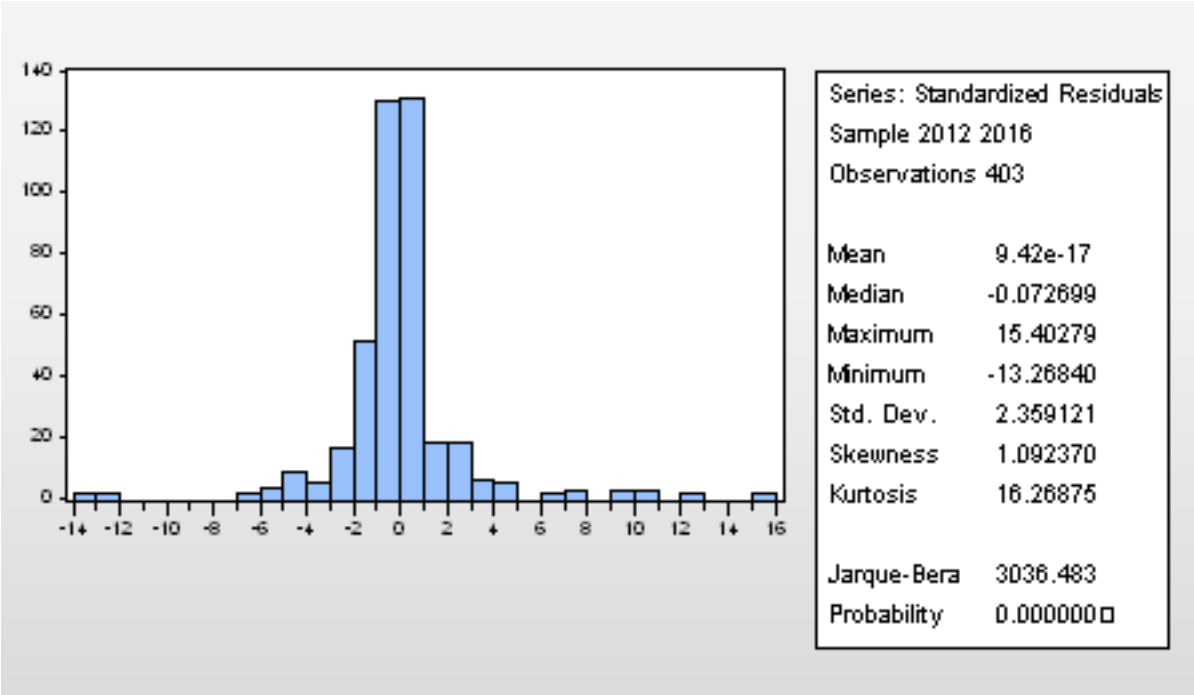

Figure C-4. Jarque-Bera test - Regression 4 - dependent variable: debt/EBITDA ratio.

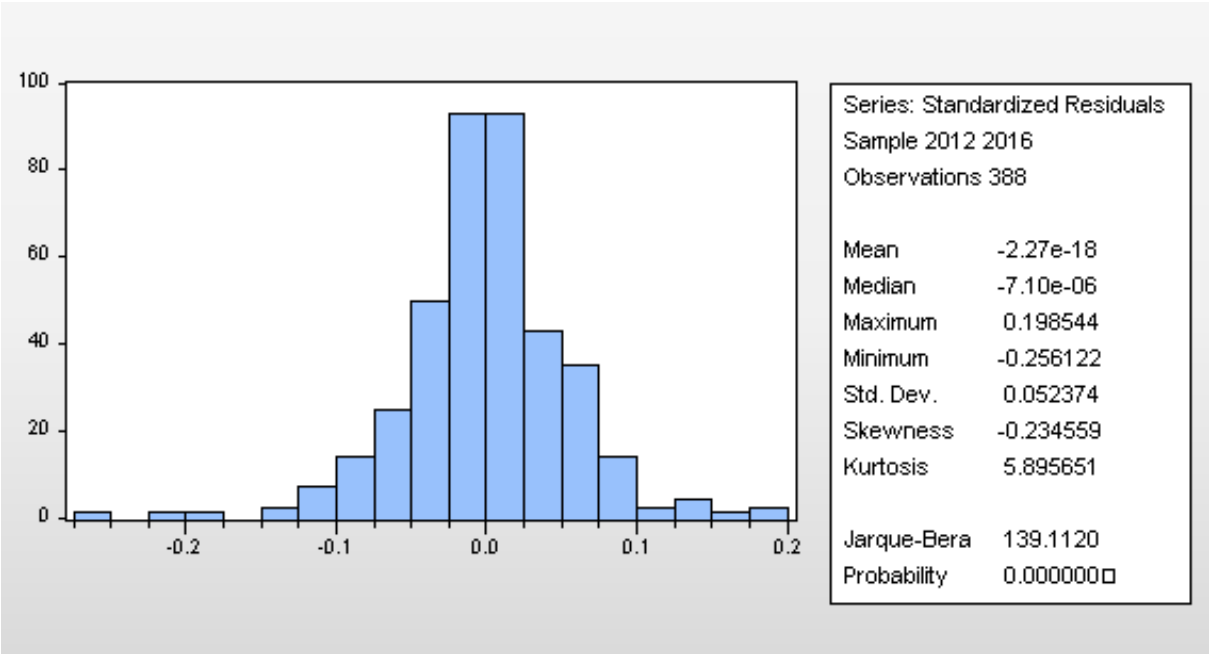

Figure C-5. Jarque-Bera test - Regression 5 - dependent variable: solidity.

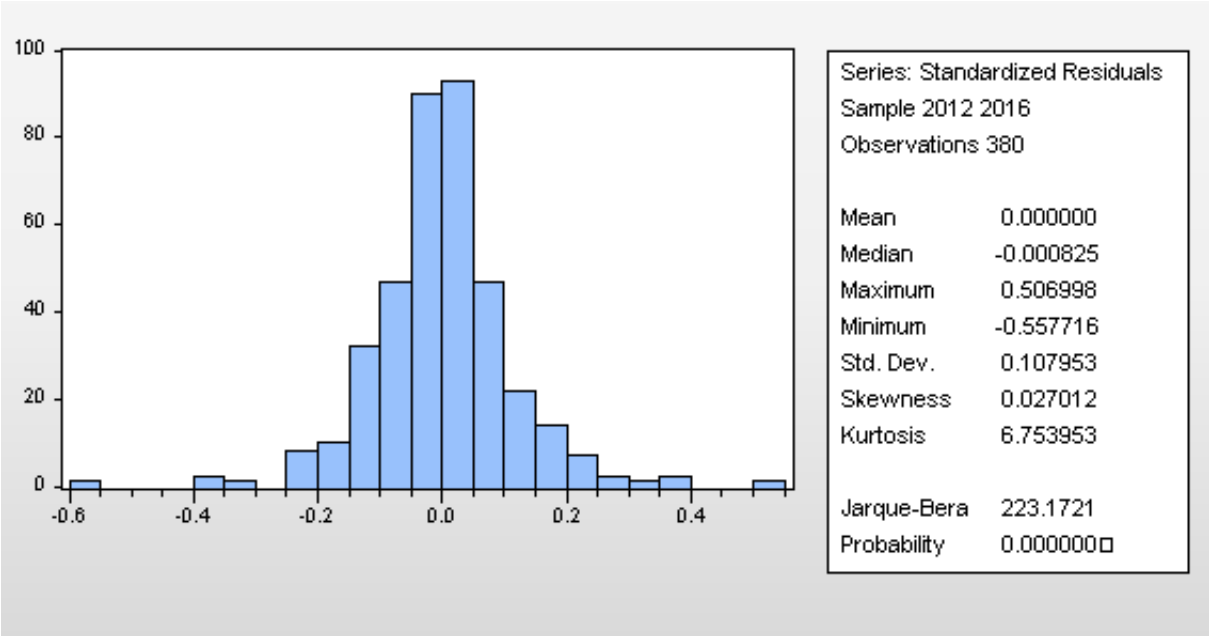

Figure C-6. Jarque-Bera test - Regression 6 - dependent variable: gearing ratio.

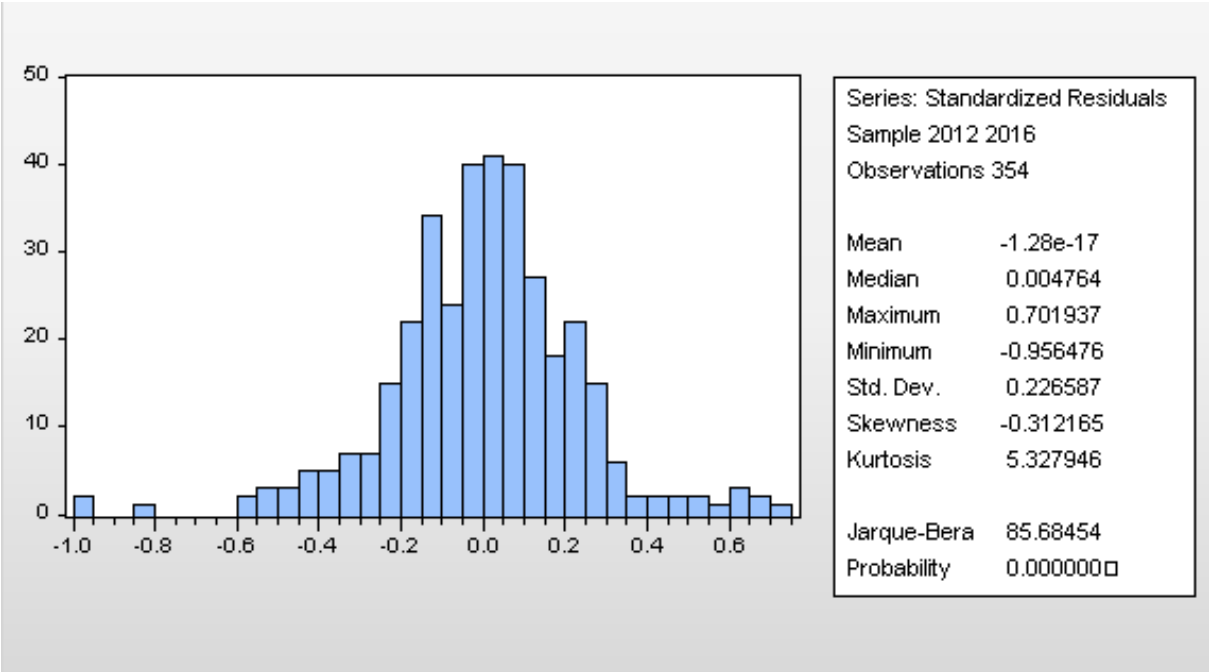

Figure C-7. Jarque-Bera test - Regression 7 - dependent variable: interest coverage ratio.

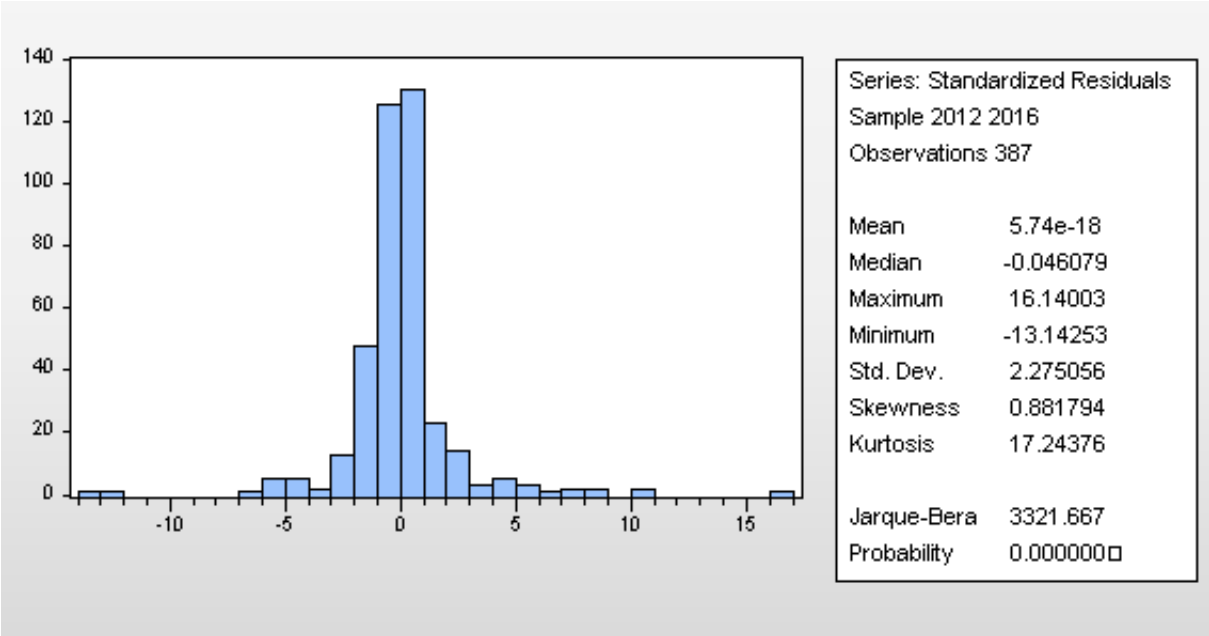

Figure C-8. Jarque-Bera test - Regression 8 - dependent variable: debt/EBITDA ratio.

Appendix D – Regression Output

Dependent Variable: SOLIDITY
Method: Panel Least Squares
Date: 05/22/18 Time: 22:25
Sample: 2012 2016
Periods included: 5
Cross-sections included: 83
Total panel (unbalanced) observations: 404
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.706459	0.386676	6.999297	0.0000
CEO_AGE	-0.004086	0.002397	-1.704854	0.0892
CEO_EDU	-0.024228	0.010099	-2.399051	0.0170
CEO_GENDER	-0.021628	0.027888	-0.775532	0.4386
CEO_STARTCEO	0.009790	0.004030	2.429421	0.0157
CEO_STARTCOMP	-0.002563	0.001671	-1.533750	0.1261
FIRM_LOG_REVENUE	-0.281022	0.049016	-5.733228	0.0000
ROA	0.591948	0.159399	3.713625	0.0002

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.905165	Mean dependent var	0.463364
Adjusted R-squared	0.876715	S.D. dependent var	0.189335
S.E. of regression	0.066479	Akaike info criterion	-2.383348
Sum squared resid	1.370044	Schwarz criterion	-1.452326
Log likelihood	575.4364	Hannan-Quinn criter.	-2.014796
F-statistic	31.81552	Durbin-Watson stat	1.208057
Prob(F-statistic)	0.000000		

Table D-1. Regression Output – Regression 1 – dependent variable: solidity.

Dependent Variable: LGEARING
Method: Panel Least Squares
Date: 05/22/18 Time: 21:43
Sample: 2012 2016
Periods included: 5
Cross-sections included: 82
Total panel (unbalanced) observations: 396
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.791600	0.758434	-6.317754	0.0000
CEO_AGE	0.000414	0.003230	0.128116	0.8981
CEO_EDU	0.012608	0.013393	0.941443	0.3472
CEO_GENDER	0.059827	0.060449	0.989709	0.3231
CEO_STARTCEO	4.47E-05	0.005061	0.008832	0.9930
CEO_STARTCOMP	-0.001859	0.002048	-0.908077	0.3646
FIRM_LOG_REVENUE	0.688673	0.112073	6.144838	0.0000
ROA	-1.215337	0.304930	-3.985634	0.0001

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.908293	Mean dependent var	0.044141
Adjusted R-squared	0.880448	S.D. dependent var	0.384246
S.E. of regression	0.132858	Akaike info criterion	-0.997053
Sum squared resid	5.348347	Schwarz criterion	-0.062024
Log likelihood	290.4164	Hannan-Quinn criter.	-0.626623
F-statistic	32.61949	Durbin-Watson stat	1.319262
Prob(F-statistic)	0.000000		

Table D-2. Regression Output – Regression 2 – dependent variable: gearing ratio.

Dependent Variable: LINCOV
Method: Panel Least Squares
Date: 05/22/18 Time: 22:07
Sample: 2012 2016
Periods included: 5
Cross-sections included: 82
Total panel (unbalanced) observations: 367
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.217366	1.261035	3.344368	0.0009
CEO_AGE	-0.018447	0.009259	-1.992382	0.0473
CEO_EDU	-0.035524	0.038069	-0.933143	0.3516
CEO_GENDER	0.021504	0.186398	0.115366	0.9082
CEO_STARTCEO	0.031401	0.013672	2.296651	0.0224
CEO_STARTCOMP	0.005587	0.008579	0.651177	0.5155
FIRM_LOG_REVENUE	-0.374618	0.183994	-2.036032	0.0427
ROA	3.111017	0.878814	3.540016	0.0005

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.884435	Mean dependent var	1.022873
Adjusted R-squared	0.845632	S.D. dependent var	0.684893
S.E. of regression	0.269092	Akaike info criterion	0.427052
Sum squared resid	19.84050	Schwarz criterion	1.416695
Log likelihood	14.63588	Hannan-Quinn criter.	0.820268
F-statistic	22.79309	Durbin-Watson stat	1.857480
Prob(F-statistic)	0.000000		

Table D-3. Regression Output – Regression 3 – dependent variable: interest coverage ratio.

Dependent Variable: DEBT_EBITDA
Method: Panel Least Squares
Date: 05/22/18 Time: 22:57
Sample: 2012 2016
Periods included: 5
Cross-sections included: 83
Total panel (unbalanced) observations: 403
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-48.70822	26.54603	-1.834859	0.0675
CEO_AGE	0.069213	0.101995	0.678593	0.4979
CEO_EDU	0.384670	0.357270	1.076691	0.2825
CEO_GENDER	-1.241827	1.188271	-1.045070	0.2968
CEO_STARTCEO	-0.289840	0.174102	-1.664772	0.0970
CEO_STARTCOMP	0.147833	0.081964	1.803642	0.0723
FIRM_LOG_REVENUE	7.224804	3.852290	1.875457	0.0617
ROA	-20.87495	8.601196	-2.426982	0.0158

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.765502	Mean dependent var	5.695022
Adjusted R-squared	0.694925	S.D. dependent var	4.871829
S.E. of regression	2.690885	Akaike info criterion	5.018523
Sum squared resid	2237.426	Schwarz criterion	5.951278
Log likelihood	-917.2324	Hannan-Quinn criter.	5.387797
F-statistic	10.84635	Durbin-Watson stat	1.890488
Prob(F-statistic)	0.000000		

Table D-4. Regression Output – Regression 4 – dependent variable: debt/EBITDA ratio.

Dependent Variable: SOLIDITY
Method: Panel Least Squares
Date: 05/22/18 Time: 23:24
Sample: 2012 2016
Periods included: 5
Cross-sections included: 82
Total panel (unbalanced) observations: 388
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.296153	0.327936	7.001841	0.0000
CFO_AGE	-0.002027	0.002016	-1.005738	0.3154
CFO_EDU	-0.011549	0.005523	-2.091297	0.0374
CFO_GENDER	0.017928	0.018829	0.952111	0.3418
CFO_STARTCFO	0.004599	0.001621	2.836459	0.0049
CFO_STARTCOMP	-0.000806	0.001010	-0.798119	0.4254
FIRM_LOG_REVENUE	-0.243830	0.046740	-5.216749	0.0000
ROA	0.377821	0.117473	3.216228	0.0014

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.920045	Mean dependent var	0.460790
Adjusted R-squared	0.895110	S.D. dependent var	0.185224
S.E. of regression	0.059988	Akaike info criterion	-2.583997
Sum squared resid	1.061571	Schwarz criterion	-1.634581
Log likelihood	594.2954	Hannan-Quinn criter.	-2.207568
F-statistic	36.89762	Durbin-Watson stat	1.387288
Prob(F-statistic)	0.000000		

Table D-5. Regression Output – Regression 5 – dependent variable: solidity.

Dependent Variable: LGEARING
Method: Panel Least Squares
Date: 05/22/18 Time: 23:43
Sample: 2012 2016
Periods included: 5
Cross-sections included: 81
Total panel (unbalanced) observations: 380
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.686177	0.771816	-6.071628	0.0000
CFO_AGE	0.002020	0.003826	0.528125	0.5978
CFO_EDU	0.015414	0.011761	1.310561	0.1911
CFO_GENDER	-0.020866	0.035339	-0.590462	0.5553
CFO_STARTCFO	-0.007373	0.003474	-2.122507	0.0346
CFO_STARTCOMP	-0.000153	0.002194	-0.069678	0.9445
FIRM_LOG_REVENUE	0.660716	0.108681	6.079426	0.0000
ROA	-1.050608	0.270275	-3.887176	0.0001

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.914515	Mean dependent var	0.044828
Adjusted R-squared	0.887505	S.D. dependent var	0.369232
S.E. of regression	0.123842	Akaike info criterion	-1.132627
Sum squared resid	4.416982	Schwarz criterion	-0.178691
Log likelihood	307.1991	Hannan-Quinn criter.	-0.754101
F-statistic	33.85748	Durbin-Watson stat	1.374014
Prob(F-statistic)	0.000000		

Table D-6. Regression Output – Regression 6 – dependent variable: gearing ratio.

Dependent Variable: LINCOV
Method: Panel Least Squares
Date: 05/22/18 Time: 23:46
Sample: 2012 2016
Periods included: 5
Cross-sections included: 80
Total panel (unbalanced) observations: 354
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.781934	1.277427	2.177763	0.0303
CFO_AGE	-0.004318	0.008421	-0.512761	0.6085
CFO_EDU	0.008282	0.042788	0.193550	0.8467
CFO_GENDER	0.213375	0.073155	2.916731	0.0038
CFO_STARTCFO	0.020330	0.009160	2.219448	0.0273
CFO_STARTCOMP	-0.003650	0.005991	-0.609156	0.5429
FIRM_LOG_REVENUE	-0.302650	0.173636	-1.743012	0.0825
ROA	3.706467	0.858974	4.314992	0.0000

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.867099	Mean dependent var	1.003049
Adjusted R-squared	0.821620	S.D. dependent var	0.621543
S.E. of regression	0.262509	Akaike info criterion	0.379921
Sum squared resid	18.12363	Schwarz criterion	1.374571
Log likelihood	23.75396	Hannan-Quinn criter.	0.775661
F-statistic	19.06576	Durbin-Watson stat	1.761889
Prob(F-statistic)	0.000000		

Table D-7. Regression Output – Regression 7 – dependent variable: interest coverage ratio.

Dependent Variable: DEBT_EBITDA
Method: Panel Least Squares
Date: 05/24/18 Time: 20:04
Sample: 2012 2016
Periods included: 5
Cross-sections included: 82
Total panel (unbalanced) observations: 387
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-24.76368	22.06252	-1.122432	0.2626
CFO_AGE	-0.130056	0.096283	-1.350769	0.1778
CFO_EDU	0.007018	0.231929	0.030260	0.9759
CFO_GENDER	-1.354541	1.232668	-1.098869	0.2727
CFO_STARTCFO	-0.028894	0.090190	-0.320364	0.7489
CFO_STARTCOMP	0.004360	0.045560	0.095704	0.9238
FIRM_LOG_REVENUE	5.479515	3.510536	1.560877	0.1196
ROA	-15.73875	8.009071	-1.965116	0.0503

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.765833	Mean dependent var	5.725616
Adjusted R-squared	0.696683	S.D. dependent var	4.741837
S.E. of regression	2.611530	Akaike info criterion	4.956367
Sum squared resid	2032.386	Schwarz criterion	5.866702
Log likelihood	-870.0569	Hannan-Quinn criter.	5.317337
F-statistic	11.07496	Durbin-Watson stat	1.956554
Prob(F-statistic)	0.000000		

Table D-8. Regression Output – Regression 8 – dependent variable: debt/EBITDA ratio.