

LAPPEENRANTA-LAHTI UNIVERSITY OF TECHNOLOGY LUT

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ANALYZING IPO RETURNS IN THE NORDIC MARKETS

Master's thesis 2021

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ABSTRACT

Lappeenranta-Lahti University of Technology LUT
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Analyzing IPO returns in the Nordic Markets

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51 pages, 8 figures, 20 tables

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Keywords: IPO, Initial public offering, Nordic markets, underpricing, clustering, k-means

The underpricing of initial public offering has been widely studied in corporate finance. The aim of this study was to research the initial public offerings in Copenhagen, Helsinki, and Stockholm in 2014-2019.

This was done by calculating returns compared to the offer price after 1st day, 2nd week, 3rd month, and 1st year of being publicly traded. The returns are observed through the stock exchange and market capitalization segmentation of the companies. The observed companies were also examined with k-means clustering. The whole sample size of the study was 94 companies.

The research questions of this thesis were *"How do the observed stock exchanges perform compared to one another?" "How do the observed market capitalization segments perform compared to one another?" "How do the observed companies move in clusters in regards of mean returns, maximum return, and minimum return during the first year?" "Do the companies grouped in the same cluster have similarities regarding listing year, city, market cap segmentation and industry?"*

Stockholm was the most active market, with Helsinki, and Copenhagen trailing it, respectively. Mid cap segmentation was the most common market cap segment in the study. The stock exchanges performed quite evenly when compared to each other. Also, no market cap segmentation jumped out. It is worth noting, that most companies performed quite well during their first year as publicly traded company.

The k-means clustering resulted in four clusters with all the used variables. The 1st day, 2nd week, 3rd month and 1st year returns were used as the target variables and mean, max and min returns were used as explanatory variables. Unexpectedly, the companies stayed in the same cluster throughout the whole observation year. Companies in the clusters showed no clear similarities when compared to each other. With larger dataset it might be possible to evaluate the future performance of the IPOs and make suggestions on which IPOs would be profitable to invest in. With this dataset and clustering these kind of suggestions are difficult to make.

TIIVISTELMÄ

Lappeenrannan-Lahden teknillinen yliopisto LUT
School of Business and Management
Strategic Finance and Analytics

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Pörssilistautumisten tuottojen analysointi Pohjoismaisilla markkinoilla

Pro gradu -tutkielma 2021

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Hakusanat: pörssilistautuminen, Pohjoismaiset markkinat, alihinnoittelu, klusterointi, k-means

Pörssilistautumisten alihinnoittelu on laajalti tutkittu aihe yritysrahoituksen piirissä. Tämän Pro gradu -tutkielman tavoitteena oli tutkia ja analysoida pörssilistautumisia Kööpenhaminassa, Helsingissä ja Tukholmassa vuosina 2014-2019.

Tämä tehtiin laskemalla osakkeiden tuotot ja vertaamalla osakkeen hintaa pörssiannin tarjoushintaan ensimmäisen listautumisvuoden aikana. Tuottoja tarkasteltiin listautumiskaupungin sekä yrityskokosegmentin avulla. Otoskoko oli 94 yritystä. Yritysten tuottoja ja ominaisuuksia tutkittiin myös k-means klusteroinnilla.

Tämän työn tutkimuskysymykset olivat *“Miten tarkastellut yhtiöt menestyvät verrattuna toisiinsa?”* *“Miten eri yrityskokosegmentit menestyvät verrattuna toisiinsa?”* *“Miten tutkitut yritykset liikkuvat klustereissa keskiarvotuoton, minimituoton ja maksimituoton suhteen ensimmäisen kaupankäyntivuoden aikana?”* *“Mitä yhteisiä ominaisuuksia samoihin klustereihin ryhmittyvillä yhtiöillä on liittyen listautumisvuoteen, -kaupunkiin, markkinakokosegmenttiin ja teollisuuden alaan?”*

Tukholman listautumismarkkinat olivat aktiivisimmat tutkituista pörsseistä. Keskikokoisia yhtiöitä oli listautunut tutkituista eniten. Eri listautumiskaupungit suoriutuivat tasaisesti toisiinsa verrattuna. Mikään yrityskokosegmentti ei suoriutunut merkittävästi muita paremmin. Huomionarvoista on, että yhtiöt menestyivät yleisesti ottaen hyvin ensimmäisen pörssivuotensa aikana.

K-means klusteroinnilla muodostettiin datajoukosta neljä klusteria ajan suhteen. Klustereita tarkastellessa huomattiin, että klusterin sisällä olevat yritykset pysyivät samana ajasta huolimatta. Yritykset eivät liikkuneet klusterista toiseen ajan kuluessa. Samassa klusterissa olevista yrityksistä ei löydetty merkittäviä yhtenäisyyksiä. Suurin osa yrityksistä oli klusterissa yksi. Suuremmalla määrällä yrityksiä ja pidemmällä aikavälillä klusteroinnilla voisi löytää merkittävämpiä yhtenäisyyksiä. Tällöin voitaisiin tehdä hypoteeseja siitä, minkä tyyppiin yrityksiin kannattaisi sijoittaa. Tällä datalla kyseisiä johtopäätöksiä on hankala tehdä.

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1 Introduction

Initial public offerings (IPO) have been the target of many academic research papers and they continue to pique the interest of academics. One of the most researched anomalies within finance have been the short run returns of IPOs. Historically, IPOs have been underpriced. This means that the stock price will rise on the first day it is offered to the public at a marketplace. The reasons for this behavior are manifold. Some of the most common theoretical frameworks handle the topic from the viewpoint of symmetric and asymmetric information, institutional reasons, behavioristic, and adverse selection theory. This thesis will also consider some other possible IPO investment time spans and strategies. Even though IPOs might have yielded extraordinary returns during their first day of trading, newly listed companies have not been very wise investments, counter intuitively, in the long run. This aspect of IPOs will be covered in this paper.

This thesis will study how companies have performed compared to their offer price. This study will take into consideration the year they listed, the stock exchange, and market cap segments. Four different time periods will be studied and compared how the companies have performed at each time. Historically, the first day returns have been under most scrutiny when it comes to initial public offerings. This study will also research how the companies in question have performed after the first day of being publicly traded. Other points of time will be two weeks, three months, and year. This study will track how the companies have performed along the first year of being a publicly listed company. Lastly, k-means clustering is used to analyze the similarities of the companies in regards of mean returns and market cap segments.

1.1 Background

Private stock companies have a closed circle of shareholders, and they are not easily available for most private investors. Publicly traded companies often have a global and broad shareholder base. Initial public offering is the first time a company's share is offered to the public at a stock market. Stocks of publicly listed companies are a popular investment instrument among both institutional and private investors. Historically stocks have yielded about a 10% annual return. However, one might be able to reach far greater returns if they manage to find specific stocks that may rise in value in a short period of time. Historically, many IPOs have yielded far greater returns than the average expected return for stocks. However, this period of extraordinary returns is quite brief, and somewhat hard to predict as an investor. This asymmetry of information available is one of the most

researched topics within the research of IPOs. It will be thoroughly covered in this thesis' literature review.

The purpose of an initial public offering is to gather equity capital for the company, or previous shareholders may be looking to sell their shares and cash out. In the first option new shares are created. In the latter new shares might not be created as the former owners are only selling their already existing shares. Shares may also come in different stock types, some might have more than one vote in the general meeting, for example.

The number of IPOs globally has been firmly attached to the current market situation. The amount of issuing companies has risen simultaneously with better market expectations. For example, the tech bubble saw a large amount of tech IPOs. Reversely, the financial crisis of 2008 greatly cut the willingness of companies to go public. From a global point of view, the biggest financial markets of USA have had a record number of IPOs since the tech bubble of the early 2000's. According to In the US, the IPO markets have been quite steady for a long period of time. Since the tech bubble, only the 2008 financial crisis has severely impacted the markets. Outside of the two-year period of 2008-2009, the amount of IPOs has been in between 150-250. However, 2020 was an extraordinary busy IPO year. Despite of the global pandemic and economic turmoil, 407 companies opted to go public in 2020. It was a significant hike from the previous year. In 2019 an overall of 195 companies went public. (Statista, 2021)

This thesis will focus on the Nordic IPO markets. In the 2010s, Nordic markets have seen a fair amount of initial public offerings. Nasdaq main list markets of Helsinki, Stockholm and Copenhagen will be considered in this paper. Of these market places, Stockholm stock exchange is the biggest in terms of number of companies listed. In the beginning of 2021, it had 385 companies listed on its main list. Stock exchange of Stockholm is clearly the biggest of the bunch, as Helsinki stock exchange had 137 companies on its main list, and Copenhagen stock exchange had a total of 133 companies on its main list in the same period (Nasdaq OMX Nordic 2021a). These numbers include cross listings, where a company is listed at multiple stock exchanges.

In terms of initial public offerings, the Stockholm stock exchange has been the most active of the bunch. The number of listings has increased slowly but steadily since the 2008 financial crisis. In 2020 the Nordic stock markets saw a total of 45 initial public offerings. (Nasdaq OMX Nordic 2021b) Listings on the stock exchanges have varied over time, and for example, the financial crisis of 2008

practically halted all listing activities also in the Nordics, so the beginning of the decade was moderate in the number of listings.

Table 1 shows the amount of main market listings in 2014-2019 in Copenhagen, Helsinki, and Stockholm. The left column shows initial public offerings in said stock exchange, and the right column shows the amount of other main market listings. These other listings are not included in the study. These include listings such as spinoffs and secondary listings. In this study, the initial public offerings are the main subject of the research. This table clearly shows how dominant Stockholm is compared to the other Nordic marketplaces. Especially, in the early years of the study there were busy times on the Stockholm stock exchange. It also maintains a steady flow of other main market listings. Copenhagen has a maximum of three IPOs per year, and 0-2 other main market listings. Helsinki, on the other hand had zero IPOs in 2014 but redeemed itself the very next year. In 2015, Helsinki saw five IPOs. This trend carried through the next years as Helsinki maintained this level of main market activity until 2019, where it saw only one IPO and one other listing.

Table 1 Main market activities during the observation period (Nasdaq, 2021)

	Copenhagen		Helsinki		Stockholm	
	Initial Public Offerings	Other	Initial Public Offerings	Other	Initial Public Offerings	Other
2014	1	1	0	3	11	9
2015	2	0	5	0	18	7
2016	3	0	3	3	11	11
2017	2	1	5	2	15	11
2018	1	1	4	2	7	17
2019	0	2	1	1	5	10

There are also other marketplace for companies to be listed on in the Nordic countries. For example, Nasdaq has First North Growth Market, that is intended for smaller companies. The First North is less regulated than the main market and the prerequisites are not as strict as on the main market. Smaller companies may seek listing on a less regulated exchange for the capital possibilities and acquiring a market value for the company. First North is perhaps more suitable for smaller companies because, for example, there is minimum market capitalization limit for the companies, and the companies are allowed to use their local accounting standards. Often the companies listed on First North, eventually seek listing on the main market. (Nasdaq, 2019) Nasdaq is not the only company offering these services. In Sweden, there is Spotlight Market Place, which was formerly known as Aktietorget. Spotlight is a Swedish marketplace also specialized in growing companies and helping companies reach their potential (Spotlight, 2021). Companies may also change the

marketplace in which they are listed at. As mentioned above, a common change is to go from First North to the main list.

Companies can also change altogether the marketplace, and go, for example, from Spotlight to Nasdaq. A company can also be listed simultaneously at several different marketplaces in different countries and currencies, this is called a cross listing. For example, the Scandinavian finance conglomerate, Nordea, is listed in Helsinki, Stockholm, and Copenhagen (Nordea, 2021). Nordea's stock is listed in local currencies in their respectable stock exchanges: in Helsinki it listed in euros, in Stockholm in Swedish Krona, and in Copenhagen in Danish Krona. The reasons for cross listing include: better access to capital and enhanced liquidity, improved corporate governance, and lower currency exchange costs (Corporate Finance Institute, 2021b).

Another special case of new equity offering is a spinoff. When a publicly listed company decides to take a part of its existing business and take it public as a new independent company, it is called a spinoff. Advantages achieved by a spinoff are for example, greater valuation multiples, management can focus on their core business, and investors can evaluate separate investment decisions. (Harvard Law School, 2019) Example of a spinoff company from recent years could be Traton SE, which listed on the Stockholm main list in 2019. It was also listed on the Frankfurt stock exchange, so it was simultaneously a dual listing. Traton SE is a subsidiary of German car manufacturer Volkswagen. Traton SE stated that it was looking for entrepreneurial flexibility and equity capital with the spin off listing (Traton SE, 2019)

The companies that have listed on the main markets of Nasdaq Copenhagen, Helsinki, and Copenhagen, due to these above-mentioned reasons are not included in this study, as they are not considered traditional initial public offerings. One of the main goals of this paper is to find out how are previously unlisted companies valued by the stock market when they decide to go public for the first time. If a company has been listed on a different platform, it already has a valuation set by the markets. Similarly, a spinoff has already been a part of a listed company and it is much easier to seek out a fair value for a subsidy of a listed company.

1.2 Research question and theoretical framework

First day performance of initial public offerings has been widely studied and existing literature and theories exist. This study will try and find some of the possible underlying factors of how the city and market capitalization may affect the initial performance of the company. In addition to just the

first day performance of the company, the IPOs will be monitored at three other times during their first year of being a publicly traded company. Stock returns after two week, three months, and a year will be taken into consideration. The current stock price will be compared to the initial offer price of the IPO.

Research questions of this study are:

“How do the observed stock exchanges perform compared to one another?”

“How do the observed market capitalization segments perform compared to one another?”

“How do the observed companies move in clusters in regards of mean returns, maximum return, and minimum return during the first year?”

“Do the companies grouped in the same cluster have similarities regarding listing year, city, market cap segmentation and industry?”

Theoretical framework of the study will focus on the essential theories and articles of IPOs, IPO underpricing, and long run performance of IPOs. IPO underpricing has been widely studied for a long time. The main theory section will handle previous studies on IPO underpricing in both short and long run. Main reasons for the observed underpricing will also be considered. IPO process will also be handled. These are popular and often discussed topics in corporate finance.

1.3 Structure of the study

This study is arranged as follows: 1. introduction, 2. main theory and literature review, 3. data and method, 4. Results and discussion, and 5. Conclusions.

The first chapter will introduce some background and reasons for this thesis. It will also cover research questions and theoretical framework of the study.

Second chapter will discuss some background of the initial public offering process and shortly review the regulatory requirements, the reasons why companies may choose to go public in the first place, and what are some of the implications of this. The second part of the chapter can be considered as the literature review on IPO underpricing and it will also cover the process searching for the correct

and most important literature articles on the subject. In the chapter can be found a table consisting of the essential literature used in this paper.

Third chapter will shed light on the data gathering process and introduce the methods that are used in this paper to find answers.

In the fourth chapter the results of the calculated returns are introduced, and the results are discussed by city and market cap. The results of the k-means clustering are analysed.

Fifth chapter will conclude the findings, and what their implications may be.

2 Main Theory

This chapter will look at the initial public offering process from the issuing firm's point of view, why a company may choose to go public, and the fundamental academic research on IPO underpricing. The IPO process section will make use of the Finnish legislation on the topic and will rely heavily on the Finnish Financial Supervisory Authority, a handbook issued by the Finnish Foundation for Share Promotion, and other corporate law sources. Common knowledge about the process will also be handled and basic corporate finance literature and other such sources will be used for this purpose.

2.1 IPO Background

Chapter 2.1. IPO Background will discuss main aspects behind the initial public offering process from the point of view of the company and regulation. It will introduce the process of initial public offering, reasons behind it, regulatory requirements, and valuation of the company for the purpose of IPO.

2.1.1 IPO Process

This part will cover the process of an initial public offering from the perspective of the Finnish legislation. A handbook (2016) issued by Finnish Foundation for Share Promotion (hereon FFSP) will be used along with sources from the Financial Supervisory Authority (hereon FSA) are used for the legislative sections. Also, some other papers will be used on some more common non-country specific aspect of IPOs, such as the roadshow and allocation of stocks (green shoe etc.).

Security offerings come in many colours; this paper will focus on initial public offerings. Initial public offering is when a company offers its stock to the public for the first time. More specifically, the focus will be on the main list offerings of Nasdaq Nordic stock exchanges. This includes Copenhagen, Helsinki, Reykjavik, and Stockholm. Nasdaq Nordic also has a less regulated First North -list. It is meant for smaller companies looking for growth opportunities outside the private equity and debt capital world. The companies are typically divided by market capitalization and industry. Every company listed company has a market capitalization, and they are divided into small, mid, and large cap.

According to the FFSP (2016) the IPO process takes around 12 months. The IPO process is quite complicated and a highly regulated one. The FFSP (2016, 10) divides the IPO process into three stages: preparation and mapping of qualifications, the IPO itself, and thirdly, post-market stage, which refers to the life as a publicly traded company. The process can be also divided into four

phases, such as in figure 1 above. However, according to the FSA (FSA, 2021) the needed preparation for the enhanced due diligence and switch to IFRS can be put into action already before a formal decision to go public. A company should commence a study about its own prerequisites of going public. This study should find answers if the company has sufficient qualifications to be publicly traded (FFSP 2016, 14).

Figure 1 shows a timeline of what aspects shall be taken into consideration at what time period of the IPO process. The whole process starts around one year before the actual listing. The first two phases are mainly internal processes and may include external entities such as consultants and auditor. During the final months of the process, the offering is made public, and investors are approached, and the marketing of the offering is under way. Also, the offer price is set and subscriptions are collected. Finally, after months of preparation, presentations, and road shows, the company is able to go public.

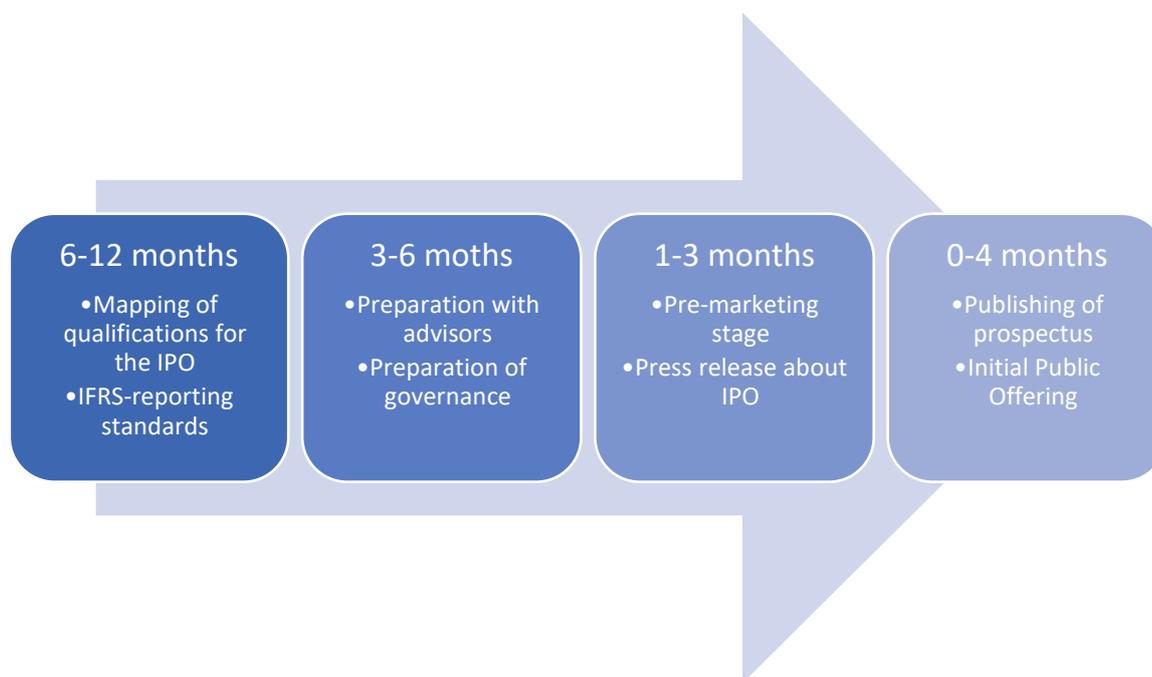


Figure 1 Initial Public Offering process (FFSH, 2016)

According to FFSP (2016) the criteria for being eligible to be publicly traded, a company must fulfil the following: general prerequisites for being public, such as correct type of business entity, financial statements for the last three years, IFRS accounting, sufficient financial ability, sufficient amount of

publicly held shares and shareholders, reliable pricing, and liquidity of the stock, a market cap over 1 million EUR, a prospectus and proper corporate governance.

Once a company decides to go public it must follow IFRS reporting standards if it has not already. However, according to the FSA (2021), the preparations for IPO should be started well before the actual issue. For example, the transformation into IFRS reporting standards has a significant effect to the IPO schedule. Also, a thorough study should be conducted into the qualitative attributes of the issuing company. Such qualities are operational and structural, these are for example, timeliness and high quality of financial reports, proper control of said reports, and accountability and realism of financial forecasts. (FSA, 2021)

During the IPO process the company will release several documents to the public to provide sufficient information about the prerequisites of the IPO. The most notable one is the prospectus. The prospectus is a mandatory document and the information it must provide is dictated by the law. The company and underwriters usually also provide other marketing materials supporting the IPO. The prospectus must provide the public with sufficient information about assets and liabilities, future forecast, and the type of issued stock and aspects affecting its value. The subscription price is also often stated on the first pages of the prospectus.

Before the issue, the company must forego a vast amount of different due diligence processes. These due diligence inspections are conducted by several different entities such as the underwriters and even by outsider entities. This inspection conducted by outside entity allows the company to verify that the issuing firm truly is eligible for the IPO. The due diligence should cover the corporate governance of the company, financial due diligence, and legal due diligence. Corporate governance due diligence cover topics such as: financial reporting, risk management, and organization and resources. Financial due diligence should cover topics such as: general description of business, business model, financial forecasting, and reliability of financial reports. Legal due diligence should cover topics such as: corporate law, holdings, leadership group, and immaterial property rights. This information is essential in the initial valuation of the share. (FFSP 2021)

A very significant change in the everyday life of the company is the vast amount of information it must provide to the public before and after the IPO. Information Disclosure obligation begins when the company makes the initial official statement of going public. (FFSP 2016, 9) Naturally, after going public the obligation to disclose information about the company continues. The obligation of

information disclosure is based on security law, market abuse regulation and Helsinki stock exchange rules. The purpose of a broad information disclosure is to guarantee even and simultaneous opportunities to make rational analysis on the issuer and its share. Companies are also obligated to issue Annual and half-year financial reports. (FSA, 2021)

The IPO process has many stakeholders apart of the issuing company and its staff itself. These stakeholders include underwriter and other advisors, market place, investors (old and new), media, legal authorities, and auditors. (FFSP, 2016) Perhaps the most notable one for the company is the underwriter. The underwriter can be described as the financial midwife to the issue. Often the underwriter can possess a triple role; they act as the main advisor during the process, they buy the issue, and resell it to the public. The main underwriter can also be called the bookrunner (Allen, Brealey & Myers 2017, 385). Companies usually pick on main underwriter, which is an investment bank. The underwriter subsequently forms a syndicate with other financial actors. The syndicate is formed to spread the risk of the issue and guarantee the financial resources of the issuance.

Table 2 provides a brief look into the main stakeholders in the IPO process according to FFSP (2016) in a table form. The issuing company is on the left, and stakeholders are on right. As mentioned above, the company has many stakeholders to take into consideration in the IPO process.

Table 2 Stakeholders in the IPO process (FFHS, 2016)

Company	Stock Exchange	Personnel
	Financial Authority	Media
	Old Shareholders	Underwriters
	New Shareholders	Accountants

Issuing company and the underwriters agree on the commitment type of issue. There are several types of underwriting commitment types. Mandelker & Raviv (1977) recognise three major ones: firm commitment, best efforts, and stand-by.

In the firm commitment contract, the underwriting company commits to buy the entire offering at a fixed price. The shares are then sold to the public at the same price. Firm commitment may involve a process of book building or fixed price placing (Espen Eckbo 2007, 244). Mandelker & Raviv (1977) add that the underwriting bank, not the issuing company itself, bears the risk of not over subscribing the issue.

Best efforts contract type does not require for the underwriter to purchase any shares. Underwriter is only tasked with the distribution of the new issue and does not underwrite the issue. (Mandelker & Raviv 1977). However, the underwriter is often obligated to sell a fixed amount of the issue or the issue is cancelled (Espen Eckbo 2007, 245).

A rights commitment provides the underwriter with a fixed number of in-the-money warrants to purchase the shares at a fixed price. Standby issue commitment is a rights issue combined with a firm commitment. The underwriter agrees to buy the shares that the issuing company is not able to sell to the public at a fixed price. Naturally, the underwriter receives a fee for this. (Espen Eckbo 2007) (Mandelker & Raviv 1977).

Other, perhaps less typical, types of flotation methods are, for example, sealed bid auction, and direct public offering. A sealed bid auction is a traditional type of IPO. A fixed number of shares are sold to investors with preannounced rules for the auction. The auction can be Dutch or Boston type. Dutch type auction has a fixed price announced in advance and the investors compete for allocation of the stocks. Boston type auctions investors may bid at a price range. Direct public offering completely foregoes the financial middleman, that is instrumental in the above-mentioned agreement types. Direct public offering does not include an underwriting bank, and the issuer directly sells the shares to the public without a financial middleman. (Espen Eckbo 2007) A notable and recent example of this type of floatation is the issue of Spotify on the New York Stock Exchange.

The issuing company can issue new stocks or sell already existing ones. The former dilutes the pre-existing shares and is an initial public offering. The latter allows the early investors or founders to transform their holdings into cash and is known as a direct listing. Direct listing may not include an underwriter, and it does not have the stability backed by the underwriters. A company going public via direct listing, does not have a subscription price for the company to start their trading. The price of the stock is simply set by the markets when the share starts trading (TD Ameritrade 2021). Hughes & Thakor (1992) discovered that the IPO underpricing might be greater when the stock is offered directly, rather than the issuing company using an underwriter.

Prior to the offering the underwriter and the issuer go on a road show. Road show usually is executed after the announcement of subscription price and the publishing of the prospectus. During the road show, investors may indicate their interest and subscribe to the issue. (FFSH 2016) This gathering of interested investors is called book building, and the information received from the road

show can also be utilized at the final valuation of the issue. Naturally, this requires that there is an initial price range for the issue. If there is no prior price range, the book building process can be vital in the valuation method of the share. The investors can indicate their maximum price they are willing to pay for the share, or they may simply express the amount they are looking to invest in the issue (Allen, Brealey & Myers 2017, 386). The book building process consists of three steps: 1) underwriter decides which investors are invited to inspect and buy the issue 2) investors evaluate the issue and indicate their interest and demand 3) underwriter sets initial price and allocates the issue (Sherman & Titman 2002, 4). Figure 2 shows the bookbuilding process as described by Sherman & Titman (2002). The process starts with the book runner meeting with investors and introducing the issue. In this phase, the underwriter pursues maximum interest by investors. This allows the underwriter to push the offer price into the top of the initial price range, and a wider shareholder base. In the next phase, the investors conduct their own research on the company based on the given information and their own available information. At this point, investors may or may not express their interest in the offering, and if they want to subscribe to the offering. After collecting subscriptions from investors, the investor is able to allocate the issue to willing participants. If the offering is heavily over subscribed, the investors share may be smaller than expected, and vice versa in the case of under subscription.



Figure 2 Bookbuilding process (Sherman & Titman, 2002)

2.1.2 Why do companies go public?

As has been previously stated, the process to go public is a complicated one and demands a lot from a company. The everyday operations of the issuing company will change and there will be considerable changes in almost every aspect of the company. For example, the company must open its business activities more than what they should if they were non-public, possibly change its accounting standards, and keep shareholders informed regularly. The company will also have many new shareholders and possibly even be open for a hostile corporate takeover. So why should a company go public since it has so many risks, and the process can be costly and time consuming?

One of the main purposes of the financial markets is to offer corporates financing at the right cost. The stock markets are one of the places a company may look for financing. For a rapidly growing and capital-intensive company going public can be the most efficient method of gathering equity financing. The cost of equity capital will be lower after the offering, and if the company need additional financing it will be easier to value the company's true value since it is publicly listed. Often the company may even receive debt financing at a lower rate because of it being publicly listed.

One of the most notable reasons for the company and its shareholders is that being public will enhance the transparency and reliability of its business. Also, its name will more widely recognised. All these reasons will be of assistance if the company is looking to expand its actions domestically or abroad. Being publicly listed, the company can also use its stock as method of payment in mergers and acquisitions. The stock can also be a method of extra payment for the company's employees. A publicly offered stock can also be a marketing method and it will be easier to enter new markets.

One possible reason for a company to consider and going public may be that the company and its initial shareholders feel that the time is favourable for IPO. It has also been widely documented that IPOs tend to happen in clusters. During certain time periods many companies seek to go public. Apart from a high number of IPOs, typical for these offerings is that they reap abnormally high returns during first days of trading. Extreme example of such hybris in the IPO markets is the tech bubble of the turn of the millennium. Both good and bad quality companies have been argued to go public during these periods of heightened IPO activity.

Ibbotson & Jaffe (1975) were among the first ones to pay attention to certain time periods when companies sought to go public more than normal. They argued that it may be possible to predict the times that IPOs were to produce abnormally high returns. They define "hot issue" markets as

periods in which first month returns of new issues are abnormally high. Investors may concentrate their capital in these “hot issue” periods and avoid cold markets. However, investors run into the problem of allotment of the issue. Hot issues are highly sought after, and investors are able to only receive meek allotments during these periods. Underwriters recommend issuers to go public during hot issue periods. This is also in the interest of the issuing company since they are able to receive larger proceeds during these periods.

Helwege & Liang (2002) argue that hot issue periods have an unusually high frequency of IPOs, clear underpricing, offerings are oversubscribed, and issues are concentrated in certain industries. They state that some previous theories have suggested that the concentration may be due to a technological breakthrough in the industry. This new tech or positive leap in productivity results in a cluster on offerings in a certain industry. However, Helwege & Liang find no concentration of certain industries during hot issue periods. They also find that the same industries have dominated the IPO markets for a longer time. These are industries associated with new products, such as PC (and everything related to), and they have a strong long-term growth trajectory. Companies planning to go public during hot issue period may be late and have their IPO in the cold issue period. The hot issue markets are rarely, if ever, the result of a single industry’s hot issue period. Rather, the hot issue period is hot for every industry, and so are the cold periods. A particular industry rarely is hot whilst the overall markets are cold.

Benninga, Helmantel & Sarig (2005) explain the hot IPO markets with cross sectional correlation in profitability of companies. They argue that macroeconomic conditions affect multiple industries, profitability is often correlated. Good macroeconomic conditions have a positive affect on cash flows of companies. Benninga et. al. predict that companies tend to go public when their cash flows are high, so when one company has favourable conditions to go public, others often have too. They also state that cash flows are higher correlated within industries than cross sectionally. This results in IPO waves of certain industries during certain time periods. Hot issue periods are correlated with high overall stock markets because the positive macroeconomic conditions also affect listed companies, thus during hot issue periods listed companies reap higher returns.

Brau & Fawcett (2006) conducted a survey about the reasons why companies may go public. They asked 336 chief financial officers about the timing of IPOs. The survey about timing was driven by some previous theories about IPO market timing. First, Brau & Fawcett (2006) wanted to find out if companies try to take advantage of bull markets and go public during. Second, if the overall IPO

market at the time had a significant effect on decision to go public. Third, they wanted to find out if the business cycle and growth cycle of firms affected the need for equity capital that is available in the IPO. The CFOs stated that overall stock market conditions were the biggest factor in IPO timing, recent transactions in the IPO market were not considered as significant. Industry conditions and the need for equity were viewed as relatively important reason for IPO timing. Furthermore based on their material, Brau & Fawcett find out that small firms depend on IPOs to gather capital for growth, and they also look for other companies in the same industry to go public and try to issue in the same time period. Also, the partition of ownership decrease at large-decrease companies motivates CFOs to mainly pursue IPO proceed rather than try to time the markets.

2.1.3 Allotment of the issue

If every share offered in the public offering is subscribed, the IPO is said to be over subscribed. Often the underwriting syndicate oversells the issue. The amount of share sold at the issue is decided beforehand by the company (Corporate Finance Institute 2021a). The bids made by the investors are not legally binding, therefore the underwriter may be able to allocate shares to “better” customers. The shares can be allocated to both institutional and private investors. (Espen Eckbo 2007) Institutional investors have expressed their interest on the share during the road show conducted by the issuing company and the underwriter. Private investors can participate via internet by placing buy orders for the amount they may want to subscribe.

The allotment rules are often released in news releases published by the issuing company. The rationing details are described more closely to the investor in a newsletter. The letter is sent to the investor after their allotment has been approved. Often the size of the allotment is dependant on the order size. The rules are often made so that they favour small investors. However, prospectuses often state that if the issue is oversubscribed, the underwriter is allowed to allocate the shares disproportionately. This may even be in the issuing company’s interest. This method will allow for a broader ownership after the issue, thus preventing the risk of a takeover. (Keloharju 1993)

The allotment of initial public offerings has also raised academic interest and has resulted in many studies. The studies have focused on, for example, how much is allocated to institutional investors vs. private investors, who receives these allocations, and do bigger institutions receive preferential treatment. Some of these questions can be answered based on the data that is available, but some, for example preferential treatment, are harder to solve, because the data may not be publicly available. (Ritter & Welch 2002, 1808) Underwriters often maintain a portion of the issue to

themselves to stabilize the stock price after the issue. This is known as a stabilization bid, and it is widely used as a marketing argument by the underwriters (Benveniste, Busaba & Wilhelm 1996). Price stabilization is the only form of stock market manipulation allowed. These activities include pre-IPO allocation, post-IPO purchases by the underwriter, and discouragement of selling (Ritter & Welch 2002, 1813). In the USA, the SEC has deemed stabilizing bids justifiable on the grounds that it mitigates the risk in the distribution phase of firm-commitment offerings. However, this way merely shifts the risk of an unsuccessful IPO to the underwriter. However, the possible stabilizing bid should be disclosed on the prospectus. (Benveniste, Busaba & Wilhelm 1996).

Institutional and private investors are often juxtaposed in academic research as investors. In reality, this is not the case. Institutional investors are often better informed and when book building process is used, institutions receive better allocations. Institutional investors are also block holders, who may have substantial power over the management of the company. Institutional investors are also able to conduct a takeover of a company, if it has enough shares. The issuing company may benefit of a more widely dispersed allocation, as it can help prevent a takeover of the company. Often the management of the issuing company holds the stock longer than outside investors for the same reason. Some may even argue that retail investors are more important than institutional ones. This is due to the increased liquidity caused by the retail investors and wide shareholder base. (Ritter & Welch 2002, 1812)

A green shoe agreement is an over-allotment option that can be exercised in case of over subscription. If the offer is over-subscribed, the underwriter can buy additional shares to sell to the investors. Green shoe option can also be used to stabilize the stock from fluctuation after the issue. This way the underwriting must not risk its own capital in the process. (Corporate Finance Institute 2021b) In case of the share price weakening, the underwriter can also buy back the extra allotted shares, to push the price up again. These shares are then retired completely (Ritter & Welch 2002, 1813).

2.1.4 IPO Valuation Process

The valuation of the new equity issue can be described as a dynamic process. The price estimate for the share enhances as the IPO process advances. Aspects that affect the price estimate are, for example, outlook for both the company and its industry, and the progress of its competitors. (FFHS 2016) Valuation can be tricky even for promising companies and experienced underwriters. Bill Gates was struggling to set the offer price for the initial public offering of his company, Windows.

Windows had a wider product range than some of its competitors in the PC industry, whereas it had some of its competitors had a longer track record in the business and more predictable cash flows. Gates decided to use multiples that lied between those competitors and Windows' stock saw a big rise in its price on the first day of trading (Kim & Ritter 1999).

The process of valuation can be somewhat divided into three steps (Figure 3): 1) preparation stage, where the initial value of the company is assessed and the company is positioned 2) pre-marketing stage, where feedback from the investors is considered 3) book building stage, where subscriptions from the investors are gathered, at this point there is price range for the issue, or the underwriter has set a price for the share. These stages result in the final offer price at which the issue is offered to the investors. (FFHS 2016)

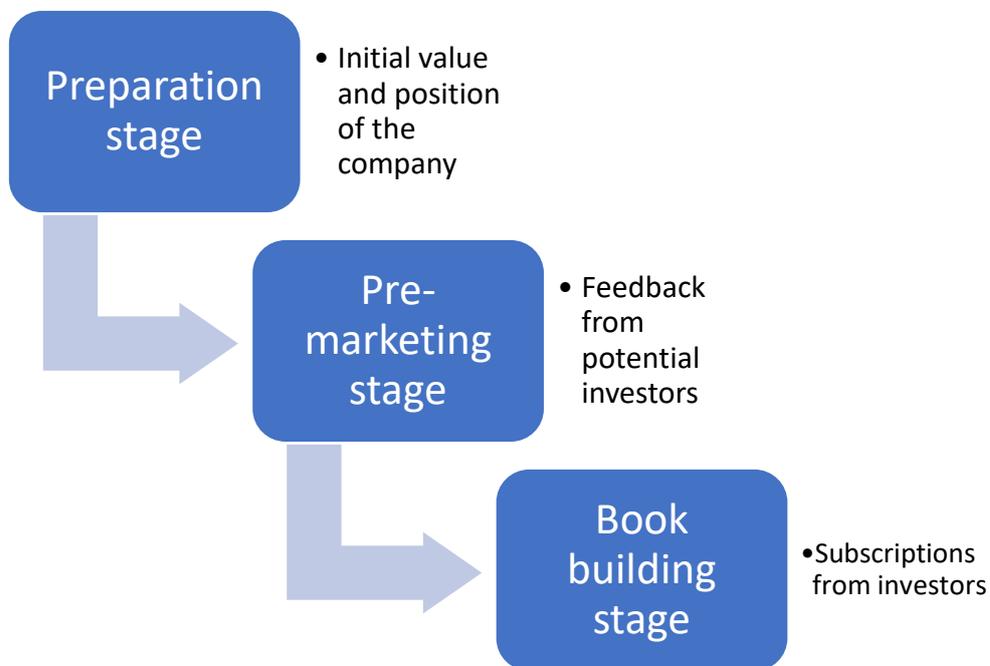


Figure 3 Valuation process of the IPO (FFHS, 2016)

According to Rosenboom (2012) the valuation and pricing processes are two separate ones, and the valuation process results in the pricing of the IPO. The valuation process starts with estimating the fair value for the company. For this estimate the underwriter uses various methods of valuation. These methods include multiple valuation, dividend discount model, discounted cash flow model, economic value added, and analyst specific valuation. Underwriters often utilize multiple of these valuation methods to receive a more precise estimate.

The most used method of the above mentioned is the multiple valuation model. Often underwriters use comparable firms or transaction multiples for the valuation. Popular multiples have been price to earnings ratio, price to cash flow, price to sales, and enterprise value ratio. According to the same study, dividend discount and discounted cash models are also fairly often used for the valuation process. Economic value added and underwriter specific methods are not that often used in the process. After the initial valuation estimate, the underwriter adds their own deliberate price discount. This results in the preliminary price estimate for the stock. Similarly, as in the FFSH model, the price is subject to change after the book building and investor feedback.

Kim & Ritter (1999) recommend using both accounting information and comparable firm multiples for reliable results in the valuation process. Multiple ratios can be imprecise when used alone for the valuation. This is due to the young age of many listed companies, for which future cash flows may be difficult to forecast. According to Kim & Ritter (1999) unadjusted multiples possess only modest reliability. They find out that the most precise price estimates for the offer come with adjustments after hearing the possible investors. Fundamental analysis and multiple ratios only provide the preliminary price range for the offer, which is adjusted after considering market demand expressed by investors.

Deloof, De Maeseneire & Ingelbrecht (2009) state that dividend discount and discounted cash flow models are the most used methods for valuing IPOs. However, according to the same study multiple analysis is also very often used in the valuation process. The choice of valuation model can also vary depending on the industry of the issuing company. For example, price to earnings ratio is often used in the services, industrials and consumer goods sector, dividend yield is considered important for the financial services and utilities, and comparative valuation methods are more popular in stable industries where the value of the company is easier to capture on the balance sheet by the accounting firm.

FFSH (2016) list similar methods as the most used in IPO valuation. They repeat the assessment that comparable multiples and models based on discounted future cash flows are widely used in the valuation process. Apart from previously mentioned ratios, multiples including enterprise value (EV) are recommended here as a useful valuation multiple. Especially EV/turnover, EV/EBITDA, and EV/EBIT are mentioned. Enterprise value is useful for estimating possible market capitalization for unlisted companies. It includes market capitalization but also includes liabilities (Investopedia 2021). Apart from these methods of valuation, also realized acquisitions can be used to assess possible

value for the issuing company. It is important to consider acquisitions of companies in the same sector and utilize their comparable multiples.

2.2 IPO Underpricing

Chapter 2.2. IPO Underpricing will discuss the main theories behind underpricing of initial public offerings. As table 3 shows the topic has been widely studied and literature on it is vast and comprehensive. In this section, the most essential and notable theories will be discussed.

The main sources for the articles have been different databases for academic literature, such as Elsevier and Scopus. Main key words used for searching relevant articles were: IPO, initial public offering, underpricing. Of the found articles abstracts were skimmed and the essential ones were used for the literature review. After finding essential literature, this gathered information was used to deepen and specify the search. This was used to search for articles of specific theories of IPO underpricing, such as signaling theory, and long run performance of IPOs.

Table 3 shows some of the most important and essential literature and theories about the subject. These studies are also reviewed in this paper's theory chapter. Earliest studies include Hatfield K. & Reilly F.K. (1969) that researched new equity issue from underwriter perspective and compared IPOs to the market. They also researched if short run returns can be used to predict long run returns. Other essential and accomplished academics on the subject are Ritter J.R., and Rock K.. Rock (1985) made some trailblazing studies on the asymmetric information between different agents in the IPO process and pricing. These studies and theories have been widely cited and are also featured in this paper. Ritter J.R. is a notable academic on the subject of IPO underpricing and his papers are also cited in this study. He also maintains a wide database on the website of University of Florida (University of Florida, 2021). The database includes global data of IPOs and their underpricing dating all the way back to 1970's. Other essential papers in table 3 mainly handle different theories about IPO underpricing and the papers featured on the list, are the most important of the bunch that are cited here.

Table 3 *Essential literature on the topic*

Author(s)	Study	Theories
Allen F. & Faulhaber G.R., 1988	Signaling by Underpricing in the IPO Market	Signaling theory and hot issue market
Baron D.P., 1982	A Model of the Demand for Investment Banking Advising and Distribution Services for New Issue	Asymmetric information and incentive for underpricing
Brav A. & Gompers P.A., 1997	Myth or Reality? The Long-Run Underperformance of Initial Public Offerings: Evidence from Venture and Nonventure Capital-Backed Companies	Long run performance of IPOs
Hatfield K. & Reilly F.K., 1969	Investor Experience with New Stock Issues	Early study of underpricing in the US
Ibbotson R.G. & Jaffe F.J., 1975	Hot issue markets	IPO activity during different time periods
Ritter J.R., 1991	The Long-Run Performance of Initial Public Offerings	Study of IPO performance in the long run up to three years of being public
Ritter J.R. & Welch I., 2002	A Review of IPO Activity, Pricing, and Allocations	Reasons for underpricing, long run performance
Rock K., 1985	Why New Issues Are Underpriced	Asymmetric information among investors and underwriters
Rosenboom P., 2021	Valuing and Pricing IPOs	Basic theory of IPO valuation process and methods
Tinic S.M., 1988	Anatomy of Initial Public Offerings of Common Stock	Legal liability of the IPO underwriter

Reilly and Hatfield (1969) discussed already in the late 1960's the under-pricing of IPOs and some possible reasons. They find five main reasons for under-pricing: 1) public's uncertainty about future cash flows, as well past ones 2) customer satisfaction, underwriters have an incentive to set the offer price low enough so that it will be over-subscribed, and the price may rise shortly after the IPO. Thus, keeping both shareholders and issuing firm happy 3) getting rid of the stocks fast, underwriting banks have a relatively small capital basis so they must maintain a fast turnover rate of capital, and this is reliant upon fast selling of the issuing stock 4) avoidance of unnecessary price fluctuation, underwriters are allowed to sell and purchase new stocks if needed, however this ties up capital and time, under-pricing reduces this risk 5) underwriting banks usually receive some of the issuing company stock or an option to buy the stock as a fee at a predetermined price, underpricing increases the values of this position.

The same paper (1969) also, offers some arguments why the issuing company may be willing to leave some money on the table: 1) shareholder satisfaction with their new stock 2) executives of the issuing company often receive stock options at the issue price, financially benefiting from the underpricing 3) it is not planned to satisfy all capital needs of the issuing company during the IPO,

for example investors may be willing to buy more of the stock if they have good experiences with the stock.

2.2.1 Theories based on asymmetric information

When other side of a deal possesses more information on the deal, the situation is called asymmetric information (Pindyck, Rubinfeld 2001, 596). Regarding IPOs, possible one of the biggest sources of asymmetric information is the final level of demand. Often the issuer has a different perceived value than the investor. This is one of the reasons that result in the underpricing of IPOs. Information asymmetry is also one of the most discussed topics in academic literature regarding IPO underpricing. (Katti & Phani 2016) The same paper suggests that this theory can be perceived as an agent problem. It can be divided to two main categories: asymmetry between the issuer and underwriter, and asymmetry between informed and uninformed investors.

Baron & Holmström (1980) discuss some of the main drivers for asymmetry between the issuer and the underwriting bank. The investment banks usually have superior knowledge of general demand through their network of pre-existing contacts with potential investors. The bank may be looking to suggest a price that would not be in the issuers interest, and the issuing firm may be unable to determine if the price set by the bank is correct. The same paper suggests that “the underwriter wants a price that is high enough to satisfy the issuer, but low enough to make the probability of successful sale to investor reasonably high”. However, the underwriting bank must avoid harm to its reputation by not continually pricing IPOs too low. Baron (1982) however suggests that the superior amount of knowledge possessed by the investment bank may be of use for the issuing firm. The bank may be able to set the price correctly which is something the issuer may not be able to do.

Rock (1986) identifies two different groups of investors: informed and uninformed ones. The informed investors are better suited to make a smart decision whether an IPO is worthy of investing into. The uninformed ones are looking to buy the issue without much knowledge, also the bad ones which the informed investor can avoid. Thus, the uninformed investor is left with a hefty position on an overpriced IPO. This is called the winner’s curse. Similarly, the uninformed investor gets only a small portion of an underpriced one, because the informed one invests heavily in them.

One possible case if information asymmetry may also occur when the investors are equal, but they possess better information about the demand of the offering. In this situation, the issuer is not well

informed or informed at all about the market demand for the offering. Investors only invest in IPOs that are underpriced. (Ritter & Welch 1992)

Intertwining with Rock's (1986) theory about uninformed investors, Ritter (2002) suggests that rational investors should fear the lemon problem. Higher than average companies should deliberately underprice their issue to signal their high quality. Conversely, worse companies must try to price the issue at the average price.

Allen (1989) assumes that the best information about the company is held by the issuing company itself. If a company is convinced about its prospect in the future, it may underprice the offering on purpose. The share price should rise and thus signal that the company has high quality. This is called the signalling theory. This method should only be used by truly good firms as they will purposely leave money on the table if they underprice the issue. According to Allen, only a high-quality company can recoup the loss made in the IPO. Companies with worse prospects have no interest in signalling because they are not able to make up for the money left on the table in the issue. So, if a company itself possesses information about its prospects, it may purposely underprice the offering. Conversely, it may also try to make as much money as possible if it sees that its future cash flow may not be that promising.

Signalling companies may also have an incentive to "leave a good taste in investors' mouth" (Welch 1989, 422). Welch (1989) also suggests that one of the reasons for underpricing IPOs is that the company may be able to obtain higher prices in seasoned equity offerings. Lower quality companies must also underprice their IPOs to signal better quality than what reality may be. The costs caused by this are known as imitation costs.

Allen (1989) raises the question if companies would signal by underpricing at all, if they had a wider range of signalling methods available. Often the company has other methods at their use than merely underpricing. These methods may include their choice of underwriter, and auditor.

Benveniste & Spindt (1989) argue that book building is a dynamic process, in which both, the issuer and the investor reveal information to each other. The information the issuer receives from the investor is utilized to price the offering. To gather best information from the investors, the issuer may reward them with bigger allocations in the offering. This may also induce investors to reveal their information about the offering to the issuer. In a way according to this theory, underpricing can be thought of as a cost for acquiring information from the investors. Benveniste & Spindt (1989)

also state that investors are only willing to give out information on underpriced IPOs. This on the other hand means that the offer price is only partially adjusted by the investors information. Correctly, or overpriced issues would not garner such interest that investors would be willing to reveal their information on the offering.

It is worth noting that, it is also not in the underwriter's interest to not fully adjust the offer price to the correct level. Hanley (1993) studies that underwriters maintain a level of underpricing even if the IPO is set to be successful measured by demand. Hanley (1993) finds that companies who receive many positive offers during the road show and price their offering at the top of the initial price range, have great success. She uses the issue of Microsoft as an example: initial price range was 16-19 USD, which was subsequently raised to 21 USD. Also, the number of shares sold had to increase. The issue was considered to be very hot by the underwriter, and the stock price did rise by 32% during the first day of trading. Positive reactions to the initial offer price are considered to have a positive effect on the stock price and also on the number of stocks issued. The companies that have their offer price revised upwards see, on average, 32% first day returns. Whereas the offering price have been set at the bottom or even lower than the initial price range, companies saw only 4% first day returns on average (Hanley 1993).

Relating to this theory, Loughran & Ritter (2002) find that the most money left on the table is by those companies that must hike up their offer price based on the initial interest expressed by the investors. Loughran & Ritter (2002) also, propose a prospect theory on why companies are not mad at leaving so much money on the table at the issue. They state that the former stockholders may be more interested in the change in their wealth rather than the actual level of their wealth. Loughran & Ritter (2002) find that the offerings also correlate to public information of the stock markets. They find that each 1% gain in the markets equal to 1.3% in the first day of an offering. Conversely, when the markets have a down fall, IPOs issued in these times have lower expected first day returns.

2.2.2 Other main theories of IPO underpricing

Theories of IPO underpricing based on asymmetric information between different agents involved in the IPO seem to be the most popular and most researched. However, academics have also looked for the reason in various other fields. Reasons for underpricing have been explained with behavioural, institutional, and timing theories.

Some theories rely on information symmetry, rather than asymmetry. The fear of legal actions is one of these theories based on symmetric information. Issuers underprice the offering on purpose to avoid legal litigation. Tinic (1988) suggests that underpricing serves as an insurance against legal action against the issuer and the underwriter. Unlike at a seasoned offering, at an initial public offering there is very little publicly available information about the issuing company. According to Tinic (1988) the information that is disclosed leading to the offering, provides merely some rudimentary historical figures and information about the management. These facts and figures do not reflect how the costs will change following the transformation from a private to a public company. These costs include agency costs among the management, for example.

The underwriter can be seen as an intermediary between the capital markets and the issuer. The intermediary has the incentive to maximize its own welfare. It could do this by overpricing the issue, but this might lead to legal troubles for both the underwriter and the issuing company. The underwriter must also consider its reputation. If the underwriter continuously runs into legal trouble, it will most likely see its customers vanish. The underwriter's reputation has influence on how much the offering might be underpriced. Hughes & Thakor (1992) argue that if the underwriter has a better reputation, it might often underprices the offering less, and it is able to recoup the money left on the table. Good reputation means that the underwriter cares about the long run performance of the issuing company. This way it will also take possible litigation costs into consideration. However, Hughes & Thakor (1992) disagree with Tinic (1988) that the risk of litigation is sufficient reason for underpricing.

Lowry & Shu observe IPO underpricing as a method of insurance against legal action after the offering. Previous evidence on the litigation risk theory is mixed at best. Even though some have argued that the true costs of underpricing are bigger than possible costs of a lawsuit and that lawsuits are quite rare regarding IPOs. Lowry & Shu argue that these theories are easily proved wrong. First, there are only few lawsuits because the IPOs truly are often underpriced. Secondly, the costs of a lawsuit are more substantial than they first may appear. Relating to this they state their two main arguments that firstly companies with higher litigation risk underprice their issues more as an insurance method. Secondly, the higher the underpricing, the lower the expected litigation cost. Because the litigation costs are very substantial, management has strong incentives to insure the issue against litigation. Management's one method of insurance is lowering the probability of litigation.

Keloharju (1993) finds empirical evidence in the Finnish IPO markets, that the underpricing of new equity issues seems unrelated to lawsuit avoidance. However, Keloharju (1993) also states that at the time the Finnish security issuance was largely unregulated. Because of this, the possibility of a successful lawsuit was fairly low. There would have to be significant evidence of wrongdoing in the offering for it to merit a successful lawsuit.

Welch (1992) suggests that investors can learn from earlier equity offerings. "Cascade" theory implies that investors may choose to ignore their private information about the issuing company and pursue abnormal returns by imitating earlier investors. This type of investor behaviour may be especially present in "hot" IPO markets and during subsequent offering. According to Welch (1992), the individual investor does not possess enough information to spot underpriced offerings. The theory assumes that aggregated together investors hold near perfect information about the offering. If this were the case, underpriced offerings would succeed whereas overpriced fail. When investors do this kind of herding behaviour, investors will underprice their offerings (Amihud, Huse & Kirsh 2003). Amihud, Huse & Kirsh (2003) find that offerings at the Tel Aviv stock exchange were clearly oversubscribed or undersubscribed, with very few cases in between. Due to this, investors may only receive very meagre allocations of underpriced IPOs. Conversely investors may be left with hefty positions in overpriced offerings.

Benveniste, Busaba & Wilhelm (1996) argue that underwriters have an incentive to overstate investors interest to other investors. Underwriters may do this to pursue the investor to pay more for the share than what was the investors first fair value estimate. To eliminate this incentive, the underwriter can participate in secondary market stabilization actions. The underwriter can place purchase orders on the stock at the offer price to stabilize the price right after the issue. The underwriter has an incentive to keep the stock price stable as negative outcome may affect their future prospects in the underwriter competition.

The issuing company's management and previous owners may have an incentive to spread the issue allocation as wide as possible. Pre IPO owners have an incentive to underprice the issue to raise investor interest to participate in the offering. This way they may be able to maintain control of the company even after going public. (Brennan & Franks 1997)

2.3 Long-run returns

If the short run returns are one of the better-known anomalies concerning IPOs and have been widely studied. It has been proved that IPO underpricing is a statistical fact at practically every stock exchange. This may raise the question are the abnormal returns of these stocks consistent through time? In contrast of the short run returns, stocks of the companies that have gone public have been studied for multiple periods of time. These studies have widely shown under performance of the newly issued stocks. So, in the long run these stocks have not produced abnormal returns, quite the opposite.

Ritter (1991) finds three possible explanations for long run under performance for the stocks: 1) risk measurement 2) bad luck 3) fads and overoptimism. Investor behaviour also affects the long run performance of the companies. They suggest that investors tend to weight recent returns heavily which eventually results in future disappointments. The problem with risk measurement is that when IPO companies are compared to similar market value and multiple characteristics, underperformance tends to disappear (Schultz 2003).

Similarly, to the short run returns of IPOs, also the longer run performance has intrigued academics for a long time. Reilly and Hatfield (1969) studied the returns of IPOs after one year of the offering. They find that of the companies that have gone public (53 companies) 37 have increased whereas 16 have decreased in price. Also, over half of the companies had outperformed some of the local stock indexes. The same study researched various time spans after the offering. For example, short run returns were also studied. The study found out that 27 of the offerings had a higher share value compared to the offer price, 12 had not changed, and 14 had decreased in value.

A notable and wide study on the long run returns of IPOs was conducted by Ritter (1991). Ritter observes some reasons why the long run returns are of interest: 1) investors may be able to point out price patterns and use them to seek superior returns, 2) nonzero long run performance of IPOs questions the whole efficiency of IPO markets, 3) revealing "hot market" IPOs, amount of initial public offerings varies over time and if the high volume periods are associated with long run under performance this indicates that companies may take advantage of these hot issue periods, 4) cost of external capital for the company is also dependant on the stock's aftermarket performance. Ritter (1991) studied 1529 IPOs in the US markets during 1975-1984. He finds that during this time period the companies have underperformed the market significantly three years after the offering. During

the observed time period Ritter (1991) finds that the IPO companies' have had a return of 34,47%, whereas the control group companies had a return of 61,86%. Essential find of Ritter's (1991) study is that the low performing IPOs are concentrated in the "hot market" time periods. When the IPO frequency is lower, under performance is not found. This may be evidence that during hot issue periods, lower quality companies are listed. Conversely, quality companies would list regardless of time period, thus generating steady flow of returns.

Keloharju (1993) studied Finnish IPO markets and included some long period performance study. He observes that IPOs in the Finnish market had significantly underperformed over the time period. During the observed time period IPO companies had an average return of -22,4%, whereas the market return over the same time period was -1,6%.

Brav & Gompers (1997) researched if initial phase financing affects long run performance of the company that's going public. They find that venture backed companies outperform non-venture backed ones in the long run. They argue that the underperformance is driven by smaller issues. Contrary to earlier research, they argue that underperformance is highly correlated with calendar time of issue rather than "hot issue" periods.

Schultz (2003) also tries to find reasons for under performance in the timing of IPOs. Schultz attempts to explain the long run underperformance with pseudo market timing -theory. The premise of the theory is that more companies issue equity in rising markets. Much of the research on long run performance is done using event-time returns or calendar-time returns. It has been studied that underperformance is greater when used event-time returns. Pseudo market timing -theory suggests that managers have no timing ability and issue equity when they think they can receive the most for the issued equity.

3 Data and method

This chapter will provide details about the data used in this study, how it was gathered, how these companies were selected, and some basic descriptive statistics.

The Data was gathered mainly from two sources: Nasdaq Nordic website, and investing.com. The companies that are still listed on the Nasdaq main list have comprehensive historical data on the website. However, if a company is, for example, delisted, historical data will not be available anymore. Historical data for these companies was found on a website called investing.com. Whenever possible, adjusted stock prices were used. In case on stock splits or other corporate actions, unadjusted stock prices were used. Had adjusted prices been used in case of stock splits etc. also the first day prices would be affected. Stock prices that were used for the study were always closing prices of said day.

3.1 Data description

Total sample size for the study was 94 companies. These are companies from the Copenhagen, Helsinki, and Stockholm Nasdaq stock exchanges. These companies were listed on the main list of one of the stock exchanges mentioned. Included cases were also IPOs. This means that this was the first time the stock was available for public to purchase. This is also the first time the company will have a publicly quoted stock price and market cap. For this reason, special cases such as list changes, spin offs, and secondary listings are not included.

This study included three different stock exchanges that are located in the Nordic countries and are owned by Nasdaq. These cities are Copenhagen, Helsinki, and Stockholm. During the observation period, Stockholm saw the most IPO activity with total of 67 companies listing on its main market list. Helsinki stock exchange had 18, and Copenhagen had 9 IPOs to their main markets. (Table 4)

Table 4 Number of observations by city.

Sample size	2014	2015	2016	2017	2018	2019	Total
Copenhagen	1	2	3	2	1	0	9
Helsinki	0	5	3	5	4	1	18
Stockholm	11	18	11	15	7	5	67
Total	12	25	17	22	12	6	94

Figure 4 illustrates the fluctuation of main market IPOs during the observation period. The figure (4) clearly shows how much more active the IPO market has been in Stockholm compared to the other

two. It also shows a receding trend in all three stock exchanges' IPO activity. It is also worth noting that 2014 Helsinki saw zero IPOs, and in 2019 Copenhagen saw zero IPOs in turn. Besides that, Helsinki Stock exchange has been somewhat more active than Copenhagen Stock exchange.

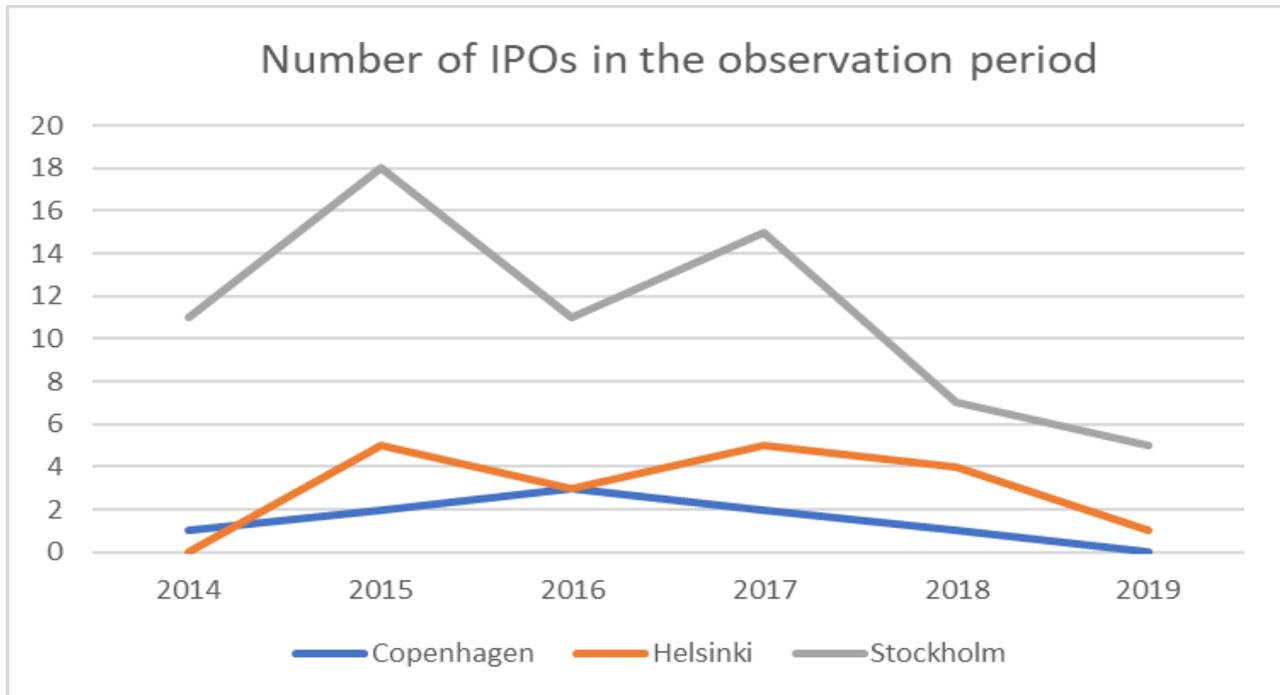


Figure 4 Number of observations by city.

Nasdaq uses three different market capitalization segments: small, mid, and large cap (Nasdaq OMX Nordic 2021b). Market cap segment requirements are the same for each stock exchange in the study. Small cap companies have a market capitalization below EUR 150 million, mid cap market capitalization is between EUR 150 million and EUR 1 billion. Large cap companies have market cap exceeding EUR 1 billion. In case of market cap change, companies can switch between market cap segments in either direction. This study only considers the market cap segment announced at the moment of IPO (Nasdaq 2018). Exchanges in market cap segment happening after IPO are not taken into consideration.

Table 5 Number of observations by market cap.

Sample size	2014	2015	2016	2017	2018	2019	Total
Small cap	1	3	2	5	4	2	17
Mid cap	10	20	9	15	6	3	63
Large cap	1	2	6	2	2	1	14
Total	12	25	17	22	12	6	94

Most of the companies listed during observation period in the observed exchanges were mid cap companies (Table 5 Number of observations by market cap. Table 5). Of the 94 companies, 63 were in the mid cap segment, whereas 17 listed as small and 14 as large cap companies. The shares' market cap segments remained quite steady along the observation period.

3.2 Methodology

The observed shares were compared to the IPO offer price at four different moments of time. Returns for each stock was calculated for the first day, after two trading weeks, three months, and after one year of trading. The first day is simply the first day the stock is available for the public to trade at a stock exchange. The price for the second week of trading is calculated after 10 days of the listing. Three months is calculated as 63 days after the listing, and the last measurement of one year is 253 days after the listing. Each of the observed stock exchanges has some differences between bank holidays. The above-mentioned numbers of days are widely regarded as normal amount of trading days in a year and a quarter.

3.2.1 Calculation of returns

The first day performance has been widely studied and analysed throughout corporate finance history. Naturally, first day performance of the IPOs is calculated also in this study. It provides a glimpse into how successful the valuation process has been. After ten days, the stock has been public for two weeks and it is interesting to see if there have been dramatic changes in stock price. Publicly traded companies often publish press releases quarterly. The stocks' returns in this study are also calculated after their first quarter of being publicly traded. Finally, returns are calculated after one year of being publicly traded. One year is the regular duration of a fiscal year.

The calculation for the stock returns on the given day was:

$$\frac{P_1 - P_{offer}}{P_{offer}}$$

where P_1 is the price on the trading day and P_{offer} is the offer price of the IPO. The complete calculations for IPO returns are shown in Appendix I.

3.2.2 K-means clustering

The data used in this study was first collected and evaluated with Microsoft Excel. The data is shown in Appendix II. After initial formatting and analysing, the data and selected variables were

researched with Matlab using k-means clustering. At this point, the data was also normalized by returning the vectorwise z-score of the data with centre 0 and standard deviation 1.

K-means clustering is an unsupervised machine learning algorithm. The goal of clustering is to assign datapoints to clusters which should capture some similarities in n-dimensional space. K-means is one of the simplest machine learning algorithms. K-means clustering takes the number of centroids as an input and each centroid will define a cluster. K-means has two phases it takes to form these clusters: assign and minimize. In the assign phase the algorithm assigns each datapoint to the centroid nearest to it. In the minimize phase centroids move so that the sum of distances of all datapoints is minimized. The distances are measured with Euclidean distance method. The number, K , of centroids is determined by the user. (Badillo, Banfai & Birzele et al. 2020, Skansi 2018, 70)

K-means is unsupervised machine learning which means that it does not require training and testing of the data separately. It is also a classification method that does not require labels. A user defined number of centroids, K , and set of examples without class labels is the input in the algorithm. The steps that the algorithm takes to define the clusters are:

1. The pre-determined number of centroids are created. Coordinates of each centroid are calculated.
2. Distance of all datapoints are calculated from all of the centroids. The nearest centroid to each datapoint are determined.
3. If datapoint is in cluster nearest to its centroid, stopping criterion has been satisfied. If not, datapoint must be moved to nearest cluster, and centroids are recalculated.
4. If stopping criteria have not been met, steps 2 and 3 are to be repeated.

Stopping criterion is when datapoint finds itself in the nearest cluster. (Kubat 2017, 277)

With the clusters received from the k-means clustering, it can be observed if there are some clear clusters that form with the given variables. The optimal number, K , of clusters can be determined with the elbow graph and silhouette graph. In Figure 4 an example of silhouette value graph is shown. In this example, the optimum number of clusters (K) would be 4.

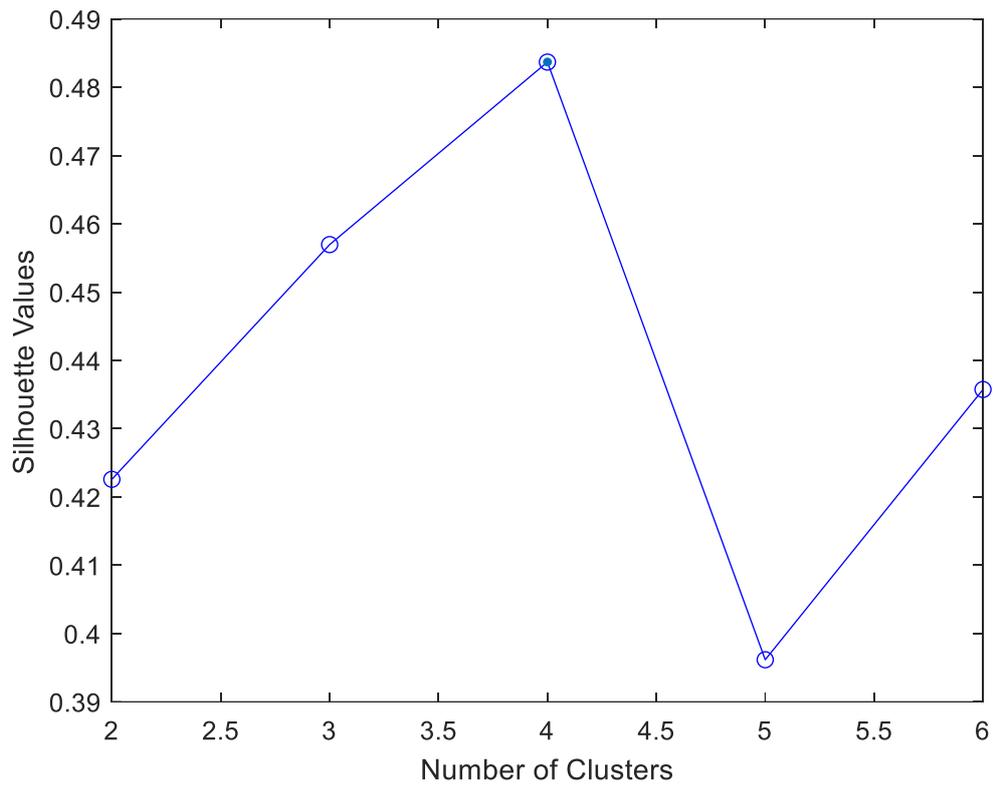


Figure 4 Example of a silhouette value plot, which is used to decide the number of clusters used. In this case, the optimum number of clusters would be 4.

4 Results and discussion

This chapter will discuss the results of the calculations and what their implications may be.

4.1 Returns

Returns for the IPOs were calculated for years 2014-2019. Overall, the returns were quite steady throughout the observation period. Interestingly, the number of IPOs seems to affect the returns. The greater the number of IPOs, the poorer the returns were.

Best first day returns were in the year 2019 and 2018, which also had the fewest IPOs. 2014, with the same number of IPOs as 2018, had the second best first day returns. Years 2015-2017 had the majority of the IPOs in the observation period. During this period, first day returns were also lower than with those years that had fewer IPOs. The worst returns were yielded in 2017, right before the best first day returns of 2018. (Table 6)

Table 6 Returns by year.

	n=12 2014	n=25 2015	n=17 2016	n=22 2017	n=12 2018	n=6 2019
1st day	10.61 %	8.54 %	6.17 %	6.02 %	11.45 %	11.43 %
2nd week	9.99 %	7.46 %	4.20 %	7.31 %	16.22 %	22.50 %
3rd month	18.85 %	7.23 %	9.15 %	5.80 %	29.55 %	10.51 %
1st year	40.91 %	29.23 %	37.49 %	-1.10 %	35.22 %	65.98 %

The same trend involving the number of IPOs and returns continued into the second week of trading. Once again, 2019 and 2018 had the best returns of the observed time-period. In 2019 the listed stocks had returned 22,50 % had the investor buy it at the offer price. 2016 had the worst two-week performance, 4,20 %.

After the first quarter of trading, 2018 had the best returns compare to the offer price. In 2018, the companies took a big leap during the gap between the first week and the first quarter. Apart from this, the trend seemed to remain that the years with most IPOs, had more modest returns.

Opposite to prior studies, after one year of trading, the companies had yielded significant returns had one bought at the offer price. Only exception to this was 2017, which had -1,10 % return after

one year of public trading. Apart from 2017, most years had returns between 29,23-65,98 %. 2019 returned 65,98% to its investors, whereas the rest of the years had steady returns.

4.2 Returns by city

The returns were also evaluated based on listing city (Table 7).

Table 7 Returns by city.

	n=67 Stockholm	n=18 Helsinki	n=9 Copenhagen
1st day	11.47 %	3.16 %	11.20 %
2nd week	11.26 %	9.71 %	10.89 %
3rd month	16.84 %	5.27 %	17.35 %
1st year	37.49 %	30.29 %	27.98 %

When the three cities are observed independently throughout the observation period, Helsinki stands out as the weakest performer of the bunch during the first year of trading. Whereas Copenhagen and Stockholm respectively perform quite steadily and almost hand in hand during the first three observation points, Helsinki trails far behind. However, after the first year the differences diminish and Helsinki catches the other two up, and even surpasses Copenhagen.

Table 8 First day returns by city

1st day	2014	2015	2016	2017	2018	2019
Copenhagen	14.19 %	9.82 %	2.82 %	-0.51 %	29.68 %	No IPOs
Helsinki	No IPOs	8.60 %	-1.50 %	5.52 %	1.42 %	1.78 %
Stockholm	7.04 %	7.19 %	17.18 %	13.05 %	3.25 %	21.08 %

When the returns of the observed times are divided by city, a clear trend can be seen: companies listed on the Stockholm stock exchange seem to stand out from the other two in a positive manner. On the first day of trading, Stockholm seems to stand out as a steady, predictable, and active market compared to the other two. Whereas Copenhagen and Helsinki both have years where there are no IPOs on their main lists, Stockholm is every year the clear winner in the amount of IPOs. IPOs of Stockholm have a quite steady performance over the first four years. After that they take a steep dive but return in 2019 with the best first day returns of Stockholm IPOs in the observed period. (Table 8)

The bigger differences in in first day returns in Copenhagen and Helsinki can be attributed to the smaller number of IPOs in these stock exchanges. For example, the best first day performance was in Copenhagen in 2018. However, in 2018 only one company listed on the main company via IPO in Copenhagen. Naturally, if this company succeeds the overall performance seems very good.

Table 9 2nd week returns by city

2nd week	2014	2015	2016	2017	2018	2019
Copenhagen	13.00 %	3.16 %	0.46 %	-0.51 %	38.32 %	No IPOs
Helsinki	No IPOs	8.97 %	0.86 %	8.74 %	4.65 %	25.33 %
Stockholm	6.99 %	10.26 %	11.27 %	13.70 %	5.68 %	19.67 %

Similar trend continues after two weeks of trading the listed companies. Companies in Stockholm continued to yield steady returns after the IPO. The companies listed onto Helsinki and Copenhagen stock exchanges performed in various ways. Overall, also they seemed to follow the trend set at the IPO. Most companies continued to shift in the determined direction, some developed faster than others. For example, in 2019 the sole listed company in Helsinki went from 1,87 % all the way to 25,33 %. Interestingly, in 2017 both companies listed onto the Copenhagen exchange yielded negative returns after two weeks of trading. Once again, the best returns came from 2018 Copenhagen, where the one company to go public continued to climb in price. (Table 9)

Table 10 3rd month returns by city

3rd month	2014	2015	2016	2017	2018	2019
Copenhagen	20.00 %	0.58 %	0.60 %	3.27 %	62.32 %	No IPOs
Helsinki	No IPOs	7.53 %	8.36 %	0.92 %	13.96 %	-4.44 %
Stockholm	17.70 %	13.58 %	18.50 %	13.20 %	12.56 %	25.47 %

After the first quarter of being publicly traded, the same companies as before seemed to continue their soaring. After being three months eligible for trading, the sole IPO from Copenhagen continued to post impressive returns with 62,32 % rise from its offer price. Stockholm once again remained steady and continued to post stable returns. All of companies that listed onto the Stockholm stock exchange had returned over 10 % after the first quarter of trading. The variance in returns was big on the Helsinki and Copenhagen stock exchanges. Companies on the Helsinki stock exchange performed quite modestly, some even posting negative returns. The Copenhagen companies on the

other hand seemed to be quite hot or cold. Either they performed extremely well or very modestly with returns close to zero after the first quarter. (Table 10)

Table 11 1st year returns by city

1st year	2014	2015	2016	2017	2018	2019
Copenhagen	41.75 %	18.80 %	20.32 %	0.71 %	58.32 %	No IPOs
Helsinki	No IPOs	39.09 %	53.65 %	-24.39 %	25.11 %	58.00 %
Stockholm	40.08 %	29.82 %	38.49 %	20.37 %	22.23 %	73.97 %

After first year of public trading, most companies had faired well. Companies from Stockholm still performed steady, and they all had positive returns. At this point, Stockholm posted the best returns of the bunch. (Table 11).

4.3 Returns by market cap segment

Table 12 Returns by market cap segment

	n=17 Small	n=63 Mid	n=14 Large
1st day	11.59 %	10.52 %	12.17 %
2nd week	12.41 %	10.74 %	12.94 %
3rd month	14.63 %	14.54 %	19.24 %
1st year	42.16 %	34.77 %	48.00 %

Judging companies post IPO performance by their initial market cap segment doesn't really produce significant differences. Differences between market caps seem to be quite small. However, the same rule of number of observations can be applied here as before. Mid cap segment has by far the most observations, whereas small and large cap segments have 17 and 14 observations, respectively. Mid cap companies seem to produce the worst returns of the three. Naturally, mid cap companies' returns were not bad by any standard. They had a 10,52 % return after the first day of trading, and the returns only grew during the year. After one year they had returned 34,77 % to their shareholders. The few large cap companies that went public during the observation period, had the best returns. (Table 12)

Table 13 1st day returns by market cap segment

1st day	2014	2015	2016	2017	2018	2019
Small cap	15.75 %	10.05 %	26.08 %	15.83 %	1.21 %	0.64 %
Mid cap	7.02 %	7.27 %	12.87 %	8.24 %	3.83 %	23.86 %

Large cap | 5.64 % 8.23 % 4.16 % 5.53 % 15.14 % 34.33 %

When the companies are compared against each other based on their market cap, there seems to be little if any patterns. Mid cap companies perform quite steadily, whereas small and large cap posted first day returns that were all over the bracket. (Table 13)

Table 14 2nd week returns by market cap segment

2nd week	2014	2015	2016	2017	2018	2019
Small cap	13.01 %	8.04 %	18.41 %	15.30 %	6.02 %	13.67 %
Mid cap	9.96 %	9.74 %	8.54 %	9.01 %	4.44 %	22.72 %
Large cap	3.55 %	8.48 %	2.38 %	12.05 %	22.98 %	28.21 %

Most market cap segments showed some incline, or at least didn't crash after two weeks of trading. However, the companies that went public in 2014-2016 showed little or no remarkable progress. After that, the situation seemed to change, and most market cap segments continued to climb after IPOs. (Table 14)

Table 15 3rd month returns by market cap segment

3rd month	2014	2015	2016	2017	2018	2019
Small cap	10.27 %	5.40 %	34.69 %	24.83 %	21.63 %	-9.02 %
Mid cap	21.14 %	11.81 %	14.25 %	4.76 %	7.94 %	27.32 %
Large cap	-6.97 %	15.42 %	5.45 %	6.71 %	35.86 %	58.96 %

After a quarter of trading, some segments had experienced strong volatility, and completely changed their direction. For example, small cap companies from 2019 went from being strongly on the positive to being -9,02 % compared to their offer price. The same happened to the sole large cap company IPO from 2014. (Table 15)

Table 16 1st year return by market cap segment

1st year	2014	2015	2016	2017	2018	2019
Small cap	55.48 %	43.53 %	105.44 %	0.24 %	34.86 %	13.40 %
Mid cap	39.83 %	29.14 %	34.37 %	10.67 %	11.00 %	83.63 %
Large cap	28.88 %	28.15 %	20.85 %	5.53 %	54.46 %	150.15 %

All market cap segments ended their first year of trading above their offer price level. It is worth noting, that in 2014 small and large cap segments only had one IPO each. The sole large company

from 2014 made a remarkable climb from -6,97 % to being 28,88 %. In 2019 only one large cap company listed on the stock exchanges in question. These companies fared well at the one year mark of their journey of being a publicly listed company. Most market cap segments made strong performance after the first quarter and ended the year on a high note compared to their offer prices. (Table 16)

4.4 K-means clustering

The returns of the companies were evaluated by Matlab using k-means clustering. The 1st day, 2nd week, 3rd month and 1st year returns were used as the target variables and mean, max and min returns were used as explanatory variables. Market cap segments and stock exchange city were used as a dummy variable by using 1=small, 2=medium, 3=large and 1=Copenhagen, 2=Helsinki, 3=Stockholm. The data was normalized prior the clustering. Iteration was used to find out the set of clusters that are as compact and well-separated as possible. By specifying one or more replicate, kmeans repeats the clustering process starting from different randomly selected centroids for each replicate. Kmeans algorithm then returns the solution with the lowest total sum of distances among all the replicates. Number of replicates was set to 10. The optimal numbers of clusters were chosen based on the silhouette values of the points. This was performed with the *evalclusters*-function and by drawing elbow figures. According to these, the optimum number of clusters for all variables was 4. Thus, K=4 was used for all clustering calculations.

The first clustering was performed with returns and mean of the profits during the first year. Cluster figures are shown in Figure 5. It can be seen that the companies with the positive first day return have also positive return mean and vice versa. First day return and 2nd week returns are relatively similar. Interestingly, the further the year goes the clearer the clusters seem to be. After the first day of trading, the clusters seem to be quite dispersed around the graph. After the first fiscal quarter of being publicly traded, some form of linearity can be detected on the graph. After the first year of being publicly traded, the four clusters seem to line up quite nicely. The ones with high returns on the previously calculated dates, and high means along the whole year, remained throughout the year, as the clusters mainly stayed the same.

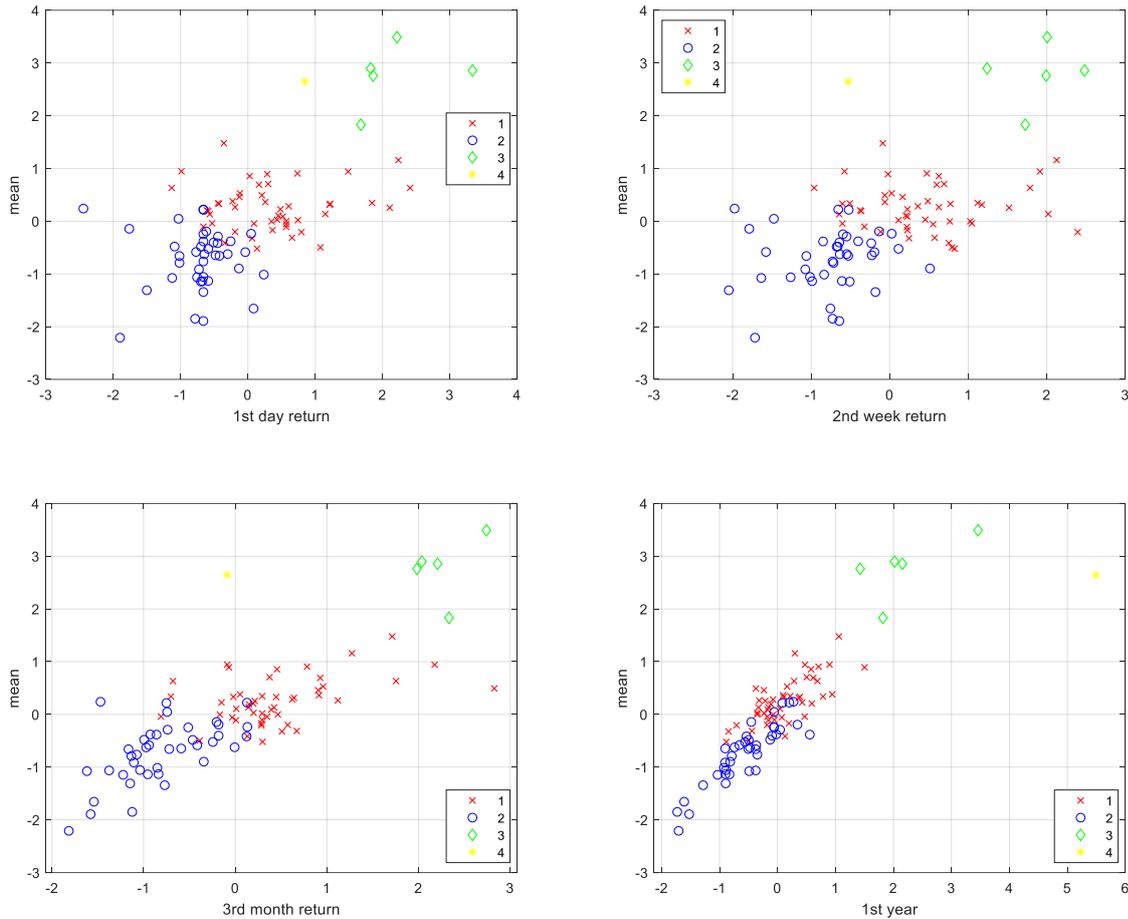


Figure 5 K-mean clustering of mean of returns during the first year as an explanatory factor and returns as target variables.

Next, the clustering was performed with max return as explanatory factor. The pattern along the year is similar to the one discussed previously. In figure 5 at the first graph, the companies seem to scatter around the graph and no clear pattern is detectable. Similarly, to the other clustering with mean values, the further the year goes, the clearer a pattern is. In the first graph there seems to be no clear pattern, whereas after the whole year, the companies seem to line up nicely into clear clusters. The clusters remain quite steady along the year, but some movement of the clusters is detectable. Through the whole year all datapoints are relatively close to the origin and move closer to it as the year goes on. Interestingly, the difference between the companies that had performed well was quite significant compared to the ones at the bottom of the graph.

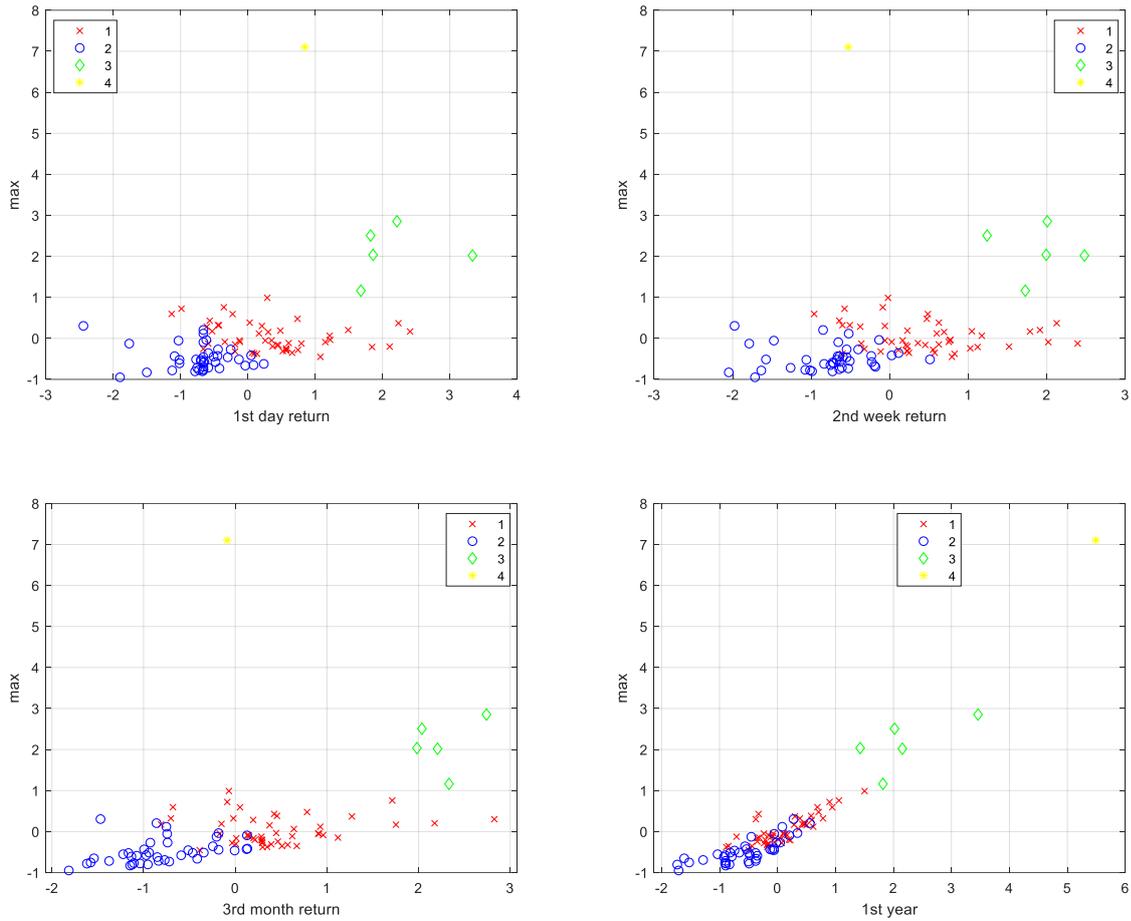


Figure 6 K-mean clustering of max of returns during the first year as an explanatory factor and returns as target variables.

Then, the clustering was performed with minimum returns of the year as an explanatory variable, and the calculated day returns as target variables (Figure 7). The results of this clustering can be seen in figure 6. Similar formation of patterns can be detected as in the ones above. After the first day of trading, the companies seem to scatter around the plot, but as the year goes on, they find their places and line up.

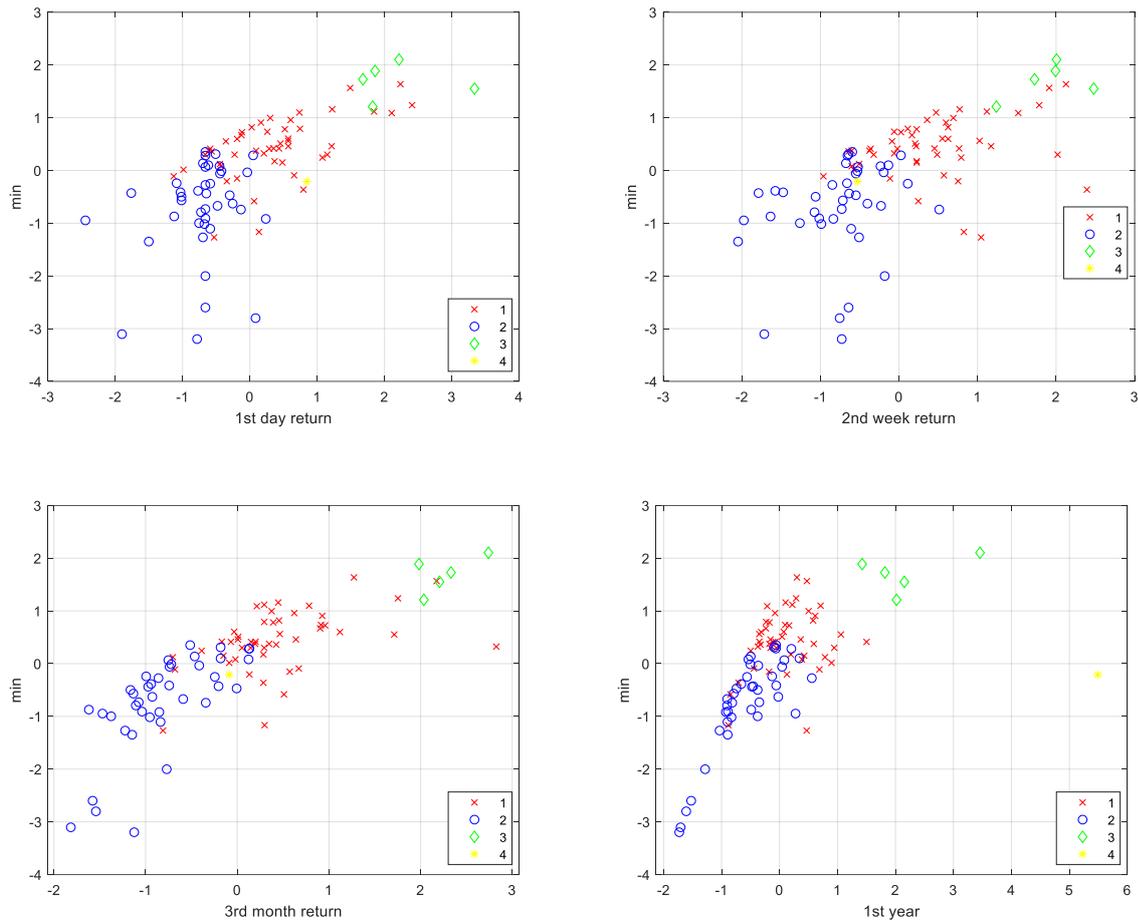


Figure 7 K-mean clustering of min of returns during the first year as an explanatory factor and returns as target variables.

As can be observed from the figures above, companies seem line up to linear formation by the end of the year with the given variable. The companies also seemed to maintain the pace the had picked up at the beginning of trading. If a company had a high value after the first day, it also most likely had a high return by the end of the year.

The formed clusters are explained in Figure 8. It can be seen that the number of the clusters remain the same for the whole year. It was also observed, that the companies stayed in the same clusters throughout the observation period with all variables (mean, min and max).

The first cluster is the biggest one by the number of companies in it by far. The second cluster is second biggest, third one is third biggest, and finally the fourth cluster has only one company, Swedish Bioarctic AB.

Bioarctic AB is a Swedish Biopharma company. The company went public in October of 2017. Its stock jumped drastically in the summer of 2018 and the stock price remained high until November

of the same year. This resulted in a very high return for the stock when it is compared to its subscription price at initial public offering. Due to this Bioarctic is the sole company in the fourth cluster.

Company	Market Cap	Year of IPO	City	Industry	1st day cluster	2nd week cluster	3rd month cluster	1st year cluster	Company	Market Cap	Year of IPO	City	Industry	1st day cluster	2nd week cluster	3rd month cluster	1st year cluster
Ahsell	Large cap	2016	STH	Industrial	1	1	1	1	Troax	Mid cap	2015	STH	Industrial	1	1	1	1
Ambea	Mid cap	2017	STH	Health care	1	1	1	1	Volati	Mid cap	2016	STH	Financials	1	1	1	1
Balco	Small cap	2017	STH	Industrial	1	1	1	1	Actic	Small cap	2017	STH	Travel and leisure	2	2	2	2
Besqab	Small cap	2014	STH	Financials	1	1	1	1	Alimak	Mid cap	2015	STH	Industrial	2	2	2	2
Better	Mid cap	2018	STH	Consumer Services	1	1	1	1	Alligator	Small cap	2016	STH	Health care	2	2	2	2
Boozt	Mid cap	2017	STH	Retail	1	1	1	1	Altia	Mid cap	2017	HKI	Consumer Services	2	2	2	2
Bravida	Mid cap	2015	STH	Industrial	1	1	1	1	Ascelia	Small cap	2019	STH	Health care	2	2	2	2
Bufab	Mid cap	2014	STH	Industrial	1	1	1	1	Asiakastie	Mid cap	2015	HKI	Financials	2	2	2	2
Calliditas	Mid cap	2018	STH	Health care	1	1	1	1	Bactiguard	Mid cap	2014	STH	Health care	2	2	2	2
Camurus	Mid cap	2015	STH	Health care	1	1	1	1	Bonesupp	Mid cap	2017	STH	Health care	2	2	2	2
CLX	Mid cap	2015	STH	Technology	1	1	1	1	Bygghemr	Mid cap	2018	STH	Consumer Services	2	2	2	2
Consti	Small cap	2015	HKI	Industrial	1	1	1	1	Capio	Mid cap	2015	STH	Health care	2	2	2	2
DNA	Large cap	2016	HKI	Telecommunications	1	1	1	1	Collector	Mid cap	2015	STH	Financials	2	2	2	2
Dometic	Large cap	2015	STH	Consumer goods	1	1	1	1	ComHem	Large cap	2014	STH	Telecommunications	2	2	2	2
DongEnergy	Large cap	2016	CPH	Utilities	1	1	1	1	Coor	Mid cap	2015	STH	Industrial	2	2	2	2
Dustin	Mid cap	2015	STH	Consumer Services	1	1	1	1	Ferronord	Mid cap	2017	STH	Industrial services and goods	2	2	2	2
Edgewise	Small cap	2016	STH	Technology	1	1	1	1	Gränges	Mid cap	2014	STH	Consumer Goods	2	2	2	2
Eltel	Mid cap	2015	STH	Industrial	1	1	1	1	Inwido	Mid cap	2014	STH	Industrial	2	2	2	2
Evli	Small cap	2015	HKI	Financials	1	1	1	1	Kamux	Mid cap	2017	HKI	Consumer goods	2	2	2	2
FM Matss	Small cap	2017	STH	Construction and materials	1	1	1	1	Karnov	Mid cap	2019	STH	Consumer products and services	2	2	2	2
Harvia	Small cap	2018	HKI	Consumer goods	1	1	1	1	Nets	Large cap	2016	CPH	Industrials	2	2	2	2
Hoist	Mid cap	2015	STH	Financials	1	1	1	1	Nobina	Mid cap	2015	STH	Industrial	2	2	2	2
Humana	Mid cap	2016	STH	Health care	1	1	1	1	Nordax	Mid cap	2015	STH	Financials	2	2	2	2
Instalco	Mid cap	2017	STH	Industrial goods and services	1	1	1	1	OmaSP	Mid cap	2018	HKI	Financials	2	2	2	2
Internatio	Mid cap	2016	STH	Consumer Services	1	1	1	1	Orphazym	Mid cap	2017	CPH	Health care	2	2	2	2
ISS	Mid cap	2014	CPH	Financials	1	1	1	1	Projektent	Small cap	2018	STH	Industrial	2	2	2	2
John Matt	Mid cap	2019	STH	Financials	1	1	1	1	Qlinea	Mid cap	2018	STH	Health care	2	2	2	2
Kojamo	Large cap	2017	HKI	Financials	1	1	1	1	Resurs	Large cap	2016	STH	Financials	2	2	2	2
Kotipizza	Small cap	2015	HKI	Consumer Services	1	1	1	1	Robit	Mid cap	2017	HKI	Industrial	2	2	2	2
Lehto	Mid cap	2016	HKI	Industrials	1	1	1	1	Rovio	Mid cap	2017	HKI	Consumer goods	2	2	2	2
Lime Tech	Small cap	2018	STH	Technology	1	1	1	1	Scandic	Mid cap	2015	STH	Consumer Services	2	2	2	2
Medicover	Large cap	2017	STH	Health care	1	1	1	1	Scandinav	Large cap	2016	CPH	Consumer goods	2	2	2	2
Mips	Small cap	2017	STH	Consumer goods	1	1	1	1	Serneke	Mid cap	2016	STH	Industrials	2	2	2	2
Munters	Mid cap	2017	STH	Construction and materials	1	1	1	1	Sparekass	Mid cap	2015	CPH	Financials	2	2	2	2
Ncab	Small cap	2018	STH	Industrial	1	1	1	1	SSM	Mid cap	2017	STH	Financials	2	2	2	2
Nnit	Mid cap	2015	CPH	Technology	1	1	1	1	TCM	Mid cap	2017	CPH	Consumer goods	2	2	2	2
NP3	Mid cap	2014	STH	Financials	1	1	1	1	Terveystat	Large cap	2017	HKI	Health care	2	2	2	2
Oncopet	Mid cap	2017	STH	Health care	1	1	1	1	Wilson	Mid cap	2016	STH	Health care	2	2	2	2
Optomed	Small cap	2019	HKI	Health care	1	1	1	1	Acade	Mid cap	2016	STH	Consumer Services	3	3	3	3
Pandox	Large cap	2015	STH	Real estate	1	1	1	1	Attendo	Mid cap	2015	STH	Health care	3	3	3	3
Pihlajalinn	Mid cap	2015	HKI	Health care	1	1	1	1	EQT	Large cap	2019	STH	Financials	3	3	3	3
Recipharm	Mid cap	2014	STH	Health care	1	1	1	1	Garo	Small cap	2016	STH	Industrial	3	3	3	3
Scandi Std	Mid cap	2014	STH	Consumer Goods	1	1	1	1	K Fast	Mid cap	2019	STH	Financials	3	3	3	3
Silmaasem	Small cap	2017	HKI	Health care	1	1	1	1	Lifco	Mid cap	2014	STH	Industrial	3	3	3	3
TF Bank	Mid cap	2016	STH	Financials	1	1	1	1	Netcomp	Large cap	2018	CPH	Technology	3	3	3	3
Thule	Mid cap	2014	STH	Consumer Goods	1	1	1	1	Tobii	Mid cap	2015	STH	Technology	3	3	3	3
Tokmanni	Mid cap	2016	HKI	Consumer Services	1	1	1	1	Bioarctic	Mid cap	2017	STH	Health care	4	4	4	4

Figure 8 Clusters explained

In Table 17 the clusters are described by market cap segmentation. It can be seen, that most of the companies fall into mid cap category (66%). Most of the mid cap companies belong to cluster number 1. However, also cluster number 2 is big regarding mid cap companies. Most of the small caps are in cluster one. The majority of mid cap companies was expected, since it is the most common market cap segmentation in the study.

Table 17 Clusters explained by company market cap size.

cluster	Small cap	Mid cap	Large cap	
1	13	29	7	52 %
2	4	27	5	38 %
3	1	5	2	9 %
4	0	1	0	1 %
sum	18	62	14	
%	19 %	66 %	15 %	100 %

In Table 18 the clusters are explained by the listing year. Cluster 1 includes mostly listings from years 2015, 2016 and 2017. There were not any clear patterns with the clusters and listing years.

Table 18 Clusters explained by the listing year.

cluster	2014	2015	2016	2017	2018	2019	
1	7	14	10	11	5	2	52 %
2	4	9	6	11	4	2	38 %
3	1	2	2	0	1	2	9 %
4	0	0	0	1	0	0	1 %
sum	12	25	18	23	10	6	
%	13 %	27 %	19 %	24 %	11 %	6 %	100 %

In Table 19 the clusters are explained by the stock exchange city. Most of the companies are in cluster 1 and listed in Stockholm. All in all, Stockholm was the busiest listing city in the observation period (71%). This cluster also follows the trend where the companies fall in the clusters quite evenly, and it is seemingly difficult to find patterns.

Table 19 Clusters explained by the stock exchange city.

cluster	CPH	HKI	STH	
1	3	11	35	52 %
2	5	7	24	38 %
3	1	0	7	9 %
4	0	0	1	1 %
sum	9	18	67	
%	10 %	19 %	71 %	100 %

In Table 20 the clusters are explained by the industry. The companies in the dataset had quite scattered industry pool. Thus, clear patterns were not seen. Many industry pools include only one or two companies. Health care (22%), industrial (20%) and financial (19%) segments are the most common ones among the listed companies.

Table 20 Clusters explained by industry.

Cluster	Construction and materials	Consumer goods	Consumer products and services	Consumer Services	Financials	Health care	Industrial	Industrial goods and services	Real estate	Retail	Technology	Telecommunications	Travel and leisure	Utilities	
1	2	5	0	5	9	10	9	1	1	1	4	1	0	1	52 %
2	0	5	1	3	7	9	8	1	0	0	0	1	1	0	38 %
3	0	0	0	1	2	1	2	0	0	0	2	0	0	0	9 %
4	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1 %
sum	2	10	1	9	18	21	19	2	1	1	6	2	1	1	
%	2 %	11 %	1 %	10 %	19 %	22 %	20 %	2 %	1 %	1 %	6 %	2 %	1 %	1 %	100 %

5 Conclusions

The aim of this thesis was to study how companies have performed compared to their IPO offer price. This study took into consideration the year they listed, the stock exchange, and market cap segments. Four different time periods were studied and compared how the companies have performed at each time. Lastly, k-means clustering was used to analyze the similarities of the companies in regards of mean returns and market cap segments. Research questions of this study were:

“How do the observed stock exchanges perform compared to one another?”

“How do the observed market capitalization segments perform compared to one another?”

“How do the observed companies move in clusters in regards of mean returns, maximum return, and minimum return during the first year?”

“Do the companies grouped in the same cluster have similarities regarding listing year, city, market cap segmentation and industry?”

Of the selected stock exchanges, Stockholm seemed to fare best of the three. Stockholm stock exchange had continuously the best returns of the bunch, when it also possessed the most IPOs. However, most companies considered in the study performed quite well, with only few yielding negative returns.

Copenhagen yielded better returns when compared to the Helsinki Stock exchange. It is worth noting however, that Copenhagen stock exchange saw only a handful of IPOs during the observation period.

Interestingly, compared to previous studies, the observed IPOs performed well throughout their first year of being a publicly traded company. Only in 2017, the mean returns were negative after the first year.

The market capitalization segment does not seem to matter that much when considering the returns of the observed companies. The problem with market cap segments is similar to the one with comparing different stock exchanges. Most of the companies belonged in the mid cap segment, and only few into the small and large cap segments. It should also be considered that the large cap companies going public may be already well-known companies and arise much investor interest.

This may bloat the short run returns, but a bigger company may also have better pre-requisites for the life of a publicly listed company. All in all, it was seen that the companies that have performed well during the first two weeks, performed also well during the rest of the year.

Further evaluation of the data was performed with k-means clustering. The 1st day, 2nd week, 3rd month and 1st year returns were used as the target variables and mean, max and min returns were used as explanatory variables. Unexpectedly, the companies stayed in the same cluster throughout the whole observation year. However, it can be seen that the cluster one included mainly small and mid cap companies. The reason for this is most likely the fact, that the differences inside the datagroup were relatively similar regarding the IPOs. Most of the companies were mid cap companies and listed in Stockholm. However, the companies had movement inside the clusters throughout the observation year.

As a further study suggestion, the clustering should be done with a dataset that has longer observation period and more observations to see how the companies move from cluster to another over time. Also, more explanatory variables should be used to see what the clusters have in common. With larger dataset it might be possible to evaluate the future performance of the IPOs and make suggestions on which IPOs would be profitable to invest in. With this dataset and clustering these kind of suggestions are difficult to make. Perhaps some other clustering or machine learning methods would be more suitable for this purpose.

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Appendices

Appendix I Calculations of IPO returns per year.

Appendix II Dataset used for k-means clustering with Matla

APPENDIX I

2014 returns						
Stockholm						
		Closing p	offer p	returns	market cap	sector
NP3	1st day	33.8	30	12.67 %	mid	Financials
	2nd week / 10 days	32.6	30	8.67 %		
	3rd moth / 63 days	40.2	30	34.00 %		
	1st year / 253 days	40.8	30	36.00 %		
Thule Group	1st day	78	70	11.43 %	mid	Consumer goods
	2nd week / 10 days	83	70	18.57 %		
	3rd moth / 63 days	94	70	34.29 %		
	1st year / 253 days	116.75	70	66.79 %		
Lifco	1st day	123	93	32.26 %	mid	Industrial
	2nd week / 10 days	126	93	35.48 %		
	3rd moth / 63 days	154	93	65.59 %		
	1st year / 253 days	221.5	93	138.17 %		
Gränges	1st day	38.567	45.5	-15.24 %	mid	Consumer goods
	2nd week / 10 days	37.68	45.5	-17.19 %		
	3rd moth / 63 days	49.649	45.5	9.12 %		
	1st year / 253 days	46.989	45.5	3.27 %		
Invido	1st day	64.5	68	-5.15 %	mid	Industrial
	2nd week / 10 days	59.5	68	-12.50 %		
	3rd moth / 63 days	66	68	-2.94 %		
	1st year / 253 days	86.25	68	26.84 %		
Scandi Standard	1st day	47	40	17.50 %	mid	Consumer goods
	2nd week / 10 days	46	40	15.00 %		
	3rd moth / 63 days	51	40	27.50 %		
	1st year / 253 days	50.25	40	25.63 %		
Bactiguard Holding	1st day	31.5	38	-17.11 %	mid	Health care
	2nd week / 10 days	31.9	38	-16.05 %		
	3rd moth / 63 days	27.8	38	-26.84 %		
	1st year / 253 days	11	38	-71.05 %		
Com Hem Holding	1st day	61.27	58	5.64 %	large	Telecommunications
	2nd week / 10 days	60.06	58	3.55 %		
	3rd moth / 63 days	53.96	58	-6.97 %		
	1st year / 253 days	74.75	58	28.88 %		
Besqab	1st day	84.5	73	15.75 %	small	Financials
	2nd week / 10 days	82.5	73	13.01 %		
	3rd moth / 63 days	80.5	73	10.27 %		
	1st year / 253 days	113.5	73	55.48 %		
Recipharm	1st day	88.25	78	13.14 %	mid	Health care
	2nd week / 10 days	85.25	78	9.29 %		
	3rd moth / 63 days	87.44	78	12.10 %		
	1st year / 253 days	171.17	78	119.45 %		
Bufab	1st day	49	46	6.52 %	mid	Industrial
	2nd week / 10 days	54.75	46	19.02 %		
	3rd moth / 63 days	63.75	46	38.59 %		
	1st year / 253 days	51.25	46	11.41 %		

APPENDIX I

2014 returns									
		Copenhagen							
		Closing p	offer p	returns	market cap	sector	Averages:		
ISS	1st day	182.7	160	14.19 %	mid	Financials	1st day		
	2nd week / 10 days	180.8	160	13.00 %			Stockholm:	7.04 %	
	3rd moth / 63 days	192	160	20.00 %			Copenhagen:	14.19 %	
	1st year / 253 days	226.8	160	41.75 %					
							2nd week		
							Stockholm:	6.99 %	
							Copenhagen:	13.00 %	
							3rd month		
							Stockholm:	17.70 %	
							Copenhagen:	20.00 %	
							1st year		
							Stockholm:	40.08 %	
							Copenhagen:	41.75 %	

APPENDIX I

2015 returns		Stockholm					
		Closing p	offer p	returns	market cap	sector	
Camurus	1st day	60.426	57	6.01 %	mid	Health care	
	2nd week / 10 days	66.606	57	16.85 %			
	3rd moth / 63 days	65.461	57	14.84 %			
	1st year / 253 days	106.203	57	86.32 %			
Scandic	1st day	63.75	67	-4.85 %	mid	Consumer services	
	2nd week / 10 days	62.75	67	-6.34 %			
	3rd moth / 63 days	58.75	67	-12.31 %			
	1st year / 253 days	72.25	67	7.84 %			
Attendo	1st day	70	50	40.00 %	mid	Health care	
	2nd week / 10 days	70.75	50	41.50 %			
	3rd moth / 63 days	71	50	42.00 %			
	1st year / 253 days	74	50	48.00 %			
Domestic	1st day	55.4	48	15.42 %	large	Consumer goods	
	2nd week / 10 days	54.1	48	12.71 %			
	3rd moth / 63 days	54.65	48	13.85 %			
	1st year / 253 days	63.75	48	32.81 %			
Bravida	1st day	43	40	7.50 %	mid	Industrial	
	2nd week / 10 days	44	40	10.00 %			
	3rd moth / 63 days	54	40	35.00 %			
	1st year / 253 days	56	40	40.00 %			
CLX Communications	1st day	62.833	59	6.50 %	mid	Technology	
	2nd week / 10 days	63.671	59	7.92 %			
	3rd moth / 63 days	74.562	59	26.38 %			
	1st year / 253 days	70.5	59	19.49 %			
Capio	1st day	49	48.5	1.03 %	mid	Health care	
	2nd week / 10 days	54	48.5	11.34 %			
	3rd moth / 63 days	52.5	48.5	8.25 %			
	1st year / 253 days	47	48.5	-3.09 %			
Nobina	1st day	32	34	-5.88 %	mid	Industrial	
	2nd week / 10 days	33.9	34	-0.29 %			
	3rd moth / 63 days	31.1	34	-8.53 %			
	1st year / 253 days	41.7	34	22.65 %			
Pandox	1st day	107.1	106	1.04 %	large	Real estate	
	2nd week / 10 days	110.5	106	4.25 %			
	3rd moth / 63 days	124	106	16.98 %			
	1st year / 253 days	130.9	106	23.49 %			
Nordax	1st day	42.8	45	-4.89 %	mid	Financial	
	2nd week / 10 days	44.5	45	-1.11 %			
	3rd moth / 63 days	39.8	45	-11.56 %			
	1st year / 253 days	37.5	45	-16.67 %			
Alimak	1st day	92.779	93	-0.24 %	mid	Industrial	
	2nd week / 10 days	88.197	93	-5.16 %			
	3rd moth / 63 days	85.906	93	-7.63 %			
	1st year / 253 days	75.369	93	-18.96 %			
Coor Service Management	1st day	38	38	0.00 %	mid	Industrial	
	2nd week / 10 days	37.5	38	-1.32 %			
	3rd moth / 63 days	34.1	38	-10.26 %			
	1st year / 253 days	41.6	38	9.47 %			
Collector	1st day	41.45	55	-24.64 %	mid	Financial	
	2nd week / 10 days	43.991	55	-20.02 %			
	3rd moth / 63 days	44.48	55	-19.13 %			
	1st year / 253 days	80.651	55	46.64 %			
Tobii	1st day	33.693	25	34.77 %	mid	Technology	
	2nd week / 10 days	34.865	25	39.46 %			
	3rd moth / 63 days	39.456	25	57.82 %			
	1st year / 253 days	53.714	25	114.86 %			
Hoist	1st day	66.1	58	13.97 %	mid	Financial	
	2nd week / 10 days	70.25	58	21.12 %			
	3rd moth / 63 days	63.75	58	9.91 %			
	1st year / 253 days	73	58	25.86 %			
Troax	1st day	78.75	66	19.32 %	mid	Industrial	
	2nd week / 10 days	77	66	16.67 %			
	3rd moth / 63 days	86.5	66	31.06 %			
	1st year / 253 days	113.75	66	72.35 %			
Dustin	1st day	58.5	50	17.00 %	mid	Consumer services	
	2nd week / 10 days	62.5	50	25.00 %			
	3rd moth / 63 days	62	50	24.00 %			
	1st year / 253 days	54.75	50	9.50 %			
Eitel	1st day	73	68	7.35 %	mid	Industrial	
	2nd week / 10 days	76.25	68	12.13 %			
	3rd moth / 63 days	91	68	33.82 %			
	1st year / 253 days	79	68	16.18 %			

APPENDIX I

2015 returns		Helsinki				
		Closing p	offer p	returns	market cap	sector
Consti	1st day	9.8	9.5	3.16 %	small	Industrial s
	2nd week / 10 days	9.56	9.5	0.63 %		
	3rd moth / 63 days	10.75	9.5	13.16 %		
	1st year / 253 days	14.54	9.5	53.05 %		
Evi	1st day	8.37	6.75	24.00 %	small	Financials
	2nd week / 10 days	8.2	6.75	21.48 %		
	3rd moth / 63 days	7.09	6.75	5.04 %		
	1st year / 253 days	6.8	6.75	0.74 %		
Kotipizza	1st day	5.15	5	3.00 %	small	Consumer services
	2nd week / 10 days	5.1	5	2.00 %		
	3rd moth / 63 days	4.9	5	-2.00 %		
	1st year / 253 days	8.84	5	76.80 %		
Pihlajainna	1st day	11.5	10.5	9.52 %	mid	Health care
	2nd week / 10 days	12.5	10.5	19.05 %		
	3rd moth / 63 days	13	10.5	23.81 %		
	1st year / 253 days	17.28	10.5	64.57 %		
Asiakastiet o	1st day	15.24	14.75	3.32 %	mid	Financials
	2nd week / 10 days	15	14.75	1.69 %		
	3rd moth / 63 days	14.4	14.75	-2.37 %		
	1st year / 253 days	14.79	14.75	0.27 %		

2015 returns		Copenhagen					Averages:	
		Closing p	offer p	returns	market ca	sector		
Sparekasse n Sjaelland	1st day	98.313	105	-6.37 %	mid	Financial	1st day	
	2nd week / 10 days	89.375	105	-14.88 %			Stockholm:	7.19 %
	3rd moth / 63 days	81.431	105	-22.45 %			Helsinki:	8.60 %
	1st year / 253 days	106.257	105	1.20 %			Copenhagen:	9.82 %
NNIT	1st day	157.5	125	26.00 %	mid	Technolo gy	2nd week	
	2nd week / 10 days	151.5	125	21.20 %			Stockholm:	10.26 %
	3rd moth / 63 days	154.5	125	23.60 %			Helsinki:	8.97 %
	1st year / 253 days	170.5	125	36.40 %			Copenhagen:	3.16 %
							3rd month	
							Stockholm:	13.58 %
							Helsinki:	7.53 %
							Copenhagen:	0.58 %
							1st year	
							Stockholm:	29.82 %
							Helsinki:	39.09 %
							Copenhagen:	18.80 %

APPENDIX I

2016 returns						
		Stockholm				
		Closing p	offer p	returns	market cap	sector
Volati	1st day	66.75	58	15.09 %	mid	Financials
	2nd week / 10 days	67.5	58	16.38 %		
	3rd moth / 63 days	68.5	58	18.10 %		
	1st year / 253 days	63.5	58	9.48 %		
Serneke	1st day	108.356	110	-1.49 %	mid	Industrial
	2nd week / 10 days	94.565	110	-14.03 %		
	3rd moth / 63 days	101.953	110	-7.32 %		
	1st year / 253 days	100.229	110	-8.88 %		
Alligator Bioscience	1st day	36.542	32.5	12.44 %	small	Health care
	2nd week / 10 days	31.555	32.5	-2.91 %		
	3rd moth / 63 days	30.788	32.5	-5.27 %		
	1st year / 253 days	24.458	32.5	-24.74 %		
Ahlisell	1st day	53.5	46	16.30 %	large	Industrial
	2nd week / 10 days	52	46	13.04 %		
	3rd moth / 63 days	56.3	46	22.39 %		
	1st year / 253 days	55.15	46	19.89 %		
Internationella Engelska Skolan	1st day	70	52	34.62 %	mid	Consumer services
	2nd week / 10 days	65.75	52	26.44 %		
	3rd moth / 63 days	62.5	52	20.19 %		
	1st year / 253 days	74.5	52	43.27 %		
Academedia	1st day	56.97	40	42.42 %	mid	Consumer services
	2nd week / 10 days	54.553	40	36.38 %		
	3rd moth / 63 days	61.071	40	52.68 %		
	1st year / 253 days	58.898	40	47.25 %		
TF Bank	1st day	85	77	10.39 %	mid	Financials
	2nd week / 10 days	77.5	77	0.65 %		
	3rd moth / 63 days	93.5	77	21.43 %		
	1st year / 253 days	92.25	77	19.81 %		
Wilson Therapeutics	1st day	49	49	0.00 %	mid	Health care
	2nd week / 10 days	47.5	49	-3.06 %		
	3rd moth / 63 days	46.3	49	-5.51 %		
	1st year / 253 days	80	49	63.27 %		
Resurs	1st day	55.1	55	0.18 %	large	Financials
	2nd week / 10 days	55.05	55	0.09 %		
	3rd moth / 63 days	50.6	55	-8.00 %		
	1st year / 253 days	56.05	55	1.91 %		
Humana	1st day	74	62	19.35 %	mid	Health care
	2nd week / 10 days	69	62	11.29 %		
	3rd moth / 63 days	74.5	62	20.16 %		
	1st year / 253 days	72.25	62	16.53 %		
Garo	1st day	102	73	39.73 %	small	Industrial
	2nd week / 10 days	102	73	39.73 %		
	3rd moth / 63 days	127.5	73	74.66 %		
	1st year / 253 days	245	73	235.62 %		

APPENDIX I

2016 returns						
Helsinki						
		Closing p	offer p	returns	market cap	sector
DNA	1st day	10.1	10.1	0.00 %	large	Telecomm unications
	2nd week / 10 days	10.08	10.1	-0.20 %		
	3rd moth / 63 days	11.77	10.1	16.53 %		
	1st year / 253 days	14.3756	10.1	42.33 %		
Tokmanni	1st day	6.7	6.7	0.00 %	mid	Consumer services
	2nd week / 10 days	6.82	6.7	1.79 %		
	3rd moth / 63 days	6.49	6.7	-3.13 %		
	1st year / 253 days	9.05	6.7	35.07 %		
Lehto	1st day	4.87	5.1	-4.51 %	mid	Industrials
	2nd week / 10 days	5.15	5.1	0.98 %		
	3rd moth / 63 days	5.695	5.1	11.67 %		
	1st year / 253 days	9.36	5.1	83.53 %		

2016 returns								
Copenhagen								
		Closing p	offer p	returns	market cap	sector		
NETS	1st day	148	150	-1.33 %	large	Industrial goods and services	Averages:	
	2nd week / 10 days	136	150	-9.33 %			1st day	
	3rd moth / 63 days	124.5	150	-17.00 %			Stockholm:	17.18 %
	1st year / 253 days	161.7	150	7.80 %			Helsinki:	-1.50 %
Dong Energy	1st day	258	235	9.79 %	large	Utilities	Copenhagen:	
	2nd week / 10 days	258.5	235	10.00 %			2nd week	
	3rd moth / 63 days	274	235	16.60 %			Stockholm:	11.27 %
	1st year / 253 days	297.2	235	26.47 %			Helsinki:	0.86 %
Scandinavia n Tobacco	1st day	100	100	0.00 %	large	Consum er goods	Copenhagen:	
	2nd week / 10 days	100.7	100	0.70 %			3rd month	
	3rd moth / 63 days	102.2	100	2.20 %			Stockholm:	18.50 %
	1st year / 253 days	126.7	100	26.70 %			Helsinki:	8.36 %
							Copenhagen:	
							1st year	
							Stockholm:	38.49 %
							Helsinki:	53.65 %
							Copenhagen:	20.32 %

APPENDIX I

2017 returns						
		Stockholm				
		Closing p	offer p	returns	market cap	sector
Ferronordic	1st day	161	150	7.33 %	mid	Industrial services and goods
	2nd week / 10 days	176	150	17.33 %		
	3rd moth / 63 days	159	150	6.00 %		
	1st year / 253 days	122.6	150	-18.27 %		
BioArctic	1st day	29	24	20.83 %	mid	Health care
	2nd week / 10 days	24.4	24	1.67 %		
	3rd moth / 63 days	26.8	24	11.67 %		
	1st year / 253 days	109.5	24	356.25 %		
Handicare	1st day	53.5	50	7.00 %	mid	Health care
	2nd week / 10 days	52.5	50	5.00 %		
	3rd moth / 63 days	53.3	50	6.60 %		
	1st year / 253 days	41.65	50	-16.70 %		
Balco Group	1st day	65.5	56	16.96 %	small	Industrial
	2nd week / 10 days	63.25	56	12.95 %		
	3rd moth / 63 days	63.73	56	13.80 %		
	1st year / 253 days	67.7	56	20.89 %		
Bonesupport	1st day	32	29	10.34 %	mid	Health care
	2nd week / 10 days	28.5	29	-1.72 %		
	3rd moth / 63 days	23	29	-20.69 %		
	1st year / 253 days	10.04	29	-65.38 %		
Boozt	1st day	77.5	62	25.00 %	mid	retail
	2nd week / 10 days	86.75	62	39.92 %		
	3rd moth / 63 days	72.5	62	16.94 %		
	1st year / 253 days	75	62	20.97 %		
Medicover	1st day	65.5	56	16.96 %	large	Health care
	2nd week / 10 days	66	56	17.86 %		
	3rd moth / 63 days	63.25	56	12.95 %		
	1st year / 253 days	75.3	56	34.46 %		
Munters	1st day	66.05	55	20.09 %	mid	Construction and materials
	2nd week / 10 days	80.05	55	45.55 %		
	3rd moth / 63 days	66	55	20.00 %		
	1st year / 253 days	48.5	55	-11.82 %		
Instalco	1st day	65	55	18.18 %	mid	Industrial goods and services
	2nd week / 10 days	65	55	18.18 %		
	3rd moth / 63 days	70.75	55	28.64 %		
	1st year / 253 days	57.2	55	4.00 %		
FM Mattsson Mora Group	1st day	94	68	38.24 %	small	Construction and materials
	2nd week / 10 days	90	68	32.35 %		
	3rd moth / 63 days	80.5	68	18.38 %		
	1st year / 253 days	80	68	17.65 %		
Actic Group	1st day	51	50.5	0.99 %	small	Travel and leisure
	2nd week / 10 days	50.75	50.5	0.50 %		
	3rd moth / 63 days	48	50.5	-4.95 %		
	1st year / 253 days	38.85	50.5	-23.07 %		
SSM Holding	1st day	58	59	-1.69 %	mid	Financial
	2nd week / 10 days	58.25	59	-1.27 %		
	3rd moth / 63 days	52.25	59	-11.44 %		
	1st year / 253 days	16.21	59	-72.52 %		
Ambea	1st day	82.5	75	10.00 %	mid	Health care
	2nd week / 10 days	85	75	13.33 %		
	3rd moth / 63 days	93.75	75	25.00 %		
	1st year / 253 days	60	75	-20.00 %		
MIPS	1st day	51.5	46	11.96 %	small	Consumer goods
	2nd week / 10 days	50	46	8.70 %		
	3rd moth / 63 days	81.25	46	76.63 %		
	1st year / 253 days	49.7	46	8.04 %		
Oncopeptides	1st day	43	46	-6.52 %	mid	Health care
	2nd week / 10 days	43.8	46	-4.78 %		
	3rd moth / 63 days	45.3	46	-1.52 %		
	1st year / 253 days	78.7	46	71.09 %		

APPENDIX I

2017 returns						
Helsinki						
		Closing p	offer p	returns	market cap	sector
Terveystalo	1st day	10	9.76	2.46 %	large	Health care
	2nd week / 10 days	10.37	9.76	6.25 %		
	3rd moth / 63 days	9.807	9.76	0.48 %		
	1st year / 253 days	7.475	9.76	-23.41 %		
Rovio	1st day	11.5	11.5	0.00 %	mid	Consumer goods
	2nd week / 10 days	11.5	11.5	0.00 %		
	3rd moth / 63 days	9.03	11.5	-21.48 %		
	1st year / 253 days	4.571	11.5	-60.25 %		
Silmäasema	1st day	7.66	6.9	11.01 %	small	Health care
	2nd week / 10 days	8.42	6.9	22.03 %		
	3rd moth / 63 days	8.3	6.9	20.29 %		
	1st year / 253 days	5.36	6.9	-22.32 %		
Robit	1st day	6.19	5.7	8.60 %	mid	Industrials
	2nd week / 10 days	6.08	5.7	6.67 %		
	3rd moth / 63 days	5.95	5.7	4.39 %		
	1st year / 253 days	6.18	5.7	8.42 %		
Kamux	1st day	7.56	7.2	5.00 %	mid	Consumer goods
	2nd week / 10 days	7.3	7.2	1.39 %		
	3rd moth / 63 days	8.17	7.2	13.47 %		
	1st year / 253 days	6.2	7.2	-13.89 %		

2017 returns						
Copenhagen						
		Closing p	offer p	returns	market cap	sector
TCM	1st day	97.5	98	-0.51 %	mid	Consumer goods
	2nd week / 10 days	97.5	98	-0.51 %		
	3rd moth / 63 days	101.2	98	3.27 %		
	1st year / 253 days	98.7	98	0.71 %		
Orphazyme	1st day	80	80	0.00 %	mid	Health care
	2nd week / 10 days	75.5	80	-5.63 %		
	3rd moth / 63 days	72.4	80	-9.50 %		
	1st year / 253 days	61.9	80	-22.63 %		
Averages:						
1st day						
		Stockholm:	13.05 %			
		Helsinki:	5.52 %			
		Copenhagen:	-0.51 %			
2nd week						
		Stockholm:	13.70 %			
		Helsinki:	8.74 %			
		Copenhagen:	-0.51 %			
3rd month						
		Stockholm:	13.20 %			
		Helsinki:	0.92 %			
		Copenhagen:	3.27 %			
1st year						
		Stockholm:	20.37 %			
		Helsinki:	-24.39 %			
		Copenhagen:	0.71 %			

APPENDIX I

2018 returns						
Stockholm						
		Closing p	offer p	returns	market cap	sector
Q-Linea	1st day	67.39	68	-0.90 %	mid	Healt care
	2nd week / 10 days	63.57	68	-6.51 %		
	3rd moth / 63 days	60.55	68	-10.96 %		
	1st year / 253 days	52	68	-23.53 %		
Lime Tech	1st day	75	72	4.17 %	small	Technology
	2nd week / 10 days	78.01	72	8.35 %		
	3rd moth / 63 days	109.3	72	51.81 %		
	1st year / 253 days	139	72	93.06 %		
Calliditas Technologi es	1st day	46.995	45	4.43 %	mid	Healt care
	2nd week / 10 days	54.41	45	20.91 %		
	3rd moth / 63 days	52.48	45	16.62 %		
	1st year / 253 days	62	45	37.78 %		
Projektenga gemang Sweden	1st day	47.005	47	0.01 %	small	Industrial
	2nd week / 10 days	50.25	47	6.91 %		
	3rd moth / 63 days	45.355	47	-3.50 %		
	1st year / 253 days	25.4	47	-45.96 %		
Better Collective	1st day	68	54	25.93 %	mid	Consumer Services
	2nd week / 10 days	68.7	54	27.22 %		
	3rd moth / 63 days	69.04	54	27.85 %		
	1st year / 253 days	82	54	51.85 %		
NCAB Group	1st day	75.5	75	0.67 %	small	Industrial
	2nd week / 10 days	78	75	4.00 %		
	3rd moth / 63 days	88.5	75	18.00 %		
	1st year / 253 days	124	75	65.33 %		
Bygghem a/BHG	1st day	42	47.5	-11.58 %	mid	Consumer Services
	2nd week / 10 days	37.475	47.5	-21.11 %		
	3rd moth / 63 days	41.83	47.5	-11.94 %		
	1st year / 253 days	36.6	47.5	-22.95 %		

APPENDIX I

2018 returns						
Helsinki						
		Closing p	offer p	returns	market cap	sector
Oma SP	1st day	7.15	7	2.14 %	mid	Financials
	2nd week / 10 days	7	7	0.00 %		
	3rd moth / 63 days	7.675	7	9.64 %		
	1st year / 253 days	8.72	7	24.57 %		
Kojamo	1st day	8.551	8.5	0.60 %	large	Financials
	2nd week / 10 days	9.15	8.5	7.65 %		
	3rd moth / 63 days	9.315	8.5	9.59 %		
	1st year / 253 days	12.8	8.5	50.59 %		
Altia	1st day	7.72	7.5	2.93 %	mid	Consumer services
	2nd week / 10 days	7.96	7.5	6.13 %		
	3rd moth / 63 days	8.73	7.5	16.40 %		
	1st year / 253 days	7.371	7.5	-1.72 %		
Harvia	1st day	5	5	0.00 %	small	Consumer goods
	2nd week / 10 days	5.24	5	4.80 %		
	3rd moth / 63 days	6.01	5	20.20 %		
	1st year / 253 days	6.35	5	27.00 %		

2018 returns						
Copenhagen						
		Closing p	offer p	returns	market cap	sector
Netcompany	1st day	201	155	29.68 %	large	Technology
	2nd week / 10 days	214.4	155	38.32 %		
	3rd moth / 63 days	251.3	155	62.13 %		
	1st year / 253 days	245.4	155	58.32 %		
Averages:						
1st day						
		Stockholm:	3.25 %			
		Helsinki:	1.42 %			
		Copenhagen:	29.68 %			
2nd week						
		Stockholm:	5.68 %			
		Helsinki:	4.65 %			
		Copenhagen:	38.32 %			
3rd month						
		Stockholm:	12.56 %			
		Helsinki:	13.96 %			
		Copenhagen:	62.13 %			
1st year						
		Stockholm:	22.23 %			
		Helsinki:	25.11 %			
		Copenhagen:	58.32 %			

APPENDIX I

2019 returns		Stockholm				
		Closing p	offer p	returns	market cap	sector
K- Fastigheter	1st day	163	105	55.24 %	mid	financial
	2nd week / 10 days	154.1	105	46.76 %		
	3rd moth / 63 days	170.9	105	62.76 %		
	1st year / 253 days	271	105	158.10 %		
F Q T	1st day	90	67	34.33 %	large	financial
	2nd week / 10 days	85.9	67	28.21 %		
	3rd moth / 63 days	106.5	67	58.96 %		
	1st year / 253 days	167.6	67	150.15 %		
John Matsson Fast.	1st day	102	90	13.33 %	mid	financial
	2nd week / 10 days	108	90	20.00 %		
	3rd moth / 63 days	109.8	90	22.00 %		
	1st year / 253 days	144	90	60.00 %		
Karnov	1st day	44.3	43	3.02 %	mid	consumer products and
	2nd week / 10 days	43.6	43	1.40 %		
	3rd moth / 63 days	41.8	43	-2.79 %		
	1st year / 253 days	57.1	43	32.79 %		
Ascellia	1st day	24.875	25	-0.50 %	small	Health care
	2nd week / 10 days	25.5	25	2.00 %		
	3rd moth / 63 days	21.6	25	-13.60 %		
	1st year / 253 days	17.2	25	-31.20 %		

2019 returns		Helsinki					
		Closing p	offer p	returns	market cap	sector	
Optomed	1st day	4.58	4.5	1.78 %	small	health care	Averages:
	2nd week / 10 days	5.64	4.5	25.33 %			1st day
	3rd moth / 63 days	4.3	4.5	-4.44 %			Stockholm: 21.08 %
	1st year / 253 days	7.11	4.5	58.00 %			Helsinki: 1.78 %
							2nd week
							Stockholm: 19.67 %
							Helsinki: 25.33 %
							3rd month
							Stockholm: 25.47 %
							Helsinki: -4.44 %
							1st year
							Stockholm: 73.97 %
							Helsinki: 58.00 %

APPENDIX II

Company	1st day r	2nd week r	3rd month r	1st year r	Mean	Variance	Max	Min	Median	Market Cap	City
Acade	0.424	0.364	0.527	0.472	0.377	0.010	0.678	0.185	0.376	2.000	3.000
Actic	0.010	0.005	-0.050	-0.231	-0.153	0.010	0.059	-0.317	-0.188	1.000	3.000
Ahlsell	0.163	0.130	0.224	0.199	0.214	0.004	0.343	0.087	0.220	3.000	3.000
Alimak	-0.002	-0.052	-0.076	-0.190	-0.154	0.006	-0.002	-0.298	-0.165	2.000	3.000
Alligator	0.124	-0.029	-0.053	-0.247	-0.117	0.005	0.124	-0.277	-0.129	1.000	3.000
Altia	0.029	0.061	0.164	-0.017	0.062	0.006	0.260	-0.063	0.047	2.000	2.000
Ambea	0.100	0.133	0.250	-0.200	0.090	0.015	0.313	-0.205	0.127	2.000	3.000
Ascelia	-0.005	0.020	-0.136	-0.312	-0.157	0.009	0.173	-0.352	-0.176	1.000	3.000
Asiakastieto	0.033	0.017	-0.024	0.003	-0.010	0.000	0.047	-0.083	-0.007	2.000	2.000
Attendo	0.400	0.415	0.420	0.480	0.535	0.016	0.820	0.270	0.565	2.000	3.000
Bactiguard	-0.171	-0.161	-0.268	-0.711	-0.476	0.028	-0.105	-0.745	-0.524	2.000	3.000
Balco	0.170	0.129	0.138	0.209	0.154	0.006	0.348	0.018	0.134	1.000	3.000
Besqab	0.158	0.130	0.103	0.555	0.255	0.046	0.692	-0.048	0.151	1.000	3.000
Better	0.259	0.272	0.279	0.519	0.281	0.014	0.605	0.018	0.278	2.000	3.000
Boiarctic	0.208	0.017	0.117	3.563	0.982	2.375	5.542	-0.125	0.083	2.000	3.000
Bonesupport	0.103	-0.017	-0.207	-0.654	-0.310	0.040	0.103	-0.680	-0.310	2.000	3.000
Boozt	0.250	0.399	0.169	0.210	0.228	0.010	0.497	-0.016	0.226	2.000	3.000
Bravida	0.075	0.100	0.350	0.400	0.346	0.009	0.500	0.075	0.363	2.000	3.000
Bufab	0.065	0.190	0.386	0.114	0.267	0.009	0.457	0.048	0.261	2.000	3.000
Bygghemma	-0.116	-0.211	-0.119	-0.229	-0.206	0.005	-0.021	-0.369	-0.187	2.000	3.000
Calliditas	0.044	0.209	0.166	0.378	0.063	0.016	0.500	-0.124	0.034	2.000	3.000
Camurus	0.060	0.169	0.148	0.863	0.301	0.072	0.976	-0.016	0.171	2.000	3.000
Capio	0.010	0.113	0.082	-0.031	0.030	0.009	0.309	-0.134	0.036	2.000	3.000
CLX	0.065	0.079	0.264	0.195	0.127	0.011	0.335	-0.113	0.124	2.000	3.000
Collector	-0.246	-0.200	-0.191	0.466	0.259	0.131	0.774	-0.283	0.452	2.000	3.000
ComHem	0.056	0.036	-0.070	0.289	0.073	0.026	0.371	-0.215	0.056	3.000	3.000
Consti	0.032	0.006	0.132	0.531	0.287	0.065	0.785	-0.063	0.219	1.000	2.000
Coor	0.000	-0.013	-0.103	0.095	-0.042	0.006	0.147	-0.237	-0.026	2.000	3.000
DNA	0.000	-0.002	0.165	0.423	0.254	0.025	0.495	-0.020	0.280	3.000	2.000
Dometic	0.154	0.127	0.139	0.328	0.219	0.012	0.445	0.029	0.184	3.000	3.000
DongEnergy	0.098	0.100	0.166	0.265	0.116	0.003	0.269	-0.019	0.117	3.000	1.000
Dustin	0.170	0.250	0.240	0.095	0.187	0.006	0.390	0.040	0.190	2.000	3.000
Edgware	0.013	0.000	0.231	0.107	0.227	0.190	0.862	-0.003	0.231	1.000	3.000
Eitel	0.074	0.121	0.338	0.162	0.325	0.012	0.526	0.063	0.335	2.000	3.000
EQT	0.343	0.282	0.590	1.501	1.057	0.290	2.319	0.179	0.959	3.000	3.000
Evli	0.240	0.215	0.050	0.007	0.038	0.004	0.244	-0.028	0.012	1.000	2.000
Ferronordic	0.073	0.173	0.060	-0.183	-0.082	0.015	0.200	-0.239	-0.133	2.000	3.000
FM Mattsson	0.382	0.324	0.184	0.176	0.264	0.004	0.419	0.153	0.268	1.000	3.000
Garö	0.397	0.397	0.747	2.356	1.235	0.223	2.562	0.370	1.291	1.000	3.000
Gränges	-0.152	-0.172	0.091	0.033	0.144	0.035	0.471	-0.172	0.130	2.000	3.000
Harvia	0.000	0.048	0.202	0.270	0.156	0.007	0.380	-0.016	0.180	1.000	2.000
Hoist	0.140	0.211	0.099	0.259	0.186	0.013	0.526	0.009	0.168	2.000	3.000
Humana	0.194	0.113	0.202	0.165	0.193	0.003	0.363	0.089	0.185	2.000	3.000
Instalco	0.182	0.182	0.286	0.040	0.093	0.013	0.314	-0.100	0.072	2.000	3.000
International Engelska	0.346	0.264	0.202	0.433	0.291	0.003	0.413	0.159	0.298	2.000	3.000
Inwido	-0.051	-0.125	-0.029	0.268	0.201	0.038	0.522	-0.169	0.278	2.000	3.000
ISS	0.142	0.130	0.200	0.418	0.136	0.008	0.424	-0.043	0.138	2.000	1.000
John Mattsson	0.133	0.200	0.220	0.600	0.399	0.018	0.669	0.133	0.400	2.000	3.000
Kamux	0.050	0.014	0.135	-0.139	0.000	0.007	0.236	-0.181	-0.007	2.000	2.000
Karnov	0.030	0.014	-0.028	0.328	0.100	0.012	0.372	-0.093	0.112	2.000	3.000
K Fast	0.552	0.468	0.628	1.581	1.045	0.194	1.977	0.252	1.095	2.000	3.000
Kojamo	0.006	0.076	0.096	0.506	0.129	0.013	0.534	-0.059	0.087	3.000	2.000
Kotipizza	0.030	0.020	-0.020	0.768	0.289	0.071	0.786	-0.054	0.241	1.000	2.000
Lehto	-0.045	0.010	0.117	0.835	0.471	0.104	1.067	-0.077	0.460	2.000	2.000
Lifco	0.323	0.355	0.656	1.382	0.737	0.055	1.376	0.290	0.757	2.000	3.000
Lime Tech	0.042	0.083	0.518	0.931	0.631	0.087	1.092	0.038	0.693	1.000	3.000
Medicover	0.170	0.179	0.129	0.345	0.170	0.004	0.366	0.049	0.161	3.000	3.000
Mips	0.120	0.087	0.766	0.080	0.335	0.049	0.772	-0.011	0.288	1.000	3.000
Munters	0.201	0.455	0.200	-0.118	0.125	0.033	0.473	-0.158	0.059	2.000	3.000
Ncab	0.007	0.040	0.180	0.653	0.249	0.043	0.760	0.000	0.160	1.000	3.000
Netcomp	0.297	0.383	0.621	0.583	0.470	0.007	0.703	0.255	0.467	3.000	1.000
Nets	-0.013	-0.093	-0.170	0.078	-0.132	0.008	0.057	-0.294	-0.154	3.000	1.000
Nnit	0.260	0.212	0.236	0.364	0.286	0.007	0.536	0.168	0.248	2.000	1.000
Nobina	-0.059	-0.003	-0.085	0.226	0.043	0.007	0.256	-0.132	0.029	2.000	3.000
Nordax	-0.049	-0.011	-0.116	-0.167	-0.050	0.005	0.133	-0.202	-0.061	2.000	3.000
NP3	0.127	0.087	0.340	0.360	0.296	0.009	0.523	0.077	0.283	2.000	3.000
OmaSP	0.021	0.000	0.096	0.246	0.066	0.003	0.249	-0.014	0.054	2.000	2.000
Oncopep	-0.065	-0.048	-0.015	0.711	0.377	0.104	0.978	-0.104	0.375	2.000	3.000
Optomed	0.018	0.253	-0.044	0.580	0.175	0.044	0.682	-0.352	0.158	1.000	2.000
Orphazyme	0.000	-0.056	-0.095	-0.226	-0.130	0.006	0.015	-0.275	-0.128	2.000	1.000
Pandox	0.010	0.042	0.170	0.235	0.245	0.012	0.471	0.008	0.274	3.000	3.000
Pihlajalinna	0.095	0.190	0.238	0.646	0.444	0.034	0.829	0.095	0.431	2.000	2.000
Projekteng	0.000	0.069	-0.035	-0.460	-0.216	0.028	0.074	-0.509	-0.245	1.000	3.000
Qlinea	-0.009	-0.065	-0.110	-0.235	-0.087	0.004	0.022	-0.250	-0.077	2.000	3.000
Recipharm	0.131	0.093	0.121	1.194	0.455	0.120	1.254	0.008	0.413	2.000	3.000
Resurs	0.002	0.001	-0.080	0.019	-0.001	0.005	0.157	-0.174	0.001	3.000	3.000
Robit	0.086	0.067	0.044	0.084	0.011	0.001	0.095	-0.088	0.013	2.000	2.000
Rovio	0.000	0.000	-0.215	-0.603	-0.381	0.050	0.032	-0.637	-0.526	2.000	2.000
Scandic	-0.049	-0.063	-0.123	0.078	-0.011	0.011	0.194	-0.187	-0.052	2.000	3.000
Scandi Std	0.175	0.150	0.275	0.256	0.272	0.006	0.481	0.125	0.281	2.000	3.000
Scandinavia Tob	0.000	0.007	0.022	0.267	0.113	0.004	0.242	-0.005	0.115	3.000	1.000
Serneke	-0.015	-0.140	-0.073	-0.089	0.012	0.006	0.200	-0.163	-0.008	2.000	3.000
Silmaasema	0.110	0.220	0.203	-0.223	0.031	0.037	0.296	-0.330	0.043	1.000	2.000
Sparekassen	-0.064	-0.149	-0.224	0.012	-0.136	0.005	0.012	-0.267	-0.154	2.000	1.000
SSM	-0.017	-0.013	-0.114	-0.725	-0.368	0.065	-0.004	-0.765	-0.347	2.000	3.000
TCM	-0.005	-0.005	0.033	0.007	0.042	0.003	0.196	-0.051	0.041	2.000	1.000
Terveystalo	0.025	0.062	0.005	-0.234	-0.007	0.006	0.155	-0.224	0.008	3.000	2.000
TF Bank	0.104	0.006	0.214	0.198	0.174	0.006	0.299	0.000	0.179	2.000	3.000
Thule	0.114	0.186	0.343	0.668	0.395	0.012	0.643	0.114	0.400	2.000	3.000
Tobii	0.348	0.395	0.578	1.149	1.016	0.177	1.988	0.324	0.958	2.000	3.000
Tokmanni	0.000	0.018	-0.031	0.351	0.252	0.041	0.642	-0.066	0.260	2.000	2.000
Troax	0.193	0.167	0.311	0.723	0.459	0.038	0.894	0.155	0.379	2.000	3.000
Wilson	0.000	-0.031	-0.055	0.633	0.072	0.019	0.704	-0.139	0.046	2.000	3.000
Volati	0.151	0.164	0.181	0.095	0.196	0.009	0.448	0.009	0.181	2.000	3.000