IPO Underpricing on small- and microcap companies
- A Study of First-Day Returns on Spotlight Stock Market

Bachelor's Thesis 15 hp
Department of Business Studies
Uppsala University
Fall Semester of 2019

Date of Submission: 2020-01-17

Dyar Allaf
Tim Vilhelm Jörnhammar
Supervisor: Katarzyna Cieslak
ABSTRACT

Historical evidence suggests that initial public offerings (IPOs), on average, are priced below their intrinsic value. In this paper, we investigate the magnitude of IPO underpricing on small- and microcap companies listed on the stock exchange Spotlight Stock Market, over the period 2012–2019. We derive from established theories on IPO underpricing, previously documented influencing factors and general assumptions for potential links to IPO underpricing. With a sample of 130 IPOs, Spotlight Stock Market was found to be underpriced by 8.31% (market-adjusted). Furthermore, a significant positive correlation was detected between IPO underpricing and the influencing driver Industry (Technology). The regression analysis did however not entail significance of the coefficients for any of the remaining variables.

Keywords: Initial Public Offerings, IPO underpricing, Spotlight Stock Market, IPO influencing factors, multiple regression model.
Sammanfattning

Acknowledgements

First and foremost, we would like to express our very profound gratitude to our thesis supervisor, Katarzyna Cieslak for her invaluable guidance and support throughout the writing process. Moreover, we would like to express our sincere gratitude towards Spotlight Stock Market, in particular Viktor Waxin for providing us with data and valuable insights. We also wish to thank our seminar group for interesting discussions and essential feedback.

Finally, we wish to acknowledge the following: Edvin Andergren, Linus Franzén and Rasmus Bloomberg Hjorter, our friends, for supporting us spiritually and improving our study continuously. Thank you.

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Dyar Allaf  Tim Vilhelm Jörnhammar

Uppsala, January 17th, 2020
Table of Contents

1. INTRODUCTION .......................................................................................................................... 1
   1.1 PROBLEMATIZATION ................................................................................................................. 1
   1.2 PURPOSE .................................................................................................................................. 4

2. THEORY ......................................................................................................................................... 5
   2.1 ESTABLISHED THEORIES ON IPO UNDERPRICING ............................................................... 5
      2.1.1 Asymmetric Information ....................................................................................................... 5
      2.1.2 Principal Agency Theory ..................................................................................................... 6
   2.2 PREVIOUS EMPIRICAL RESEARCH IN IPO UNDERPRICING ..................................................... 7
      2.2.1 Industry (Technology) ......................................................................................................... 7
      2.2.2 Company Age ....................................................................................................................... 8
      2.2.3 Leverage ratio ....................................................................................................................... 9
      2.2.4 Venture capital backing ....................................................................................................... 10
      2.2.5 Proceeds ............................................................................................................................... 10

3. METHODOLOGY .......................................................................................................................... 12
   3.1 RESEARCH APPROACH ............................................................................................................ 12
   3.2 CHOICE OF MARKET ............................................................................................................... 12
      3.2.1 Industries and sectors .......................................................................................................... 13
      3.2.2 Data Collection .................................................................................................................... 13
      3.2.3 Sample Size ........................................................................................................................ 14
      3.2.4 Extreme values ..................................................................................................................... 15
   3.3 DEPENDENT VARIABLE ........................................................................................................... 15
   3.4 INDEPENDENT VARIABLES .................................................................................................... 16
      3.4.1 Industry (Technology) ......................................................................................................... 17
      3.4.2 Firm age ............................................................................................................................... 17
      3.4.3 Leverage .............................................................................................................................. 17
      3.4.4 Proceeds .............................................................................................................................. 18
   3.5 MULTIPLE REGRESSION MODEL ............................................................................................. 18
      3.5.1 OLS Assumptions ................................................................................................................. 18
      3.5.2 Multicollinearity .................................................................................................................. 18
      3.5.3 Research reliability and validity ........................................................................................... 19

4. RESULT ......................................................................................................................................... 21
   4.1 IPO UNDERPRICING ON SPOTLIGHT STOCK MARKET ............................................................. 21
   4.2 DESCRIPTIVE STATISTICS ..................................................................................................... 22
   4.3 STATISTICAL TESTS ............................................................................................................... 23
   4.4 REGRESSION RESULTS ............................................................................................................ 24

5. DISCUSSION ................................................................................................................................. 27
   5.1 RESEARCH LIMITATIONS ....................................................................................................... 30
   5.2 FUTURE RESEARCH RECOMMENDATIONS ............................................................................. 30

6. CONCLUSION ................................................................................................................................. 32

7. REFERENCES ................................................................................................................................. 33
1. Introduction

In the following chapter, we discuss some of the most pertinent ideas in the empirical field of IPO underpricing relevant for this study. A brief introduction will be outlined, followed by a problematization, research questions and the purpose of the study.

An Initial Public Offering (IPO) is referred to as the process a private corporation goes through when transitioning to become a public corporation. This involves admitting shares to a publicly traded stock exchange for the first time. Once publicly traded, this enhanced liquidity will allow the company to raise capital for their future operating procedures (Ritter, 1998). At its core, the IPO price should relate to the valuation of the company. By studying IPOs on several markets around the world, researchers have found that IPOs, on average, tend to be priced below their intrinsic value. (Loughran, Ritter and Rydqvist, 1994; Jenkinson and Ljungqvist, 2001). IPO underpricing is extensively documented in previous academic literature and one of the most recognized anomalies in corporate finance theory (Abrahamson and De Ridder, 2015). Loughran, Ritter and Rydqvist (1994) conducted a study on the IPO underpricing phenomenon in 25 different countries and found that each studied country had an, on average, underpriced IPO-market over the given period. In accordance, similar finding has been obtained on the Swedish market (Abrahamson, De Ridder and Råsbrant, 2011). Pervading for previous empirical literature related to IPO underpricing in Sweden, most research is focused on the main market (Nasdaq OMX Stockholm). Authors of this research has documented several characteristics (drivers) among companies listed on this market, closely linked to underpricing. However, less research has been devoted to investigating whether these drivers apply on small- and microcap companies, listed on the less regulated markets. In this thesis, we intend to fill this void.

1.1 Problematization

Several studies on IPO underpricing have been conducted from various angles of attack. In order to outline potential causes for the phenomenon, previous research has been conducted from the perspective of the issuer, underwriter and investor (Nielsson and Wójcik, 2016; Abrahamson and De Ridder, 2015, Loughran and Ritter, 2004). Ritter and Welch (2002) define underpricing as the difference between the offered introduction price of an initial public offering, and the closing price of the share after its first day of trading. When shares are sold at a price below that at which they subsequently trade, the initial owners realize an indirect cost.

Essentially, they “leave money on the table” for the investors who purchase the shares at the IPO (Jenkinson and Ljungqvist, 2001; Loughran and Ritter, 2004). If the issue would have been valued with zero discount at its intrinsic value, the issuing firm could have raised the same amount of equity by selling fewer shares, if sold at the aftermarket price (Ritter, 2016). Loughran and Ritter (2002) report an accumulated sum of $27 billion in lost shareholder equity as an effect of IPO underpricing on the U.S. market during 1990–1998.

Over the period of 1980-2001, U.S. IPOs traded, on average, 18.8% above its introduction price after its first day of trading (Ritter and Welch, 2002). The later part of this period (1999-2000), often referred to as the Dot-com bubble, has been studied more extensively by Loughran and Ritter (2004). The study found that the U.S. IPO-market jumped to an average level of underpricing at 65% during the mentioned period. Loughran et al. (1994) investigated the phenomenon on a global scale, conducting studies in 25 different countries and declared each observed IPO-market as underpriced. The average level of underpricing on the different markets ranged between 4.2% in France, to 80.3% in Malaysia. In the same study, the Swedish IPO-market was underpriced 39% over the given period (1971–1991). Jenkinson and Ljungqvist (2001) found similar tendencies when examining 35 different countries, where all studied countries had an, on average, underpriced IPO-market. Their study did entail clear differences between industrialized countries and emerging markets. Emerging markets accounted for more substantial levels of underpricing, averaging 60%, while their industrialized counterparts averaged at 15% (ibid.).

A handful of studies has been done on the Swedish IPO-market, for instance, Bodnaruk et al. (2008), who found an average level of underpricing of 14.2% on the Stockholm Stock Exchange (Nasdaq OMX Stockholm) during the years 1995-2001. A more recent study was conducted by Abrahamson and De Ridder (2015), finding an average level of underpricing at 7.68% over the period 1996–2011. Jenkinson and Ljungqvist (2001) states that some underpricing is to be expected, and that there are reasonable explanations for its occurrence. For instance, buying shares in an IPO involves taking risks. The share price might fall below the issuing price, which raise concerns among risk-averse investors. Thus, underpricing is argued to be an efficient method for compensating investors for taking this risk (Lowry, Officer and Schwert, 2010). Underwriters tend to press for lower initial prices, in order to enhance the level of demand for the issued shares. Thereby, an initial discount is interpreted for bearing this risk and will consequently benefit the IPO as it increases chances of full coverage of the issue, which
generally is the main objective for both the issuing firm and the underwriter (Jenkinson and Ljungqvist, 2001).

Previous research entails various drivers for IPO underpricing, contributing to the occurrence of the phenomenon. Firms differ in size, age, ownership structure, industry affiliation, intended proceeds (turnovers), and stock exchange belonging – factors that affect the market’s perception of the firms and by extension, the underwriter’s ability to constitute proper valuations previous to their listings (Loughran and Ritter, 2004). Recent studies explore these characteristics and find that some tend to increase the level of ex-ante uncertainty, causing a higher volatility of the initial returns. Lowry et al. (2010) states that the level of underpricing is significantly higher, when difficult-to-value companies are issuing public stock for the first time. These types of companies can for instance be firms with a limited financial- and operational history (younger firms), and emerging high-tech firms with more unusual and complex products, often untested on a larger population. They can therefore expect to face potential pricing errors prior to its listing (ibid.). The rate of ex-ante uncertainty can hence be increased when investing in high-tech firms, compared to non-tech firms with products or services of more common material (Loughran and Ritter, 2004; Lowry et al., 2010). Previous research supports this argument and assert that the price of an initial offering should be related to the level of information asymmetry and ex-ante uncertainty that is surrounding the company (Beatty and Ritter, 1986; Jenkinson and Ljungqvist, 2001).

Despite the fact that IPO underpricing is one of the most extensive researched fields of study in financial theory, Ljungqvist (2007) argues that further empirical evidence is needed to increase the significance of various explaining theories. A limited amount of IPO underpricing studies has been conducted on the Swedish market during the 21st century, mainly targeting larger issues on the Stockholm Stock Exchange (Nasdaq OMX Stockholm) (Loughran et al., 1994; Abrahamson and De Ridder, 2015; Bodnaruk et al., 2008). However, little attention has been devoted to investigating the underpricing phenomenon on Swedish small- and microcap companies, publicly listed on Multi Trading Facilities (MTFs), such as Spotlight Stock Market. MTFs are alternative stock exchanges for small- and microcap companies, often in an emerging stage. As of now, Spotlight Stock Market consists of approximately 175 Nordic companies (Spotlight, 2019). A large proportion of the companies listed carries characteristics, documented by previous research, to have a significant impact on IPO underpricing. Based on a thorough literature review, suitable research questions for this thesis are the following:
- Are Swedish small- and microcap companies underpriced on average?
- Are some industries or sectors underpriced more than others?
- Can influencing factors, documented by previous research and applied on the main market, be used in order to explain the IPO underpricing phenomenon on Swedish small- and microcap companies?

1.2 Purpose
The purpose of this thesis is to explore IPO underpricing on small- and microcap companies, listed on the Swedish stock exchange, Spotlight Stock Market. Secondly, to investigate whether drivers of the phenomenon, documented in previous research and applied on the main market, are relevant for Swedish small- and microcap companies.
2. Theory

This chapter presents previous academic literature on the phenomenon of IPO underpricing. We start with discussing theories linked with IPO underpricing, then present prior empirical studies of initial returns that build on these theories.

2.1 Established theories on IPO underpricing

In this section, various theories are presented in order to find suitable explanations for the IPO underpricing phenomenon. Existing literature has provided several renowned theories associated with underpricing, from which the most essential for this thesis will be outlined in the following paragraphs.

2.1.1 Asymmetric Information

The “Winner’s Curse Model” was founded by Rock (1986) and is a theory often applied on IPOs. Rock assumes that both the issuing firm and the underwriter are equally uninformed of the intrinsic value of the offered issue, meanwhile, some investors are perfectly informed. The aggregated information of the market is argued to be superior to the information gathered by a single player, including the issuer itself and their engaged underwriter. Particularly regarding one critical input in the pricing process previous to the listing – the aggregated demand for the firm’s shares. Due to information asymmetry, the aggregated demand for an issue is hard to project, which can give rise to errors when underwriters attempt to price an IPO (Rock, 1986; Beatty and Ritter, 1986; Jenkinson and Ljungqvist 2001; Lowry et al., 2010). Furthermore, Rock (1986) assumes that some investors are better informed than others and consequently make better decisions. A consequence of the information asymmetry can be seen in investors decisions to invest in an IPO. Investors have dissimilar knowledge and information of the value of the various offered issues, which will help them evaluate if the introduction price of the share is underpriced relative to the market value, and thus worth investing in. The informed group of investors, that is aware of the intrinsic values, will have an advantage against the less informed group and will as a result only subscribe to IPOs where the offered introduction price is lower than the market value. Simultaneously, the less informed group will take more chances in their investment decisions and hence risk potential losses (Rock, 1986). Ljungqvist (2007) argues that companies may not want to disseminate all ongoing information of its current or future operations at the time of the IPO, causing an information friction between the issuing firm and the hired underwriter. The underwriters are only able to perform a valuation based on the
information that is provided, which cause a disruption in the valuation process, thus an uncertainty of the company’s intrinsic value. The uncertainty is offset by a lower valuation, hence a lower price on the initial offer, causing the issue to be underpriced (Ljungqvist, 2007).

### 2.1.2 Principal Agency Theory

The principal- and agency theory emerged in the 1970s from the combined disciplines of institutional theory and economics. It is one of the most common codified modes of social interaction and describes the relationship of agency (Mitnick, 2019; Ross, 1973). The fundamental idea of the theory is to explain and resolve any conflict of interest that might occur between business principles and their agents. As the theory outline, a principal delegate decision-making authority to an agent that are supposed to execute services on the behalf of the principal and act according to their directives. Since many decisions that are affecting the principal financially are made by the agent, differences of opinions and priorities may arise when the agent’s self-interest does not align with the principals. Such a situation is referred to as the principal-agent problem (Jensen and Meckling, 1976).

In an IPO underpricing-scenario the principal is the company getting listed, and the agent is the underwriter whose responsibility is, among other things, to value the issue. The principal that is about to expose their equity to an open market intend to raise as much capital as possible, at the lowest expense possible. It is therefore in their interest to avoid an underpricing scenario. The engaged underwriter (the agent) is working on the behalf of the issuer (the principal) on valuing the company and pricing the shares as accurate to its intrinsic value as possible. Simultaneously, the underwriter opts to meet its own interests, which is to receive full coverage on the issue and by doing that maintaining a strong reputation for the firm (Schiller, 1990). The underwriter-issuer relationship is described as a conflict of interest between the two parties. Since the underwriter got full mandate in the valuation process, it tends to result in a scenario where the underwriters directly or indirectly underprice the issue to increase demand and enhance the chance of receiving full coverage. Consequently, the underwriter fails to meet the expectations of the issuing company (Ritter and Welch, 2002; Ritter, 2016; Ritter, 2019; Baron, 1982). The result of the conflict of interest is that the issuer will not fulfil their full potential of shareholder equity infusion, while an opportunity arises for private investors to earn abnormal returns by investing in underpriced issues. Loughran and Ritter (2002) refer to this scenario as issuers are “leaving money on the table” and calculate it by taking the number of shares sold
times the difference between the first day closing price and the offer price. However, leaving money on the table is surprisingly something issuers rarely complain about. In order to explain this fact, Loughran and Ritter (2002) has a prospect theory. The theory predicts that issuers only sell a smaller proportion at the time of the public offering, meanwhile retraining a larger proportion to sell after the price has jumped, producing a net increase in wealth for the pre-issue shareholders. The assumption is therefore that issuers care more about the change in their wealth rather than the level of wealth in connection to an IPO (Loughran and Ritter, 2002). Issuing firms are not likely to replace their engaged underwriter for following rights issues if they were satisfied with their performance at the time of the IPO. In addition, underwriters often extract higher fees for subsequent transactions, making the profits from the IPO less crucial (Ljungqvist and Wilhelm, 2005).

2.2 Previous empirical research in IPO underpricing

In accordance to previous academic research, numerous attempts have been done to identify determining factors for IPO underpricing. The following paragraphs will outline variables chosen in line with existing literature that are commonly labeled as influencing determinants of IPO underpricing.

2.2.1 Industry (Technology)

Industry affiliation has been proven by previous researchers to contribute to the investors perception of a share issue and is something that can trigger ex-ante uncertainty (Loughran and Ritter, 2004). Firm specific characteristics differ between industries and sectors. The degree of IPO underpricing has been argued to vary heavily depending on industry affiliation (Trueman, Wong and Zhang, 2000; Deng, Lev and Narin, 1999; Lowry et al., 2010). Daily, Certo and Dalton (2005) studied various influencing factors of IPO performance, including industry affiliation. They classified industries into two subgroups, “high-technology” respectively “low-technology” companies. Their research found a significant positive relationship between firms considered as high-technology companies and the level of IPO underpricing.

According to Cohen and Lou (2012), investors often fail to process and analyze information of firms with a complex business, making it harder to form an opinion regarding the potential of the business venture. Technologically advanced companies are often characterized with having an enhanced complexity due to the shape of their products or services (Markarian and
Parbonetti, 2007). Science and high-tech firms generally provide inadequate information to investors regarding their innovation-producing outcomes, particularly about the nature of their innovative activities (Deng et al., 1999). As such, complex firms can experience difficulties in communicating firm-specific information to investors (Markarian and Parbonetti, 2007). If investors are not able to fully understand, or adequately evaluate a firm's business, an increased discount is required in order to invest. This aggravates the valuation process and is offset by a lower initial offer price of an IPO; making high-tech firms a subject for underpricing scenarios more often than any other industry (Bartov, Mohanram and Seethamraju 2002). Other characteristics are that these firms often are young and lack sufficient historical financial data to make forecasts on. They are generally expected to experience a rapid growth in sales while still making negative earnings, causing a high level of uncertainty in their financial situation (ibid.). Previous academic research supports this argument and assert that the price of an initial offering should be related to the level of ex-ante uncertainty surrounding the company (Beatty and Ritter, 1986; Jenkinson and Ljungqvist, 2001). Similar observations have been made by several researchers, stating the fact that there is a positive relationship between tech-companies and the degree of underpricing (Arosio, Giudici and Paleari, 2000; Daily et al., 2005). The following hypothesis is thereby formed:

Hypothesis 1: The degree of IPO underpricing is higher in the technology industry compared to other industries.

2.2.2 Company Age

The decision for a private corporation to go public implies a vast amount of changes, e.g. their obligation to meet the stock exchange's requirements, financial regulations to cope with, and a new ownership structure. At which point in time of the firm’s business cycle they choose to go public is up to the corporate executives of the concerned firm (Lowry et al., 2010). Their decision may result in different outcomes depending on the period of time since the firm was established (Loughran and Ritter 2004). Since available financial- and operational history of the firm corresponds with the period they have been active, younger companies with limited data are considered to hold more risk than their older counterparts. This, since the financial data that the underwriter base their valuation on, and subsequently share with potential investors, is a vital part of an investment decision. It is therefore common among investors to consider younger companies as riskier investments, thus requiring higher returns from these firms (Ritter, 1984). Recent studies further conclude that companies that have been active for a long
period before going public tend to get priced more according to their intrinsic value than young companies (Carter, Dark and Singh, 1998; Lowry et al., 2010). Beatty and Ritter (1986) found a negative relationship between firm age and the level of underpricing. As did Loughran and Ritter (2004), who found that young companies (0-7 years) on average generates a higher degree of underpricing than older companies through the period 1999-2000 on the U.S. market. Exhibited correlation between firm age and IPO underpricing leads to the second hypothesis:

*Hypothesis 2: The degree of IPO underpricing has a negative relationship with firm age.*

**2.2.3 Leverage ratio**

The leverage ratio is used to evaluate the amount of debt over total assets that a firm has issued and indicates at which degree a firm’s operational procedures are funded. Previous research suggest that the proportion of leverage is a solid indicator of a firm’s financial quality (James and Wier, 1990; Habib and Ljungqvist, 2001; Scheone, 2004). Managers of firms with a high degree of leverage have greater budget constraints and are less exposed to the distortion of the firm’s cash flows as they have to finance their debt obligations (James and Wier, 1990). According to recent empirical evidence, increased leverage may influence investors perception of the firm value, decreasing investor uncertainty of market value and hence being inversely related to IPO underpricing (Cai, Ramchand and Warga, 2004). Information asymmetry has been a key explicator for such relationships since firms with larger pre-IPO debt ratios often are older, providing the markets with more historical data and thus being considered less risky (ibid.). Other evidence of underpricing dependency on leverage was found by Cai et al., (2004). These authors compared initial returns of stock offerings for two groups of companies, namely, those which issued debt before going public and those which did not. The outcome of their study shows an inverse relationship between underpricing and leverage ratio. Information asymmetry was considered as an essential determinant of such relationship. The authors further assert that a lower level of underpricing for firms with larger prior debt obligations could be explained by the fact that such firms often are older, larger and considered less risky, meaning that they have a more solid financial history (Cai et al., 2004). We intend to test the link between IPO underpricing and pre-IPO leverage ratio thorough the following hypothesis:

*Hypothesis 3: The degree of IPO underpricing has a negative relationship with leverage.*
2.2.4 Venture capital backing

Venture Capital (VC) is a type of financing provided to smaller companies in an early stage of their business lifecycle. Usually, venture capitalists opt to obtain concentrated equity positions in order to exercise significant influence on management. Venture capital firms opt to target high risk entrepreneurial ventures with high growth potential, unlike private equity firms (Leveraged-Buyout Specialists), who mainly focus on mature companies with stable future cash flows (Megginson and Weiss, 1991, Barry et al., 1990). With a sample of 433 VC-funded issues, and 1123 non-VC funded issues, Barry et al. (1990) found that VC-backed IPOs were underpriced substantially less than their non-VC funded counterparts. The sampled VC-firms controlled a concentrated ownership stake of 19% on average and a minimum of 1% equity stake was enabled as a threshold for companies to be considered as VC-funded. Similar findings were made on the Australian IPO-market by Vu, Worthington and Laird (2008), who also obtained lower degrees of underpricing of issues with VC-funding. As ex-ante uncertainty among investors is considered having a major impact on IPO underpricing, the presence of VC-funding in an IPO is often perceived as a signal of quality among investors, thus decreasing uncertainty (Barry et al., 1990). Venture capitalist have a strong incentive to establish a trustworthy reputation to enable access to the IPO market on favorable terms. (Megginson and Weiss, 1991). Therefore, capital markets and probing investors might recognize a VC-funded IPO as more appealing, as they put trust in a VC-firms monitoring role and thus their information advantage (Megginson and Weiss, 1991). A further aspect is the fact that VC-firms often are willing to bear higher costs of underpricing. Something that is explained by their interest of raising future funds, which much relies on the firm’s abilities to take their companies public (ibid.). By taking this into account, VC-firms are considered as active investors contributing to lower information asymmetry, thus minimizing the degree of underpricing, which leads to the fourth hypothesis:

*Hypothesis 4: The degree of underpricing is lower in VC-funded IPOs compared to non-VC-funded IPOs.*

2.2.5 Proceeds

The amount of money that has been raised from a share issue is usually referred to as proceeds (turnover). Proceeds raised through an IPO are not solely for the benefit of selling shareholders. The equity raised can also be used to fund organic growth and expansion, retire existing debt, or to expand capacity in other capital markets (Loughran and Ritter, 2004). Previous IPO
underpricing studies have investigated the relationship between the degree of underpricing and proceeds and have found significant positive relationships between the extent of underpricing and the total turnover. Yüksel and Yüksel (2006) researched IPOs on the Istanbul Stock Exchange during the period 1990–2002, confirming a positive relationship between the variables. Authors refer to this occasion as an indicator of trading activity, aligning with the informational friction among investors and positively influencing the level of underpricing (Loughran and Ritter, 2004). In order to test this correlation, the fifth hypothesis is formulated as follows:

**Hypothesis 5: There is a positive relationship between Proceeds and the degree of IPO underpricing.**
3. Methodology

The following paragraphs outline the various research methods used when exploring IPO underpricing of small- and microcap companies. The research approach is summarized, followed by a motivation of our choice of market, data collection process, and a review of the sample size. Moreover, the Ordinary Least Square (OLS) regression-model is explained along with insights on the dependent as well as independent variables. At last, research reliability and viability are reviewed.

3.1 Research approach

In order to conduct the desired research for the topic of this study, a deductive research approach was used. According to Bryman and Bell (2018), deductive research is commonly used as an approach to test the relationship between theory and research in which research is conducted with reference to hypotheses, and ideas inferred from theories. By initially analyzing previously published theories and empirical evidence associated with IPO underpricing, the researcher grasps a solid understanding concerning the relevant topic. In order to test a possible relationship between two or more variables; a hypothesis is formed. We test the theories concerning influencing drivers of IPO underpricing in a new empirical setting relating to small- and microcap firms. Several studies have however been conducted with similar research approach e.g. Beatty and Ritter (1985), Ljungqvist and Wilhelm (2005), Markarian and Parbonetti (2007). The validity and reliability of the conducted study is thereafter discussed. The analysis then looks at five hypotheses of potential influencing drivers of IPO underpricing and conclude if a possible correlation with small- and microcap companies exists.

3.2 Choice of market

To the best of our knowing, no previous studies has examined the occurrence of IPO underpricing with a particular focus on Spotlight Stock Market. The stock exchange is a favorable market to be listed on for small- and microcap companies. Their business model is clear: “To make it easier, safer and more visible for growth companies to be publicly listed” (Spotlight Stock Market, 2019). They provide an opportunity for companies to be traded with an easier listing process, and less legal obligations and regulations, which is advantageous terms for young and emerging firms (ibid.). Spotlight Stock Market is a so-called Multilateral Trading Facility (MTF), thus not registered as an EU-regulated stock exchange. MTFs are less regulated
in comparison to the main market (Nasdaq OMX Stockholm). For instance, regarding their accounting standards, publication of price-sensitive information, and requirements in market communication. The absence of EU-regulation increases the risk of investing in companies listed on MTFs compared to their EU-regulated counterparts (Nasdaq, 2019). Spotlight Stock Market provides this thesis with a sufficient number of listings of small- and microcap companies to build this study on. As presented in Table 3, it consists of numerous companies belonging to the Information Technology industry which allows us to test Hypothesis 1. A study on Spotlight Stock Market does therefore align with the purpose of this paper.

3.2.1 Industries and sectors
The Global Industry Classification Standard (GICS) is a classification used by stock exchanges to categorize companies into different segments. GICS consists of eleven different subsets: Energy, Materials, Industrials, Consumer Discretionary, Consumer Staples, Health Care, Financials, Information Technology (IT), Telecommunication Services (Telecom), Utilities, Real Estate (MSCI, 2019). Consistent with previous research, categories holding less than five observations will be merged into a mutual category labeled as “Other Industry” (Loughran and Ritter, 2002). In this study, industries categorized into the mutual category are: Utilities, Consumer Staples, Materials, and Energy.

3.2.2 Data Collection
The dataset for this thesis was both collected manually from various secondary sources and provided directly from Spotlight Stock Market. The data provided included company names, tickers, and date of listing for all IPOs on Spotlight Stock Market between the years 2012–2019. The final listing in our sample was made on November 20th, 2019. In addition, the data included information on initial offering prices, proceeds (turnovers), and the Spotlight Index over the given period, e.g. an index of daily market movements on the stock exchange over the researched period.

Since some relevant data was missing in the dataset provided by Spotlight Stock Market, it had to be supplemented by several secondary sources. A manual data collection process was therefore conducted as well. Closing share prices after the firm's first day of trading was collected via Spotlight Stock Market’s web-based database. As accounted for in section 3.3, closing prices were adjusted to exclude for market movements corresponding to the day of
listing (Bansal and Khanna, 2012). The industry affiliation of the sampled issues was collected via Avanza Bank since they utilize the GICS when categorizing companies into different segments. Dates of establishment for the sampled issues was collected via Retriever Business database. Leverage-ratios one year prior to their listing was also collected via Retriever Business database, which provide data over historic annual accounts. If any data was missing at Retriever Business, information had to be obtained via IPO prospectuses.

When determining if an issue was backed by a venture capital firm, ownership data prior to their listing was collected. The ownership data was collected via IPO prospectuses of each issue. The IPO prospectuses was mainly obtained via Nyemissioner.se (www.nyemissioner.se). If any prospectus were missing at Nyemissioner.se, company web pages, press releases, and general search engines were useful alternative sources. In alignment with Barry et al. (1990) and Ritter (1998), a number of criteria were applied in order to classify an owner as a venture capitalist. Consistent with Barry (1990), lists and journals of active venture capitalists was used as a reference. The Swedish Private Equity & Venture Capital Association’s (SVCA) members list, combined with the startup- and venture capital-oriented website Breakit (www.breakit.se) recent list of venture capitalists invested in Swedish public companies was used to confirm VC-classification. The stockholders listed in the prospectus was cross-referenced against SVCA’s and Breakit’s lists. If a plausible VC-firm was identified, but not part of either referenced list, the SVCA definition of venture capitalists was applied against the investors company description and their annual reports. In addition, a minimum ownership stake of 1% was applied as a final criterion (Barry et al., 1990; Ritter, 1998).

3.2.3 Sample Size
The sample selection was based on data availability of the stock exchange and the research design and approach of this thesis. The original dataset included all 179 listings on the stock exchange over the period 2012–2019. The final sample did however only consist 130 observations. The number of IPOs per year varies over the period, with a maximum number of 24 issues in 2014 and 2017, and a minimum number of 6 in 2012. A proportion of the sample had to be excluded from the study, meeting criteria that are common in previous empirical IPO literature. Following reasons resulted in an exclusion: dual listings, spin-offs, and reverse takeovers (e.g. companies that were acquired by a private corporation with the motive to bypass the process of an initial public offering). Similar exclusions were made by Bodnaruk et al. (2008), Loughran and Ritter (2002), and Lowry et al. (2010). We were unable to obtain
prospectus of some offerings, leading to missing information that was required for the concerned observations to be included in the study. These firms were generally delisted, had switched to another stock exchange or missing necessary financial data. Therefore, a number of 49 issues were excluded from the dataset. Reasons for exclusion is accounted for in Table 1. The most frequent industries were Health Care and Information Technology, with 45 respectively 37 issues. Financials, Consumer Staples, Materials, Utilities, and Energy were the most infrequent industries, thus categorized into the mutual category Other Industries, together holding a number of 8 observations.

<table>
<thead>
<tr>
<th>IPOs 2012–2019</th>
<th>179</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market switch</td>
<td>13</td>
</tr>
<tr>
<td>Spin-off</td>
<td>11</td>
</tr>
<tr>
<td>Delisting</td>
<td>10</td>
</tr>
<tr>
<td>Reverse takeover</td>
<td>1</td>
</tr>
<tr>
<td>Missing information</td>
<td>14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>130</strong></td>
</tr>
</tbody>
</table>

*This table presents the various reasons why some of the companies issuing equity on Spotlight Stock Market between 2012–2019 were excluded from the sample.*

### 3.2.4 Extreme values

Since the number of observations accumulate to 130, the study is rather sensitive to outliers. After running a number of tests, it was found that the outliers had a substantial effect on variables such as mean and variance, contributing to a skewed result. Furthermore, this thesis applies an OLS regression, which increase the necessity to adjust for outliers in order to retrieve a reliable result. In line with existing literature and previous studies, this thesis will practice winsorizing to reduce the impact of outliers, e.g. Liu and Ritter (2010). Winsorizing is the transformation of statistics by limiting extreme values in the statistical data to reduce the effect of spurious outliers (Reifman and Keyton, 2010). In this study, the dependent variable (MAIR) was winsorized at the lower and upper 2.5% tail.

### 3.3 Dependent Variable

In order to investigate the relationship between the level of IPO underpricing and the influencing factors documented by previous research, a regression model was applied. To conduct the empirical analysis, the dependent variable will be set as the first day return of the sampled IPOs. It entails whether an issue was under- or overpriced. In consistent with previous
studies, we measured the level of IPO underpricing by applying the commonly used method of first day returns; defined as the percentage difference between the offer price and the first day closing price (Ritter, 1991). The higher the first day returns, the higher level of underpricing. By contrast, a stock that realizes a negative first-day return is considered overpriced. The dependent variable was obtained by applying Ritter’s (1991) approach, which provided the degree of underpricing for each firm. The mathematical formula is presented below:

\[
\text{Underpricing} = \frac{\text{First day closing price} - \text{Offer price}}{\text{Offer price}}
\]

However, formula (1) can only be classified as the raw level of underpricing, since it is not adjusted for any general market movements that may have occurred during the day of the listing. Volatile markets, with large fluctuations in prices of securities might cause an impact on the level of underpricing. In order to adjust for such movements, a common approach is to subtract a relevant market index return, corresponding to the listing-day of the IPO. The formula for market-adjusted initial return (MAIR) was first introduced by Logue (1973) and has been applied frequently ever since in more modern studies (Bansal and Khanna, 2012). Since this thesis only examine listings on Spotlight Stock Market and no other stock exchange, the market index applied in the formula is the Spotlight Index. This method adjusts the raw first day return by subtracting the return of the Spotlight Index corresponding to the day of listing for each and every IPO. Therefore, the dependent variable is labeled as MAIR and the mathematical formula applied is as follows:

\[
\text{MAIR} = \frac{\text{Closing price} - \text{Offer price}}{\text{Offer price}} - \frac{\text{Spotlight Index Closing Value} - \text{Spotlight Index Opening value}}{\text{Spotlight Index Closing value}}
\]

### 3.4 Independent Variables

To investigate the relationship between IPO underpricing and the previously documented influencing factors of the phenomenon, five different independent variables were applied in the regression analysis. In section 2.2, previous empirical research is reviewed in order to explain their impact as influencing drivers of IPO underpricing.
3.4.1 Industry (Technology)
Previous documented research concludes that companies in the high-tech industry generally are associated with higher risks, thus experiencing higher levels of IPO underpricing (Loughran and Ritter, 2004; Lowry et al., 2010; Daily et al., 2005). According to GICS firms involved in computer science/equipment, electronics, advanced communications and/or general technology derive from the Information Technology industry (MSCI, 2019). Therefore, consistent with previous research, a dummy variable approach is applied in order to differentiate IPOs after the subgroup “Tech”. If a firm originates from the Information Technology industry, the dummy equals one (1), while other industries takes the value of zero (0) (Ritter, 2004; Lowry et al., 2010).

3.4.2 Firm age
According to previous academic research, the extent of available historical financial- and operational data correspond to the level of ex-ante uncertainty. In addition, increased historical data reduce the level of information asymmetry (Lowry et al., 2010; Loughran and Ritter, 2004; Ritter, 1991). Since the concerned data is related to the date since establishment, firm age (Age) will be used as a natural logarithmic independent variable in the regression analysis in order to reveal a possible negative relationship with IPO underpricing. To calculate firm age, company registration date was subtracted from the date of listing by using the following formula:

\[ Age = \ln(1 + (Year_{IPO} - Year_0)) \]

3.4.3 Leverage
In line with Leone, Rock and Willenborg (2007), the leverage-ratio of the sampled issues are from one calendar year before each IPO. The leverage-ratio is stated as a percentage, based on the total accumulated debt relative to the firm's total assets. Leverage is used in the regression analysis as a natural logarithmic variable to enable a better fit in the normalized dataset. The formula for calculating the leverage-ratio is consistent with Leone’s et al. approach (2007) and is presented below.

\[ Leverage \ ratio = \ln \left( \frac{PreIPO \ long \ term \ debt}{PreIPO \ total \ total \ assets} \right) \]
3.4.4 Proceeds
As stated in section 2.2.5, previous research entails significant positive correlation between proceeds (turnover) and the level of IPO underpricing (Loughran and Ritter, 2004). Proceeds is therefore applied as an independent variable in the regression analysis. The total proceeds of an issue generally differ heavily between firms, resulting in a high degree of skewness. Therefore, a natural logarithmic transformation was used for this variable. By doing so, the variable has a better fit into a more normalized dataset.

3.5 Multiple Regression Model
In order to investigate the combined effect that the independent variables have on the dependent variable, a multiple regression model was derived from the dataset through an Ordinary Least Square (OLS) Regression. This statistical model is effective when estimating relationships between one or more independent variables, in relation to a dependent variable. The model helps to determine which of the independent variables that affect the response variable, and in which direction the explanatory factor pushes the value of the response variable (Stock and Watson, 2015). The regression is set by using MAIR as the dependent variable. As regressors, the abovementioned influencing factors are applied. The statistical program Stata 13.0 is used in order to test and ensure the validity of the model.

\[
\text{MAIR}_i = \beta_0 + \beta_1 (Tech_{\text{dummy}}) + \beta_2 \ln(Age) + \beta_3 \ln(Leverage\ ratio) + \\
\beta_4 \ln(Proceeds) + \beta_5 (Venture\ capital_{\text{dummy}}) + \epsilon_i
\]

3.5.1 OLS Assumptions
It is necessary to understand underlying OLS assumptions when conducting an OLS regression model. A lack of knowledge of OLS assumptions could lead to incorrect results for the econometrics test completed, why it cannot be overemphasized. Since this study is based on a cross-sectional dataset, potential violations of multicollinearity are considered.

3.5.2 Multicollinearity
Multicollinearity is referred to as the occurrence of high correlations among two or more independent variables in a multiple regression model (Brooks, 2014). If the relationship between independent variables are significant, the statistical power of the analysis decreases, hence the occurrence for such relationships should be treated with caution. However, some degree of observed correlation between the independent variables (regressors) are generally
accepted. In order to identify a possible multicollinearity problem, a correlation matrix is applied. If a correlation coefficient between the independent variables retrieves a value close to one (1), it indicates a strong relationship, which might cause several implications for the model (Brooks, 2014). For instance, if correlated variables affect the dependent variable to a greater extent than the other independent variables, a higher standard error might arise. By not including one of the highly correlated variables, this error can be mitigated (ibid.).

3.5.3 Research reliability and validity

In academic research, the question of reliability and accuracy of a study is always a topic of concern. Optimally, a research approach can be replicated in future studies, with a basis in the same assumptions but under a different dataset and retrieve comparable findings. The reliability of a dataset is highly related to the reliability of the sources and should hence only be collected from reliable sources (Bryman and Bell, 2018). The data collection process for this thesis is accounted for in section 3.2.2. It outlines that a high degree of the obtained data was provided directly from Spotlight Stock Market. To reduce the risk of potential errors, the data was confirmed manually. By a random selection of observations, values were cross-referenced against information in their web-based database in order to enable a confirmation. Moreover, the remaining part of the dataset had to supplemented by secondary sources, thus collected manually, which increase the risk of potential human errors. However, a high degree of the collected secondary data was gathered from the IPO prospectuses of the issued companies, while the remaining part was collected from reputable sources. To reduce the risk of errors related to the manual data collection process, all secondary data was audited and confirmed.

Research validity refers to which extent the received findings measures what is intended to be measured and to which degree the established theories is tested, hence the accuracy of the conducted study (Bryman and Bell, 2018). When referring to the validity of a study, potential errors in the research approach is a key aspect. To investigate the phenomenon of IPO underpricing, this thesis used a model consistent with previous conducted studies, meeting criteria’s that are common in prior empirical IPO literature, e.g. when measuring values of variables. The model has been carefully reviewed and can be considered to be in line with previous studies. It does however still contain assumptions of our own, for instance regarding the exclusion of various observations, causing selection bias. All assumptions are described in detail in order to enable a replication of the study. The choice of applying the Spotlight Index when market-adjusting first day returns, instead of an index from the main market, e.g.
OMXS30, might also have an implication on the received results. The companies listed on Spotlight Stock Market are a subject of more fluctuations and differs in characteristics compared to the main market. The Spotlight Index is therefore more representative to the sampled issues of this study. Omitted variable-bias might also have an effect on the insignificant retrieved results of the regression analysis. The inclusion of only five influencing factors in the regression analysis, with a basis from previous IPO underpricing literature, excluded all other potential influencing factors that might have an impact on the phenomenon.
4. Result

This chapter outlines findings and results of IPO underpricing on Swedish small- and microcap companies, listed on Spotlight Stock Market, over the period 2012–2019. The empirical results are presented from the descriptive statistics followed by the regression results.

4.1 IPO underpricing on Spotlight Stock Market

With a sample of 130 IPOs on Spotlight Stock Market over the period 2012–2019, the winsorized dataset revealed an average level of underpricing at 8.38%. After having adjusted the result for market movements, it amounted to 8.31%. This entails that IPOs on this stock exchange are underpriced on average. The IPO with the highest level of underpricing was listed in 2014, belonging to the Healthcare-industry, and was underpriced by 114.29% (market-adjusted). The IPO that had the lowest first day return was observed in 2012, also belonging to the Healthcare-industry, and was overpriced by 48%. As Table 2 presents, the average first day returns differ year by year. The year 2012 was on average overpriced by 7.69%, hence the year with the lowest average first day return in this study, and the single year with negative average first day returns. All next coming years were underpriced, several with double digits. The year with the highest average first day return was 2013 (17.78%).

Table 2. Average first day return on Spotlight Stock Market

<table>
<thead>
<tr>
<th>YEAR</th>
<th>IPOs</th>
<th>IR</th>
<th>MAIR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>6</td>
<td>-7.54%</td>
<td>-7.69%</td>
</tr>
<tr>
<td>2013</td>
<td>7</td>
<td>17.10%</td>
<td>17.78%</td>
</tr>
<tr>
<td>2014</td>
<td>24</td>
<td>12.11%</td>
<td>11.70%</td>
</tr>
<tr>
<td>2015</td>
<td>20</td>
<td>13.44%</td>
<td>13.57%</td>
</tr>
<tr>
<td>2016</td>
<td>20</td>
<td>9.50%</td>
<td>8.73%</td>
</tr>
<tr>
<td>2017</td>
<td>24</td>
<td>2.12%</td>
<td>2.57%</td>
</tr>
<tr>
<td>2018</td>
<td>19</td>
<td>7.92%</td>
<td>7.66%</td>
</tr>
<tr>
<td>2019</td>
<td>10</td>
<td>6.42%</td>
<td>6.68%</td>
</tr>
<tr>
<td>Total</td>
<td>130</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table illustrates how many IPOs that were issued per year, along with the initial return (IR) and the average market adjusted initial return (MAIR).

The average degree of underpricing varies heavily depending on industry affiliation. As seen in Table 3, the Information Technology industry produces the highest first day returns with an average of 15.10% (market-adjusted). In opposite, the Telecom industry was overpriced by 9.48%, thus being the sector with the lowest average first day returns. The industries generating
positive average first day returns were Industrials, Information Technology, Healthcare, Real Estate, and the mutual category Other Industries. Their overpriced counterparts, with negative average first day returns were Consumer Discretionary and Telecom. As accounted for in 2.3.5 and 3.3.1, and predicted according to Hypothesis 1, firms belonging to the Information Technology industry were expected to generate a higher level of underpricing than other industries. According to the results, that was also the case. Over the given period, the sector account for an average level of underpricing at 15.10%. That being said, this sample highlight several differences compared to previous studies where this tendency has been observed. Most notable in firm size, revenue and profits, and history of conducting business previous to the listing. The result may hence be a coincidence with a basis in the specifically issued companies, or an effect of the relatively small sample. Nevertheless, the results indicate that the observed assumption, namely that high-tech firms experience higher levels of underpricing than non-tech-firms, may apply on Swedish small- and microcap companies.

Table 3. Average first day return by industry on Spotlight Stock Market

<table>
<thead>
<tr>
<th>INDUSTRY</th>
<th>COUNT</th>
<th>IR</th>
<th>MAIR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Care</td>
<td>45</td>
<td>9.85%</td>
<td>10.17%</td>
</tr>
<tr>
<td>Information Technology</td>
<td>37</td>
<td>15.87%</td>
<td>15.10%</td>
</tr>
<tr>
<td>Industrials</td>
<td>13</td>
<td>9.90%</td>
<td>10.18%</td>
</tr>
<tr>
<td>Consumer Discretionary</td>
<td>11</td>
<td>-6.91%</td>
<td>-6.85%</td>
</tr>
<tr>
<td>Real Estate</td>
<td>10</td>
<td>2.76%</td>
<td>2.96%</td>
</tr>
<tr>
<td><strong>Other Industry</strong></td>
<td><strong>8</strong></td>
<td><strong>4.77%</strong></td>
<td><strong>4.64%</strong></td>
</tr>
<tr>
<td>Telecom</td>
<td>6</td>
<td>-9.88%</td>
<td>-9.48%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>130</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table illustrates the number of IPOs that each industry accounted for in this study along, with the average market initial return (IR) and adjusted initial return (MAIR). By using the Global Industry Classification Standard (GICS), each observed company has been categorized into different subsets (MSCI, 2019). Industries with five observations or less is found under the heading “Other Industry”.

4.2 Descriptive statistics

The descriptive statistics for all variables used in the regression analysis are specified in Table 4. The dataset amounts 130 IPOs. Distinctions between median and mean indicates an uneven distribution of values, which is the case for some of the variables in the sample. For instance, the MAIR variable have a mean of 8.31%, while the median only amount to 1.71%, indicating an uneven distribution. The dispersion of the sample is revealed when looking at the range for the same variable, which is 162.29%. Similar patterns can be seen in the variables Age and Proceeds, particularly when observing the spread between the maximum and minimum values.
Furthermore, both variables show a degree of skewness and kurtosis, indicating long tails and peaked curves.

### Table 4. Descriptive statistics

<table>
<thead>
<tr>
<th></th>
<th>MAIR</th>
<th>TECH</th>
<th>AGE</th>
<th>LEV-RATE</th>
<th>PROCEEDS</th>
<th>VC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>8.31</td>
<td>0.27</td>
<td>7.87</td>
<td>45.86</td>
<td>37 824 615</td>
<td>0.33</td>
</tr>
<tr>
<td>Median</td>
<td>1.71</td>
<td>0.00</td>
<td>5.14</td>
<td>44.80</td>
<td>12 000 000</td>
<td>0.00</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>30.83</td>
<td>0.44</td>
<td>10.38</td>
<td>27.80</td>
<td>95 864 639</td>
<td>0.47</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>0.84</td>
<td>-0.93</td>
<td>29.09</td>
<td>-0.73</td>
<td>20.27</td>
<td>-1.54</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.94</td>
<td>1.04</td>
<td>4.58</td>
<td>0.24</td>
<td>4.34</td>
<td>0.69</td>
</tr>
<tr>
<td>Range</td>
<td>162.28</td>
<td>1.00</td>
<td>85.96</td>
<td>125.90</td>
<td>642 600 000</td>
<td>1.00</td>
</tr>
<tr>
<td>Min.</td>
<td>-48.00</td>
<td>0.00</td>
<td>0.14</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Max.</td>
<td>114.28</td>
<td>1.00</td>
<td>86.10</td>
<td>125.90</td>
<td>642 600 000</td>
<td>1.00</td>
</tr>
<tr>
<td>Total (n)</td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>130</td>
</tr>
</tbody>
</table>

This table shows individual sample descriptive statistics for 130 companies that issued new equity on the Spotlight Stock Market during the period 2012-2019. The table illustrates a percentage of the market adjusted initial return (MAIR) for the population along with descriptive statistics for each independent variable used in the regression. Some observations were missing reliable information, why the number of observations between the variables differ.

#### 4.3 Statistical tests

The dataset was tested for multicollinearity through a correlation matrix of the independent variables and by calculating the Variance Inflation Factor (VIF). A correlation coefficient above 0.6 is used as a cut-off rule, meaning that any number above this figure might be a subject of multicollinearity problem (Richardson, 2015). As shown in Table 5, the correlation matrix shows that none of the independent variables demonstrates any correlation close to the indicated thresholds. Therefore, the assumption of no multicollinearity in the dataset is considered achieved.

### Table 5. Correlation matrix

<table>
<thead>
<tr>
<th></th>
<th>MAIR</th>
<th>TECH</th>
<th>AGE</th>
<th>LEV-RATE</th>
<th>PROCEEDS</th>
<th>VC</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIR</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TECH</td>
<td>-0.0917</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGE</td>
<td>0.0113</td>
<td>0.0221</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEV-RATE</td>
<td>-0.0830</td>
<td>0.0028</td>
<td>-0.2173</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROCEEDS</td>
<td>-0.0186</td>
<td>-0.1552</td>
<td>-0.0374</td>
<td>-0.0120</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>VC</td>
<td>0.0033</td>
<td>0.1235</td>
<td>-0.1250</td>
<td>0.0377</td>
<td>-0.0724</td>
<td>1.000</td>
</tr>
</tbody>
</table>

This table consists of a correlation matrix for the dependent variable (MAIR) and all independent variables used in the regression model. None of the variables exhibit significantly large amount of correlation.
Values of VIF that exceeds the value of 10 is regarded as strong indications of multicollinearity. A table of the obtained VIF-test is presented in Table 6.

**Table 6.** Variation Inflation Factor (VIF) test

<table>
<thead>
<tr>
<th>Variable</th>
<th>VIF</th>
<th>1/VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>TECH</td>
<td>1.06</td>
<td>0.943772</td>
</tr>
<tr>
<td>AGE</td>
<td>1.06</td>
<td>0.943945</td>
</tr>
<tr>
<td>LEV-RATE</td>
<td>1.04</td>
<td>0.963710</td>
</tr>
<tr>
<td>PROCEEDS</td>
<td>1.02</td>
<td>0.978148</td>
</tr>
<tr>
<td>VC</td>
<td>1.02</td>
<td>0.979330</td>
</tr>
<tr>
<td>Mean VIF</td>
<td>1.04</td>
<td></td>
</tr>
</tbody>
</table>

This table illustrates the Variance Inflation Factor (VIF) for the independent variables. As shown, no indications of multicollinearity were detected.

### 4.4 Regression results

The conducted regression analysis does not find significant evidence for any relationship between IPO underpricing of small- and microcap companies and the established independent variables, assumed having an effect on the phenomenon, except for the tech-variable. The R-squared ($R^2$) measure the proportion of variance for the dependent variable (MAIR) that is explained by the independent variables. The $R^2$ takes on any value within the range of zero (0) and one (1) and provide us with information regarding the goodness of fit of the model (Brooks, 2014). The $R^2$ of 0.047 in the multiple regression analysis means that the established model explains only 4.7% of the level of underpricing in the sample. This figure also entails that there is a significant amount of unexplained variance in the regression model. However, a low $R^2$ is also the case in some previous research e.g. Abrahamson and De Ridder (2015). Assuming that the underlying influencing factors of IPO underpricing on Swedish small- and microcap-companies can be properly covered by independent variables in a regression model, 95.3% of the variation of underpricing is caused by other factors than the chosen regressors. The F-statistic of 1.203 does not entail an appropriate level of significance since the P-value amounts to 0.312. Consequently, we cannot reject the null hypothesis that the regressors coefficients are jointly equal to zero.
Table 7. Results from multiple regression test

<table>
<thead>
<tr>
<th></th>
<th>(1) MAIR</th>
<th>(2) MAIR</th>
<th>(3) MAIR</th>
<th>(4) MAIR</th>
<th>(5) MAIR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tech_dummy</td>
<td>21.23**</td>
<td>21.33**</td>
<td>22.33**</td>
<td>22.69**</td>
<td>23.35**</td>
</tr>
<tr>
<td>ln(Age)</td>
<td>-0.201</td>
<td>-0.158</td>
<td>-0.169</td>
<td>-0.180</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.405)</td>
<td>(0.421)</td>
<td>(0.428)</td>
<td>(0.432)</td>
<td></td>
</tr>
<tr>
<td>ln(LevRate)</td>
<td>1.697</td>
<td>1.261</td>
<td>1.332</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4.763)</td>
<td>(5.039)</td>
<td>(5.079)</td>
<td></td>
<td></td>
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<tr>
<td>ln(Proceeds)</td>
<td>1.865</td>
<td>2.039</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4.237)</td>
<td>(4.401)</td>
<td></td>
<td></td>
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<tr>
<td>VC_dummy</td>
<td></td>
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<td>-5.081</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(9.235)</td>
<td></td>
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<tr>
<td>_cons</td>
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<td>7.895</td>
<td>1.160</td>
<td>-2.020</td>
<td>-0.993</td>
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<tr>
<td></td>
<td>(4.823)</td>
<td>(5.745)</td>
<td>(18.42)</td>
<td>(22.92)</td>
<td>(23.52)</td>
</tr>
</tbody>
</table>

N = 130
R^2 = 0.038
F = 5.311
p value = 0.312

Standard errors in parentheses
" p < 0.1, "" p < 0.05, "*** p < 0.01

This table represents the results from the multiple OLS regression. The dependent variable Market Adjusted Initial Return (MAIR) is tested against the independent variables Industry (Tech dummy), Company age (lnAge), Leverage ratio (lnLevrate), Proceeds (lnProceeds) and Venture capital backing (VC dummy).

Hypothesis 1: A dummy approach was applied in order to test the first hypothesis regarding high-tech firms experiencing higher levels of underpricing than non-tech-firms. The regression shows that the tech-dummy is significant as the coefficient estimate is detected significant at 5%, resulting in the null hypothesis being rejected.

Hypothesis 2: The second hypothesis was tested through the natural logarithmic value of the variable Age. The hypothesis predicted a negative relationship between the age of a firm and the level of IPO underpricing (Beatty and Ritter, 1986; Ritter 1991). However, the regression results did not find enough significance to reject the null hypothesis for this variable.

Hypothesis 3: The third hypothesis aims to test the relationship between the level of IPO underpricing and the natural logarithmic value of proceeds realized through the IPO. The hypothesis stated that there should be a positive relationship between the turnover and the level of IPO underpricing. The relationship for the coefficient was found to be positive, however without significance, thus not enabling a rejection of the null hypothesis.
Hypothesis 4: In order to test the fourth hypothesis regarding leverage ratio, the natural logarithmic variable leverage ratio was applied. The hypothesis predicted that IPO underpricing should have a negative relationship with a higher leverage ratio. The inclusion further assumes that a high degree of pre-IPO leverage indicates firm quality, making it less exposed for underpricing. Nevertheless, a negative relationship was not found through this regression analysis. The results provided us with non-significant results of a positive relationship. This inverse relationship may be explained by the fact that this study focuses on small- and microcap companies, which tend to have lower degrees of leverage compared to companies studied in previous research (Cai et al., 2004).

Hypothesis 5: The fifth hypothesis opted to investigate the effect of venture capital-backed IPOs and the level of IPO underpricing. Our inclusion stated that there should be a negative relationship between the degree of underpricing and venture capital-backed IPOs. This hypothesis was tested through a dummy approach, where companies being backed by a VC-firm was given the value of one (1). A negative relationship was found, stating that VC-backed IPOs tend to be less underpriced than non-VC-backed IPOs. The regression analysis did however not entail significance of the coefficient, thus not enabling a rejection of the null hypothesis.
5. Discussion

In the following section a discussion will be presented. In accordance to previous research exploring plausible explanations for IPO underpricing, the variables: industry (technology), age, leverage ratio, proceeds (turnover) and venture capital-backing were used as regressors in order to investigate the IPO underpricing phenomenon on Swedish small- and microcap companies.

Based on the statistical findings from the conducted study, one may conclude that the overall result seem rather week. The $R^2$ of the regression analysis, which can be interpreted as the coefficient of determination, amounted to 0.047. This entails that only 4.7% of the level of underpricing can be explained by the independent variables. However, a low $R^2$ could also entail that everything is as it should be. If the regression were to generate a high $R^2$, it would imply that the actual level of underpricing is predictable (Beatty and Ritter, 1986). Previous theories state a positive correlation between ex-ante uncertainty and IPO underpricing since riskier issues are harder to evaluate, which can be explained by the winner's curse problem (ibid.). Furthermore, the sample of the dataset is represented by small- and microcap firms, which according to the theory should imply an increased ex-ante uncertainty, thus bearing more risk and hence experience a higher level of underpricing.

The regression analysis did however entail that high-tech firms experience a higher level of underpricing compared to non-tech firms, as the coefficient estimate is detected significant at 5% level. The descriptive statistics presented in Table 4 further supports this result. Firms belonging to the Information Technology industry were, on average, underpriced with 15.10% (market-adjusted), compared to Industrials and Healthcare-companies, being the second and third most underpriced industries (10.18%, 10.17%).

Over the given period (2012–2019), the average turnover per IPO on Spotlight Stock Market amounted to 37.8 MSEK. With an average level of underpricing (market-adjusted) at 8.31%, it amounts to $\sim$3.15 MSEK in average lost shareholder equity infusion for each issue. To generate the effect in financial terms of IPO underpricing on Spotlight Stock Market and with a basis on the sample of 130 observations, the total amount is $\sim$410 MSEK. As discussed in previous sections, Loughran and Ritter (2002) refers to this occasion as “leaving money on the table” for the IPO investors, but also as an opportunity for speculative investors to earn abnormal returns.
Clearly, a substantial amount of money is left on the table for the small- and microcap firms listed on Spotlight Stock Market. As Ritter (2016) further suggests in more recent studies, these levels of underpricing tend to cause major complications, both for the issuing firm and the underwriters. The issuing firm will raise less shareholder equity in the IPO. Since underwriters usually are paid a fixed percentage price on the IPO, they suffer lower profits as well (Ritter, 2019). Despite this fact, one also has to bear in mind that underwriters want to signal their predominance to the market, usually by lowering the price of the issue to achieve full coverage on the IPO (Schiller, 2019). From a principal- and agency perspective, a conflict of interest should arise between the underwriters and the issuing firm since the issuers want to raise as much capital as possible. As Loughran and Ritter (2002) stated, issuers rarely complain about this. The principal- and agency theory might hence not be a suitable explanator. A better fit on IPO underpricing may however be the prospect theory, presented by the same authors. We noticed that a significant amount of the companies in the sample pursued rights issues fairly close after their IPO. By doing so, issuers can sell a larger proportion of their stock after the price has jumped, thus caring less about the level equity in connection to the IPO. From an underwriter perspective, they will earn lower profits on the IPO while extract higher fees for subsequent transactions (Ljungqvist and Wilhelm, 2005).

As suggested in previous research (Loughran and Ritter, 2004), high-tech firms tend to be associated with a greater risk, mainly due to the increased complexity associated with these firms. Processing and evaluating firm specific information become more challenging, making it harder for investors and underwriters to form opinions. The risk is offset by an increased ex-ante uncertainty among investors, why underwriters generally value complex firms at a lower price. The reason is partly to avoid a decrease in demand, but also in order to compensate for the increased risk associated with complex firms (Cohen and Lou, 2012; Beatty and Ritter, 1986). In alignment with these theories, the Information Technology industry is experiencing the highest level of underpricing on Spotlight Stock Market. According to Ritter (1998), the theory of asymmetric information can be applied on this occasion as well, since underwriters usually find it challenging to value complex firms. However, since the Information Technology industry experienced such a level of underpricing, it indicates that investors actually are able to process complex information to a greater extent than the underwriters assumes. Therefore, one might ask why underwriters still tend to underprice tech-firms to this magnitude, with no propensities of stopping.
In alignment with Barry et al. (1990) and Megginson and Weiss (1991) and their academic research on venture capital backed IPOs, this study shows similar tendencies, namely that these firms tend to experience lower levels of underpricing. Companies opted to get listed on Spotlight Stock Market are often in an emerging stage, why they tend to get targeted by venture capitalists. In this study, VC-backed IPOs experienced an average level of underpricing at 5.96%, in comparison to their non-VC backed counterparts that was underpriced with 9.43%. Nevertheless, the results from the regression analysis did not provide statistical significance for this assumption. The coefficient for the variable VC did however turn out negative, meaning that there is a negative relationship between underpricing and VC-backed IPOs in this sample.

Since ex-ante uncertainty is assumed having a major impact on underpricing, the presence of a VC-firm as an owner in the issuing firm tend to reduce this ambiguity. Megginson and Weiss (1991) describes the presence of a VC-firm as a signal of quality, thus decreasing the level of uncertainty among investors, causing these IPOs to experience lower levels of underpricing.

Historical financial- and operational data on issuing firms are important factors for investors in order to make informed investment decisions. Previous theories concerning firm age suggests that younger firms, on average, tend to be more underpriced, meaning that there should be a negative relationship between the age of a firm and the level of IPO underpricing (Loughran and Ritter, 2004). In accordance, this study found the coefficient “Age” to be negatively correlated with underpricing. Although, not at a statistical level of significance. Applying a dummy variable approach, categorizing firms as either young or old, would perhaps generate different results.

Another characteristic affecting underpricing among firms is the leverage ratio. In previous academic research, a high degree of pre-IPO leverage work as an indication of firm quality. The underlying assumption is that managers within these firms are forced to adhere to strict budget constraints, making them less risky for investors thus decreasing the level of ex-ante uncertainty. Therefore, higher leverage-ratios are assumed having a negative correlation with underpricing. The regression analysis did not find any statistical significance, nor any negative correlation. A reason could be that high-tech firms compared to non-tech firms tend to be interpreted differently regarding leverage-ratio. Even though previous research conducted by James and Wier (1990), Habib and Ljungqvist (2001), and Schenone (2004) hypothesized that increased leverage reduces asymmetric information, hence lowering IPO underpricing, these findings did not agree with those results. One must bear in mind that the optimal leverage ratio
is a very firm specific characteristic. A higher degree of leverage must not always be positive, something that some investors possibly are aware of when evaluating IPOs.

5.1 Research Limitations
The aim of this thesis was to explore the phenomenon of IPO underpricing on Swedish small- and microcap companies over the period 2012–2019. The period limits the study to a specific amount of observations, which might be unfavorable for our research approach. The researched period was decided on after the data availability of the studied stock exchange. In addition, when collecting secondary data, a proportion of the IPOs had to be omitted, mainly due to switching to other markets, delisting’s, or missing available historical data for various variables. First after confirming their lack of data availability, the affected observations were omitted (49 out of the original 179 IPOs). Conducting this study with a rather small sample of 130 observations might limit the possibility to achieve valid and significant results. Due to the exclusion and the following selection bias, the possibility of wrong results (and thus wrong conclusions) arises. Furthermore, omitted-variable bias might be an explaining factor for the achieved insignificant results for all variables except Industry (Technology). As previous research entails and is accounted for in the theory section of this thesis, several determining factors are considered to have an influence on the underpricing phenomenon. After a careful literary review, five determinant drivers were incorporated as variables in the regression analysis, leaving out numerous factors with possible significant impacts over the result. Moreover, previous research has mainly observed the main market when investigating the phenomenon. Spotlight Stock Market is a stock exchange focused on emerging growth companies, thus different from companies listed on the main market which generally are characterized by high market caps, revenue and profits, and stable growth rates. Previously documented influencing drivers for IPO underpricing may hence not be applicable on a stock exchange that shares the characteristics of Spotlight Stock Market.

5.2 Future Research Recommendations
When exploring the phenomenon of IPO underpricing on Swedish small- and microcap companies, future research could include IPOs from further stock exchanges. There exist two other MTFs in Sweden: Nasdaq First North and Nordic Growth Market (NGM). These stock exchange should preferably be included in a future study due to sharing several characteristics with Spotlight Stock Market. For instance, in firm size and age, regulations and risk, and the general characteristic of hosting emerging growth companies. The scope of such a study would
be broader, resulting in a significantly larger sample, less sensible to company specific first day-returns and various implicating factors of a singular stock exchange. Moreover, this thesis only investigate first day returns of IPOs. Since the stock exchange is underpriced, on average, it would be interesting to investigate the long-run performance of the same observations in a future study.

Regarding the drivers of IPO underpricing, this thesis explored if previously documented influencing factors in IPO literature, e.g. firm age, proceeds, degree of leverage, industry (technology), and venture capital-backing, have a similar impact on small- and microcap companies as they are argued to have on the main market. The obtained results of this study were found insignificant for every variable except industry (technology). As stated previously, Spotlight Stock Market is a different stock exchange in many ways compared to the main market and might thus not be affected by the same drivers. Consequently, other influencing factors should enable higher degrees of explanation and possible significant results when tested on this market segment.
6. Conclusion

The purpose of this thesis was to analyze the occurrence of IPO underpricing on Swedish small- and microcap companies, listed on Spotlight Stock Market. Previous empirical research on the topic provided several theories to put to practice in a new context. Even though the topic is well-researched, no solid consensus has not yet been reached regarding the drivers of the phenomenon. Several researchers have however found significant indications on what might be considered as influential factors. The goal towards this study was to apply previously documented influencing factors from prior studies, in a new context e.g. Spotlight Stock Market, aiming to receive similar empirical evidence and thus contribute to the academic research on the topic.

This report consisted of a final sample of 130 IPOs over the period 2012–2019. By choosing Spotlight Stock Market as the studied stock exchange, we managed to target a sample consisting of IPOs considered as small- and microcap companies, which was the fundamental idea of the thesis. Consistent with previous studies, we found that IPOs tend to be underpriced on this stock exchange, with an average level of 8.31% (market-adjusted). The Information Technology industry was found being the most underpriced, with an average of 15.10%. The Telecom industry reflected the opposite phenomenon, namely being overpriced with an average by 9.48%. The examination of the relationship between IPO underpricing and the influencing factors: industry (technology), firm age, leverage-ratio, proceeds and venture capital-backing were tested through a regression analysis. We found a significant positive relationship at 5% between IPO underpricing and firms belonging to the Information Technology industry. Therefore, previous theories on firm complexity and information asymmetry supports the main hypothesis regarding high-tech firms being more underpriced than non-tech firms. The other factors, predicted to influence IPO underpricing, did however show insignificant results. Previously documented influencing factors of IPO underpricing may hence not be applicable on Swedish small- and microcap companies.
7. References


