Can efficient corporate governance, as a signal of the level of agency cost, have an impact on IPO underpricing?

A study on 115 Swedish IPO firms

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Abstract

This thesis investigates whether corporate governance can signal the level of agency costs and have an impact on the IPO underpricing. By researching 115 Swedish IPO firms between the years 2000 and 2019, the study conducts a number of multiple variable regressions using four board structure variables. The study finds statistically significant relationships between the share of females on the board and underpricing, supporting the hypothesis that risk-aversion among women increases the amount of agency costs at the time of the IPO. Further findings show a statistically significant relationship between board member tenure and IPO underpricing, supporting the theoretical prediction that newly appointed board members reduce the level of agency costs in a firm.

Keywords: Initial Public Offering, underpricing, corporate governance, board structure, agency costs

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1. Introduction

1.1. Background

One of the most significant milestones for a company is the process of going public. The initial public offering (IPO) is both time-consuming and costly, with an uncertain success rate. Despite this, hundreds of companies choose to go public every year. The purpose varies among firms where some researches claim the main reason for going public is to raise equity financing future growth (Bancel, Mittoo 2009). Others argue the implications have to do with market conditions and the firm's life cycle (Jay R. Ritter, Ivo Welch 2002), or the facilitation of acquisitions (Brau, Fawcett 2006). Academics have conducted vast amounts of research on the IPO subject, where studies often revolve around the IPO process, post-IPO performance, the role of intermediaries, IPO cycles, and corporate governance in IPO firms (Lowry, Michaely et al. 2017). Another common IPO topic that has interested scholars for decades is the return of the share on the first day of trading. Historically, the first-day return on an IPO has been noticeably higher than the performance of the market. Ibbotson (1975) argues that the reason for this is a systematic underpricing of the share. Therefore the phenomenon is commonly referred to as underpricing. Scholars have not yet reached a consensus as to why companies underprice their share (Butler, Kefe et al. 2014), and therefore the subject raises an exciting research topic.

Previous research shows that there is a downward bias in the price setting of an IPO, meaning that the offer price is lower than the market value of the firm (Ibbotson 1975). The low price does not only entail a higher underpricing but also reduces the amount of equity that a higher offer-price would raise. As the degree of underpricing varies among companies, scholars have given much attention to the underlying factors that drive this price-setting. Research has ranged from studying the underwriter's price-setting strategies to the market's perception of the firm. However, a large number of studies focus on a few theories that scholars argue have explanatory power. These theories are the information asymmetry theory and signaling theory, which scholars have studied for a long time (Moonchul Kim, Jay R. Ritter 1997, Butler, Kefe et al. 2014).

The IPO process entails that some information is disclosed according to the requirements of the market exchange, while some information remains undisclosed. Undisclosed information creates information asymmetry between the company and the potential investors, which results in a certain degree of uncertainty for the market when estimating the value of the company. Previous research has found that the amount of uncertainty in a firm correlates with the amount

of underpricing (Beatty, Ritter 1986). Thus, the extent of underpricing of an IPO reflects the degree of information asymmetry. The underpricing phenomenon becomes a proxy for the ex-ante uncertainty of the firm (Rathnayake, Louembé et al. 2019).

As underpricing reduces the equity raised, companies aim to decrease uncertainties to raise more capital. One way to reduce the information asymmetry is by using signaling techniques (Certo, S. Trevis, Daily et al. 2001, Darmadi, Gunawan 2013). Signaling quality to the market diminishes the level of uncertainty regarding the estimated company value. Scholars have found that solely financial information has inconclusive explanatory value when studying the impact of information asymmetry and signaling of underpricing (Moonchul Kim, Jay R. Ritter 1997). Therefore, researchers test non-financial variables, where Conelly et al. (2011) provide a review of research testing signaling theory using non-financial variables. Conelly et al. (2011) show that studies on IPO underpricing tend to include insider ownership, board structure, and top management team. However, academics have not reached a consensus, advocating for further research.

One aspect that has been encouraged to explore more in-depth is the agency theory, as researchers discuss the plausible correlation between the level of agency problems and IPO underpricing (Jay R. Ritter, Ivo Welch 2002). Furthermore, previous studies have found that during the IPO process, agency cost cultivates, denoting an even higher relevance of the subject (Howton, Howton et al. 2001). Although research reviewing the agency theory in relation to underpricing is limited, some scholars indicate that agency costs affect underpricing as it signals the quality of the company to the market (Darmadi, Gunawan 2013). Others claim that it is sufficient to indicate low agency costs to the market to decrease underpricing (Bell, Moore et al. 2008). Because of the scarce literature, as well as Ritter and Welch's (2002) encouragement to explore the agency theory in light of IPO underpricing, we argue there is an opportunity to contribute by investigating the subject further.

1.2. Research question and hypothesis

Following previous literature, our thesis aims to study whether an efficient governance structure can reduce the impact agency costs have on underpricing. We aim to answer the question: *can corporate governance, as a signal of the level of agency cost, have an impact on underpricing*? The study results provide evidence of whether the agency theory has an explanatory value of the IPO underpricing process. Thus, contributing to current IPO underpricing literature on

signaling theory by expanding the subject using agency theory. We study the four board structure variables; board size, board member diversity, board member tenure, and CEO tenure.

Our hypothesis development revolves around the assumption that governance structure can impact and signal the level of agency costs in a firm. We argue this will affect the level of underpricing, reflected by the first-day return (Beatty, Ritter 1986). Following this argumentation, we include one hypothesis per board structure variable. Firstly, we argue that larger boards increase underpricing, as previous research states that small boards are more efficient in monitoring management, thus reducing agency costs (Jensen 1993, Lipton, Lorsch 1992, Darmadi, Gunawan 2013). Secondly, we claim that an increased share of females on the board will increase underpricing, as women are proven to be more risk-averse (Heckman, Golsteyn et al. 2009, Eckel, Grossman 2008). Thirdly, our hypothesis on board member tenure states that higher tenure increases underpricing (Thorsell, Isaksson 2014). We base this on the idea that owners often appoint new board members prior to the IPO and that they are more likely to choose board members with high expertise and aligned interests. Consequently, we argue that more recently selected board members mitigate agency costs and reduce the underpricing. Finally, we hypothesize that higher CEO tenure reduces underpricing, as the CEO will become more identified with the company and its owners as their tenure increases (Dutton, Dukerich et al. 1994, Dukerich, Golden et al. 2002, Boivie, Lange et al. 2011).

1.3. Purpose

The purpose of the thesis is to expand prior IPO underpricing literature by conducting a study testing whether the agency theory has an impact on the IPO pricing in Swedish firms. In the study, we look at four board structure variables that, based on previous research, are argued to influence agency costs and thereby signal quality to the market. Furthermore, our study follows a benchmark study for IPO underpricing studies conducted by Butler, Keefe et al. (2014). Thus, we provide statistically comparable and robust conclusions that contribute to IPO underpricing literature.

1.4. Assumptions

The consequences of IPO pricing is bisectional. On the one hand, higher underpricing results in a lower amount of raised equity, which indicates a disadvantage for the owners prior to the IPO. On the other hand, more underpricing entails higher returns on the first day for new

investors, who realize a profit because of the low initial price. As Filatotchev and Bishop (2002) conclude, higher underpricing entails a wealth transfer from previous owners to new investors. Earlier research in the IPO underpricing area shows that some scholars find higher underpricing to be a signal of quality. They base this argument on the idea that investors are aware of that only firms who are prosperous can take on the cost of a large underprice (Allen, Faulhaber 1988). Later studies contradict this area of research, where the alleged signaling effect shows to be very small (Garfinkel 1993). Other studies, such as research conducted by Filatotchev and Bishop (2002), Certo et al. (2001), and Darmadi and Gunawan (2013), argue that firms instead use signals to reduce underpricing, thus obtaining more equity. In our thesis, we side with these researchers and assume that underpricing is something firms aim to avoid.

1.5. Limitations

To conduct a thorough investigation of the underpricing of IPO's, we need to capture all drivers of the phenomena using control variables. There is no way of being entirely confident that we have included all the correct drivers, which poses a limitation for the research. However, we have chosen to follow the benchmark study by Butler et al. (2014), to minimize the risk. In addition, conducting a study on the Swedish market poses a limitation when comparing the results to other countries, as the findings are not necessarily applicable to other markets. However, Sweden is relatively comparable to other Western markets, which justifies the choice of conducting our study using solely Swedish IPOs.

1.6. Structure

The structure of the thesis is to initially introduce the topic of the study in this section, followed by a section that aims to explain the theoretical framework by presenting previous literature on the subject. We finish the literature review with a hypothesis development of each variable. The third section of the thesis presents the methodology, by accounting for the research design, as well as the chosen techniques to test the independent variables. The section concludes with a presentation of the study's sample. The following section presents descriptive statistics, the results of the regression analysis and provides an initial explanation and analysis of these results. The fifth section further discusses the implications of our findings, and the final part concludes the study by presenting the contributions, limitations, and suggestions for future research.

2. Literature review

2.1. Summary of section

The following section describes previous research in the field to provide some insight into the area of IPO underpricing and the hypothesis development of the study. Initially, this section will describe the IPO process and the information asymmetry issues arising between the main participants. After this, we provide explanations and empirical evidence of the signaling theory, followed by a review of the agency theory. The final part of the literature review includes published research linking each of the variables included in this study to the agency theory. The section concludes with the hypotheses of the variables' impact on the underpricing of the IPO.

2.2. The IPO process

The IPO process entails the public listing of a company on an exchange market, where the company goes from being privately owned to publicly traded. Scholars present several benefits for companies to enter the exchange market. Ritter and Welch (2002) imply that a public listing is a consequence of the company's stage in their lifecycle, although the timing may be a result of the current market conditions. Other scholars argue that a public listing is an efficient way for the founders to gradually shift the control of the company, as the first step in their selling process, allowing for individual portfolio diversifications (Zingales. 1995). Furthermore, Pagano et al. (1995) highlight the firms' benefits of gaining financing in other ways than through banks, thus overcoming potential borrowing constraints. Bancel and Mittoo (2009) argue that financing is a reason to go public, as it enables future growth. Throughout the process, it is common to employ an underwriter to facilitate the procedure and assist in determining a price. Thus, the firm and the underwriter make up the sell-side of the transaction. The buy-side consists of investors that are willing to purchase shares from the firm. Since the firm discloses some information, while remaining other information a secret, there is a difference in the availability of information between the buy-side and the sell-side, creating information asymmetries. (Certo, Daily et al. 2001).

In the 1970s, Ibbotson (1975) reported that companies going public set systematically lower prices than the market value of the firm. Scholars have drawn different conclusions as to why firms do this. On the one hand, Rock (1986) argues underpricing appears to attract uninformed investors. On the other hand, Beatty and Ritter (1986) claim the underpricing phenomena is a consequence of the uncertainty caused by asymmetric information. In this study, we side with

Beatty and Ritter (1986), assuming that underpricing reflects uncertainties. This is in line with several studies conducted in later years, reporting similar findings (Certo, Daily et al. 2001, Darmadi, Gunawan 2013). Since a lower price conveys less equity raised for the company, there is an incentive for firms to reduce information asymmetry, and thereby the uncertainties as this is expected to minimize underpricing. Firms use different approaches to assure the investor of the firm's quality and potential (Jay R. Ritter, Ivo Welch 2002). A common way of doing this is signaling, ensuring the investors of the firms' high standard (Connelly, Certo et al. 2011).

2.3. Signaling theory

According to Leland and Pyle (1977), the signaling theory entails that as information asymmetry causes uncertainty, firms aim to signal their quality to the market. Doing so can reduce the information asymmetry between the parties, as the investors receive more information via the signals (Spence 2002). The signaling theory includes a sender and a receiver, where the sender signals in the hope of assuring the receiver of the sender's high standard (Connelly, Certo et al. 2011). In the IPO process, the company signals to potential investors to assure the firm's legitimacy or quality (Connelly, Certo et al. 2011). As Beatty and Ritter (1986) argue, the amount of uncertainty correlates with the degree of underpricing in a firm. Thus, reducing uncertainty through signaling is argued to have a direct impact on the level of underpricing.

Several studies show empirical evidence of such a correlation. Connely et al. (2011) provide an extensive review of the research performed on the signaling theory. The IPO research conducted is performed with IPO firms as signalers and almost exclusively potential investors as receivers (Connelly, Certo et al. 2011). The common factor in the IPO studies brought forward by Connely et al. (2011) is that the firms signal using corporate governance mechanisms. Amongst the previous research, we choose to bring forward three studies. Firstly, Certo et al. (2001) study board characteristics, where board size and board independence show a significant relationship in 748 US firms. The authors argue that their findings are consistent with the signaling theory, as the board has a distinct signaling value to potential investors (Certo, Daily et al. 2001). Secondly, a study by Filatotchev and Bishop (2002) provide evidence indicating interlinks between specific corporate governance characteristics and the

underpricing in an IPO firm. The research also suggests that such governance factors can be incorporated in the firms prior to the IPO, to reduce the amount of underpricing.

Thirdly, in line with the research above, Zimmerman (2008) explains the impact of management in a study where he argues that the firm's top management plays an essential role in the IPO process. Several studies provide results showing that variables indicating an efficient governing structure reduce the underpricing of a firm's IPO (Certo, Daily et al. 2001, Certo, S. T. 2003, Darmadi, Gunawan 2013). Consequently, an essential factor in the signaling of quality in firms prior to the IPO is undoubtedly the governing structure. However, there are some inconsistencies in the results as scholars have not reached a consensus on which governance variables are statistically proven to impact underpricing. Consequent to the failure to reach an agreement, researchers have requested the inclusion of other theories to contribute to the signaling theory's explanatory value, where one study suggests the subject of agency theory (Jay R. Ritter, Ivo Welch 2002).

2.4. Agency theory

Due to the variance in interpretations among previous scholars, we test whether the agency theory can provide useful insight. The agency theory centers around the agency problem, which is the conflicting interest between shareholders and management, referred as principle and agents (Jensen, Meckling 1976). In addition, the board of directors could act as either a principal or agent, depending on if they are seen as an extention of the owners or the excecutive team (Eisenhardt, 1989). The costs to ensure that management is acting to maximize the shareholders' value increase if the different interests grow more significant, denoted as agency cost (Baysinger, Butler 1985). The root of the problem is due to a separation of control and ownership within the company (Jensen, Meckling 1976). Naturally, the governance of a company is closely related to the agency theory (Baysinger, Butler 1985), as several corporate governance systems are put into place as monitoring mechanisms to assure management acting per the shareholders' interests (Arthurs, Hoskisson et al. 2008).

In the context of IPO underpricing, previous literature argues that the impact of agency costs is twofold. The first part is brought forward by Howton et al. (2001), who states that the extent of agency costs tends to increase during the IPO process. Filatotchev and Bishop (2002) further add on to this. They say that the number of agency relationships in the process of an IPO increases as a result of information asymmetry. Secondly, the agency costs themselves cause

the underpricing to increase (Filatotchev, Bishop 2002). Previous IPO underpricing literature on agency problems is somewhat scarce. However, apart from the above mentioned, some research has been conducted in the area. Bell et al. (2008) studied the phenomena with results that suggest the governance mechanisms that effectively reduce agency problems have an impact on the underpricing of an IPO. They further state that reducing the agency costs might not be necessary, as it may be the signaling of efficient governance structures that reduces the underpricing. We argue that agency costs increase the amount of underpricing, and a suitable governing structure can reduce agency costs and thereby signal quality. Thus, reducing agency costs by an efficient governing structure can reduce underpricing. As agency costs are challenging to measure, we look at the board governance mechanisms that academics argue have a high explanatory value for impacting agency costs.

2.5. Board structure

As stated above, previous research indicates that corporate governance mechanisms have an explanatory value in the IPO underpricing phenomena as these may reduce agency costs within the firm. Some scholars argue that the most effective monitoring is conducted by a firm's corporate governance (Arthurs, Hoskisson et al. 2008). In previous research conducted by Arthurs et al. (2008), one of the most prominent monitoring mechanisms is the board of directors. Several other studies conducted on governance mechanisms and underpricing have focused on board structure. However, the amount of research on the agency theory's impact on underpricing is scarce. Thus, we see a gap in the previous literature, which provides an opportunity for our research to contribute. We aim to fill this gap by conducting a study on board structure variables, which past research says have an impact on agency costs, and how they, in turn, affect the underpricing of IPO firms. The following is a description of such variables tested in the study.

2.5.1. Board size

The variable board size is a frequently used variable in board governance studies, including research by Certo et al. (2001) and Darmadi and Gunawan (2013). Certo et al. (2001) studied whether the size of the board has an impact on underpricing from a signaling perspective. Their study found a statistically significant negative relationship between the two, thus implying that a large board reduces underpricing. Darmadi and Gunawan (2013), on the other hand, evaluate the board size variable from two perspectives. They claim that if larger boards reduce

underpricing, in line with the findings presented by Certo et al. (2001). The findings provide support for the hypothesis that larger boards give rise to less information asymmetry. On the contrary, if smaller boards reduce underpricing, the findings instead provide support for the hypothesis that reduced agency costs signal quality. In that instance, the results indicate that smaller boards reduce underpricing due to their ability to reduce agency costs.

Darmadi and Gunawan (2013), base the discussion in their study on previous research, where some academics have found evidence, similar to Certo et al. (2001), of larger boards having a symbolic value (Weisbach, Hermalin 2003, Boone, Casares Field et al. 2007). They claim that the symbolic value reduces uncertainties regarding companies and therefore mitigate information asymmetry problems. Consequently, the assumption is that larger boards reduce underpricing because of reduced information asymmetry. On the other hand, Darmadi and Gunawan (2013) also refer to studies showing that smaller boards are more effective in monitoring, thus aligning the interest of the top management and the stock owners more efficiently (Jensen 1993, Lipton, Lorsch 1992). Accordingly, the study concludes that smaller boards reduce underpricing due to mitigated agency costs. The findings are in line with research by Filatotchev and Bishop (2002), where they claim that agency costs increase underpricing. In this thesis, we side with Filatotchev and Bishop (2002). As ineffective governance mechanisms aggravate agency costs, signaling inefficient governance will result in more underpricing. Therefore, we base our hypothesis development on the idea that increasing agency costs will increase underpricing. We hypothesize that the efficiency of small boards allows for reduced agency costs in line with Jensen (1993) and Lipton and Lorsch (1992). Consequently, larger boards fail to reduce underpricing to a significant extent.

H1: There is a positive relationship between board size and IPO underpricing

2.5.2. Gender diversity

The second variable of the study is gender diversity within the board. Numerous scholars have researched the topic of gender diversity; however, its relation to the underpricing of IPOs has been given little attention in previous literature. Nevertheless, Nguyen et al. (2015) performs a study that concludes that increased gender diversity within a firm's board of directors enhances the firm performance. They base this result on a significant relationship between gender diversity and a market-based performance measure, namely the Tobin's Q ratio. The authors further state that the findings are robust and consistent with agency theory. A more recent study

strengthened the result, evaluating gender diversity in boards from an agency theory perspective. The results indicate that female involvement in the board has positive outcomes for the firm (Poletti-Hughes, Briano-Turrent 2019).

On the other hand, the gender diversity variable raises an IPO associated agency discussion, related to the area of behavioral finance. As Howton et al. (2001) state, some agency problems can arise during the IPO process. We argue this to be the case for female board members. Within the behavioral finance and accounting literature, women are allegedly more risk-averse and conservative (Heckman, Golsteyn et al. 2009, Eckel, Grossman 2008). Naturally, being more risk-averse and conservative is deemed to have an impact on the pricing, where such board members are more cautious valuing the firm and will likely not overprice the share. Therefore, a direct consequence of increased risk-aversion within the board will result in more board members lobbying for a lower initial price of the stock. An indirect effect is that a lowered offer price goes against the owner's interests, as it raises less equity. Since the risk-aversion of the female board members does not represent all shareholders' interests, this creates an increased agency cost in the IPO process. Thus, the consequence of a higher degree of risk-aversion within the board is a magnified agency costs. Therefore, in this study, we assume that women's tendency to be more risk-averse induce a significant increase in agency costs and, consequently, more underpricing. We argue this increase is more significant than the overall reduction of agency costs of the firm from high diversity, as contended by Nguyen et al. (2015), and Poletti-Hughes and Briano-Turrent (2019). Accordingly, a more female-dominated firm will signal non-aligning interests to the market, causing uncertainties and increasing underpricing.

H2: There is a positive relationship between board member diversity and IPO underpricing

2.5.3. Board member tenure

The third variable in the study is board member tenure, which aims to test whether the time a board member has been on the company's board has an impact on the underpricing. A previous study by Hillmand and Dalziel (2003) has found that the longer a board member has been on the board, the more likely this person is to have firm-specific knowledge of the firm. The finding has been further researched and confirmed by a later study (Johnson, Schnatterly et al. 2013). Furthermore, the experience and firm-specific knowledge have been proven useful in the board's ability to monitor the management team (Hillman, Dalziel 2003). Ombaba and Kosgey (2017) argue that as a result of the increased monitoring ability, director tenure should have an

impact on mitigating the agency costs of the firm. However, due to the regulations of Swedish exchange markets, Swedish firms tend to replace directors before the IPO to meet such regulations (Thorsell, Isaksson 2014). Thorsell and Isaksson (2014) state that the previous owners also replace directors to signal a higher quality board. Following Filatotchev and Bishop (2002), we argue ex-ante board selection is a strategic move prior to the IPO that will reduce the underpricing. Further, we reason that as the newly appointed board members are chosen recently by the current owners, they will be more likely to reflect their interest, reducing agency costs. Drawing on this, we claim that the strategic choice of new board members close to the IPO will reduce agency costs and signal quality due to their professionalism and likelihood that the owners have chosen board members with aligning interests.

H3: There is a positive relationship between board tenure and IPO underpricing

2.5.4. CEO tenure

The final variable to be researched in the study is that of the Chief Executive Officer's (CEO) tenure. As accounted for in section 2.4, the agency theory revolves around the costs arising from the principal and agents, where the agents can be both management and the board, while the principals are the shareholders. Board size, gender diversity within the board, and board member tenure all provide some form of measure on the monitoring ability of the board. In other words, the previous three variables evaluate agency costs from a board perspective. The CEO tenure instead measures the impact the management has on agency issues. Much like board member tenure, the CEO's ability to develop abilities and gain knowledge increases over time. Some scholars argue that the more extended CEO mandate thus results in an increased ability to influence the board's monitoring abilities (Hermalin 1998). Hermalin (1998) states that the CEO's evolved competence to control the firm increases agency problems due to the reduced monitoring abilities of the board.

Contrary evidence shows that the CEO tenure impacts agency costs as it correlates with CEO organizational identification. If a CEO has a high organizational identification, this person tends to act in accordance with the firm's interest (Dutton, Dukerich et al. 1994, Dukerich, Golden et al. 2002). Boivie et al. (2011) find results of CEO organizational identification increasing with CEO tenure. Consequently, a more extended CEO mandate will increase the extent to which the person identifies with the firm and its owner, resulting in lower agency costs. In this thesis, we side with Boivie et al. (2011), arguing that a CEO with a higher tenure would be more likely

to have a higher identification with the company and therefore act according to what is best for the firm. Thus, a longer CEO tenure is assumed to decrease the agency costs and signal more efficient governance to the market, reducing underpricing.

H4: There is a negative relationship between CEO tenure and IPO underpricing

3. Methodology

3.1. Research design

We have designed the study to determine whether there is a statistically significant impact of board structure on the underpricing of Swedish IPOs. It is performed through a quantitative research, using a multiple variable regression analysis with ordinary least squares. We test four board structure variables, which scholars argue have an impact on mitigating agency costs. There are several possible methodologies when conducting a study on the statistical relevance of variables. Butler et al. (2014) provide a list of possible methods for regression models where the study aims to find robust variables. We find that the ordinary least squares (OLS) approach is most appropriate for our research. The reason for this is that we assume our data to be homoscedastic and because it is the preferred method in a vast majority of previous IPO research literature (Darmadi, Gunawan 2013, Certo, Daily et al. 2001).

We base the study on companies that have been listed, thus being the primary data with additional data points gathered for the independent variables. Our regression model consist of the dependent variable of first-day return, our main independent variables related to board structure, as well as control variables. We explain the variables' conversion to fit the assumptions of the multiple regression model in section 3.2. The hypotheses are developed based on prior literature within the field, explained thoroughly in section 2.5. To determine whether there is a statistical significance or not, we use the probability of the beta values using the result to confirm or reject the hypotheses. In line with Darmadi and Gunawan (2013) we apply the five percent level for determining statistical significance as it is deemed appropriate for our sample size.

We conduct the study on all Swedish IPOs carried out on OMX Stockholm and First North between the years 2000 and 2019. Out of the listings on First North, only companies that use the International Financial Reporting Standard (IFRS) has been included in the study to ensure

comparability within the sample. Data has been gathered on these observations to conduct the regression analysis and test the statistical significance of several variables. The study's variables have been chosen based on previous research done on the signaling theory and agency theory. Thus, the results of this study can shed some light on whether the agency theory has a signaling value that can reduce underpricing.

3.2. Variables

3.2.1. Dependent variable

The study's dependent variable is the first-day return of the share. The reasoning behind the first-day performance is that it can explain the underpricing of an initial offering, reflecting the uncertainty of the firm (Loughran, McDonald 2013). The method follows previous studies demonstrating a connection between uncertainty and underpricing of the IPO (Beatty, Ritter 1986). The first-day return provides evidence of underpricing, as an underpriced firm experiences a high return on the first day of trading. In line with previous studies (Aissia 2014, Loughran, McDonald 2013, Certo, Daily et al. 2001), we define the dependent variable in this study as the percentage change from the offer price and the closing price. In cases of the first-day return being zero, there has been no underpricing. When the first-day return is negative, the share was offered at a price exceeding its market value. As opposed to previous studies, we choose to log-transform the first-day return. The reason for doing so is to achieve data that is closer to normal behavior, to fit the OLS method. As it is not possible to log-transform negative values, the percentage change cannot be used for the dependent variable as there are a number of observations with negative percentage change. To enable log-transformation, we instead use the change factor, given by dividing the closing price with the opening price. Thus, the definition of the dependent variable is:

$$First\ day\ return = log\left(\frac{closing\ price}{opening\ price}\right)$$

3.2.2. Independent variables

As the study aims to research whether agency costs have an impact on the underpricing of an IPO, the independent variables are factors that influence agency costs. We convert the variables to fit the model, as per the assumptions of the multiple regression analysis. We account for the process in the following section.

Board size

We argue that the size of the board is positively related to the dependent variable. The hypothesis is based on previous research and accounted for in section 2.5.1. In the regression model, the board size has been estimated following prior literature (Certo, Daily et al. 2001), by the number of people holding a seat on the board the year before the IPO:

Board size $= number\ of\ board\ members$

Gender diversity

We expect gender diversity within the board to have a positive relationship to underpricing, based on previous research in the area of behavioral finance and accounting. We express the variable as the percentage of females holding a seat on the board:

$$Gender\ diversity = \frac{number\ of\ women}{number\ of\ board\ members}$$

Board member tenure

The board member tenure has an expected positive relationship to the underpricing, as per the findings of newly appointed board members prior to the IPO signaling reduced agency costs. In the study, we define the variable in the same way as earlier literature (Thorsell, Isaksson 2014), by the average number of years the board members have served on the board:

$$Board\ member\ tenure = \frac{\Sigma\ tenure\ each\ board\ member}{number\ of\ board\ members}$$

CEO tenure

The CEO tenure has an expected negative relationship to underpricing, based on the fourth hypothesis. This assumption is in line with research that finds the CEO becoming more personally identified with the firm as his or her tenure increases, which reduces agency costs. We define the variable as the number of years the CEO had served as a member of the board:

$CEO\ tenure = the\ number\ of\ years\ the\ CEO\ has\ been\ on\ the\ board$

Table 1. Expected signs of variables based on hypotheses

This Table summarized the expected sign of the variables based on the hypotheses	
Independent variable	**Expected sign**
Board size	+
Board member diversity	+
Board member tenure	+
CEO tenure	-

3.2.3. Control variables

To account for additional factors that may influence the underpricing or the board structure, we include several control variables in our model. We base the control variables used on a benchmark regression specification, which creates robust results and statistical comparability (Butler, Keefe et al. 2014). In the benchmark study, Butler et al. (2014) found several control variables that reported robust results. The definitions of the control variables provided below are in line with the study conducted by Butler, Keefe et al. (2014). Due to a lack of available information as well as some variables not applying to the Swedish IPO market, we use a reduced number of control variables. We divide the control variables into three categories; firm characteristics, offer characteristics, and market conditions.

Firm characteristics

The firm-specific variables are both financial and non-financial variables that are in line with the benchmark study. The financial control variables are firm sales and the total liabilities to asset ratio of the firm (Butler, Keefe et al. 2014). The financials used are those reported the year prior to the IPO, and we define them by the following equations:

$$Log\ of\ firm\ sales = log(firm\ sales)$$

$$Total\ liabilities\ to\ asset\ ratio = \frac{total\ liabilities}{total\ assets}$$

The other firm-specific control variables that were deemed robust in the article by Butler et al. (2014) have been mainly industry-focused, where the information available for this study is limited. Therefore, we have incorporated the industry component, as per previous research, by creating a dummy for technological industries, denoting those companies as one and all other

sectors as zeros (Aissia 2014). A second firm-specific control variable that we use in the study is a dummy variable indicating whether the company was financially supported by private equity or venture capital firms before the IPO. Thus, we denote firms backed by such companies with one, and non-backed firms with zero.

Offer characteristics

The offer characteristic that was proven to be robust in the benchmark study was the logarithm of the price to sales ratio. The offer price in the following equation equals the opening price in the dependent variable:

$$Log\ price\ to\ sales\ ratio = \log\left(\frac{offer\ price * shares\ outstanding}{firm\ sales}\right)$$

Market conditions

The benchmark study included the return on the NASDAQ index 30 days before the IPO date. As we conduct the following research on Swedish firms, we use the OMX Stockholm 30 Index. Similar to the dependent variable, we look at the return as the change factor, not the percentage change; therefore, we add one to the percentage change. We define the control variable in the following way:

$$OMX\ index, return = \left(\frac{closing\ price_t}{closing\ price_{t-1}}\right) - 1$$

$$OMX\ Stockholm\ 30\ index, 30\ day\ average\ return = 1 + \frac{\sum_{t-31}^{t-1} OMX\ index\ return}{30}$$

3.3. Sample

We collect IPO data from the database SDC Platinum, produced by Thomson Reuters. The initial sample consists of 322 IPOs and is limited to public offerings on Swedish markets between the years 2000 and 2019. The decision to restrict the sample to solely Swedish IPOs is due to the lack of IPO research on the Swedish market, especially within the area of corporate governance. Thus, conducting the study on Swedish firms allows us to contribute further to the existing field of IPO research. Furthermore, the time interval is a result of the aim to find a range that provides a sufficient number of IPOs, while having a timeframe with comparable market conditions. We limit the scope to IPOs from the year 2000. By doing so, there is no impact of IPOs conducted in an environment with too different circumstances from that of recent years. The earlier years include substantial influence from the Internet boom, which

Ritter and Welch (2002) show had a substantially higher first-day return than that of prior periods. Simultaniusly, the interval is long enough to minimize the risk of impact from time-specific market fluctuations, such as recessions or booms in the economy. We base the reasoning on Ritter & Welch's (2002) claims that market circumstances are one of the critical factors deciding when companies choose to go public (Jay R. Ritter, Ivo Welch 2002).

The sample initially contained Swedish IPOs from all four stock exchanges in Sweden, where the markets all have different requirements that firms need to fulfill before the listing (Avanza, 2016). We limited the scope to two out of the four exchanges, namely OMX Stockholm and First North, to ensure comparability between the companies. Out of the listed companies on First North, we make a further selection of only including firms using IFRS at the time of the IPO. The reason is to maintain the comparability of the firms used in the study.

Along with the IPO firms, we collect information on the characteristics of the IPO deals from SDC Platinum. For further data collection, we used the database Serrano where we obtained information regarding the company's board for the study's independent variables, as well as financial data for the control variables. Utilizing the industry classification from Serrano, we excluded companies in the financial industry from the study as per previous research (Butler, Keefe et al. 2014). As some observations lacked specific data points, the data collected from the databases was completed by manually gathering information. Furthermore, we calculated the dependent variable according to the formula provided in section 3.2.1. Information on the closing price was collected manually using Avanza for shares still listed on the market and Börsdata for delisted companies. Out of the sample of 192 listings, we made additional exclusions of IPOs to reach the final sample. Due to inconclusive information, we had to exclude 77 observations from the original sample. As seen in Table 2 this resulted in the final sample of 115 IPOs.

Table 2. Exclusion process in the data sample

This Table shows the exclusion process when reaching the final sample used in the study

Data samples and exclusions	**Number of observations**
SDC data from 2000-2019	322
Non-OMX Stockholm or First North	- 45
Non-IFRS firms on First North	- 22
International companies	- 1
Duplets/triplets	- 21
Missing first-day return	- 39
Financial companies	- 3
Original data sample	**192**
Missing organizational numbers	- 46
Missing board data	- 22
Missing financial data	- 9
Final sample	**115**

Also, we made further adjustments to our sample, including altering outliers that could potentially have a misleading impact on the result of the study. However, the issue of outliers has not been substantial, and we have only made alterations on some of our variables. When excluding outliers, we have winsorized the observations by replacing values of the lowest and highest five percent with the values reported equal to the five, respectively 95 percent observations. We applied winsorization to the variables first-day return, OMX Stockholm Index 30-day average return, and the price to sales ratio.

3.4. The research model

The following regression model using OLS is used to test our hypotheses:

$$Log\ of\ first-day\ return_w = \alpha + \beta 1_{boardsize} + \beta 2_{boarddiversity} +$$
$$\beta 3_{boardmembertenure} + \beta 4_{CEOtenure} + \beta 3_{log(firmsales)} + \beta 4_{liability/assets} +$$
$$\beta 5_{Industry\_dum} + \beta 6_{PE/VC\_dum} + \beta 6_{log(price/sales)_w} + \beta 7_{avg.30dayreturn_w} + \varepsilon$$

Where:

$\alpha = constant$

$\beta = the\ coefficient\ of\ the\ variable$

$\varepsilon = error\ term$

$i_w = the\ variable\ i\ has\ been\ winsorized$

4. Analysis

The following section provides an overview of the results gathered from the analysis of our regression model. We initially provide descriptive statistics of the study, followed by a correlation matrix and regression results, which provides a basis for hypothesis testing. After that we present robustness tests, which aim to test whether the findings of our model are statistically robust when altering the conditions. Following, further implications and economic significance of the results are presented. Concluding the section is a summary of the study's findings.

4.1. Descriptive statistics

As presented in Table 3, the dependent variable has a long spread with positive skewness reporting outliers with extremely high first-day returns. Also, the variance of the first-day performance, relative to its mean, is higher than the other variables studied. We winsorize the observations to normalize the data. The sample includes both negative and positive first-day returns, which indicates both overpricing and underpricing. Furthermore, when comparing the winsorized mean of -0.6 percent to previous studies by Darmadi and Dunawan (2013) and Certo et al. (2001), they report substantially higher means. Their sample reports means at 0.22 and 0.15, respectively. Further comparison to Ritter and Welch's (2002) overview of underpricing in the US shows a considerable difference to our sample. They present an average first-day return between 1980 and 2001 at 18.8 percent (Jay R. Ritter, Ivo Welch 2002).

There are two presumable reasons for the differences, the first one being the time of the research. Both Ritter and Welch (2002) and Certo et al. (2001) use a period influenced by the Internet boom, which had a reported first-day return of 65 percent (Jay R. Ritter, Ivo Welch 2002). Consequently, it is natural for our sample to have a lower performance due to our choice to exclude those years. The second reason for the differences is that we perform our study on a different market than those of similar studies. Ritter and Welch (2002) and Certo et al. (2001)

perform studies on the US market, while Darmadi and Dunawan (2013) research an emerging market. Naturally, these market differences entail different results due to inherent dissimilarities in the sample. For example, in the Swedish market, we can identify a significant degree of overpricing, which provides one reason for a lower mean in our sample.

We do not winsorize the independent variables initially, as the variation coefficient is in an acceptable range for all four variables. The size of the board has an average of five board members, which is smaller than the findings made by Darmadi and Dunawan (2013), who report an average of eight board members. However, the board size is an evident difference of board characteristics across countries, which could explain why Darmadi and Dunawan (2013) observed a maximum board size of 28 members, compared to our study's maximum of eleven board members.

Furthermore, considering the allocation of gender in the board composition, there is an evident heft of men, with several boards consisting exclusively of men. We do not find this to be a limitation in the sample's data, rather a reflection of the gender distribution in boards. There are, however, also some observations with boards composed solely of female board members. Board member tenure varies from one year to twelve years, with a mean and median differing at the hundredth decimal. Lastly, the CEO tenure range is from zero to nineteen years with a similar mean and median. Both board member tenure and CEO tenure show low variation coefficients. Out of the control variables, the average liabilities to asset ratio reports similar numbers to the general rate in Sweden, implying that the sample is representative of the market (SCB 2019). Furthermore, the variables OMX Stockholm Index 30-day average return and the price to sales ratio report high variation coefficients, therefore, we winsorize them.

Table 3. Descriptive statistics

This Table provides a summary of the statistics for all variables used in the study. We use the subscript w to denote winsorized variables

N=115	**Mean**	**SD**	**Min**	**25th**	**Median**	**75th**	**Max**
Dependent variables							
First-day return	1.148	1.154	0.119	0.940	1.010	1.170	9.938
First-day return$_w$	0.994	0.281	0.366	0.940	1.010	1.170	1.442
Log of the first-day return$_w$	-0.0594	0.355	-1.005	-0.062	0.010	0.157	0.366
Independent variables							
Board size	6.845	1.946	1.000	6.000	7.000	8.000	11.000
Board size$_w$	6.829	1.812	3.000	6.000	7.000	8.000	10.000
Board member diversity	0.280	0.225	0.000	0.125	0.250	0.400	1.000
Board member diversity$_w$	0.273	0.208	0.000	0.125	0.250	0.400	0.714
Board member tenure	4.144	2.304	0.000	2.143	3.833	5.248	11.429
Board member tenure$_w$	4.081	2.112	1.000	2.143	3.833	5.248	8.600
CEO tenure	4.783	3.907	0.000	2.000	4.000	7.000	19.000
CEO tenure$_w$	4.667	3.556	1.000	2.000	4.000	7.000	12.000
Control variables							
Log of firm sales	19.905	2.225	14.221	18.542	20.292	21.601	21.601
Liabilities to asset ratio	0.583	0.248	0.024	0.401	0.637	0.780	0.780
Industry dummy	0.0174	0.131	0	0	0	0	1
PE/VC dummy	0.271	0.446	0	0	0	1	1
Log of price/sales	0.081	1.760	-3.572	-0.985	-0.335	0.823	5.904
Log of price/sales$_w$	0.066	1.586	-2.238	-0.985	-0.335	0.823	3.758
Avg. 30-day return OMX Stockholm 30	1.000	0.002	0.993	0.999	1.000	1.001	1.005
Avg. 30-day return OMX Stockholm 30$_w$	1.000	0.002	0.994	0.999	1.000	1.001	1.003

4.2. Correlation matrix

In Table 4 and Table 5, we present a Pearson's correlation matrix to detect potential multicollinearity between the variables. A correlation exceeding 0.8 may indicate substantial multicollinearity problems (Grewal, Cote et al. 2004); this is not the case for any of the variables in the table. There are, however, some variables that have a statistically significant correlation to one another. We explain some of these using logical reasoning. Firstly the CEO tenure and board member tenure shows significant relationships. We argue this could be a consequence of the inherent culture at the company, where some firms tend to replace their executives more often than others. Furthermore, firm sales have a significant positive relationship with both board size and board diversity. Firm sales is a measure of the firm's size. As larger firms tend to have larger boards, we find a possible explanation for the correlation between sales and board size. Furthermore, large firms are usually subject to more public scrutiny. Thus they are pressured to enhance diversity, possibly explaining the correlation between firm sales and board diversity. This reasoning also applies to the relationship between board size and the diversity of the board.

Other variables with significant correlations are the liabilities to asset ratio and the firm sales. Sales may be positively correlated to the liabilities ratio, as companies likely use debt financing to enhance sales. Moreover, private equity-backed or venture capital-backed firms show a significant association with short CEO tenure. A possible logic behind this could be the short timeframe of such financial sponsors, who aims to divest their holding within a certain number of years and tends to replace top management within this timeframe. Other significant relationships do not have as apparent causes. However, this is not a statistical problem due to the relatively low correlations.

Table 4. Correlation matrix

*This Table and the next include a correlation matrix for all variables included in the study, where a correlation of +1.00 implies a perfect positive linear correlation, and a correlation of -1.00, a perfect negative correlation. We use the subscript w to denote winsorized variables and statistical significance at the 5% level, where p≤0.5 with a **

	Log of the first-day return$_w$	**Board size**	**Board diversity**	**Board member tenure**	**CEO tenure**
Log of the first-day return$_w$	1.000				
Board size	0.076	1.000			
Board diversity	0.206*	0.281*	1.000		
Board member tenure	0.259*	-0.100	-0.181	1.000	
CEO tenure	0.147	-0.141	0.001	0.499*	1.000
Log firm sales	0.026	0.49*	0.240*	0.009	0.002
Liability/assets	0.086	0.260*	0.201*	-0.060	-0.063
Industry dummy	-0.082	-0.072	-0.002	-0.021	0.057
PE/VC dummy	-0.044	0.280*	0.066	-0.124	-0.185*
Log price/sales	0.103	-0.305*	-0.045	0.042	0.072
Avg. 30-day return OMX Stockholm 30	0.361*	0.015	0.049	0.065	0.059

Table 5. Correlation matrix continued

	Log firm sales	**Liability/ assets**	**Industry dummy**	**PE/VC dummy**	**Log price/sales**	**Avg. return OMX**
Log firm sales	1.000					
Liability/assets	0.365*	1.000				
Industry dummy	-0.024	-0.088	1.000			
PE/VC dummy	0.359	0.208*	-0.083	1.000		
Log price/sales	-0.780*	-0.295*	-0.143	-0.186*	1.000	
Avg. 30-day return OMX Stockholm 30	0.091	0.085	0.100	0.052	0.068	1.000

To provide an initial hypothesis testing, we look at the board variables´correlation to the dependent variable. The matrix reports a significant correlation between the independent variables board member diversity, board member tenure, and the dependent variable. The relationship between both gender diversity and board tenure and the dependent variable is positive, supporting H2 and H3. The sign of the correlations indicates that boards with a more significant percentage of women tend to result in more underpriced IPOs and the same being for boards with a higher average board member tenure. Although the correlation matrix does not report significant explanatory power of board size, the sign is in line with the first hypothesis. H1 states that the underpricing of an IPO increases when more members are added to the board, thus a positive correlation between the independent and dependent variables. The correlation matrix does not support H4. The positive sign instead indicates that a higher CEO tenure increases the amount of underpricing, contradicting our hypothesis that increased CEO tenure decreases underpricing.

4.3. Regression results

After examining the correlations, we present a model with the four independent variables, shown in Appendix 1. The reason for providing a model excluding the control variables is an attempt to secure explanatory power from the main variables alone. The initial mode shows positively significant coefficients for board diversity and board member tenure, similar to the results of the correlation matrix and our hypotheses H2 and H3. On the other hand, CEO tenure shows a negative coefficient, although not significant at the five percent level. Likewise, the board size variable does not show any significant findings, although the sign is in line with H1. The models adjusted R^2 is positive, indiciating that the chosen variables have an explanatory value in the IPO undepricing beyond the sample mean.

The the adjusted R^2 is low, indicating there are more factors explaining the variance of the first-day return. However, the p-value of the over-all model is less than five percent, implying significant findings. When adding the control variables to the model, presented in Table 6, the adjusted R^2 improves from 10.3 percent to 19.0 percent, presented in the first column of Table 6. The results indicate that the control variables add explanatory value for the first-day return. The probability of the F-value in the expanded model equals 0.003, indicating that the model is significant even at one percent significance level. Thus, the model is an adequate fit with the sample data. The mean of the variance inflation factor (VIF) is distinctly lower than ten, demonstrating no issues with multicollinearity in our model.

To confirm or reject the hypotheses, we use the p-value of our model's coefficients. Board size continuously reports a positive relationship with the first-day return, although still not statistically significant at the five percent level. Furthermore, the significance and signs of board diversity and board member tenure are not altered, continuing to support H2 and H3. Lastly, the coefficient of CEO tenure remains negative, however, remaining not statistically significant. Looking at the control variables, the average return on OMX 30 days before the IPO is the only variable showing a statistically significant correlation to the underpricing. The result indicates that the market conditions before the IPO has a substantial impact on the IPO's performance. This finding is in line with the findings of Ritter and Welch (Jay R. Ritter, Ivo Welch 2002).

To improve the model, we make some adjustments to the regression, presented in the second and third column in Table 6. Initially, we winsorize all the independent variables, which reports an increased adjusted R^2 and F-value ratio, thus providing a better explanation and statistical significance. The reported results are still statistically significant for board member tenure and board diversity, although there are no improvements in the findings of board size and CEO tenure. Furthermore, we transform the diversity variable into a dummy on the first quartile and convert CEO tenure into a dummy constructed on the median. The reasoning for changing the model is that we want to test whether it is a specific level of women on the board rather than the percentage ratio that impacts the level of underpricing. Moreover, we transform the CEO tenure variable as the impact of one additional year may differ over time. The effect is likely more substantial for a newly appointed CEO than for a CEO with longer tenure. Therefore, it might not be accurate to assume a linear relationship between underpricing and CEO tenure. Including the adjustments above further improved the significance of the model and the explanatory value through increased F-value and adjusted R^2. Moreover, the t-value of the CEO tenure and board size variables increases, although not to a significant level. The adjustments of these two transformations result in the final model, which we present in the last column of Table 6.

Table 6. Regression results

*This Table shows the results of the three initial OLS regression of the logarithmized first-day return with the independent variables and the control variables. The coefficients are the standardized beta estimates, and the t-value is reported in the brackets. We use the subscript w to denote winsorized variables and statistical significance at the 5% level, where p≤0.5 with a **

Log of the first-day return$_w$	**First regression**	**Winsorized regression**	**Final model**
Board size	0.015 (0.76)	0.015 (0.70)	0.016 (0.77)
Board diversity	0.393* (2.44)	0.514* (2.92)	0.233* (3.17)
Board member tenure	0.043* (2.69)	0.050* (2.94)	0.043* (2.77)
CEO tenure	-0.003 (-0.03)	0.001 (0.10)	0.017 (0.26)
Log firm sales	-0.012 (-0.41)	-0.017 (-0.57)	-0.008 (-0.29)
Liability/assets	0.058 (0.39)	0.056 (0.39)	0.065 (0.44)
Industry dummy	-0.203 (-0.80)	-0.208 (-0.83)	-0.267 (-1.07)
PE/VC dummy	-0.037 (-0.47)	-0.036 (-0.47)	-0.039 (-0.52)
Log price/sales$_w$	0.010 (0.25)	0.004 (0.10)	0.008 (0.23)
Avg. 30-day return OMX Stockholm 30$_w$	57.049* (3.85)	56.406* (3.85)	55.844* (3.83)
Number of observations	115	115	115
Adjusted R^2	0.190	0.209	0.221
Prob > F	0.003	0.0001	0.0001
Mean VIF	1.81	1.81	1.71

4.4. Robustness tests

To test the robustness of the final model and explanatory value of the independent variables, we have examined the regression with several modifications. The robustness tests are focused on including variables that may impact the robustness of the results presented above. Our robustness tests include adding industry effects, year fixed effects, dividing the sample on firm size, and lastly, dropping variables that appear to have no impact on the model. Presented below in Table 7 are the coefficients and t-values of the regressions under the first three modifications. We present the results from dropping variables in Appendix 4. We also include the F-value and adjusted R^2 of the models to show the statistical significance and explanatory value of the models.

The first column shows an initial test where we include industry fixed effects. As explained in section 3.2.3, the initial model consist of an industry dummy denoting firms in the tech industry. To examine whether other sectors can have any explanation of the variance in first-day returns, we include industry dummies for all industries in the sample, as provided by Serrano. Simultaneously, none of the added variables present a significant coefficient forecasting the first-day return. Furthermore, the p-values and coefficients of the two significant variables, board member diversity and board member tenure, and their coefficients change marginally. From this, we can conclude that adjustments for industry fixed effects do not impact the outcome of our results substantailly. Thus, the industry any given company operates in does not seem to affect the results of the model, indicating that the prior model provided robust results. We report the p-values and coefficients for all industries in Appendix 2.

We report the second robustness test in the third column, where we include the year of the IPO in the model. Initially, we perform this using year fixed effects. However, due to problems with remarkably high VIF-values, we include years on a group basis with clusters of five years. Doing so is in line with previous researchers that include years clusters to test the robustness of their findings (Butler, Keefe et al. 2014). The reasoning in adding a year variable in our model is that the year of the IPO risks influencing the independent variables, in particular board member diversity. We base this reasoning on the public attention the discussion of adding a gender quota in Swedish boards has received later years. When adding the year effect, the model shows that although neither of the year-dummies has significant results, including year effect alters the coefficients and p-values from the original model. The board member diversity

variable still shows significant results. However, the coefficient decrease slightly, indicating a lower impact on the underpricing of a company. On the contrary, board member tenure does not report significant results when taking the effect of point in time of the IPO into consideration. Consequently, as the previous results may be impacted by what year each IPO took place, the robustness of the earlier findings is questioned. Also, the adjusted R^2 is higher for the modified model. The discovery suggests that it could be necessary to alter the control variables to explain more of the fluctuation of IPO's first-day returns.

The fourth column includes considerations of firm size, where we test whether our results are applicable for all companies or if they are dependent on the size of the organization. Using the firm sales variable, we divide the sample into large and small firms based on their relative size of sales to the rest of the sample. Both models show a lower F-value than the combined model, thus indicating a lower significance for the models based on the divided sample. The board size variable show opposite signs in the two samples, although neither of the coefficients is reported significant at the five percent level. The diversity variable only reports significant results for large companies. The coefficient of diversity is almost twice the size of the one reported for the small firm sample, implying that diversity impacts underpricing in larger firms to a greater extent. Furthermore, the significance increases for board diversity in large companies, compared to the original model. In contrast, board tenure only reports significant results for small firms. Additionally the coefficient is substantially more significant for small firms than for large firms as well as the combined sample. The alterations of the significance and magnitudes of the coefficients further signal concerns regarding the robustness of our model.

Lastly, we test the results of the model by excluding some non-significant variables and analyze the results reported when eliminating those variables. In Appendix 4, we present the results of dropping the logarithm of sales, liabilities to assets, the PE/VC dummy, and the logarithm of price to sales ratio. By dropping one of them at a time, as well as all of them simultaneously, we allow for a comparison providing insight into our main variables explanatory value for the model. Although the adjusted R^2 and the F-values are improved, neither of the exclusions alters the significance of board diversity or board member tenure.

Table 7. Robustness tests

*This Table shows the results of the original model, along with the robustness tests conducted to test the results of the original model. The coefficients are the standardized beta estimates, and the t-value is reported in the brackets. We use the subscript w to denote winsorized variables and statistical significance at the 5% level, where p≤0.5 with a *. For industry fixed effect and year cluster coefficients, see Appendix 2 and Appendix 3*

Log of the first-day return$_w$	**Original model**	**Industry fixed effects**	**Year clusters**	**Firm size**	
				Large firms	**Small firms**
Board size$_w$ dummy	0.016 (0.77)	0.027 (1.19)	0.012 (0.57)	-0.015 (-0.46)	0.056 (1.93)
Board diversity$_w$ dummy	0.233* (3.17)	0.256* (3.23)	0.200* (2.69)	0.340* (2.59)	0.164 (1.77)
Board member tenure$_w$ dummy	0.043* (2.77)	0.052* (3.14)	0.030 (1.86)	0.030 (1.35)	0.059* (2.93)
CEO tenure$_w$ dummy	0.017 (0.26)	0.002 (0.02)	0.006 (0.09)	-0.054 (-0.51)	0.049 (0.56)
Log firm sales$_w$	-0.008 (-0.29)	-0.018 (-0.60)	-0.012 (-0.44)	0.007 (0.11)	0.018 (0.47)
Liability/assets$_w$	0.065 (0.44)	-0.008 (-0.05)	0.047 (0.32)	0.061 (0.19)	0.168 (0.98)
Industry dummy	-0.267 (-1.07)	n/a	-0.185 (-0.74)	-0.949* (-2.74)	0.548 (1.52)
PE/VC dummy	-0.039 (-0.52)	-0.035 (-0.42)	-0.004 (-0.05)	-0.007 (-0.07)	-0.128 (-0.97)
Log price/sales$_w$	0.008 (0.23)	-0.003 (-0.08)	-0.002 (-0.17)	-0.064 (-1.04)	0.063 (1.51)
Avg. 30-day return OMX Stockholm 30$_w$	55.844* (3.83)	57.726* (3.78)	44.453* (2.85)	68.081* (3.10)	40.31 (1.93)
Industry fixed effects	No	Yes	No	No	No
Year fixed effects	No	No	Yes	No	No
Number of observations	115	115	115	115	115
Adjusted R^2	0.221	0.1958	0.236	0.214	0.308
Prob > F	0.0001	0.0019	0.0001	0.0164	0.0015
Mean VIF	1.71	1.81	1.81	1.34	1.44

4.5. Further implications

To expand our analysis of the two significant variables, we look at the distribution within our sample. Firstly, we show the average underpricing for the board diversity dummy, where we have divided the sample on the first quartile. In Table 3 the value for the first quartile is reported to be 12.5 percent of women. This means that the 25 percent least diversified boards in our sample have less than 12.5 percent women on their boards. Table 8 shows that boards consisting of more than 12.5 percent of women have an average first-day return of 3.4 percent. Furthermore, boards comprised of less than 12.5 percent of women have an average return of -13.6 percent on the first day. Thus the shares are generally priced over the market value. Secondly, we present a similar finding for board member tenure in Table 8. As board tenure is not transformed into a dummy, we decide to split the sample on the mean of 4.1 years, reported in Table 3. Boards with an average tenure below the mean of 4.1 years reported an average first-day return of -4.5 percent. The results further show that boards with an average tenure above 4.1 years have an average return of 2.3 percent on the first day. Similar to the board gender diversity, the findings show that smaller boards experience a general overvaluation of the share.

Table 8. Sample distribution

This Table shows the distribution of the first-day return for companies with boards that have less than 12.5 percent female share, and larger than 12.5 percent female share. Below, the same distribution is presented for companies with boards where the average tenure is either higher or lower than the mean of 4.1 years.

First-day return$_w$	**Mean**	**SD**	**25th**	**Median**	**75th**
Less than 12.5% of women	0.864	0.350	0.528	0.968	1.113
More than 12.5% of women	1.034	0.250	0.969	1.022	1.175
Avg. tenure lower than 4.1 years	0.955	0.314	0.783	1	1.170
Avg. tenure higher than 4.1 years	1.023	0.253	0.956	1.019	1.170

4.6. Economic significance

Although the findings in the models above show various statistical implications for the first-day return, we find it meaningful to highlight the results' economic significance as well. While the statistical significance provides valuable intel if the model's outcome is due to sampling

variation or if the findings are likely to be the same in a new sample, this does not explain the economic implications. Table 6 discloses the variable's coefficients that show to what extent each variable impacts the first-day return. Thus, smaller coefficients have a less substantial effect on underpricing. As we have a log-transformed dependent variable, we have to exponentiate our coefficients to obtain the non-logarithmized impact.

In our model, the economic significance that we are interested in is the impact of board member diversity and board member tenure, as those are the statistically significant variables. For board member diversity, we have used a dummy in our model. Thus, the coefficient, therefore, shows the average change when going from a board with less than 12.5 percent of women to a board with more than 12.5 percent women, all else equal. When exponentiating the coefficient of 0.233, we obtain a percentage change of 26.2 percent[1]. Thus, a board tenure with more than 12.5 percent of women will have an underpricing that is, on average, 26.2 percent higher than firms with boards that have less than a 12.5 percent female share. For board member tenure, the exponentiated coefficient of 0.043 is 4.4 percent[2]. Thus, an increase in average board member tenure with one year increases the underpricing of 4.4 percent.

4.7. Summary of findings

To summarize, the results of our regression initially reported statistically significant values for board member diversity and board tenure, supporting H2 and H3. We continue by winsorizing all variables, including the control variables. Doing so gives the model more precision and a higher significance, while the previously significant variables remain robust. Furthermore, we converted the diversity and CEO tenure variables into dummies, which improved the model further, while the board member diversity and board tenure variables remained significant. At the same time, the model's adjusted R^2 and F-value increased, decreasing the p-value for F. This indicates a model with superior explanatory power and more considerable statistical significance.

[1] Calculations for board member diversity:
Exponentiating the coefficient $e^{0.233} = 1.262$
Turning the coefficient into percent $(1.262 - 1) * 100 = 26.2\%$

[2] Calculations for board member tenure:
Exponentiating the coefficient $e^{0.024} = 1.044$
Turning the coefficient into percent $(1.044 - 1) * 100 = 4.4\%$

Furthermore, to test the robustness of our results, we performed four separate tests on our model. We included industry effects, year cluster effects, divided the sample into large and small firms, and lastly dropped control variables and variables without significance. The results from this reported board member diversity to be robust for all alterations, except when dividing the sample into large and small firms, in which only large firms reported significant findings. The conclusion we draw from this is that the board member diversity appears to only be robust in samples with larger firms. The variable board member tenure does not report significant results when including the year clusters or when looking at only large-sized firms. After this, we present further implications of the model's findings, dividing the sample, and providing more clarity to our two significant variables. Lastly, we analyze our results from an economic perspective. The findings report that the average underpricing increases with 26.2 percent more when the board's female diversity is over 12.5 percent, compared to boards with shares below 12.5 percent. Finally, the impact from board member tenure shows an increasing underpricing of 4.4 percent per added year.

5. Discussion

This thesis aims to research if efficient corporate governance that reduces agency costs can signal quality to the market, thus impacting underpricing by reducing ex-ante uncertainty. The hypotheses presented in section 2.5 are developed by looking at four board structure variables, which we argue to have an impact on agency costs. The expectation of the variables' impact on the IPO underpricing is that governance variables indicating higher agency costs will signal lower quality. We reason that this results in increased uncertainty and higher underpricing. Our hypotheses assumed this to be the case for large boards, high female share on the board, high board member tenure, and low CEO tenure. This section will discuss our findings in light of previous literature, as well as the implication of the reported results.

The regression results provide several interesting findings. The model shows that an increased share of female board members increased underpricing, significant at the five percent level. The finding supports our theoretical predictions as it is in line with the assumption of women being more risk-averse (Eckel, Grossman 2008, Heckman, Golsteyn et al. 2009). We prove the robustness of the results for all alterations of the model, except in the sample of solely small companies. As the variable did not show full robustness, we cannot fully rely on the results. Further findings include statistically significant results that higher board member tenure

increases underpricing. The results support our theoretical predictions, based on previous literature, that appointing new board members prior to the IPO results in lower underpricing (Thorsell, Isaksson 2014). Although this finding is not proven to be robust for all alternations of the model, the statistical significance should not be exaggerated. As the results further report non-significant findings for board size and CEO tenure, we cannot draw any conclusions regarding those two variables.

We base the practical implications of our findings on the variables that we can statistically rely on, presented above. We claim that our findings provide some insight into how the board structure impacts IPO underpricing. Our results show that an increased ratio of women on the board increases the amount of underpricing. We find this to be in line with the results from previous literature, arguing that women are more risk-averse than men. As stated in section 4.5, the sample shows that boards with fewer women tend to set a price above the market value, thus creating a negative first-day return. These results further indicate risk-aversion amongst females, as it shows that boards with a higher percentage of females tend to not overvalue the company. Our analysis on the economic significance shows that the average underpricing is 26.2 percent higher in boards with more than 12.5 percent of women compared to boards with less than 12.5 percent of women. Our hypothesis argues that this finding implies that due to the increased percentage of female board member, there will be more lobbying for a lower offer price. In according with our hypothesis, this finding suggests that the agency costs increase prior to the IPO. Although, due to the low average underpricing of 3.4 percent in boards with high female share, the economic implication may indicate that boards with fewer women rather overprice the share, than boards with high female percentages underpricing them.

Although the results may indicate that firms would gain from reducing the number of women on the board prior to the IPO in an attempt to maximize the raised equity, there are several other consequences arising from doing so. Firstly, there are negative implications from an overvalued offer—one of these being the risk of having an undersubscribed share. Secondly, reducing the number of females on the board before the IPO means having lower diversity, which also has consequences for the firm. As we discuss in section 2.5.2, females generally increase the performance of the firm and reduce the overall agency costs. Although the hypothesis states that risk-aversion increases agency costs, this is only a temporary impact during the IPO process. Weighing the overall benefits of increased diversity, we claim that the effects are likely to be predominantly advantageous. Furthermore, the social debate on gender diversity in listed

firms creates a substantial risk of negative publicity for firms consciously reducing the number of women on the board. Finally, from an investor's point of view, a negative first-day return is not preferable, as initial investors would lose money. Consequently, the buy-side of the transaction are better off investing in firms with a larger share of females on the board, as the first-day return is more likely to be positive.

Moreover, the practical implications of our results on the board member tenure show that appointing new board members prior to the IPO reduces underpricing. In line with Filatotchev and Bishop (2002), this indicates that the company can strategically structure its board before the IPO to influence the level of underpricing. Our results imply that one of the strategic moves can be to replace members of the board within a few years before the listing. However, as seen in section 4.5, the first-day return for boards with low average tenure is negative. The findings entail that appointing newer board members may increase the risk of problems arising from an overvalued share.

6. Conclusions

Because the listing of a company is such an important happening in a company's lifecycle, reporting explanatory results in the area of IPOs could provide useful insights for companies as well as scholars. Although several academics have performed research in the field of IPO underpricing, we find that the agency theory and its impact on the first-day return is relatively unexplored. Thus, providing us with an opportunity to contribute to previous literature. The purpose of this thesis is to research whether the level of agency problems, measured by the efficiency of a firm's corporate governance, can signal quality to the market and thereby impact underpricing. The research studies 115 Swedish IPOs between the years 2000 and 2019, testing the relationship between four different corporate governance variables' and the first-day return. The findings show statistically significant correlations between the two variables board member diversity and board member tenure and IPO underpricing.

6.1. Contributions

The study contributes to the previous IPO literature in two distinct ways. Firstly, we build on the existing IPO underpricing research that explores how the board structure impacts the underpricing of an IPO. Seeing as how previous literature has not been able to reach a consensus, or determine the optimal board structure, new results further builds on the

established research in the field. Secondly, we contribute to the research area by exploring the agency theory and its impact on underpricing. Our contribution consists of significant findings for two of the variables studied, namely board member diversity and board member tenure. These two variables are shown by previous research to have an impact on agency costs, and we extend this by presenting their effects on underpricing.

6.2. Limitations

We recognize that the research is not without imperfections, where we primarily acknowledge two such limitations. Firstly, we conduct the study looking solely at Swedish IPOs. Although this increases the comparability between the companies in the sample, the results may not be robust in other markets. Different countries have different economic systems that are influenced by regulations and cultural distinctions. When studying non-financial aspects such as corporate governance and agency theories, there is a risk that such variables are not behaving the same in different contexts. However, we deem our results to be relevant in the Swedish research field. We further argue that the findings are somewhat representative for western markets which show similar characteristics as those in Sweden. Secondly, we realize that the model may have some limitations as we can not be confident that we have captured all drivers of the first-day return in our chosen control variables. To minimize the risk of not including all variables needed, we have used a benchmark article created for IPO underpricing research. Thus, we acknowledge this limitation and have attempted to reduce the risk of it affecting our results.

6.3. Suggestions for future research

We argue that the findings in the thesis provide an interesting topic to continuously elaborate on future research. Our study focuses on the return of the short term performance measured by the first-day return, whereas we do not discuss how the variables impact the performance over time. Consequently, there is a possibility to provide further explanation of our variables by conducting a long-term performance study. As the study indicates that agency costs have an impact on the underpricing of an IPO, we find that this area of research has great potential to be further studied. Such further research could be interesting within Sweden, where research on more precise measures of agency costs and their implications on the underpricing can provide further understanding in the Swedish setting. Conducting studies such as the one we have presented in this thesis applied abroad is also interesting, to see if the impact of agency costs is more substantial in other countries with different cultures. Another area of future

research that we encourage is cross country research on the subject. Such research is generally scarce in the IPO underpricing literature and shows interesting results as comparing the findings can provide a deeper understanding of the differences in the markets. Furthermore, compared to other studies we find our sample interesting, as the average underpricing presented in our study is close to zero. The finding poses a potential incentive for future research on the Swedish IPO market along with asset marketing theories, which may find explanations for such attributes.

Appendix

Appendix 1. Regression results

*This Table shows the results of the three initial OLS regression of the logarithmized first-day return with only the main independent. The coefficients are the standardized beta estimates, and the t-value is reported in the brackets. We use the subscript w to denote winsorized variables and statistical significance at the 5% level, where p≤0.5 with a **

Log of the first-day return$_w$	**First regression**
Board size	0.007 (0.38)
Board diversity	0.428* (2.66)
Board member tenure	0.049* (2.96)
CEO tenure	-0.000 (-0.02)
Adjusted R^2	0.103
Prob > F	0.003

Appendix 2. Robustness test coefficients for industry fixed effects

*This Table presents the coefficients for the industries from the robustness test reported in Table 7. The coefficients are the standardized beta estimates, and the t-value is reported in the brackets. The Serrano industry code is provided in brackets next to each industry. We use the subscript w to denote winsorized variables and statistical significance at the 5% level, where p≤0.5 with a **

First-day return$_w$	**Coefficient (t-value)**
Industry fixed effects	
Industrial goods (20)	-0.110 (-0.86)
Construction industry (22)	0.134 (0.84)
Shopping goods (25)	0.099 (0.70)
Health & Education (35)	-0.060 (-0.50)
Finance & Real estate (40)	0.108 (0.83)
IT & Electronics (45)	-0.267 (-1.00)
Telecom & Media (50)	0.056 (0.32)
Corporate Services (60)	-0.001 (-0.01)
Other (98)	0.019 (0.07)
Number of observations	115

Appendix 3. Robustness test coefficients for year clusters

*This Table presents the coefficients for the year clusters from the robustness test reported in Table 7. The coefficients are the standardized beta estimates, and the t-value is reported in the brackets. We use the subscript w to denote winsorized variables and statistical significance at the 5% level, where p≤0.5 with a **

First-day return$_w$	**Coefficient (t-value)**
Year clusters	
2000-2004	-0.252 (-1.52)
2005-2009	-0.079 (-0.73)
2010-2015	(Omitted)
2015-2019	0.056 (0.67)
Number of observations	115

Appendix 4. Robustness test dropping variables

*This Table shows the results of the original model, along with the robustness tests where variables have been excluded to test the results of the original model. The coefficients are the standardized beta estimates, and the t-value is reported in the brackets. We use the subscript w to denote winsorized variables and statistical significance at the 5% level, where p≤0.5 with a **

Log of the first-day return$_w$	**Original model**	**Dropping variables**					
		Sales	**Liabilities/ Assets**	**Industry**	**PE/ VC**	**Price/ Sales**	**None. Significant**
Board size$_w$ dummy	0.015 (0.20)	0.014 (0.72)	0.017 (0.80)	0.017 (0.81)	0.015 (0.72)	0.017 (0.81)	0.0010 (0.56)
Board diversity$_w$ dummy	0.233* (3.19)	0.229* (3.18)	0.238* (3.27)	0.223* (3.05)	0.237* (3.25)	0.237* (3.30)	0.234* (3.32)
Board member tenure$_w$ dummy	0.247* (2.80)	0.042* (2.77)	0.043* (2.79)	0.054* (2.96)	0.043* (2.84)	0.043* (2.80)	0.045* (3.05)
CEO tenure$_w$ dummy	-0.079 (-1.02)	0.014 (0.22)	0.013 (0.21)	0.013 (0.19)	0.021 (0.32)	0.019 (0.29)	0.013 (0.20)
Log firm sales$_w$	0.006 (0.21)		-0.007 (-0.25)	-0.002 (-0.07)	-0.012 (-0.45)	-0.013 (-0.77)	
Liability/assets$_w$	0.131 (0.88)	0.061 (0.42)		0.083 (0.56)	0.060 (0.41)	0.062 (0.42)	
Industry dummy	-0.236 (-0.92)	-0.253 (-1.04)	-0.280 (-1.13)		-0.265 (-1.07)	-0.285 (-1.20)	
PE/VC dummy	-0.064 (-0.83)	-0.045 (-0.62)	-0.036 (-0.49)	-0.037 (-0.50)		-0.036 (-0.49)	
Log price/sales$_w$	0.021 (0.58)	0.016 (0.75)	0.007 (0.20)	0.019 (0.58)	0.005 (0.15)		
Avg. 30-day return OMX Stockholm 30$_w$	50.946* (3.45)	54.824* (3.89)	56.370* (3.90)	52.928* (3.70)	55.883* (3.85)	56.751* (4.06)	53.939* (3.93)
Adjusted R^2	0.218	0.228	0.227	0.220	0.226	0.228	0.238
Prob > F	0.0001	0.000	0.0000	0.0000	0.0000	0.0000	0.0000
Mean VIF	1.82	1.16	1.74	1.70	1.71	1.21	1.07

References

AISSIA, D.B., 2014. IPO first-day returns: Skewness preference, investor sentiment and uncertainty underlying factors. *Review of Financial Economics,* **23**(3), pp. 148-154.

ALLEN, F. and FAULHABER, G.R., 1988. Signaling by underpricing in the IPO market. *Journal of Financial Economics,* **23**, pp. 303-323.

ARTHURS, J.D., HOSKISSON, R.E., BUSENITZ, L.W. and JOHNSON, R.A., 2008. Managerial Agents Watching other Agents: Multiple Agency Conflicts Regarding Underpricing in IPO Firms. *Academy of Management Journal,* **51**(2), pp. 277-294.

BANCEL, F. and MITTOO, U.R., 2009. Why Do European Firms Go Public? *European Financial Management,* **15**(4), pp. 844-884.

BAYSINGER, B.D. and BUTLER, H.N., 1985. Corporate Governance and the Board of Directors: Performance Effects of Changes in Board Composition. *Journal of Law, Economics, and Organization,* **1**(1), pp. 101.

BEATTY, R.P. and RITTER, J.R., 1986. Investment banking, reputation, and the underpricing of initial public offerings. *Journal of Financial Economics,* **15**(1), pp. 213-232.

BELL, R.G., MOORE, C.B. and AL–SHAMMARI, H.A., 2008. Country of Origin and Foreign IPO Legitimacy: Understanding the Role of Geographic Scope and Insider Ownership. *Entrepreneurship Theory and Practice,* **32**(1), pp. 185-202.

BOIVIE, S., LANGE, D., MCDONALD, M.L. and WESTPHAL, J.D., 2011. Me or We: The Effects of CEO Organizational Identification on Agency Costs . *The Academy of Management Journal,* **54**(3), pp. 551-576.

BOONE, A.L., CASARES FIELD, L., KARPOFF, J.M. and RAHEJA, C.G., 2007. The determinants of corporate board size and composition: An empirical analysis. *Journal of Financial Economics,* **85**(1), pp. 66-101.

BRAU, J.C. and FAWCETT, S.E., 2006. Initial Public Offerings: An Analysis of Theory and Practice. *The Journal of Finance,* **61**(1), pp. 399-436.

BUTLER, A.W., KEEFE, M.O. and KIESCHNICK, R., 2014. Robust determinants of IPO underpricing and their implications for IPO research. *Journal of Corporate Finance,* **27**, pp. 367-383.

CERTO, S.T., 2003. Influencing Initial Public Offering Investors with Prestige: Signaling with Board Structures. *Academy of Management,* **28**(3), pp. 432-446.

CERTO, S.T., DAILY, C.M. and DALTON, D.R., 2001. Signaling Firm Value through Board Structure: An Investigation of Initial Public Offerings. *Entrepreneurship Theory and Practice,* **26**(2), pp. 33-50.

CONNELLY, B.L., CERTO, S.T., IRELAND, R.D. and REUTZEL, C.R., 2011. Signaling Theory: A Review and Assessment. *Journal of Management,* **37**(1), pp. 39-67.

DARMADI, S. and GUNAWAN, R., 2013. Underpricing, board structure, and ownership. *Managerial Finance,* **39**(2), pp. 181-200.

DUKERICH, J.M., GOLDEN, B.R. and SHORTELL, S.M., 2002. Beauty is in the Eye of the Beholder: The Impact of Organizational Identification, Identity, and Image on the Cooperative Behaviors of Physicians. *Administrative Science Quarterly,* **47**(3), pp. 507-533.

DUTTON, J.E., DUKERICH, J.M. and HARQUAIL, C.V., 1994. Organizational Images and Member Identification. *Administrative Science Quarterly,* **39**(2), pp. 239-263.

EINSENHARDT, K.M., 1989. Agency Theory: An Assesment and Review. *Academy of Management Review*, **14**(1), pp. 57-74.

FILATOTCHEV, I. and BISHOP, K., 2002. Board Composition, Share Ownership, and 'Underpricing' of U.K. IPO Firms. *Strategic Management Journal,* **23**(10), pp. 941-955.

GARFINKEL, J.A., 1993. IPO Underpricing, Insider Selling and Subsequent Equity Offerings: Is Underpricing a Signal of Quality? *Financial Management,* **22**(1), pp. 74-83.

GREWAL, R., COTE, J.A. and BAUMGARTNER, H., 2004. Multicollinearity and Measurement Error in Structural Equation Models: Implications for Theory Testing. *Marketing Science,* **23**(4), pp. 519-529.

HECKMAN, J.J., GOLSTEYN, B.H.H., BORGHANS, L. and MEIJERS, H., 2009. Gender Differences in Risk Aversion and Ambiguity Aversion. *Journal of the European Economic Association,* **7**(2), pp. 649-658.

HERMALIN, B.E., 1998. Endogenously chosen boards of directors and their monitoring of the CEO. *The American economic review,* **88**(1), pp. 96-118.

HILLMAN, A.J. and DALZIEL, T., 2003. BOARDS OF DIRECTORS AND FIRM PERFORMANCE: INTEGRATING AGENCY AND RESOURCE DEPENDENCE PERSPECTIVES. *Academy of Management Review,* **28**(3), pp. 383-396.

HOWTON, S., HOWTON, S. and OLSON, G., 2001. Board ownership and IPO returns. *Journal of Economics and Finance,* **25**(1), pp. 100-114.

IBBOTSON, R.G., 1975. Price performance of common stock new issues. *Journal of Financial Economics,* **2**(3), pp. 235-272.

JAY R. RITTER and IVO WELCH, 2002. A Review of IPO Activity, Pricing, and Allocations. *The Journal of Finance,* **57**(4), pp. 1795-1828.

JENSEN, M.C., 1993. The modern industrial revolution, exit, and the failure of internal control systems. *The journal of finance,* **48**(3), pp. 831-880.

JENSEN, M.C. and MECKLING, W.H., 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics,* **3**(4), pp. 305-360.

JOHNSON, S.G., SCHNATTERLY, K. and HILL, A.D., 2013. Board Composition Beyond Independence. *Journal of Management,* **39**(1), pp. 232-262.

LELAND, H.E. and PYLE, D.H., 1977. Informational Asymmetries, Financial Structure, and Financial Intermediation. *The Journal of Finance,* **32**(2), pp. 371.

LIPTON, M. and LORSCH, J.W., 1992. A Modest Proposal for Improved Corporate Governance. *The Business Lawyer,* **48**(1), pp. 59.

LOUGHRAN, T. and MCDONALD, B., 2013. IPO first-day returns, offer price revisions, volatility, and form S-1 language. *Journal of Financial Economics,* **109**(2), pp. 307-326.

LOWRY, M., MICHAELY, R. and VOLKOVA, E., 2017. Initial public offerings. *Foundations and Trends® in Finance,* **11**(3-4), pp. 154-320.

MOONCHUL KIM and JAY R. RITTER, 1997. Valuing IPOs. *Journal of Financial Economics,* **53**, pp. 409-437.

NGUYEN, T., LOCKE, S. and REDDY, K., 2015. Does boardroom gender diversity matter? Evidence from a transitional economy. *International Review of Economics and Finance,* **37**, pp. 184-202.

OMBABA, K.M.B. and KOSGEI, D., 2017. Board Composition and Financial Distress of Listed Firms in Kenya. An Empirical Analysis. *Journal of Finance and Investment Analysis,* **6**.

PAGANO, M., PANETTA, F. and ZINGALES, L., 1995. Why do Companies go Public. *The Journal of Finance*, **53**, pp.27-64.

POLETTI-HUGHES, J. and BRIANO-TURRENT, G.C., 2019. Gender diversity on the board of directors and corporate risk: A behavioural agency theory perspective. *International Review of Financial Analysis,* **62**, pp. 80-90.

RATHNAYAKE, D.N., LOUEMBÉ, P.A., KASSI, D.F., SUN, G. and NING, D., 2019. Are IPOs underpriced or overpriced? Evidence from an emerging market. *Research in International Business and Finance,* **50**, pp. 171-190.

ROCK, K., 1986. Why new issues are underpriced. *Journal of Financial Economics,* **15**(1), pp. 187-212.

SPENCE, M., 2002. Signaling in Retrospect and the Informational Structure of Markets. *The American Economic Review,* **92**(3), pp. 434-459.

THORSELL, A. and ISAKSSON, A., 2014. Director experience and the performance of IPOs. *Australasian accounting business and finance journal,* **8**(1), pp. 3-24.

WEISBACH, M.S. and HERMALIN, B.E., 2003. Boards of directors as an endogenously determined institution: a survey of the economic literature. *Economic Policy Review,* (1), pp. 7-26.

ZIMMERMAN, M.A., 2008. The Influence of Top Management Team Heterogeneity on the Capital Raised through an Initial Public Offering. *Entrepreneurship Theory and Practice*, 32(3), pp. 391-414.

ZINGALES, L., 1995. Insider Ownership and the Decision to Go Public. *The Review of Economic Studies*, **62**(3), pp. 425-448.

Online sources

Avanza, 2016. Vilka företag får göra en börsnotering? Retrieved March 25, 2020, from https://www.avanza.se/lar-dig-mer/avanza-akademin/borsintroduktioner-emissioner-foretagshandelser/vilka-foretag-far-gora-en-borsnotering.html

ECKEL, C.C. and GROSSMAN, P.J., 2008. *Chapter 113 Men, Women and Risk Aversion: Experimental Evidence.* [Online] Elsevier.

SCB, 2019. SCB:s Branschnyckeltal. Retrieved April 19, 2020, from https://www.scb.se/vara-tjanster/branschnyckeltal/