IPOs, A Dish Best Served Hot or Cold?

A Study of the Market Condition Effect on IPOs

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Summary

The purpose of this research is to study the effect of market conditions on the performance of IPOs which is relevant information for investors and companies alike, involved with IPOs. The long-term underperformance of IPOs has been previously discussed by Loughran & Ritter (1995) which has later been named as the “New Issuance Puzzle” of IPOs. This underperformance, however, has later been contradicted by research from Carter et al. (2011) who did not find long-term underperformance of IPOs. By studying the previous research of Helwege & Liang (2004), who examined IPO issuances under different hot and cold IPO periods, we found a research gap of what effect the market conditions have on the IPO issuance.

By analysing the performance under different time periods, we compare the results to an index benchmark with matching time periods of the IPO issuing companies under our full sample period. We can then analyse the performance of the IPOs compared to their respective benchmark. By adding an analysis of hot/cold and bull/bear market conditions under which the IPOs were conducted, we will observe the effect of IPO performance under different market conditions.

Our positivistic and ontological view guided our article and research process. We relied on a deductive approach in order to test our anticipated outcomes and hypotheses. Articles yielding substantive theories, based on the explanation of middle-range theories serve as the benchmark of our theoretical framework.

The research came to a conclusion where we did not observe underperformance of the IPOs in the long-term, which contradicts the “New Issuance Puzzle” of Loughran & Ritter (1995). We could observe underperformance (overperformance) of IPOs under hot (cold) period market conditions when we defined the hot and cold market periods in accordance with the number of IPO issuance during each year. In accordance to initial first month IPO returns, we observe overperformance (underperformance) of hot (cold) period IPOs. We also included bull and bear market conditions into our research, where we could find patterns that the number of issuance had the same distribution as the bull and bear market conditions currently consisting on the market. The index of OMXS30 had the same price movement as the number of issuance each year. Therefore the number of issuance each year could hypothetically be used as an indicator of the future market performance of the OMX Stockholm. We did not find statistical significance of abnormal returns on the IPO market under different market conditions.

Keywords:
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Christian Lindvall                                   Sebastian Widén
Preface

We intend this thesis to be directed to investors, financial journalist or other individuals with basic knowledge within investments and business economics, since the terminology and concepts contained within this thesis can prove to be difficult to understand without these requisites.
Definitions of Concepts

**SEO**: A seasoned equity offering is when a company is already publicly traded on a stock market exchange, but issues new equity once again with a secondary stock offering with similar mechanics to an IPO.

**Under-pricing**: Under-pricing is one of the main phenomenon within IPOs that have puzzled researchers for quite some time. The under-pricing implies that the outside investors receive a positive abnormal return on their investment on the very first day of trading, at the expense of the original investors who “leave money on the table” Jenkinson & Ljunqvist (2001). This means that the owners evidently under-price the shares when going public and the opening price being far lower than the true value of the stock, which leads to high variability in the stock price until the price matches the true value of the stock.

**Fad**: A behaviour followed by a large set of population under a period of time being followed positively. In terms of our discussion following in our thesis, the fad are regarded as optimism/pessimism about an IPO which leads to the price of the stock being speculatively priced based on a population’s general beliefs about the stock.
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1.0 Introduction

In this chapter the fundamental knowledge about the characteristics and methods of an Initial Public Offering (IPO) is introduced. We continue by discussing issues related to IPOs to conclude our specific research gap. Later on we present our research question along with the purpose of our thesis. We conclude by a discussion of our chosen subject.

1.1 Introduction to IPOs

An Initial Public Offering (IPO) is when a company issues equity on a public stock market for its first time, making their shares available to outside investors by trading them on a primary public stock market. After the issuance the stock is then traded by investors on a secondary market.

During an IPO the firm can either issue new shares or sell existing shares, where the sale of new shares help raise capital to the firm and the sale of existing shares usually accrue to the original investors (Jenkinson & Ljunqvist, 2001, p. 3). Thus, a firm can issue an IPO in order to acquire additional funds, or to simply allow the original investors to be able to sell their desired portion of shares to cash in on their original investment (Jenkinson & Ljunqvist, 2001, p. 3). A firm does not have to choose whether to exclusively issue new shares or existing shares, as many IPOs are comprised as a combination of the two (Jenkinson & Ljunqvist, 2001, p. 3).

Firms have a number of reasons to go public, where the most common objectives are to raise equity capital for the firm and to provide the original owners an “exit-route” (Jenkinson & Ljunqvist, 2001, p. 4). Furthermore, Ellingsen & Rydqvist (1997, p. 2), raise two other reasons to go public; to motivate managers and other employees, and to enhance a company’s image and publicity. These particular reasons might not infuse funds directly to the firm, but can help the IPO firm attract (or retain) top managers through offering perks like stock options, as well as benefitting potential mergers and acquisitions deals as part of the payment.

Other major benefits of an IPO, according to a study conducted by Bancel & Mitto (2009, p. 844) of CFOs made over twelve European countries is the company prestige, the increased ease of raising funding for growth projects along with providing financial flexibility. Although, they continue to argue that there is no single theory that can explain why companies decides to go public. Companies have different reasons reflecting their current objectives and financial situation that influence the perceived benefits that the company receives for going public. (Bancel & Mittoo, 2009, p. 875).

The first step in the process of going public involves the decision of choosing a market of which the firms’ shares will be traded. This can be any major stock exchange such as NASDAQ Nordic, OMX Stockholm (Jenkinson & Ljunqvist, 2001, p. 11). The next step is to generate information necessary to produce the prospectus. The prospectus should provide information regarding the offering itself such as information related to previous financial performance, ownership information, the history of the organisation, and the potential risks associated with the investment (Bhabra & Pettway, 2003, p. 370). Thus, a prospectus is a document providing the potential investors a full disclosure of
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its business about the firm’s previous- and projected performance. The process of creating a prospectus is usually in conjunction with lawyers, auditors and investments banks. The investments bank, who works as the underwriter of the IPO, generate interest by taking the prospectus and presenting it to prospective investors, which is known as a "road show", handled either by the underwriter or the senior executives of the firm (Jenkinson & Ljungqvist, 2001, p. 13). This is a form of marketing, where the road show involves visiting business related institutions to promote the upcoming IPO and entice investors to invest.

The next stage in the process of an IPO is the pricing of the shares and/or allocation of shares. There are three methods of pricing the upcoming issue of shares, namely book-building, open offer/fixed price, and auction (Jenkinson & Ljungqvist, 2001, pp. 15-21). The most common method is book-building, where the underwriter gather the prospective investors’ interest in the IPO and proceed to set the appropriate price according to the demand (Jenkinson & Ljungqvist, 2001, pp. 16-17). In an open offer/fixed price method, the underwriter sells the shares for a predetermined price without taking demand into consideration, and in those cases the apportioning of shares will be in accordance to what the investors have invested (Draho, 2004, p. 217). The third method is auction, where investors can bid however they please. The firm fixes an amount of shares to be sold with an unsettled price for each share. Investors then state the quantity and price of shares that they wish to purchase. Evidently, there will be a great number of different bid-prices, but the final price will ultimately be set when there are sufficient investors to buy all shares in the offering (Degeorge et al., 2010, p. 179). This is thus the most democratic method of the three, as there are no previous allocation of shares divided among a set amount of investors where the demand itself is the main determinant of the price.

1.2 Problem Background

Past academic research of Initial Public Offerings (IPOs) have confirmed evidence of long-term underperformance of IPOs. The phenomenon of IPO long run underperformance has been named the “new issuance puzzle” after the article of Loughran & Ritter (1995). One of the most referenced source about underperformance is from Ritter (1991) who conducted a study on 1 526 IPOs between the years 1975 to 1984, and concluded that the average IPO return where 34.47% during a three year holding period. If you compare this result of IPO performance to Ritter’s control sample that had the same quantity, industry, and market value compared to the IPO companies, the non-IPO companies produced a return of 61.88% over the three year holding period (Ritter, 1991, p. 4). By holding the similar, already public, control-group portfolio leads to a higher return of 27.39% (Ritter, 1991, p. 4). This proves the underperforming on the aftermarket long-term return from IPOs. Contradictory, later research by Carter et al. (2011) has shown signs of the opposite that IPOs do not underperform if risk-adjusted, compared to a sample match of non-issuers. Carter et al. (2011) also combined data from several other research articles and found patterns of large-growing-firm IPOs outperforming smaller-firms that were issuing an IPO. This might not be enough to disprove the “new issuance puzzle” theory, but it raises questions about the reliability of the theory.

Another issue to IPOs is the initial under-pricing of IPO stock price. An overhaul of IPO under-pricing was conducted by Loughran et al. (1994) who summarized under-
pricing research on a country level previously conducted by other researchers. They combined the several researches into a large summary of IPOs under-pricing in 25 countries to show that under-pricing is a consistent phenomenon (Loughran et al., 1994, p. 167). Another study made on over 10 783 samples during the period 1998-2008 shows that the sample mean initial return over the period was 36.5% (Boulton et al., 2011, pp. 490-492).

Loughran & Ritter also shows that initial public offerings have a higher estimation of beta compared to seasoned equity offerings (SEO). The IPOs should have a higher long-term return than SEOs if you compare the beta values to each other (Loughran & Ritter, 1995, p. 24). On the other hand, according to the result of the research, the return from SEOs are higher than the returns from IPOs (Loughran & Ritter, 1995, p. 23). This leads to a question about possible information asymmetry on the equity issuance market. A study by Shiller (1990) shows that information asymmetry exists in IPO issuing. In fact, underwriters of IPOs increase their reputation by intentionally under-pricing the IPO, in order to make investors benefit on the first trading day of these issues (Shiller, 1990, p. 62). This leads to the investors thinking more highly of the underwriter who in turn increase their reputation (Shiller, 1990, p. 62). The impact of underwriters’ under-pricing of IPOs leads to psychology having a great impact when issuing new equity. If investors have reasons to believe that fads exists on the market in the form of average under-pricing of IPOs, it will lead to the market price of the newly issued stock to be speculatively priced in the short run (Shiller, 1990, p. 62).

An article from Bossaerts & Hillion (2001) investigates the characteristics of fads that has previously been proven to exist by Loughran & Ritter (1995). The research investigate if the fads of IPO markets are a cause of irrationality from the investors, or if the under-pricing of the IPO stock is based on rational optimism/pessimism about the future performance of the stock (Bossaerts & Hillion, 2001, p. 337). The article argues that optimism is not irrational if the stock price is corrected to its appropriate price as more information becomes available (Bossaerts & Hillion, 2001, p. 337). If the investor behaviour was irrational, it would suggest that the efficient market hypothesis (EMH) is rejected. The EMH is defined as the stock price on today’s competitive stock markets reflect all information available on the market and that all information available is already incorporated in the current stock price (Brealey et al., 2011, p. 317). According to the EMH, fads of IPOs should not exist, since at the time of issuance all the available information is already incorporated into the stock price. Why the stock is under-priced initially, proven by articles such as Loughran et al. (1994), should question the existence of EMH in IPO markets if information available is not incorporated into the stock price.

The asymmetric information is a theory that contradicts the EMH. It is concerned with the uneven amount of information available between managers and investors. This leads to the pricing of the stock being influenced by optimistic and pessimistic thoughts (Brealey et al., 2011, p. 460). The information asymmetry could be a reason as to why fads exist on the IPO market, which indicates that EMH does not exist in the early stage of an IPO. Therefore the notion of EMH is only rejected if the fads existing from IPOs are irrational according to Bossaerts & Hillion (2001). The research concludes that there is little evidence of irrationality on the aftermarket of IPO stock markets Bossaerts & Hillion (2001). Therefore the fads in the IPO market are only connected to the optimism of the stock, and not irrationality according to his evidence (Bossaerts & Hillion, 2001,
Information asymmetry can also, according to Ritter (1991, p. 4) become an issue of risk mismeasurement, when investors trade on the belief of over optimism that the stock price after an IPO will increase. Lowry et al. (2010, p. 426) argues that information asymmetry exists when conducting an IPO, where the issuer and its investment bank knows more about the firms prospects than the market does. Although, the market knows more about the aggregated demand for the stock than the underwriter and issuer does which complicates the pricing process of IPOs (Lowry et al., 2010, p. 426). The results of the article shows that both underpricing of the IPOs as well as pricing error of the IPOs, leads to large volatility of the initial return of the IPO stock (Lowry et al., 2010, p. 425). This market price movement exposure can then become undesirable for the investor and lead to large unexpected losses. Which in the worst-case scenario can result in bankruptcy of the issuing company and substantial losses for the investor. The topic of information asymmetry and EMH are interesting aspects of IPO issuance, which will be discussed further in section 3.1.

How do we then, as investors, prevent the exposure to large stock price fluctuations of IPOs becoming unexpectedly high? An article about IPO failure (Demers & Joos, 2007, p. 335) has attempted to create models for estimating the probability of bankruptcy of an IPO company within the one-year horizon, where they analyse variables based on available financial information. The research, in addition to analysing the accounting variables, shows that approximately 17% of non-tech companies and 9% high-tech companies fail within the first year after an IPO issuance.

“Specifically we find that accounting measures of financial leverage, pre-IPO performance, and investments in intangible assets, in addition to proxies for underwriter prestige, audit quality, the hotness of the IPO market, firm age, and IPO offer price, are all significant explanatory variables for post-IPO failure.” (Demers & Joos, 2007, p. 335)

By analysing the mentioned variables, the investor can create an estimation of the likelihood of a company going bankrupt and thus avoiding large losses linked to the issuing company. If there are indicators of some of these variables showing warning signs of the company struggling on more than one topic, investing in the IPO of the company will lead to increased risk exposure for the investor. This does not solve the problem of speculative post-IPO pricing, but it can give an estimation of important variables to consider before investing in an IPO.

Helwege & Liang (2004) conducted a study about IPO issuances in hot or cold IPO market conditions. They define the markets as hot or cold by analysing the amount of IPO issuances in a month. By analysing companies issuing in the different market conditions, they have concluded that there is no major difference in terms of quality between the companies in hot or cold IPO market conditions (defined as growth potential of the company, the operating performance and the performance of the stock in the years following the IPO) (Helwege & Liang, 2004, p. 543). The hot markets of different IPO industries also occur at the same time when the general market for IPOs is hot (Helwege & Liang, 2004, p. 543). The results also show that there is little connection between profits, size or sales growth between companies of the different
1.0 Introduction

Market conditions except that the cold market IPOs had higher capital expenditures (Helwege & Liang, 2004, p. 543). But why then is there a greater investor optimism about companies issuing in hot IPO markets?

Ibbotson & Jaffe (1975) conducted research regarding hot and cold issue market IPOs, where the hot (cold) markets are defined by periods of abnormal (subnormal) initial month returns of IPOs issuing within a specific period. The results concluded from their research shows that the cold markets IPO companies can obtain a higher issuing price compared to the efficient price of the company (Ibbotson & Jaffe, 1975 p. 1041). (Lowry et al., 2010, p. 426) find that the variability of the initial returns of an IPO under hot IPO periods are extremely high. This should give reason that the hot issuance market of IPO should be beneficial for the investors, and that the cold market should be more beneficial to the issuing companies in terms of issuing price.

Another market condition that affects the outcome of IPOs are the bull and bear market conditions. A research conducted by (Gonzales et al., 2005, p. 82) identifies the bull (bear) market as persistent rise (fall) in stock prices of a whole stock market. A second definition of the bull (bear) market conditions is when the overall market has ongoing periods of abnormal (subnormal) market returns (Gonzales et al., 2005, p. 83). We found no research connecting bull and bear market conditions to the performance of IPOs and therefore we find this topic in need of further investigating.

Previous research have shown that there are reasons to believe that there exists differences in IPO performance in different market conditions. The particular research topic of IPOs under different market conditions is shallow in terms of previous research. Our research gap is to investigate into what effect the hot/cold and bull/bear market conditions have on the buy-and-hold returns of IPOs. We also wish to discuss the variability of logarithmic (log) return movements of these IPO companies, as it can be an important aspect to consider the exposure to return movements from an investor perspective.
1.3 Research Question

We will investigate the effect of IPO performance in different stock market and time-horizon conditions which will be introduced and defined in the theoretical framework. To investigate the effect, we observe and compare the buy-and-hold returns of the IPOs and compare it to an index benchmark in order to draw conclusions from our results.

- What is the effect of IPO buy-and-hold returns in different Stock Market Conditions, compared to an index benchmark under the same period.

As a part of the above research question, an interesting factor of the returns of the IPO stock is the variability of IPO stocks return. We can analyse the variability of the IPO buy-and-hold returns and compare it to an index benchmark, in order to discuss the exposure to large movements in returns for an investor. It is not the main importance of this thesis but can be regarded as an interesting topic of discussion for investors who wish to invest in IPO stock. We therefore limit our research question upon the effect of market conditions upon IPOs and consider the variability of IPO buy-and-hold return a interesting topic of discussion.

1.4 Purpose

The main purpose of this thesis is to examine the effect of different market conditions on IPO buy-and-hold returns. We will examine whether the buy-and-hold return is affected by the market condition of which the particular IPO was conducted. Did the IPO produce more favourable buy-and-hold returns, compared to an index, when conducted under hot IPO market conditions, or vice versa? In addition to the hot and cold market conditions, we will examine what affect the bull and bear market conditions have on IPO buy-and-hold returns. The hot and cold periods are terms used to define the state of the IPO market, whereas the bull and bear market conditions are terms used to define the state of the general stock market. These market conditions will also be tested statistically, where we investigate the abnormal buy-and-hold returns of the IPO firms under different stock market conditions. Our findings will tell us whether the abnormal returns are attributed purely to chance, or if there are patterns of consistent buy-and-hold abnormal returns under any of the IPO stock market conditions. As an adjunction to the main question and purpose of this thesis, we will also discuss the variability of IPO buy-and-hold returns, as an important aspect for investors is to limit their exposure to large log return movements. The variability will be compared between the different market conditions similar to the research question, in order for the discussion to be coherent throughout our research.

The results of this research will give investors a general idea of what to expect when investing in IPOs under different market conditions, in terms of both buy-and-hold returns, and the exposure to variability of log return movements. The research will be focused on the Swedish stock market, and will therefore be focused on aiding investors who are investing in the OMX Stockholm stock market. Therefore the results will not be generalizable to all markets of IPO issuance, but can give indications to investors in other markets as well. With this thesis, we want to contribute to the theoretical- and practical field of IPOs. The study will be conducted by including the whole population as the sample for our study, which makes the results representative for the specific period of IPO issuance of which we are conducting our study upon.
1.5 Choice of Subject

We, as authors, have both studied a one year master program in finance and therefore sought a research topic that could broaden our knowledge about investments within the stock markets. While searching through academic articles we became specifically interested in IPOs, and ultimately narrowed our search to the buy-and-hold return of IPOs. Various studies have been conducted about IPO buy-and-hold returns (Loughran & Ritter, 1995; Helwege & Liang, 2004; Carter et al., 2011). We also found specific articles related to IPO performance under different IPO market conditions (Helwege & Liang, 2004; Ibbotson & Jaffe, 1975). We combine previous research to form our theoretical framework, which will support the theoretical and practical outcome of our research. The results from our thesis will give estimations to what an investor can expect when investing in IPOs. We chose to limit ourselves to the OMX Stockholm Stock Exchange and therefore our study represent a full population of a stock exchange. The reason for our country specific limitation was the large differences in terms of macroeconomic environment, legal fees and regulations, requirements of issuance and transparency between stock markets. The limitation of comparativeness between different countries would make our result less generalizable and valid for investors, if we would have included stock markets in other countries. We also chose to exclude minor stock exchanges, such as Aktietorget and First North, since the requirements for issuing are less strict for these markets which reduces the comparativeness. The limitations of our thesis will be discussed in section 4.3.

1.6 Delimitations

The focus of the study is concerned with IPOs and excludes SEOs, as already public companies are more transparent. Thus, information asymmetry leads to the two equity issuances being incomparable.

Our sample size will only consist of firms publicly traded on the OMX Stockholm. Therefore we exclude other Swedish stock exchanges such as First North and Aktietorget, where the requirements of issuance are less strict.

We exclude foreign companies that are listed on several stock exchanges simultaneously, since these companies are influenced by altering conditions on other markets to a greater extent than companies listed on one exchange.

We will not account for the first day of trading when conducting our research. Loughran & Ritter (1995, p. 26) argue that the first trading day is not preferable, as few investors have access to acquire shares at the offering price, whereas when the shares have been released on the secondary market the shares become available to all investors.

We will use the OMXS30 index with matched time periods to the issuing IPO firms to be used as a benchmark, instead of using selected firms matched to the IPO sample. This will lead to a different approach of answering our research question than what has been done in previous research studies. The comparativeness will therefore be reduced between our thesis and the results of related research.

We use one month, one year and three year time periods since we preferred our sample to consist of data as close to the present day as possible, while still maintaining the long-term holding relevance of the research. Meaning that if we would have used a five
year holding period as in Loughran & Ritter (1995) and Helwege & Liang (2004), the relevance of our result would decrease.

Another aspect that has an impact on the generalizability of our research is that the majority of the available material concerning IPOs and market conditions are based on the US market. The vast amount of IPOs conducted in the US is far more than what we can see on the Swedish stock market, which has an impact on our comparison between our result and previous research. Furthermore, investment behaviour and IPO regulations in the US differ to its Swedish counterpart. Since investor behaviour affect the market conditions, it would result in different patterns compared to if we would have conducted the same research in the US. Nevertheless, we believe that our results will be similar to that of previous research, but it cannot be neglected that there are country-specific differences when conducting this type of research.

1.7 Research Contribution

Our research paper is contributing to the academic field of research concerning that of IPOs and their relative performance, in terms of the holding period return during different market conditions. We intend to fill the research gap we identified in this field of study, and by doing so we will contribute with knowledge to the field of IPOs which will lead to increased understanding of our particular subject. Our topic concerns the investigation of certain middle-range theories, such as the notion of hot/cold markets and bull/bear markets, in addition to the IPO underperformance. We have found a number of scientific articles adding to these middle-range theories, with the development of supporting substantive theories. However, we have not found any research concerning Swedish IPOs nor any relation to the Swedish market. The measuring of IPO performance, during the aforementioned hot and cold markets, is not a widespread research topic and we have found only one supportive article with any substantive theory. There is a substantial research gap, as research investigating the IPO performance during different market conditions is lacking, both in Sweden and in general. Our research is focused on observing and testing the long-term buy-and-hold investment method during the particular chosen time horizon of ten years in different market conditions. We will thus contribute with practical observations and theoretical discussion to the IPO performance of Swedish firms during certain market conditions. The information provided in this study will also be useful to researchers who wish to conduct a similar study within this research topic, or perform further tests.

Our study is providing practical contributions to relevant practitioners, investors and firms alike. This research will help investors in terms of decision-making, as they can assess the effect of different market conditions whether it would be wise to invest in an IPO or not. Our research will provide investors with information regarding the characteristics of the buy-and-hold abnormal return investment method under different market conditions, which will lead to information regarding periods that are more, on average, fruitful in terms of returns. In terms of firm benefits, our paper will similarly help them in their choice of timing their IPOs, when looking for positive long-term performance.
1.8 Disposition

Chapter 1 Introduction: In this chapter we will introduce the reader to our problem background, followed by an explanation of our research gap and issues at hand. Afterwards we continue by stating our research question and discuss what goals we wish to achieve during this thesis. Lastly, we will explain why and how we chose the subject of our thesis.

Chapter 2 Scientific Method: In this chapter we present our methodological assumptions that have guided our research process. The chapter begins with our preconceptions and our general knowledge about our field of study. Next, we convey our assumptions in regard to ontology and epistemology. The research strategy- and approach we use to answer our research question is then argued for. The chapter concludes with a discussion of the ethical aspects we may face during the course of our research.

Chapter 3 Theoretical Framework: In this chapter we introduce our reader to the framework of theories we are using during this thesis. The articles we base our research upon will be introduced along with the performance measurements that we will use.

Chapter 4 Practical Method: In this chapter we will show the reader how we practically conducted our research and the methods we used in order to achieve our results. The performance measurements introduced in the theoretical framework will be discussed further and linked to our thesis. The method of conducting a t-test will be explained. We end this chapter by discussing issues that may take form during our research in terms of validity, reliability, and replicability.

Chapter 5 Empirical Findings: In this chapter we will state our results that we arrived at after conducting our research. They will be posted in an objective manner without discussion about the outcome of the results.

Chapter 6 Analysis: In this chapter we will discuss the results posted in the empirical findings section and analyse the outcome between previously posted theory and the results of our thesis.

Chapter 7 Conclusion: In this chapter we draw conclusion of our findings in the analysis and provide answers to our research question. Further, we discuss the ethical and societal implications of our research, as well as giving predictions about the future. In the end we will also suggest further research that can be done within the subject.
2.0 Scientific Method

In this section we will describe the different methodological components that have guided the process of our research. We will argue for our standpoints in regard to ontology, epistemology, and methodology, as well as explaining the implications they have on our research. This chapter concludes with a discussion regarding the ethical issues we may face during this research.

2.1 Preunderstanding

We as authors find IPOs an interesting subject since it has major benefits/drawbacks for both the investor and the company issuing equity. We are both studying the International Business Program at Umeå School of Business and Economics. Our studies has given us a broad knowledge base of business economics and concepts related to financial- and risk management. We are both finance major students which will benefit the writing of this thesis, since we have further developed our knowledge of concepts related to finance during the course of our final year. We have a personal interest in investing and we are both managing our own portfolio of stock during our free time. This can have a positive effect on our thesis as we can relate to the aspects of investing and exposure to stock return movements an investor is forced to manage.

Before our research began, our knowledge specific to IPOs was fundamental where the majority of our current knowledge was obtained through various courses within our program as well as previously published academic articles. Our knowledge about IPOs also extended to benefits and limitations in the perspective of the investor and the issuing company. Since we do not possess profound knowledge within IPOs, it can have implications in the form of misinterpreting results or limit our topic related analysis which can hurt the validity and credibility of our conclusion. We have tried to solve this issue by improving our knowledge during the time of the thesis work, not exclusively about IPOs, but about the different components that can be tied to the field of IPOs such as market conditions and investment behaviour.

Our approach to axiology is determined by our own values and knowledge in our research field (Saunders et al., 2009, p. 116). To improve the credibility of our research, it is important that we are aware of how our own interpretations can affect the outcome of the research and skew the result in the wrong direction. Bryman & Bell (2007, p. 30) argue that our prior knowledge, experience, and attitudes influence how and what we see during the course of our research, which implies that research cannot be value free. According to Saunders et al. (2009, p. 119) Research conducted with axiology in mind, under the positivistic research philosophic view, is regarded as value-free. Thus, our research is conducted under no influence of our personal values since the study is based on the collection of data and are therefore facts, which cannot be changed in accordance with our personal values. The conclusion of our research will therefore have no skewed or biased answer according to the axiologistic research approach.
2.0 Scientific Method

With Figure 1 below, our scientific method is presented in a chronological order. Our methodological views and standpoints will be explained and argued for throughout this chapter.

Figure 1: Summary of Scientific Method

- Research Method - Mode 2
- Linking Theory and Research - Substantive Theories
- Research Philosophy - Objectivism & Positivism
- Research Approach - Deductive & Explanatory
- Research Strategy - Quantitative
- Time Horizon - Longitudinal
- Data Collection - Secondary Data

Source: Authors

2.2 Research Method

As cited in Bryman & Bell (2007, p. 5), the nature of business research is a debatable subject as various scholars and practitioners have different views upon how research should be conducted and evaluated. It is therefore important for the readers of this thesis, that we explain our views on the methodological assumptions that have influenced this research, in terms of the creation of knowledge and the methods employed.

The thesis conducted by Gibbons et al. (1994) was influential in the world of research, in terms of how scientific knowledge should be produced (Bryman & Bell, 2007, p. 6). Gibbons et al. suggest two types of modes of producing knowledge, namely Mode 1 and Mode 2. The essence of Mode 1 is that the research undertaken is primarily driven by academic interests, and is considered a more fundamental research (Gibbons et al., 1994, p. 3). There is little emphasis in the manner of knowledge gathering, since the main audience is people within the academic field, and is more concerned with the practicability of the underlying theory which results in the applicability of the research being overlooked (Saunders et al., 2009, p. 6). Kothari (2004, p. 3) further explains that fundamental research, consistent with Mode 1, is primarily concerned with the formulation of theory and is considered to be employed in most cases where research is done just for the sake of research. The studies relating to a pure mathematical problem...
or the generalisation of human behaviour are examples of fundamental research. Mode 2, on the other hand, combines the practical- and academic contribution where the research is highly contextual, and the combination of academics, policy makers, and practitioners within different fields take on a shared problem to derive readily applicable theories to be of advantage on a practical level. This can also be regarded as “Applied research” as mentioned in Kothari (2004, p. 3), which is defined to generate a solution to a practical problem such as a social or business problem, whereas a fundamental research, or Mode 1, adds to already existing knowledge.

Mode 2 is not intended to replace Mode 1 in terms of research, rather they are supposed to complement each other (Gibbons et al., 1994, p. 9). However, Tranfield & Starkey (1998, pp. 351-352) argue that Mode 2 is the more applicable method in terms of generating knowledge when conducting business research, as it serves as a better model in linking theory and practice, and contributes to both simultaneously. The criteria for this degree project is that we are able to generate a conclusion regarding a practical problem, and thus Mode 2 is the most suitable approach for the generation of knowledge in this thesis.

2.3 Linking Theory and Research

Before we describe our view on the connection of theory and our research, we must first conclude what type of theories we are linking to our research. Merton (1967) mention two different types of theories: theories of the middle range and grand theories (cited in Bryman & Bell, 2007, p. 7). Grand theories are more abstract in form and can be difficult for researchers to implement in their study, as these types of theories offer little in terms of how researchers should guide their study or what methods to use in the collection of relevant data. Merton thus argue that grand theories are of little use when connecting with social research. Furthermore, Kelly (1955) argue that individuals who continually tries to solve problems we all face, use similar processes as scientists do. The results are organised into schemata’s in order to comprehend the issue, which is ultimately applied into theories (cited in Saunders et al., 2009, p. 37). Kelly thus stress the importance of creating theories in order for us to make sense of the world we live in, where both grand theories and middle-range theories have their place. However, middle-range theories are more limited in its field of operations where they aim to understand and explain a certain aspect of social life. Grand theories can be overwhelming in its complexity, thus middle range theories are more suitable to the practical applicability when conducting research (Bryman & Bell, 2007, p 8).

Creswell (2002) mention an additional type of theory generation, substantive theory, which are even more limited in its applicability. The content is more descriptive in its essence and aims to enhance the understanding of a particular subject, within case studies focused on a similar theme (cited in Saunders, 2009, p. 40). Sher (2004, p. 5) define substantive theory as a theory that “provides an explanatory, constructive, and systematic account of rich, significant, and fundamental subject-matter”. We have, for this degree project, collected numerous studies of substantive theories that are based on different middle-range theories, to use as a framework and guide for our study. The relative underperformance of IPOs is considered a middle-range theory, as well as the notion of hot and cold market periods, which have influence our study. Yet the different scientific articles we have reviewed are substantive theories since they offer an increased insight and apprehension of these particular middle-range theories. We as
authors have combined these theories to make sense of the phenomena, to ultimately draw our own conclusions and generate our expected outcomes.

2.4 Research Philosophy

The choice of research philosophy one adopt when conducting research is imperative to the reader, as it contains the underlying assumptions of how you view the world. This will in turn support and justify your choice of research strategy and the methods you have chosen to answer your research question (Saunders, 2009, p. 108). It is important that we are clear about our positions within the philosophies of research, in order to not cause confusion in terms of the aspects we take into account during the course of our research. By clearly declaring our standpoints, we will decrease the possibility of other readers or scholars criticizing our work based on factors tied to ontological and epistemological assumptions (Grix, 2002, p. 176). We have thus declared our understanding of the different philosophies, which are most suitable to adopt in our research. The different research philosophies are exhibited below.

2.5 Ontological Considerations

Ontology is the starting point of all research, and our position within the concept of ontology will be the cornerstone that defines our approach to research and how we will position ourselves when making sense of the world. Ontology is essentially what constitutes social reality and what there is to know (Grix 2002, p. 177). Bryman & Bell (2007, p. 22) describe the concept of ontology as whether we view social entities as having a reality external to social actors, or whether these social entities are built up from the perceptions and process of social actors. We will hereby explain the two main positions within ontology; objectivism and constructionism, and argue for our choice as to which position is the most suitable choice for our research as well as arguing against the opposite position.

Objectivism maintains that social phenomena- and entities exists independent of the influence of social actors (Grix, 2002, p. 177; Saunders et al., 2009, p. 110). That means that social actors cannot influence the behaviour of social phenomena- and entities through their actions, and these social entities would remain constant in spite of any changes by social actors. On the other end of the spectrum lies constructionism or subjectivism, where social phenomena- or entities are thought to be created by the actions of social actors, and are in constant alteration (Bryman & Bell, 2007, p. 23). One could argue that this proposition means that the factors influencing stock price movements are indeed a result of social actors, where human behaviour is the reason for the variation of bid- and ask price offerings, meaning that our perception of a stock and intentions when investing determines the performance of a stock's behaviour on the market. A research with a constructionist view on ontology, in regards to our research question, would aim to find the answers as to why the relationship exists and finding the underlying factors influencing its behaviour, as well as which factors cause the fluctuations in stock prices.

However, we want to find out whether there are any observable effect of the variables associated with our research question. This implies that we have to view the outcome of these relationships objectively, as something that is not created by social actors and exists independently. In order for us to successfully answer our research question, our
personal views and interpretations are excluded from the presentation of the empirical data and we take the empirical results for what they are in our analysis. Thus an objectivistic view will allow us to observe the causal relationship between buy-and-hold returns and market conditions. This will help us answer our research question, where we will be able to describe rather than trying to understand these observations.

2.6 Epistemological Considerations

If ontology is concerned about what there is to know in the world, epistemology is concerned with what and how we can know about it (Grix, 2002, p. 175). Epistemology concerns what should be viewed as acceptable knowledge in a particular field of study (Bryman & Bell, 2007, p. 16; Saunders et al., 2009, p. 112). One of the main issues in epistemology is whether research within the social sciences should be considered acceptable, if it is studied according to the same rationale as that of the natural sciences (Bryman & Bell, 2007, p. 16). As a researcher, it is thus important that we clarify our views of what should be regarded as acceptable knowledge, as our stance in regard to the previous statement defines our position within epistemology. This will help guide us in our choice of research method. We do believe that research within social sciences can be achieved through the same procedures as natural sciences, which implies that our epistemological view is consistent with that of positivism (Bryman & Bell, 2007, p. 16). We will hereby explain and argue why a positivistic view can help us answer our research question and why the opposing view, interpretivism, is disregarded.

A positivist will only regard phenomena that can be observed and confirmed by the senses to be seen as credible knowledge (Bryman & Bell, 2007, p. 16; Saunders et al., 2009, p. 113). This implies that a positivistic researcher is an objective analyst who conduct the research in a value-free way, and one who is independent of the research subjects and neither affects nor is affected by these particular subjects (Remenyi, et al., 1998, p. 33). Knowledge is thus built by the testing of hypotheses and theories, and the outcome leads to true knowledge (Saunders et al., 2009, p. 113).

Interpretivism is the opposing epistemological paradigm to positivism, where interpretivists disagree with the idea that research within social sciences could be fulfilled using the same methods as in natural science (Bryman & Bell, 2007, p. 17). The fundamental view within interpretivism, inspired by the intellectual tradition of phenomenology, is to understand the underlying meaning of the social actions and activities and how we make sense of the world around us, (Remenyi et al., 1998, p. 34; Saunders et al., 2009, p. 116). Positivism have an emphasis on the explanation, whereas interpretivism aims to understand the phenomena.

Our research question will be tested based on historical data which is later processed through economical models, and in turn produce empirical findings. To successfully answer our research question we must objectively view the outcome of our empirical findings, which implies that our view on the theory of knowledge is clearly consistent with positivism. The aim of our research question is not to explain what causes the market condition effects on IPO performance, but rather objectively identifying the outcome of the effect through observations. If we would have employed an interpretivistic approach to our research, we would not be able to successfully answer our research question as it currently stand. If we would have changed the emphasis from “what is” to “why is”, an interpretivistic approach would have been more suitable as
the aim of our research would then be to understand the subjective meaning of the impact certain variables would have on any patterns we might find (Bryman & Bell, 2007, p. 19). Thus, we are confident to say that a positivistic approach will help us answer our research question to a greater extent, than if an interpretivistic approach would have been utilized.

2.7 Research Approach

Saunders et al. (2009, p. 124) mention that research involves the use of theories, and it is thus important that the researcher is clear in how to position him-/herself to these theories, and how they will be handled throughout the research. That is, will theory be tested using hypotheses, whereby the research is designed to ultimately test these hypothesis using the deductive approach, or will the research develop new theory through the analysis of collected data with an inductive approach?

A deductive approach to research regards the creation of a hypothesis derived from previous theory and research, ultimately confirming or rejecting said hypothesis through the analysis of gathered data (Bryman & Bell, 2011, p. 11). Saunders et al. (2009, p. 124) further states that the deductive approach involves the testing of a hypothesis, usually between the relationship of two or more variables derived from theory. In contrast, the inductive approach implies that the researchers aim to understand the collected data and ultimately come to a conclusion through an analysis of the results, where the generation of new theory hopefully follows.

We have used anticipated outcomes as a concept for our research upon descriptive statistics. Our predicted outcomes are compared to the actual outcome of our research during the observational period. In addition to the descriptive statistics and anticipated outcomes, we have constructed hypotheses that will be statistically tested through t-tests. We can then either accept or reject the null hypotheses. This will prove if the average abnormal returns of the IPO firms during the different market conditions are attributed to chance, which will help to assess the level of market efficiency in each market condition.

With the use of theories regarding our chosen subject, we have been able to identify different connections and relationships among certain variables mentioned in the different theories. From this, we have deduced anticipated outcomes and hypotheses that will be compared and tested with the help of our collected data. Our results will then be subject to empirical scrutiny, where our anticipated outcomes and hypotheses can be either confirmed or rejected (Bryman & Bell, 2007, p. 11). Our conclusion will be connected to our original theories, where we will discuss the relevance of our findings.

One could approach a study in the form of a combination of the inductive and deductive approach. An inductive study in itself would not be applicable to our research question, and thus a deductive approach comes as a rather natural choice in our case. Moreover, our aim is to study the causal relationship between two variables, namely buy-and-hold return and market conditions. These type of relationship-testing studies are regarded as explanatory studies. We can thus comfortably claim our research as being explanatory in nature (Saunders et al., 2009, p. 140)
2.8 Research Strategy

Bryman & Bell (2007, p. 28) state that within research, it is helpful to distinguish between quantitative and qualitative research. They further declare that quantitative research is generally associated with the testing of theory using a deductive approach, an epistemological view of positivism, and an objectivist stance within ontology (2007, p. 28). A qualitative research is where an inductive approach is employed to generate new theory, an interpretivistic view in terms of epistemology, and the ontological position is in line with constructionism (Bryman & Bell, 2007, p. 28). However, there are more distinctions separating quantitative- and qualitative research, although these aspects are most relevant in terms of our previous discussions regarding these particular positions and orientations.

Our ontological- and epistemological position thus make it a natural choice for us to conduct a quantitative research strategy in order for us to answer our research question, as this study generally involves the testing of theory and viewing gathered data objectively. It is important to note that it is not our research strategy that influences our position in regards to ontology and epistemology, but that these positions have helped steer us towards the use of a quantitative study. Our objectivistic view in regards of ontology suit the use of a quantitative study, since we must consider this social phenomena as something independent and not influenced by social actors. This implies that we do not attempt to influence our results based on our own interpretations and assumptions. Our approach in terms of epistemology further invites the use of a quantitative approach as we consider our findings as something “true”, i.e. if we can discover effects on IPOs buy-and-hold return under different market condition compared to its index, and whether the exposure to log return movements differ.

We have thus not considered a qualitative approach to our study, as it generally involves the generation of new theory and usually employ time-consuming methods in terms of data collection, such as in-depth interviews or surveys. That is not to say a qualitative approach would not suffice to answer our research question. However, the sheer volume of our data collection would be highly time consuming if gathered through the use of a qualitative method. A qualitative method would, however, aim to uncover the more underlying reasons for a particular phenomenon, something that would be improbable with the use of a quantitative method. But that is, as mentioned previously, not the aim of our study. A qualitative approach is thus impractical in this particular research setting.
2.9 Time Horizon

According to Saunders et al. (2009, p. 155), an important aspect within research is to argue whether your research should account for a particular point in time, or represent an event for a given time-period. A cross-sectional research involves the study of a phenomenon during a particular point in time, and are usually conducted using a survey design (Bryman & Bell, 2007, p. 55). A longitudinal research however, is concerned with the development and change of a particular phenomenon under a certain time-period.

We will conduct our research using a longitudinal approach where we will examine historical data over a longer period of time. Remenyi et al. (1998, p. 47) argue that longitudinal studies can be difficult to conduct when the research is conducted under a limited time period. However, we will study the relationship of IPOs buy-and-hold return compared to an index in order to investigate whether there are any consisting abnormal returns under the different market conditions using historical data, during the course of one month, one year, and three years of each subject. We have thus been able to overcome this potential hurdle by using historical stock prices. This readily available data thus help justifying the use of a longitudinal research as it is a suitable approach when studying data within an extended time frame (Menard, 2002, p. 2).

2.10 Data Collection

The data of our research will be retrieved from Thomson Reuters Datastream, which is an information database of historical stock prices. In order for the information to be comparable, it needs to be quoted at the same point in time. This leads to possibilities of either using opening or closing stock prices. For this research we choose to use the closing price of stocks, similar to that of Loughran & Ritter (1995 p. 26), in order for our research to be comparable to previous studies.

2.10.1 Secondary Data

The data we collect from Thomson Reuters consist of secondary data, since market stock prices has already been published beforehand. Throughout this work we are referring to data that is publicly available. We are not using any form of primary data, as this entails that we retrieve the data from its original source, such as information gathered from an individual during an interview (Remenyi et al., 1998, p. 141).

Secondary data can be divided into three main sub-groups: documentary-, survey-based-, and multiple-source secondary data. Documentary secondary data refers to written documents such as e-mails, reports to shareholders, books, and journals, in addition to non-written documents as voice and video recordings (Saunders et al., 2009, p. 258). Survey-based secondary data involves the collection of data derived from surveys already analysed for their original purpose, where the researcher may use a collection of different surveys with contrasting goals to answer their own research question (Saunders et al., 2009, pp. 259-261). Multiple-source secondary data can be grounded either on documentary- or survey-based secondary data, or a combination of the two (Saunders et al., 2009, p. 262).

We will use both documentary- and multiple-choice secondary data for our research, where we will be able to obtain documentary secondary data through the Thomson
Reuters database of historical stock prices. Relying on secondary data makes a longitudinal research more feasible (Saunders et al., 2009, p. 269). Longitudinal research, as mentioned, is concerned with observing subjects for a continuous time period. Thus, secondary data not only makes it easier but is essentially the only possibility to conduct a longitudinal research in the limited time frame of our research.

2.11 Literature Review

When we began our research, we initiated our search for topics related to IPOs in general. We only possessed basic knowledge about IPOs, and were familiar with the basic terms and understanding of the subject. However, after our research began we became aware of previous research on the topic of IPOs, and thus gained an understanding of the initial topics that had been researched regarding the subject. This made us realise what we could add to the field of IPO, i.e. identifying the research gap. Adding to that, it enabled us to contend the significance of our research.

When we eventually established our research focus, we began to search for student theses within our field, by using student thesis portal DiVA (Uppsala University, 2013) to investigate if similar research had been conducted before. We obtained theses that somewhat related to our subject, but there were no related research within IPO underperformance under different market conditions.

As we were now familiar what different type of theses that were available, we started our literature review by searching for previous academic research closely related to market conditions in conjunction with IPOs. We searched for peer-reviewed articles on EBSCO Business Premier1, available on the Umeå University Library homepage. This was our primary search engine as it contains a large amount of academic articles along with the ability to filter for peer-reviewed articles. Beyond EBSCO Business Premier, we obtained articles in Google Scholar as it sometimes include more scientific articles available than the former. However, as it is not as straightforward in regards to peer-reviewed articles as in EBSCO Business Premier, we acted with caution and used our own judgement when choosing to cite or reference an article obtained on Google Scholar.

Key words in our engine-searches was:


When having searched the different databases for suitable articles, we had to be critical in what type of research could help steer our thesis in the right direction, and use only those that were relevant for our study. Research that studied similar phenomena, but used entirely different variables, were not used in this thesis as there would be no relevant connection. For instance, there are several ways of defining the hot and cold market conditions, but studies relying on the underpricing definition have not been considered in this thesis as we are not using the initial offering prices required to

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1 We found that EBSCO Business Premier contain articles from 1975 and onwards. We have tried to stay up to date in terms of relevant articles, but we may have unwittingly excluded relevant articles prior to 1975. This problem have in part been solved by including the google scholar search engine.
calculate the effect of underpricing. Thus, there would not be a compatible connection between our outcomes and no relevant way of referencing our analysis to their results.

The search of relevant literature, articles, and theories is a process active throughout the entirety of the thesis (Saunders et al., 2009, p. 60). We have continuously stayed up-to-date to ascertain the relevance and reliability whenever we have formed any type of conclusion, or issued a statement.

### 2.12 Ethical Considerations

When writing this thesis it is important for us as researchers to consider the ethical issues that might arise during the process of conducting our research. It is not only the integrity of this research that is highly reliant upon our ethical awareness throughout this paper, but any ethical boundaries we may overstep can also affect the integrity of our institutional sponsor, Umeå University, and the participants in our research (Saunders et al., 2009, p. 187). It can be easy to imagine that most ethical issues are concerned with qualitative research, as they usually involve individuals supplying the authors with primary data. The interpretivistic nature of qualitative research, can result in the participants being misquoted, or the information they supply may be used in the wrong context due to the researchers own subjective interpretations. However, there are several ethical concerns within quantitative research as well. Ethics is something that should be considered from the very start of your research paper, as it is present throughout the entire process (Saunders et al., 2009, p. 187). We have clearly stated the intent of our research, how the quoted theories and previous research papers are utilized, and have been meticulous in properly quoting any statements that are not of our own. As we are conducting a quantitative research we may not be exposed to as many ethical issues that might follow a qualitative research. However, it is imperative that we disclose all ethical issues concerned with both quantitative- and qualitative research in order for us to fully affirm the integrity of our research.

Diener and Crandall (1978) have broken down the ethical principles into four main areas; harm to participants, lack of informed consent, invasion of privacy, and deception (cited in Bryman & Bell, 2007, p. 132). Harm to participants implies, among other things, that the participants of the research are portrayed in a negative manner which may not represent a true reflection of reality. Participants are thus subject of potential misrepresentation within research, which can have a detrimental effect on their own credibility. In our research, we believe our participants are free from any potential harm as a result of our outcome, as we will keep all included firms anonymous throughout our research. The analysis of our results will be an aggregate representation of all firms in our population and thus there will not be an analysis of each individual firm. Informed consent imply that the participants are given enough information about the research in order to make a decision whether to participate in the research or not (Bryman & Bell, 2007, p. 137). Since we are using publicly available data, we did not need to rely on informed consent to be able to use the data in our research. Neither did we invade any subjects’ privacy as the aforementioned statement holds true in this regard as well.

We believe that the simple nature of our research means that any failure to adhere to the ethical issues mentioned above are of minor risk. We do believe, however, that deception is an ethical issue that is generally present regardless of what method you use
in your research. According to Bryman & Bell (2007, p. 141), deception implies that the researchers claim their research represent something other than what it is. We will remain objective and transparent throughout our research, were we have not altered our collected data or our results in any way. Our data will be analysed through mathematical- and economical methods to test the relationship of different variables, but the results will be presented as they are. Our research is thus completely objective, where what we see is what we get. We have furthermore been careful in referencing previous research when used, and have given proper explanations as to what they contribute to in our research.

The legal issues are also an important aspect within research, such as if any legislation of data protection have been broken during the process of the data collection (Bryman & Bell, 2007, p. 143). This could mean copyright infringement, but as we have relied on publicly available data we are exempt from any potential data right infringements.

We have in this section discussed ethical issues tied to the implications of our research process. We will go into further details on the ethical- and societal implications of our research in chapter 7.
3.0 Theoretical Framework

In this section we will present our choice of previous research that we base our thesis upon. We will also discuss the different market conditions being examined. Finally we will introduce the reader to the performance measurement models that we use throughout the thesis along with the statistical t-test that will be conducted based upon hypotheses.

The anomalies on the market will be tested using the Efficient market hypothesis and abnormal returns as supporting theory for analysing and testing our sample. The anomalies will be tested during the different IPO market conditions of hot, cold, bull and bear where two different main areas of research will be done using descriptive statistics and hypothesis testing. The different methods and theoretical framework of our research presented in figure 3 below will be explained in detail throughout this chapter.

Figure 3: Conceptual Framework

3.1 Efficient Market Hypothesis

The efficient market hypothesis is used to identify the potential forms of market efficiency in the different IPO market conditions, based on the buy-and-hold abnormal returns achieved during each condition. Abnormal return entails that an investment have produced a return that deviates from the expected return, which imply that the market is not efficient. Loughran & Ritter (1995) uncovered the phenomenon of IPOs underperforming during the long-run time horizon when compared to non-issuing firms
during 1970 and 1990, giving rise to “the new issues puzzle”. Carter et al. (2011) sought to conduct a similar research with more recent samples, who examined the performance of IPOs issued during the period of 1981-2005. Carter et al. found that IPOs underperformance was concentrated in the 1980’s and early 1990’s, similar to that of Loughran & Ritter. However, they found that IPOs issued in the period of 1998-2005 performed the same as the market or even outperformed on a risk-adjusted basis. In either case IPOs displayed tendencies of producing abnormal returns, whether that be under- or outperforming the market. The efficient market hypothesis states that in a perfect market, all relevant information is available and incorporated in the market price, and there would be no way of “beating the market”, and actual returns equal expected returns. Achieving abnormal returns would rely on a game of chance rather than skill. Thus, according to the efficient market hypothesis, continuous under- or outperformance of IPOs suggests that the market is inefficient.

The efficient market hypothesis is a concept first introduced by Eugene Fama (1970). The theory is founded on the notion that prices fully reflect all available relevant information, at any point in time (Fama, 1970, p. 413). As a consequence, one is not able to consistently achieve abnormal returns on a risk-adjusted basis. As soon as information becomes available, investors respond and the market prices adjust accordingly. Fama (1970, p. 387) describe three different conditions required for the theory of efficient markets to be upheld. The three conditions are: (i) a market where there are no transaction costs in trading securities, (ii) the information available are free to all participants, and (iii) all participants agree on the implications available information have on current- and future prices on each security.

The efficient market hypothesis exists in three various forms: weak, semi-strong, and strong form. The weak form implies that current stock prices fully reflect all historical information, such as historical prices (Fama, 1970, p. 383). The semi-strong form broadens the weak form by the assumption that all prices fully reflect and adjust to information that is publicly available. This type of information includes annual reports, public company announcements, patents etc. (Fama, 1970, p. 383). The strong form imply that all forms of information, including that which are supposed to be known only to insiders, is fully reflected in the price of securities. Thus, there would be no way of achieving excess returns, as investors have no access to unique information and no way of outperforming the market.

Firms are required to provide potential investors with a detailed prospectus in the event of a IPO issuance. The investment community recognize the prospectus to include the most detailed and precise information about the issuing firm, which provide investors with relevant information regarding the IPO and the firm itself (Bhabra & Pettway, 2003, p. 370). This publicly available information is thus reflected in the market price, consistent with semi-strong form of market efficiency. However, the semi-strong form does not imply a perfectly efficient market, as it is evidence that corporate insiders possess information that is not yet known to the public (Fama, 1970, p. 409). This leaves room for investors privy of inside information to achieve positive abnormal returns. As mentioned in the introduction (1.1), one reason for conducting an IPO is to provide the original owners or entrepreneurs an exit strategy (Jenkinson & Ljungqvist, 2001, p. 4). The intentions of the original owners is not known to outside investors prior to the IPO issue, and investors have no way of knowing of the quality of the firm’s innovation or the success or failure of its implementation (Allen & Faulhaber, 1988, p. 308). The
investors can only observe the price of the stock, and their willingness to pay depends on their prior beliefs of the company which is usually attained from the firms prospectus (Allen & Faulhaber, 1988, p. 308). The level of original owners’ equity retention can thus become a signal of quality in terms of outside investors’ perception of the firm. Jain & Kini (1994) investigate the post-IPO performance in terms of entrepreneurial equity retention, and found that there is a positive relation between post-IPO performance and equity retention by the original entrepreneurs (Jain & Kini, 1994, p. 1699). However, they cannot find evidence as to whether the superior post-IPO performance related with higher original entrepreneurial ownership is due to lower agency conflicts, or whether higher original entrepreneurial equity retention signal quality to outside investors (Jain & Kini, 1994, p. 1725). Nevertheless, the intentions of the original owners is information not known to the public, which is further evidence of the existence of information asymmetry in the field of IPOs. These revelations are evidence that information asymmetry is a reality in the early stages of an IPO and that outside investors are not privy to all forms of information, thereby excluding the possibility of a strong form efficient market in the initial stages of an IPO.

Stock prices naturally has a slow adjustment to new information, and therefore the stock returns has to be examined over the long term time-horizon in order to review if market inefficiency exist (Fama, 1998, p. 284). Ibbotson (1975) examined the performance of firms issued in 1960 to 1969 where the aim was to test for departures in market efficiency in the aftermarket. Ibbotson does find evidence of abnormal performance, where there is generally positive performance the first year, negative performance the third year, and positive performance the fifth year (Ibbotson, 1975, p. 252). However, due to the standard error being so large it is difficult to reject market efficiency (Ibbotson, 1975, p. 243), thus concluding that the market is efficient after a stock goes public (Ibbotson, 1975, p. 265). Over- or under reaction to new information affects the stock price, which leads to abnormal stock price returns. According to Fama, the first reason in favor of market efficiency is in an efficient market the frequency of overreaction and under reaction will be evenly split in the long run, which indicates that the market is efficient (Fama, 1998, p. 284). The second reason is that if the anomalies are large enough that they cannot be dependent on chance, and over- and under performance is evenly split in the long term; the market is efficient (Fama, 1998, p. 284). These two reasons would indicate that long-term anomalies exists on the IPO market. But if these anomalies were evenly split between over- and under reactions, the abnormal returns would even out and account for zero (Fama, 1998, p. 287). When reviewing the performance findings of Ibbotson’s research (1975), the occurrence of under- and over performance seems to be roughly evenly split during the observational period, indicating that Fama’s description of market efficiency in regard to long-term anomalies hold true in this instance. Furthermore, this explanation of the stock market IPO anomalies indicates that the results of articles such as Ritter (1991), Loughran & Ritter (1995) & Carter et al. (2011) who prove anomalies on the IPO market, are purely attributed to chance rather than market inefficiency. The samples of Carter et al. (2011 p. 1068) results in three periods of different performance results of IPOs. During the period of 1981 to 1987 the abnormal returns are negative, the following period of 1988 to 1997 shows no abnormal returns, and the final period of 1998 to 2005 show positive abnormal returns (Carter 2011, p. 1068). Again, similar to Ibbotson’s findings (1975), the results of different abnormal returns under different periods would indicate that the efficient market hypothesis is true if explained by the two reasons brought forward by
Fama (1998), since the under and overreaction of the market are evenly split in the long term.

Aside from Ibbotson (1975), short-term market inefficiency is apparent in the IPO market based on the continuous occurrence of abnormal return, and is documented to have implications on post-IPO performance. Abnormal returns should thus be possible to observe even in our sample, given that the market is not fully efficient in the short-term when accounting for evidence against it (see Ritter (1991), Loughran & Ritter (1995), Carter et al. (2011)). However, our statistical testing will tell us whether the abnormal returns of our sample are attributed to chance. Based on the statistical significance of our findings, we will be able to determine if the IPOs during the different market conditions are in fact efficient or not and thus no abnormal long-term return exists on that specific market condition. Therefore if market efficiency is apparent and statistically proven to exist, we can determine that the market conditions does not effect the efficiency of the long-run buy-and-hold returns according to the Efficient Market Hypothesis.

3.2 Abnormal Return

Abnormal returns is a term used to describe the outcome of how actual returns of an asset or security deviates from its expected return. As such, the term does not specifically imply that a particular asset or security have produced returns in excess of its expected return, but can also imply that an asset or security deviated negatively in terms of its expected return. Abnormal returns can be triggered by unsystematic stock specific events, such as public company announcements, mergers & acquisitions, stock splits, annual reports etc. Abnormal return is thus a testament of how a certain asset or security perform relative to a benchmark consisting of control firms or an index, and do not take into account how an asset or security perform relative to its initial investment. Being a firm-specific term, it can thus be evidence of how relevant information is reflected in the market price, and therefore the level of market efficiency.

Abnormal return is one of the most discussed subjects within the field of IPOs. Loughran & Ritter (1995) identified a recurring phenomenon of IPOs underperforming compared to non-issuing firms during a five year buy-and-hold period, giving rise to the theory of “The New Issues Puzzle”.

There are different methods for testing long run abnormal returns, where they conclude that the method of buy-and-hold abnormal return reference portfolios (BHAR) is favorable compared to the cumulative abnormal return model (CAR) (Lyon et al., 1999, pp. 175-176). The upside to buy-and-hold abnormal return is that it measures the investor’s experience accurately without the need of rebalancing the benchmark, meaning that the results will be in accordance to that of an investor using a buy-and-hold investing technique on the stock market (Lyon et al., 1999, p. 166). The reasons that the CAR-model does not represents the investors experience is that it ignores compounding interest where the BHAR does not (Barber & Lyon, 1997, p. 345). The exclusion of compounding interest of CAR means that the returns of a stock on each specific day is added up with the remaining returns on each day for the full sample time frame where the returns do not exponentially change from the days prior. This imply that BHAR has compounding interest that takes into account the returns of the previous day that will exponentially affect the total return gained throughout the time horizon.
We use the method of BHAR for the reason that it more accurately reflects investors experience without the need of rebalancing the samples which can add bias in the statistical analyses. The model of long-term BHAR also has the advantage of being used in previous research articles such as Ritter (1991), Loughran & Ritter (1995), and Carter et al. (2011).

The method of comparing Abnormal Returns has, as previously mentioned, been conducted by Loughran & Ritter (1995) whose research has given rise to the theory of the “new issuance puzzle”. The theory is concerned with long-term post-IPO stock significantly underperforming compared to non-issuing firms during a five year buy-and-hold period. The research use the average equally weighted holding-period return for firms conducting an IPO each year, and compares the return to non-issuing firms as a benchmark. The authors calculate an average weighted buy-and-hold return of both the IPOs and the Benchmark companies in order for the results to become comparable. A sample consisting of 4,753 operating companies who issued in the period of 1970 until 1990 has been used in the research (Loughran & Ritter, 1995, p. 24)

By calculating a wealth relative which compares the expected return of a stock with the actual return, Loughran & Ritter (1995, p. 23) concludes that the annual return after a five year buy-and-hold of the post-IPO stock leads to a seven percent return. Therefore an investor must hold 44 percent more post-IPO stock in order to acquire the same wealth as the buy-and-hold of non-IPO stock (Loughran & Ritter, 1995 p. 32). Although the research includes a stock sample data that is old, the research has been conducted on a large sample of IPO stock which improves the generalizability of the article. A drawback of the research is that the sample consist of stocks only located on the United States stock market, which limits the generalizability of the research to the US stock market alone.

A similar outcome to the new issuance puzzle is the Pseudo Market Timing theory. The theory is based on a study by (Schultz, 2003) who argues IPO events during bull market periods underperforms in the long-term after the issuing event (Schultz, 2003, p. 483). The more firms can gain on an IPO, the higher the number of issuance in that specific period. That particular period is when the overall market is attributed to continuous increase in returns, known as a bull period (Schultz, 2003, p. 484). Post market peak performance is often attributed to bear market conditions of negative returns. This indicates that the IPO firms issuing at a market peak should underperform more than 50% of the time in the long run of it’s post IPO issuing during the bear market conditions, leading to the Pseudo Market Timing Theory (Schultz, 2003, p. 484).

The long run post IPO underperformance has been questioned from research by Carter et al. (2011), who compares buy and-hold returns of post-IPO stock and wealth relatives’ returns with a control group of non-issuing firms. The research sample that Carter et al. (2011, p. 1068) use consist of 6,686 IPOs issued under the time frame of 1981-2005, which is a larger sample than that of Loughran & Ritter (1995) while also using data that are closer to the present date. Their research shows signs that in the later periods of 1998-2005, the post-IPO returns did not underperform compared to the control group. This give reasons to believe that IPOs do not underperform on a risk-adjusted basis, nor to similar firms matched on size and book-to-market ratio (Carter et al., 2011, p. 1084-1085). Furthermore, the article highlights the sensitivity of the time-period researched, where they find that IPOs studied in the period of the 1980s and
early 1990s, as in Ritter (1991) and Loughran and Ritter (1995), will yield a higher proportion of underperforming IPOs, whereas IPOs either perform the same as the market or outperform on a risk-adjusted basis in the late 1990s and 2000s.

The results of Carter et al. (2011) have a higher extent of relevance because of the more up-to-date data sample as well as sample size, compared to the results of Loughran & Ritter (1995). The results of both mentioned articles are representative to their specific time period, and therefore neither of the results can be neglected. The research of Carter et al. (2011) cannot directly oppose the research of Schultz (2003) since Carter et al. (2011) investigates the overall IPO market and Schultz (2003) investigate the bull-bear market period effects. Even though there can be doubts about the existence of New Issues Puzzle or Pseudo Market Timing, they can be a useful theories to keep in mind when discussing the variability in log return movements of IPOs. If the movements in return of IPO performance can be estimated beforehand, the exposure to unexpected large return movements when investing in IPOs can be partly reduced, since known patterns of historical IPO log return variability exposure can be analysed on average. The underperformance of IPOs can be connected to different market conditions as discussed in articles such as Helwege & Liang (2004), Ibbotson & Jaffe (1975) and Schultz (2003) which will be discussed further in the following chapter.

3.3 Hot and Cold IPO Market Conditions

Previous research of Schultz (2003) and Ritter (1991) has indicated that poor IPO performance is more prevalent in certain market conditions. In this section we will discuss the definition, content and context of the market conditions we have chosen to analyse further in this thesis. The market conditions regarded are the hot/cold IPO market conditions and the bull/bear market condition of the overall market which we will explain thoroughly later on in this chapter. The market conditions will be investigated in terms of long-term IPO performance, where under and over performance will be observed as well as statistically tested in order to identify if the market efficiency exists on the IPO issuing market under the different market conditions in terms of average buy-and-hold abnormal returns.

In Helwege & Liang’s study (2004), the differences of hot and cold IPO markets are explained. In their study, they define hot markets as instances where there is a high volume of offerings on the market, major underpricing, oversubscription of IPO offerings, and occasionally a high focus of issuing firms in certain industries (Helwege & Liang, 2004, p. 541). A cold IPO market is the complete opposite of a hot IPO market, where there is a lower volume of issuance on the market, lower levels of underpricing, and fewer oversubscriptions (Helwege & Liang, 2004, p. 541). Their study concerns whether there is a clear difference in the type of firms being represented in hot and cold IPO markets, such as the nature of their business and age of the firm.

Helwege and Liang (2004) use monthly returns that are subsequently compared to indices such as CRSP, NASDAQ, and NYSE, which in turn produce wealth relatives that represents a given year (Helwege & Liang, 2004, p. 550). They find that most wealth relatives for the full sample are below 1, implying that the full sample of IPOs are underperformers. The result is similar to the result of Ritters new issuance puzzle (1995) and Schultz Pseudo Market Timing underperformance even though the research has not been investigated under different market conditions in accordance to Helwege
and Liang (2004). Moreover, Helwege and Liang (2004) find that when hot market conditions are defined by volume, hot market firms are generally worse performers than cold, where hot firms register wealth relatives as low as 0.710, and cold IPOs wealth relatives in the range of 1.021 and 1.388 (Helwege & Liang, 2004, p. 551). When IPO market conditions are based on underpricing, they find that they too often underperform the benchmark, although not as clearly apportioned. Krigman et al. (1999) find that firms with the most underpricing perform worst of all sampled IPOs. However, in Helwege & Liang’s (2004) research, they do not come to this conclusion as the wealth relatives of hot and cold periods based on underpricing are fairly similar, and most often below one.

In terms of defining the different market conditions, there has been previous other research such as Allen & Faulhaber (1989), Grinblatt & Hwang (1989), and Welch (1989) that argue the market is characterized as hot when a greater number of quality firms go public (cited in Helwege & Liang, 2004, p. 542). This is in stark contrast to the conclusion made by Loughran & Ritter (1995), where the long-run performance of stocks issued during hot markets suffer of a worse stock return compared to stocks issued during cold markets, implying that stock issued in hot markets are thus of a lower quality. They further claim that this is a result of managers taking advantage of the bullishness of the market, where they see an opportunity to issue an IPO to capitalize on the behaviour of irrational investors (Helwege & Liang, 2004, p. 542). Stoughton et al. (2001), Benveniste et al. (2002), and Maksimovic & Pichler (2001) maintain that hot markets are characterized as a result of small, risky IPOs within particular industries, where the main factor driving firms to conduct IPOs are technological innovations or positive productivity shock (cited in Helwege & Liang, 2004, p. 542). These particular firms are not considered to be established companies, but are firms with a lot of potential to grow while the potential profitability of the firms remain doubtful. There are thus many ways to identify whether the market is hot or cold.

### 3.3.1 Number of Issuance

The most occurring method is to define hot IPO markets based on either volume of issuance, or based on underpricing (Helwege & Liang, 2004, p. 548). Periods of high underpricing are generally followed by high volume of IPO issues, by investigating the relationship between volume and underpricing under hot and cold market conditions Lowry & Schwert (2002, p. 1199). Helwege & Liang (2004, p. 548) use a three-month centred moving average of the number of IPOs, were the definition of a hot or cold period is set according to the amount of new issuances within a three-month period. Three-month periods that register new issuances in the top quartile in their research are considered hot, and the periods that register new issuances in the bottom third quartile are considered cold (more than 30, and fewer than 10.5 IPOs respectively) (Helwege & Liang, 2004, p. 548). They include the bottom third because there are instances in certain months where there are no offerings at all (Helwege & Liang, 2004, pp. 549-550). We will use the same method as Helwege & Liang (2004) when determining our portfolio of sample firms for the different market condition of hot and cold under the number of issuance definition.

### 3.3.2 Initial Month Return Defenition

Ibbotson & Jaffe’s (1975, p. 1027) use a different approach to define hot and cold market periods, where they use the initial first month return of a particular stock and
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compare it to a benchmark index, whereby if a firm’s stock produce an abnormal (subnormal) return the period is regarded as hot (cold). We will make use of Ibbotson & Jaffe’s definition of a hot market as we have chosen not to include the return on the first day of trading. In order to calculate the hot and cold market condition, according to the underpricing definition, we would need the first day of trading in order to see if the stock was underpriced or not (Ritter, 1991, p. 3). Another reason why we prefer to use the initial month return definition is that this process allow us to compare the first-month returns to the stocks’ index. Our thesis is investigates the relationship between stocks and indices, thus a definition that is not firm specific is preferable in our research.

Ritter mention the relationship that exists between periods of high initial return and an increase in IPO volume (Ritter 1998, p. 11). He propose that periods of high initial returns and high volume of IPOs are considered hot markets. He identify a pattern where periods of high volumes of IPOs show a strong inclination of following periods of high stock market returns (Ritter 1998, p. 11).

3.4 Bull and Bear Market Conditions

There has been little research about a formal consensus on the definition to the commonly referenced bull- and bear market conditions (Gonzalez et al., 2005, p. 470). Pagan & Sossounov (2003, p. 23) state that “bull and bear markets are ways of describing cycles in equity prices”. Gonzalez et al. (2005) say that although the notion of bull (bear) markets is generally agreed as an important aspect within finance, several researchers believe it is consistent with the quote of Pagan & Sossounov that it is nothing more than the result of a categorization of random data to explain ex-post market movements, and not an economic phenomena in itself. The research conducted by Gonzalez et al (2005, p. 482) defined the concept of a bull market by persistent rise or falls in stock index series. A bull (bear) market is therefore defined as the period between the lowest (highest) peaks of the stock index. A second definition of the bull and bear market is defined as an ongoing period of above average return of a bull market, and an ongoing period of lower than average return of a bear market (Gonzales et al., 2005, p. 83). Chauvet & Potter (2000, p. 90) propose a similar definition of bull- and bear markets, where the bull (bear) market equate to periods of generally increasing (decreasing) market prices. Maheu & McCurdy (2000, p. 101) further add to the definition of bull- and bear markets, where bull markets display high levels of return in addition to low volatility. In contrast, a bear market show low returns on the market coupled with high volatility. The theory of Pseudo Market Timing connects the Bull market periods with the underperformance of IPO events. The pseudo market timing theory is based on that the firms will issue equity at periods where they can receive the most from their issuance (Schultz 2003 p. 484). This leads to firms issuing equity during overall market peaks within bull market periods even in an efficient market (Schultz 2003 p.484). The more occurring market condition after an overall market peak is the bear market condition, which will result in overall underperformance of IPOs since bear market condition is attributed to general stock market downturn, according to the Pseudo Market Timing (Schultz 2003 p.484).

Bull (bear) markets are identified from the obvious rise (fall) of stock market prices following the lowest (highest) peaks evident on our data collection of stock market prices. Bull and bear markets can be narrowed down to a particular time of interest, such as the market conditions for a given month or year. The bull- and bear markets,
3.0 Theoretical Framework

associated with the stock market price index in our thesis, represent the market conditions based on each year for the full ten year sample time frame.

3.5 Performance Measurements

3.5.1 Beta

The beta is the covariance risk of an asset relative to the assets average covariance risk. The market beta measures the sensitivity of the specified assets return to the variation in the return of the market (Fama & French, 2004, p. 28). By calculating the beta from each of the IPO stock we can identify the stocks sensitivity of its price movements compared to the index (Fama & French, 2004, p. 28). The beta is a measurement that can be used as an estimator of how much a change in the index price changes the specific IPO stock price. Therefore it can be used as an estimator of the individual stock exposure of its stock price movement, compared to the price movements of a benchmark index. The beta value can be explained as if the beta had a value of one, then a one percent increase in the index price benchmark will lead to an estimated one percent increase in the IPO stock price. If we calculate an average of the beta values during a year, we can assess the average movement of the IPOs during that year compared to the index benchmark specific to those IPOs. The value of the beta is estimated based on historical stock prices. This implies that the calculation of beta does not take into consideration future stock prices that has not occurred yet and therefore future estimations are based on the past performance.

3.5.2 Standard Deviation

The volatility of a stock return is defined as the standard deviation (SD) of the return of a stock during a specific time frame, if the return is stated using continuous compounding (Hull, 2012, p. 205). The standard deviation estimates the distribution of possible returns during the period of our sample around its mean. Therefore, if the results from the calculation of standard deviation has a high value, then the investor is exposed to large variations of the stocks return. Hull (2012, p. 207) argues that when new information reaches the market it causes the opinion about an assets value to be revised which therefore causes the price of the stock to change which causes volatility.

The standard deviation calculation is based on data of historical data. The fact that it does not account for events that is yet to occur is the reason why standard deviation is regarded as an estimation of investor risk exposure instead of a certainty. Therefore the standard deviation cannot foresee the exposure to large variability of a stocks return of an investment. The calculation of standard deviation will be the instrument for estimating the variability of log returns of IPOs in this thesis, which will estimate the investor exposure to log return movements. The volatility (standard deviation) measurement has been previously used as the basis of evaluating the risk levels of companies in research, such as Lowry et al. (2010). The standard deviation instrument will be the foundation of estimating the exposure to the IPO log returns movements in our thesis.
4.0 Practical Methodology

This chapter introduces the sample and data approach while defining the time period of the research. Hypotheses and specific measurement models used to generate results to our research is introduced and explained. This chapter ends with a discussion regarding the quality criteria of our research such as reliability, validity and replicability.

4.1 Anticipated Outcomes

Based on our initial discussion, our research question, and past academic research, we anticipate to see that the market conditions effect the IPO holding return and the index benchmark return. Loughran & Ritter (1995) argues for underperformance in the long-term while Carter et al. (2011) effectively disputes the fact that new issues underperform relative to matching firms. The difference in time frame proved to be the deciding factor when obtaining different results, when comparing their studies. Therefore our anticipation is that we will see underperformance of the IPOs in the long-term, but there is doubt since the research of Carter et al. (2011) disproved the long-term underperformance.

This thesis have discussed two separate definitions of hot and cold market periods, the volume-based and the initial-month return definition. We anticipate to see a difference in the performance in terms of the definition used to describe these market conditions, as previously examined by Helwege & Liang (2004) in particular. However, our anticipation is that our analysis will yield results similar to Helwege & Liang. When we define the hot and cold market conditions based on number of issuances of IPOs, we anticipate IPOs issued under hot market conditions to underperform, on average, relative to their benchmark index. In contrast, we anticipate the IPOs to outperform the market, on average, under cold market conditions in accordance to the result of Helwege & Liang (2004). In addition, under the initial return definition of IPO market conditions, we anticipate to see hot period IPOs over perform while the cold IPOs underperform similar to the conclusion by Ibbotson & Jaffe (1975).

The bull and bear market conditions have an affect on the market as a whole. During bull (bear) market conditions, it is more (less) likely that a company chose to conduct an IPO (Helwege & Liang, 2004, p. 541). Therefore the bull and bear market conditions should have an effect on hot and cold markets of IPOs, where during bull (bear) markets we should be able to detect hot (cold) IPO periods.

We also anticipate to see differences in the variability between the IPOs and the index benchmark. IPOs during their initial holding period are highly volatile investments, as the price has not adjusted into their long-term stock price. Therefore the market movements of the stock can have large movement fluctuations initially. We would anticipate to see the IPO having a higher variability than the index benchmark and also to differ on average depending on the time of choice for the IPO of the issuing company.

4.2 Population

Our sample consist of 97 firms that was listed for the first time on the NASDAQ OMX Stockholm stock exchange within the time frame of 2000-2010. Our sample includes
all companies listed on NASDAQ OMX Stockholm within the specified period and conform to our specified criteria. We can conclude that our sample represents all the issuing companies on the OMX Stockholm stock exchange specified to our criteria, and this represents the full population of issuing stocks.

4.3 Sampling Approach

Our target population consist of Swedish companies issuing equity for the first time on the OMX Stockholm stock exchange, within the period of 2000-2010. The sampling method employed in this research is consistent with the probability sampling method, which implies that all subjects within our specific time frame have had the same chance of inclusion.

Reasons for delimiting our sample of stocks to the OMX Stockholm stock exchange is that the rules of admission differs between the different stock exchanges. The Aktietorget and First North stock exchanges share similarities in regards of admission rules, although the First North admission is stricter than Aktietorget. Differences consist in all stages of the admission process of an IPO listed on the NASDAQ OMX, according to The NASDAQ OMX Group (2014). Some of the differences are that the share percentage owned by the public needs to be a minimum of 25% in the OMX Stockholm (main market), and only 10% in the First North. The main market applicant companies also need to have at least three years of sufficient operating history, documented profitability records or sufficient enough funds, and a minimum market value of one million EUR, according to The NASDAQ OMX Group (2014). Therefore, when we compare the admission rules for the main market of NASDAQ OMX Stockholm stock exchange to First North, we concluded that the regulations of admission for the main market requires higher levels of transparency along with company minimum requirements in terms of operations. When it comes to the transparency, companies that issues on the main market needs to have a higher degree of publicly available information, where they need to allocate resources in order to distribute the level of transparency required. Firms listed on the First North do not require this type of resource investing and therefore avoids costs, and in turn they have an advantage to the firms listed on the main market. We therefore chose to delimit ourselves to the main market only, and in turn excluding both the First North and Aktietorget stock exchanges. The differences of the companies that are listed on the stock exchanges is incomparable in terms of size, transparency and operation of activities. This would make the markets incomparable in regards to our research question.

When choosing what data to obtain we decided to use major security stocks and exclude preferred stock, where the latter has less frequent public trading. By using the more frequently traded shares we represent the value and performance of the firms more precise, since the more frequent trading conducted, the more efficient the market is in terms of adjusting to represent the real market value of the company. We are using both dead and alive firms in our sample to decrease the risk of survivorship bias. Survivorship bias implies that the research lead to an inconclusive research where the study instils a false belief because failures are ignored. A sample that includes both dead and alive subjects thus renders the survivorship bias negligible (Grinblatt & Titman, 1992, p. 1978)
4.4 Data

Our main source of data has been collected from the database program Thomson Reuters Datastream, which has offered us readily available secondary data of all the companies that conducted an IPO on the NASDAQ OMX Stockholm stock exchange.

4.4.1 Data Collection

When searching for the appropriate type of information on Datastream, we first had to set out different criteria in order to screen out any unwanted samples in our data collection.

Knowing what type of firms we sought to obtain information of, we used the search criteria option available on Thomson Reuters Datastream in order to screen out any firms who did not conform to our criteria. The criteria are present below:

- **Market** – This criterion was set equal to Sweden, meaning that all stocks represented in our sample are traded on the Swedish market, thus leaving out any potential firms traded on a foreign stock market.

- **Base Date** – We set the base date to Jan. 1st 2000, and end date to Dec. 31st 2010. The base date is the date when a stock was issued for the first time on the stock market. As stated previously in this thesis, our time frame is the ten-year period of 2000-2010. It was thus a requirement that the IPOs were conducted within this ten-year period.

- **Currency** – We set the currency criteria to filter for stocks quoted in the Swedish Krona (SEK). Having stocks quoted in the same currency makes it easier for us to examine the performance, as we do not have to take the exchange rate differences into account over the various periods.

- **Primary Quote** – We set this criteria to only account for primary quotes, which means that our selection of firms are restricted to only include the primary quotes and exclude cross-listings. Primary quotes imply that the stock is listed on its original stock exchange, whereas cross-listing mean that the stock is traded on more than one stock exchange.

- **Major Security** – This criteria was set to only include major securities, thus excluding the likes of preferred shares. We believe using only major securities will prove to accurately represent the true performance of the stocks, and prove a suitable measurement when comparing the stocks and indices.

- **Adjusted Prices** – We chose to only include adjusted prices. Adjusted prices are amended to account for any changes due to corporate actions and distributions, such as stock splits and dividends, respectively. These prices thus reflect the true representation of a firm’s equity value, and is a suitable measure when analysing historical returns.

- **Status** – The status criteria is concerned whether a firm is alive, dead, or suspended. We decided to include all options, as a firm may have died or become suspended after the three-year time frame. Excluding these stocks
would then result in us excluding subjects who should have been included in our research. Furthermore, by including dead stocks we decrease the risk of survivorship bias, which state that the exclusion of such stocks would result in our outcome becoming biased, if we are not taking any failures into account (as mentioned in section 4.3).

- **Instrument Type** – We are only interested in examining the performance in terms of stock market price changes, and are thus only in need of one instrument type: equities. We thereby exclude other instrument types, such as warrants, mutual funds, closed-end funds, real estate investment trusts, and futures.

- **Exchange** – We set the exchange criteria to only include stocks traded in Stockholm. This entails that all stocks in our selection are listed on an exchange operating in Stockholm.

All stocks listed in Stockholm on Datastream included those traded on Aktietorget and First North, which resulted in an overrepresentation of 493 samples. As the available criteria for exchanges were limited to the location, and not to specific exchanges, we had to manually screen out each of the 493 individual firms in order to find out which firms were listed on the NASDAQ OMX Stockholm exchange. We used the information available of publicly traded stocks on Skatteverket.se, to examine where each firm was listed. We did not include firms that were registered on Aktietorget, First North, or the Nordic Growth Market (NGM), from their initial date of issuance up to the anniversary date of Dec. 31st 2010. However, firms being initially noted on either of those exchanges, but subsequently issuing stock on the OMX Stockholm some time before our end-date of Dec. 31st 2010 were included in our sample. The starting date of those particular firms was their respective introduction date on the OMX Stockholm stock exchange.

For further validation on the particular firms we believed conformed to our stock exchange criteria, we utilized the information available on Nyemissioner.se to confirm that they were indeed noted as a newly issued IPO on the OMX Stockholm stock exchange. However, information of IPOs on Nyemissioner.se was limited from 2005 and onwards. Thus our ability to double-check was limited from IPOs conducted in 2005 to our anniversary year of 2010. Nyemissioner.se did confirm the information we found on Skatteverket.se, in relation to firms being listed on OMX Stockholm. We did safely establish that the information retrieved from Skatteverket.se to be credible between 2005 and 2010. This method of cross-checking not only established Nyemissioner.se as a valid source of IPO information, but Skatteverket.se as well. We thus determined the information of the remaining stocks from 2000 to 2005, found on Skatteverket.se, to be valid.

This resulted in our initial sample of 493 firms being reduced to 97 firms, when screening for our stock exchange criteria.

When we now had the appropriate firms needed for our research, we could search for the necessary time series data on Thomson Reuters Datastream. Since we are interested in measuring the three-year performance of the firms, in periods between 2000 and 2010, we downloaded the three-year historical price data from the introduction date of each firm up to their anniversary date three years later.
In order for us to measure the performance of each firm on a time-adjusted basis, we had to compare the performance of each firm to its corresponding index. Thus, in conjunction with the downloading of the three-year historical data of each firm, we downloaded the historical prices for OMXS30 during the same time period of each firm.

We then calculated the log returns for each firm and its corresponding index during the whole three-year period. We use log returns because of their mathematical properties. The difference between using log returns instead of ordinary stock returns is that the log returns are normally distributed and the growth therefore becomes linear. This means that the log returns of each trading day does not compound, and thus the total return of the logarithmic returns does not grow exponentially but rather grows on a linear basis. This enables the log returns to calculate the return of each day in accordance to how an investor is investing in a stock, the original purchase remains the same and therefore returns should not compound since the selling price of the stock has not been fixed until the process of selling the stock has gone through.

4.4.2 Time Frame

We have used an observational period of ten years, stretching from 2000 to 2010 when collecting our samples, with three different time frames of each subject. We chose to use a ten year period in order to observe a time period including several changes between market conditions of bull and bear, while still having a time span that was up to date. There are no specific articles that has specified an observational period similar to ours, and therefore our choice of time period is a result of our own reasoning. Articles mentioned in the theoretical framework of this thesis have chosen a time frame of five years, as Loughran & Ritter (1995) and Helwege & Liang (2004) argue that underperformance is evident as long as up to a five year buy-and-hold period. The choice of time frame for our thesis has been set to a maximum of three year buy-and-hold return, since we consider having up to date information highly important for our research. If we were to use the holding period of five years instead, it would have limited us to collecting data from the latest of 2008. This change would have removed the up to date information we would have liked in our research, meaning us missing out on the aftermarket effects of the change from bull market into a bear market of 2007-2008. We also chose to base the time frame on the research of Ritter (1991), as the time frame of three years enable us to collect stock price information as close to the present as 2010.

To not cause confusion in the upcoming presentation of results, and the analysis that follows, we will explain the time frame and observational period used in this thesis. We have used an observational period of ten years, stretching from 2000 to 2010 when collecting our samples, with three different time frames of each subject. The time frame periods are one month, one year, and three years, in a linear fashion. That is, all three time frame periods have the same \( T_0 \). However, the time frame periods are firm specific, which effectively means that there are 97 different \( T_0 \)'s for the represented firms, with the same quantity of \( T_0 \)'s for their respective indices. \( T_0 \) represent the date when a firm’s stock price is introduced on the OMX Stockholm Exchange for the first time, and is the starting point of each firm along with its corresponding index. Moreover, \( T_N \) represent the anniversary date at the end of a particular time frame period. Thus, \( T_N \) would be the adjusted closing-price at the end of the one month, one year, or three year time frame.
4.0 Practical Methodology

period. In our effort to explain our calculations, any reference to T_0 is thus in general terms and is not attributed to a specific firm, whereas T_N relates to the anniversary date of the specific time frame period.

4.5 Buy-and-hold Return

By using the historical prices of the IPO companies, the buy-and-hold return was calculated by dividing the last stock price of the period (T_N) divided by the first stock price (T_0), to calculate the total return by holding the stock over the specified time-period. The buy-and-hold is essentially the return of holding the security from the initial time of purchase to the eventual sale of the security. We will use the performance measurement of buy-and-hold return during our research of descriptive statistics, in order to compare the IPO sample performance under different market condition. Our calculations of buy-and-hold return will consisted of the initial one month, one year, and three year period after an IPO issuance of the companies. The buy-and-hold was also calculated for our benchmark sample of OMXS30 index prices during the same periods as the IPO companies. By being able to compare the IPO closing stock price sample and the benchmark closing price sample, we can get an understanding of how the IPO stocks compared to the index benchmark during the period. The following shows the formula for the buy-and-hold return:

Equation 1: Buy-and-Hold Return

\[ \text{Buy and Hold Return (BHR)} = \left( \frac{P_{T_0+N}}{P_{T_0}} \right) - 1 \]


Where \( P_{T_0} \) is the price on the date of the first issue, and \( P_{T_0+N} \) is the price after N days equal to the sample period. The return is based on the daily-adjusted stock prices obtained from Thomson Reuters Datastream. The daily adjusted closing prices is the closing price of a stock that has taken into consideration events that alters the stock prior to the next day’s opening price. By being able to obtain daily adjusted stock closing prices it enable us to compare the real equity value of the companies, instead of focusing on only the prices at which the stock is traded, which can be altered by, for example dividends or stock splits. From the results of the buy-and-hold calculation we combine the returns of the IPO companies along with their benchmarks and divide the results by calculating an average in accordance to the number of issuance per year. The results will then show the average buy-and-hold of both the IPO-companies and its benchmark divided by year of issuance.

4.6 Buy-and-Hold Abnormal Return

We use the same method of calculating buy-and-hold abnormal return as Lyon et al. (1999, p. 172) using the following formula:

Equation 2: Buy-and-Hold Abnormal Return

\[ BHAR_{IT} = BHR_{IT} - E(BHR_{IT}) \]

Source: Lyon et al., 1999, p. 172
Where $BHAR_{iT}$ is the abnormal buy-and-hold return for security $i$, $BHR_{iT}$ is the T period buy-and-hold return for security $i$, and $E(BHR_{iT})$ is the T period expected return for security $i$.

The expected return will be the buy-and-hold return for the corresponding period of the benchmark index. Barber & Lyon argue that researchers should calculate abnormal returns using the buy-and-hold returns on a sample less the buy-and-hold return on a reference portfolio or control firm (Barber & Lyon, 1997, p. 342). Our benchmark index server as a reference portfolio of which our sample firms are compared to, similar to Barber & Lyon who consider the return on an equally weighted index as the expected return for each security (Barber & Lyon, 1997, p. 344). The BHAR (buy-and-hold abnormal return) model will be used to identify the abnormal return under the different stock market conditions when conducting our statistical t-tests.

### 4.7 Wealth Relative

The wealth relative is a measurement of the buy-and-hold return of a stock, in comparison to the buy-and-hold of its benchmark (Loughran & Ritter, 1995, p. 36). The wealth relative is used for comparison of returns between the IPO-company and its benchmark. The outcome of the wealth relative will simplify the analysis between the periods for leading up to answering our research question. The formula for wealth relative is the following:

**Equation 3: Wealth Relative**

$$ \text{Wealth Relative} = \frac{\sum (1 + R_{iT})}{\sum (1 + R_{mT})} $$

Source: Loughran & Ritter, 1995, p. 39

Where the buy-and-hold of the IPO firm at time $T$ is divided by the buy-and-hold of a benchmark index beginning at time $T$ in order to calculate the wealth relative of the IPO. After calculating a Wealth relative for each IPO, we continued by calculating an average of all the wealth relatives specific to the year that the company was conducting an IPO. By calculating the year specific average wealth relative of each stock we can compare the outcome of the average IPO relative to the average index, in accordance with each IPO/Index specific $T_0$. The result will give us a clear picture of the return outcomes of the total population of firms conducting an IPO on the OMXS30.

### 4.8 Standard Deviation

To assess how far the logarithmic returns of our population sample is spread around its mean, we need to calculate the standard deviation of the logarithmic returns of the IPO stock prices. We divide the categories as usual into three distinct categories of one month, one year and three year holding period. To calculate the standard deviation of the IPO company stock log return in excel we use the St. Dev function, which calculates the standard deviation. The results for each company in the holding period categories are then calculated into several averages of standard deviations divided into each specific year, into which the IPO was issued. This will be done in order to analyse the differences between the periods. The same is being done to the benchmark of our sample, using the St. Dev function and categorize results into holding periods. Followed
by calculating an average divided into specific year into which it serves as a benchmark to each individual IPO.

We end up with specific sample results and their appropriate benchmark to be able to compare the periods of variability against each other. The comparison will be important to estimate as to what extent the logarithmic returns were spread around its mean compared to the benchmark index.

4.9 Robustness Test
The reason to conduct a robustness test is to check the validity of our calculations. We conducted two robustness tests in order to find out how the overall outcome change by removing outliers from our calculations. In our first robustness test, we removed the samples of the year with the least amount of issuances, along with their corresponding index. In the second robustness test we removed two of the samples with the worst buy-and-hold return over their specific time frame along with their corresponding index. The outcome of the robustness test will therefore show how much of an impact the outliers have on our calculations.

4.10 Statistical Testing of Hypotheses
The t-test based on hypothesis testing will identify whether the buy-and-hold abnormal returns of our samples are attributed to chance or if there can be signs of market inefficiency. As previously discussed, our hypothesis are based on identifying the effect of IPOs in different market conditions consisting of hot/cold as well as bull/bear. The hypothesis will be based on two different time periods of one month (22 trading days) and three years (756 trading days). The null hypothesis will indicate that no anomalies exist, or that the anomalies that do exist are purely attributed to chance in our samples during the specific criteria’s of market condition and time period. If the null hypothesis is rejected, the t-test is statistically significant and we can therefore detect anomalies on the market that is not attributed purely to chance.

4.10.1 Number of Issuance Tests
The observed returns are not different from zero and attributed by chance during specified IPO market condition periods.

Hypotheses 1:

H0: BHAR (Cold Period IPOs) = 0  \( t=22 \)
H1: BHAR (Cold Period IPOs) ≠ 0  \( t=22 \)

H0: BHAR (Hot Period IPOs) = 0  \( t=22 \)
H1: BHAR (Hot Period IPOs) ≠ 0  \( t=22 \)

H0: BHAR (Cold Period IPOs) = 0  \( t=756 \)
H1: BHAR (Cold Period IPOs) ≠ 0  \( t=756 \)
4.10.2 Initial Return Tests

The observed returns are not different from zero and attributed by chance during specified IPO market condition periods.

Hypotheses 2:

H0: BHAR (Cold Period IPOs) = 0  t=22
H1: BHAR (Cold Period IPOs) ≠ 0  t=22

H0: BHAR (Hot Period IPOs) = 0  t=22
H1: BHAR (Hot Period IPOs) ≠ 0  t=22

H0: BHAR (Cold Period IPOs) = 0  t=756
H1: BHAR (Cold Period IPOs) ≠ 0  t=756

4.10.3 Bull Period Tests

The observed returns are not different from zero and attributed by chance during specified IPO market condition periods.

Hypotheses 3:

H0: BHAR (Bull Period IPOs) = 0  t=22
H1: BHAR (Bull Period IPOs) ≠ 0  t=22

H0: BHAR (Bear Period IPOs) = 0  t=22
H1: BHAR (Bear Period IPOs) ≠ 0  t=22

H0: BHAR (Bull Period IPOs) = 0  t=756
H1: BHAR (Bull Period IPOs) ≠ 0  t=756

H0: BHAR (Bear Period IPOs) = 0  t=756
H1: BHAR (Bear Period IPOs) ≠ 0  t=756
We will test our hypotheses using a conventional one sample t-statistic in accordance to the method used by Lyon et al. (1999 p. 173):

Equation 4: Conventional T-Test

\[ t = \frac{\bar{AR}_\tau}{\sigma(AR_\tau)/\sqrt{n}} \]

Source: Lyon et al., 1999, p. 173

The $\bar{AR}_\tau$ is the mean abnormal return of the samples we are investigating with regards to the time horizon of the hypotheses tested. The samples of firms that are investigated are based on the market condition that is being tested. We then divide with the standard deviation of the same sample of firms $\sigma(AR_\tau)$ which in turn is divided by the square root of the $n$ number of firms. This implies that the standard deviation of our sampled firms’ abnormal returns are compared under a single point in time (Barber & Lyon, 1997, p. 358).

We will compare the t-statistic that we calculated in the previous section to a t distribution of critical values table in order to evaluate if our hypothesis is accepted or rejected. We are testing our conventional t-statistics on a 5% significance level where the percentage will be distributed with 2.5% on each tail since we are investigating abnormal returns which can have both positive and negative values above mean to be statistically significant. We use a degrees of freedom that depends on the number of firms in the current sample that we are investigating for the critical values.

4.11 Truth Criteria

An important aspect to have in mind is to assess the quality of results when conducting a research. Swanborn (1996) & Saunders et al. (2009) emphasise two critical components to reduce the risk of getting the wrong answer in your research: reliability and validity. Bryman & Bell (2007) further includes replication as another critical component of the quality control of research results.

4.11.1 Reliability

According to Saunders et al. (2009), reliability refers to the “extent of which our data collection techniques or analysis procedures will yield consistent findings”. This proposition raise the question as to whether other researchers would find the same results using the same methods and population, or if this research was done on another occasion. It also concerns the level of transparency used in processing of the raw data, which is how explicit we as researchers have been in our methodology concerned with our data collection- and process. Our particular research have used secondary data in the form of historical prices gathered through Thomson Reuters Datastream, which would not yield any different results should this research take place any other time in the future, as the historical time-series data would not be any different on any other occasion. A research is thus reliable if the same, or similar, methods used in other researches would generate the same findings (Saunders et al., 2009, p. 156).

Furthermore, in conducting this quantitative research with the use of historical stock prices, we defend ourselves against potential threats to reliability, such as subject,
participant, or observer error/bias (Saunders et al., 2009, p. 156-157). Subject or participant error occur when the subjects are analysed in situations that are not of their typical behaviour patterns, such as studying the level of enthusiasm employees have for their work during different days. This would yield varied results depending on what day of the week the study takes place (Saunders et al., 2009, p. 156). Subject or participant bias occur when the subjects act upon an outside influence, such as saying what they believe their boss want them to say (Saunders et al., 2009, p. 156). Observer error can occur when the research is conducted by more than one person, and the individuals involved collect the data separately and during different times. This can yield different results among the researchers and they can end up with different types of data, which will cause systematic errors in the research. Observer bias occur when the interpretation of the results differ among the researchers involved, which leads to an inconclusive and incoherent conclusion. For instance, in our research, observer bias would imply that the two of us would examine the results individually and come to two separate conclusions. Subject or participant error/bias will be avoided since our subjects are not directly affected by current social events, and as such the results will be the same regardless of what point in time they are obtained or who obtained them. Similarly, observer error/bias will also be avoided as we have obtained the same type of data through Datastream, which have been transported to Excel. Moreover, all data collection have been undertaken while both authors were present, resulting in the assurance that the correct data was downloaded at all times and that we shared the same interpretation (Saunders et al., 2009, p. 157).

4.1.2 Validity

Validity refers to the questions as to whether the results in your study are trustworthy and if the findings can really explain what they are claiming (Saunders et al., 2009, p. 157). Swanborn proclaims that validity means that “our propositions describe and explain the empirical world in a correct way” (1996, p. 22). Or as Bryman & Bell (2007, p. 164) puts it: “whether or not a measure of a concept really measures that concept”. Swanborn further claims that validity is the ultimate criterion in terms of quality criteria in research (1996, p. 22)

Internal validity is concerned with the question regarding the relationship between two or more variables and questions what impact each variable has on one another (Bryman & Bell, 2007, p. 41). There may be other variables that can explain the causal relationship other than the variables being tested in the research. The internal validity is the relationship between IPO and index buy-and-hold returns under different market conditions. Can market conditions have an effect on the buy-and-hold return performance? Ryan et al. (2002, p. 122) states that a study is considered as having achieved high internal validity when the variation in the independent variable have been caused by changes in the independent variable, and not by other uncontrolled variables. The main point of internal validity is thus if one can draw valid conclusions from the research.

We have improved the internal validity by reducing the survivorship bias in including all delisted stocks in the observation period. Delisted stocks can have a major effect on our research, as the price will usually increase right before a merger and decrease sharply if a firm goes into bankruptcy. Furthermore, investors will still receive funds after the death, or delisting of a stock, when the firm sells its assets. However, these
numbers are not obtainable or evident on regular lists or the Thomson Reuters Datastream database. Shumway & Warther (1999, p. 2378) have in their study estimated an ‘after-delisting-ratio’ of -0.55 (-55%) to account for the return an investor would receive if holding a stock that delisted for performance reasons. The closing price prior to the delisting of a stock is thus multiplied by -0.55 for the continuation of the observational period. They state that researchers can use this figure whenever CRSP shows a missing return for firms delisted on NASDAQ OMX for performance reasons, in order to compensate delisting bias in the unmodified database (Shumway & Warther, 1999, p. 2378). Although we are exclusively using stocks listed on NASDAQ OMX Stockholm, we have not come across another estimate of delisting return to account for this specific stock exchange, or specifically for Swedish stock. We have used the ’after-delisting-ratio’ of -0.55 as suggested by Shumway & Warther to account for the continuing observational period of the delisted stocks.

External validity is concerned whether the results generated in the research can be generalized beyond NASDAQ OMX Stockholm. Ryan et al. (2002, pp. 123-124) emphasize three different categories of external validity one should keep in mind. The first category is called population validity, and refers to the level of validity in researchers’ results derived from a certain population. We obtained our sample through the method of probability sampling, as all subjects in our initial search had the same probability of inclusion in this study, given the basic search criteria available in Thomson Reuters Datastream. However, we subsequently conducted a screening process to obtain the suitable subjects to use in our research, those that fit our criteria, of the full sample. The resulting sample represents the whole population, since we included all subjects we could find that matched our requirements. The second category refers to time validity, which concerns the questions as to whether the study can be generalized to other time periods. In our case, our ten year observational period from 2000 to 2010 contains different scenarios in the market, such as the burst of the IT-bubble in 2001 and the financial crisis in 2008. Factors like these are difficult to replicate or assume in an estimate when doing a similar study in the future. There may be quiet and fruitful periods in a ten year period in the future, or even financial crises of heavier calibres. Both being scenarios which can cause different results when using a similar observational period but at a different point in time. Thus, it is practically impossible for us to estimate how the buy-and-hold return will fare in the future. Each stock’s total time frame is three years, and to make the results generalizable for our observational period, we evaluate and compare the performance in two additional time frames (one month and one year) which may be easier to replicate, as they represent a shorter and less varied time period. The third category, environmental validity, asks if the study can be generalized over different experimental settings. Since we measure the performance of IPOs on NASDAQ OMX Stockholm, over a certain time period, there may be difficulties when doing a similar study when using the same observational period but perhaps a different stock exchange. This can be due to differences in taxations and regulations in other countries. Thus, this can imply that our results are not entirely environmentally valid. Our main objective is to increase the internal validity of this research; however we believe the population validity of this research to be sufficient.

Bryman & Bell mention two additional types of validity measures, (i) Measurement validity and (ii) Ecological validity. (i) Measurement validity primarily applies to quantitative research and is often referred to as construct validity (Bryman & Bell,
2007, p. 41). It concerns whether the measure of a concept accurately reflect that concept. Does our research measure the variation in buy-and-hold returns? We have mainly used historical stock prices as our form of measurement in terms of variation, and we have replicated the mathematical calculations, tests, and analysis performed in previous studies (Loughran & Ritter 1995; Helwege & Liang 2004), which have enabled us to avoid any misinterpretations and reduce the risk of misstatements. (ii) Ecological validity concerns the question of whether our findings are applicable to people’s everyday life, and whether the materials, methods and settings of the research is an appropriate estimation of the social reality it is investigating (Bryman & Bell, 2007, p. 42). Our materials, methods and settings are applicable to social reality, as we are unable to manipulate the historical stock prices in our research. There is only one type of setting to obtain stock prices, which would give the same findings regardless of who obtained them. Furthermore, the stock prices reflect the information and behaviour of people, and is thus derived from the real world.

4.11.3 Replicability

The concept of replicability is based on the fact that researchers occasionally choose to replicate the empirical findings of others (Bryman & Bell, 2007, p. 41). There are several reasons for other researchers to replicate other research, such as a feeling that the results do not match that of other similar studies undertaken, or that the original researcher may have been lacking objectivity in his/her research (Bryman & Bell, 2007, p. 171). If an outside researcher choose to replicate another’s research, and ultimately fails to replicate the results, serious questions would be raised in regards of the validity of the original findings. To increase the replicability of your research, the main rule to follow is to be very detailed about the procedures adopted throughout the research.

We have explained our procedures as explicitly as possible in the selection of our stocks. We have explained the reasons for the inclusion of the stocks in our sample as well as being detailed in how we have obtained the data. The replication criteria is a minor issue in our research, as we have used secondary data as well as using known descriptive methods when computing our results. Thus, we can safely assume that our research is easily replicable and that we fulfil the replication criteria.

4.12 Practical Method Critique

As previously mentioned, Datastream allowed us to screen for Swedish companies being listed in Stockholm which resulted in an overrepresentation of results, as non-major exchanges in Stockholm were included. As this led us to manually look for the issuance information on Skatteverket.se of each company, there is a risk that we have excluded some firms in the research whom were not represented on Skatteverket’s website.
5.0 Empirical Findings

In this section we will present the results of our research. This section will remain objective and therefore no discussion about our findings will be performed.

5.1 Empirical Results

5.1.1 Aggregated Data

We will first begin the chapter with a discussion regarding the outcome of the market during the period of our observational period. We use the return of the small stock index of OMX CSEPI to compare to the market return of OMXS30, as most of the IPOs are considered small stock companies which can be an interesting index to compare to. The x-axis of the graphs throughout this chapter will be presented in days, as it will be more specific to the current time period.

Figure 4: OMXS30 and OMX CEPI Return

The OMXS30 index and the OMX Stockholm Small Cap Index (OMX CSEPI), show similar movements in the stock price. Initially the OMXS30 index display bear market conditions between the end of year 2000 until the end of 2002. Both the OMX30 and OMX CSEPI show bull market conditions between the years 2002 and 2007. Afterwards the market conditions change into bear market until the early period of 2009, where the market shows bull market conditions once again, according to the definitions of bull/bear market of sustained increase or decrease of overall market returns (Gonzales et al., 2005, p. 82-83). The buy-and-hold return of the OMXS30 over the ten year period is equal to -17.6%, while the buy-and-hold return of the OMX CSEPI was equal to 162.0%. If the starting time period of buy-and-hold return is set to the same time in 2002, the buy-and-hold return of OMXS30 changes to 100,3%.

5.1.2 Wealth Relatives of Buy-and-Hold Returns

By comparing the wealth relative results from our calculations we can see the performance of the IPOs compared to its benchmark index. The average wealth relative
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will then be calculated on average each year to compare the results with the market conditions. By using a full population type of sampling, instead of using random sampling from a population, we can safely assume that the results we receive will be the true outcome of the population during the specified period. This is without using set confidence intervals from the population to make the results statistically representable of the whole population.

Table 1: Average Wealth Relatives of IPO Buy-and-hold Return

<table>
<thead>
<tr>
<th>Wealth Relative</th>
<th>1 month</th>
<th>1 year</th>
<th>three years</th>
<th>Number of Issuance</th>
<th>Initial Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>0.94</td>
<td>1.00</td>
<td>0.94</td>
<td>hot</td>
<td>Cold</td>
</tr>
<tr>
<td>2001</td>
<td>0.94</td>
<td>0.93</td>
<td>1.06</td>
<td>normal</td>
<td>Cold</td>
</tr>
<tr>
<td>2002</td>
<td>1.06</td>
<td>0.81</td>
<td>1.03</td>
<td>normal</td>
<td>Hot</td>
</tr>
<tr>
<td>2003</td>
<td>1.03</td>
<td>1.46</td>
<td>1.93</td>
<td>cold</td>
<td>Hot</td>
</tr>
<tr>
<td>2004</td>
<td>0.97</td>
<td>0.68</td>
<td>0.56</td>
<td>cold</td>
<td>Cold</td>
</tr>
<tr>
<td>2005</td>
<td>1.02</td>
<td>1.29</td>
<td>1.23</td>
<td>normal</td>
<td>Hot</td>
</tr>
<tr>
<td>2006</td>
<td>1.00</td>
<td>0.89</td>
<td>0.76</td>
<td>hot</td>
<td>Hot</td>
</tr>
<tr>
<td>2007</td>
<td>0.94</td>
<td>1.16</td>
<td>0.86</td>
<td>normal</td>
<td>Cold</td>
</tr>
<tr>
<td>2008</td>
<td>0.91</td>
<td>0.99</td>
<td>1.48</td>
<td>normal</td>
<td>Cold</td>
</tr>
<tr>
<td>2009</td>
<td>0.93</td>
<td>0.97</td>
<td>0.83</td>
<td>cold</td>
<td>Cold</td>
</tr>
<tr>
<td>2010</td>
<td>0.98</td>
<td>0.88</td>
<td>0.64</td>
<td>normal</td>
<td>Cold</td>
</tr>
<tr>
<td>Average</td>
<td>0.98</td>
<td>1.01</td>
<td>1.03</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

By initially examining the results from the wealth relative between the IPOs and the index benchmark, we see that the wealth relatives increases the longer the buy-and-hold period. The wealth relatives shows that on average, the initial first month buy-and-hold yields a greater return by holding the index rather than the IPO companies. The following holding periods, one and three year respectively, show a greater return by holding the IPO companies compared to the index. By viewing the results for each year we can see that occasional periods with extremely large gains make up for the more common event of IPO losses which is the reason why the IPO displays a greater return for the longer buy-and-hold periods.
Figure 5: Index vs. IPO Overall Three Year Holding Period Return

As shown in Figure 5, the overall IPO performance is superior to that of the buy-and-hold returns of the benchmark indices. We can also see that the co-movement of the returns are highly correlated. Both of the IPO and benchmark indices have negative long-term overall return for the three year holding period.

Table 2: Average Wealth Relative of IPOs, Market Conditions Defined by Number of Issuance

<table>
<thead>
<tr>
<th>Number of Issuance</th>
<th>1 month</th>
<th>1 year</th>
<th>3 years</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>hot</td>
<td>0.97</td>
<td>0.95</td>
<td>0.85</td>
<td>0.92</td>
</tr>
<tr>
<td>normal</td>
<td>0.97</td>
<td>1.01</td>
<td>1.05</td>
<td>1.01</td>
</tr>
<tr>
<td>cold</td>
<td>0.74</td>
<td>1.04</td>
<td>1.11</td>
<td>0.96</td>
</tr>
<tr>
<td>Average</td>
<td>0.89</td>
<td>1.00</td>
<td>1.00</td>
<td>0.96</td>
</tr>
</tbody>
</table>

Table 3: Average Wealth Relative of IPOs, Market Conditions Defined by Initial Return

<table>
<thead>
<tr>
<th>Initial Return</th>
<th>1 month</th>
<th>1 year</th>
<th>3 years</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>hot</td>
<td>1.03</td>
<td>1.12</td>
<td>1.24</td>
<td>1.13</td>
</tr>
<tr>
<td>cold</td>
<td>0.94</td>
<td>0.94</td>
<td>0.91</td>
<td>0.93</td>
</tr>
<tr>
<td>Average</td>
<td>0.99</td>
<td>1.03</td>
<td>1.07</td>
<td>1.03</td>
</tr>
</tbody>
</table>

The comparison between hot and cold market conditions of buy-and-hold returns shows that there is a difference between the results depending on how the market conditions are defined. By initially categorising the results into amount of issuing companies, we see in Table 2 that the average wealth relative of the hot IPO periods are underperforming compared to the cold market conditions in all holding periods except for the initial first month. On the contrary, when defining the IPO markets by the initial month return, we see in Table 3 in the first month of issuance that the hot IPO market
conditions outperforms the cold market condition IPOs in all of the three different holding periods.

**Table 4: Average Wealth Relative of IPOs, During Bull/Bear Market Conditions**

<table>
<thead>
<tr>
<th></th>
<th>Return Bull/Bear Market Wealth Relatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 Month</td>
</tr>
<tr>
<td>Bull Market</td>
<td>0,99</td>
</tr>
<tr>
<td>Bear Market</td>
<td>0,96</td>
</tr>
<tr>
<td>Average</td>
<td>0,97</td>
</tr>
</tbody>
</table>

In the comparison between bull and bear market wealth relatives, we can see in table 4 that in the bull period, the buy-and-hold period returns is close to the same return of the index when holding for one month and three years. During the one year holding period the bull market outperforms the index. In the case of bear market there seems to be a constant increase in the buy-and-hold returns the longer the holding period, with a high outperformance of the index benchmark in the three year holding.

### 5.1.3 Beta

**Table 5: Averag Beta Values of IPOs**

<table>
<thead>
<tr>
<th>Beta</th>
<th>1 Month</th>
<th>1 Year</th>
<th>3 Years</th>
<th>Number of Issuance</th>
<th>Initial Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>0,76</td>
<td>0,74</td>
<td>0,71</td>
<td>hot</td>
<td>Cold</td>
</tr>
<tr>
<td>2001</td>
<td>0,47</td>
<td>0,45</td>
<td>0,51</td>
<td>normal</td>
<td>Cold</td>
</tr>
<tr>
<td>2002</td>
<td>0,35</td>
<td>0,30</td>
<td>0,33</td>
<td>normal</td>
<td>Hot</td>
</tr>
<tr>
<td>2003</td>
<td>-0,05</td>
<td>0,17</td>
<td>0,53</td>
<td>cold</td>
<td>Hot</td>
</tr>
<tr>
<td>2004</td>
<td>1,01</td>
<td>0,47</td>
<td>0,45</td>
<td>cold</td>
<td>Cold</td>
</tr>
<tr>
<td>2005</td>
<td>0,29</td>
<td>0,70</td>
<td>0,69</td>
<td>normal</td>
<td>Hot</td>
</tr>
<tr>
<td>2006</td>
<td>0,54</td>
<td>0,53</td>
<td>0,48</td>
<td>hot</td>
<td>Hot</td>
</tr>
<tr>
<td>2007</td>
<td>0,58</td>
<td>0,52</td>
<td>0,61</td>
<td>normal</td>
<td>Cold</td>
</tr>
<tr>
<td>2008</td>
<td>-0,10</td>
<td>0,36</td>
<td>0,39</td>
<td>normal</td>
<td>Cold</td>
</tr>
<tr>
<td>2009</td>
<td>0,55</td>
<td>0,46</td>
<td>0,47</td>
<td>cold</td>
<td>Cold</td>
</tr>
<tr>
<td>2010</td>
<td>0,25</td>
<td>0,43</td>
<td>0,47</td>
<td>normal</td>
<td>Cold</td>
</tr>
<tr>
<td>Average</td>
<td>0,42</td>
<td>0,47</td>
<td>0,51</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results from our beta calculations shows that our distribution of beta values varies depending on the time period of holding. The average beta values for all the IPO companies over the full ten year sample period is 0,42 for the initial one month holding, 0,47 for the first one year holding and 0,51 for the three year Buy-and-hold period. The beta values are therefore increasing on average the longer the chosen holding period.

If we look at the distribution of the beta values according to the holding period we can see that the characteristics of the distribution follows that of a normal distribution. During the one month holding period, the beta values are widely distributed with outliers on both sides of the distribution. The one year holding period we can see that the distribution is more centred around the mean with a single outlier on the right side of the distribution. The three year distribution has a high concentration around its mean with no single outlier.
5.1.4 Robustness Test

The following figures in the robustness test section graphically presents the result of our robustness tests, where in our first test we excluded the year with the least amounts of IPO issuance (Figure 6), and in the second test we removed two of the least amount of issuance years (Figure 7).

**Figure 6: First Robustness Test Excluding Least Number of Issuance Year**

When conducting the first robustness test we can see that the result shows a large difference in the returns when removing samples of the year with the least number of issuance, along with its specific index benchmarks. This year seem to have a great effect on the overall return of the IPOs. After conducting the robustness test, the IPOs displays a lower return than the index benchmark. The correlation between the IPOs and index overall return has decreased slightly as a result of this robustness test.

**Figure 7: Second Robustness Test Excluding the Two Worst Samples**
The second robustness test was conducted by removing two of the worst IPO Buy-and-hold return samples along with its index benchmarks. The results show that the overall return of both the index and the returns have increased, along with the correlation in the movements between the index and the IPO return has decreased.

### 5.2 Variability

<table>
<thead>
<tr>
<th>1 Month</th>
<th>1 Year</th>
<th>3 Years</th>
<th>Number of Issuance</th>
<th>Initial Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>53%</td>
<td>52%</td>
<td>57%</td>
<td>hot</td>
</tr>
<tr>
<td>2001</td>
<td>61%</td>
<td>63%</td>
<td>64%</td>
<td>normal</td>
</tr>
<tr>
<td>2002</td>
<td>17%</td>
<td>45%</td>
<td>44%</td>
<td>Hot</td>
</tr>
<tr>
<td>2003</td>
<td>36%</td>
<td>57%</td>
<td>61%</td>
<td>cold</td>
</tr>
<tr>
<td>2004</td>
<td>51%</td>
<td>57%</td>
<td>49%</td>
<td>Cold</td>
</tr>
<tr>
<td>2005</td>
<td>63%</td>
<td>48%</td>
<td>36%</td>
<td>normal</td>
</tr>
<tr>
<td>2006</td>
<td>50%</td>
<td>32%</td>
<td>30%</td>
<td>hot</td>
</tr>
<tr>
<td>2007</td>
<td>47%</td>
<td>37%</td>
<td>45%</td>
<td>normal</td>
</tr>
<tr>
<td>2008</td>
<td>46%</td>
<td>26%</td>
<td>39%</td>
<td>Cold</td>
</tr>
<tr>
<td>2009</td>
<td>21%</td>
<td>37%</td>
<td>31%</td>
<td>cold</td>
</tr>
<tr>
<td>2010</td>
<td>51%</td>
<td>45%</td>
<td>46%</td>
<td>normal</td>
</tr>
<tr>
<td>Average</td>
<td>45,11%</td>
<td>45,30%</td>
<td>45,47%</td>
<td></td>
</tr>
</tbody>
</table>

The standard deviation of IPO log returns compared to its index benchmark, shows a 45,29% higher standard deviation of IPOs average log returns, over all the time periods. Therefore if all possible investments are made there are 45,29% higher swings of the log returns each day compared to the index benchmark. When looking at each specific time period we see that during the first initial month the standard deviation of the logarithmic returns is 45,11% higher than index, one year standard deviation is 45,30% higher, and the final three year period standard deviation is 45,47% higher. The results show that the variability of daily logarithmic returns, compared to the index, remains extremely similar amongst the different investment time periods.

During the period of a three year buy-and-hold period, 6 out of all 97 companies currently held became considered dead stocks. The amount of losses on holding dead stocks are uncertain since the amount of capital returned to the investor is uncertain. Considering that 7,22% of all the stocks held during this period became considered as useless is a high consideration for IPO investors.

### 5.3 Statistical Results

As previously mentioned we are using a two tailed conventional t-test in order to test the significance of our hypotheses. The reason for using a two-tailed t-test is to identify both positive and negative return return, and therefore the confidence level of 5% is divided evenly between the two sides of the distribution. The p-value is retrieved by comparing the t-statistic result to a table of critical values and the p-value must surpass 2.5 percent in order to accept the null hypothesis.
Hypothesis 1:

The first hypothesis regards the hot and cold market conditions, defined by our previous mentioned method using the number of issuances each year to define the type of market conditions. The average buy-and-hold abnormal returns (ABHAR) of our firm samples all produce a negative ABHAR in each case, except for the cold period with a time period of three years. We can interpret the results in table 7 that the result from our conventional one sample t-test produce a p-value that is not smaller than our 2.5% level in any of the specified time horizons or market conditions, from our previously stated hypothesis. Therefore, the null hypothesis is accepted in each of the tests. This indicates that the abnormal returns of the market are attributed to chance. The 756 days cold period has a high standard deviation value which leads to a high p-value, since the statistical significance decreases in turn, this is an indication that there are one or more outliers that exist in this in this sample.

Table 7: Hot & Cold Market Conditions: Number of Issuance

<table>
<thead>
<tr>
<th>Hypothesis 1: Hot and Cold Market conditions defined by number of issuance</th>
<th>ABHAR</th>
<th>St Dev</th>
<th>T-Statistic</th>
<th>P-Value</th>
<th>Stat. significance</th>
<th>Df</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 days cold period</td>
<td>-3.18%</td>
<td>0.097</td>
<td>-0.923</td>
<td>0.383</td>
<td>Accept H0</td>
<td>8</td>
</tr>
<tr>
<td>756 days cold period</td>
<td>0.18%</td>
<td>1.302</td>
<td>0.004</td>
<td>0.997</td>
<td>Accept H0</td>
<td>8</td>
</tr>
<tr>
<td>22 days hot period</td>
<td>-3.11%</td>
<td>0.187</td>
<td>-0.957</td>
<td>0.346</td>
<td>Accept H0</td>
<td>33</td>
</tr>
<tr>
<td>756 days hot period</td>
<td>-10.08%</td>
<td>0.390</td>
<td>-1.486</td>
<td>0.147</td>
<td>Accept H0</td>
<td>33</td>
</tr>
</tbody>
</table>

Hypothesis 2:

The second hypothesis is investigating the market conditions set by the framework of the first month initial return where hot and cold market conditions are defined by positive or negative return compared to the benchmark index the first moth after issuance. We can see from the outcome of the t-test that the p-values surpass the 2.5% level in all except the first test of 22 days cold period.

Table 8: Hot & Cold Market Conditions: Initial First Month Return

<table>
<thead>
<tr>
<th>Hypothesis 2: Hot and Cold Market Conditions defined by First Month Initial Return</th>
<th>ABHAR</th>
<th>St Dev</th>
<th>T-Statistic</th>
<th>P-Value</th>
<th>Stat. significance</th>
<th>Df</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 days cold period</td>
<td>-5.24%</td>
<td>0.158</td>
<td>-2.663</td>
<td>0.010</td>
<td>Reject H0</td>
<td>64</td>
</tr>
<tr>
<td>756 Days cold periods</td>
<td>-8.67%</td>
<td>0.599</td>
<td>-1.159</td>
<td>0.251</td>
<td>Accept H0</td>
<td>64</td>
</tr>
<tr>
<td>22 days hot period</td>
<td>2.00%</td>
<td>0.074</td>
<td>1.515</td>
<td>0.140</td>
<td>Accept H0</td>
<td>31</td>
</tr>
<tr>
<td>756 days hot period</td>
<td>7.65%</td>
<td>0.725</td>
<td>0.588</td>
<td>0.561</td>
<td>Accept H0</td>
<td>31</td>
</tr>
</tbody>
</table>

Hypothesis 3:

The third hypothesis regards the bull and bear market conditions. The bull market condition is defined as a period were the overall market has a constant increase of stock market return. The bear period is when the same market has a constant negative return. The result shows that in all four tests we accept our null hypothesis and therefore the abnormal returns of our sample during these period is attributed to chance according to our analysis.
## Table 9: Bull & Bear Market Conditions

<table>
<thead>
<tr>
<th>Hypothesis 3: Bull and Bear Market Conditions</th>
<th>ABHAR</th>
<th>St Dev</th>
<th>T-Statistic</th>
<th>P-Value</th>
<th>Stat. significance</th>
<th>Df</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 days bull period</td>
<td>-0,85%</td>
<td>0,085</td>
<td>-0,653</td>
<td>0,5175</td>
<td>Accept H0</td>
<td>43</td>
</tr>
<tr>
<td>756 days Bull Period</td>
<td>-13,83%</td>
<td>0,697</td>
<td>-1,300</td>
<td>0,2005</td>
<td>Accept H0</td>
<td>43</td>
</tr>
<tr>
<td>22 days Bear period</td>
<td>-4,52%</td>
<td>0,171</td>
<td>-1,903</td>
<td>0,0625</td>
<td>Accept H0</td>
<td>52</td>
</tr>
<tr>
<td>756 days Bear Period</td>
<td>5,46%</td>
<td>0,588</td>
<td>0,669</td>
<td>0,5062</td>
<td>Accept H0</td>
<td>52</td>
</tr>
</tbody>
</table>
6.0 Analysis

In the analysis section we aim to answer our research question. In order to do so we need to analyse the results that we have stated in the empirical findings section. We will begin by analysing the aggregated results and then narrow it down into more specific results. We will continue to compare patterns of our empirical findings to that of previous research in order to find similarities.

6.1 Aggregated Analysis

The performance of the OMXS30 index during the full ten year period results in a buy-and-hold performance of -17.61%, and the buy-and-hold performance of the OMX CSEPI is 162%, as seen in figure 4 in the empirical findings section. The holding period in this case is incomparable since the OMXS30 has a longer time frame including both years 2000 and 2001, which is not the case for OMX CSPEI since they do not have data prior to 2002. The market between 2000 and 2002 is showing bear market conditions, and therefore our sample of the OMXS30 began its sample period when the stock market price was at its peak. This would then skew the results of the comparison between the indices with different starting periods. If we change the starting time period for the OMXS30 index to the same as the OMX CSPEI at 2002, the buy-and-hold of OMXS30 return is 100.3%. We can see that the variability of the price movements is much higher of the OMX CSPEI which would have sufficed as a more appropriate benchmark for our study instead of the OMXS30, since the variability of IPO stock price movements are closer to the small cap index than the OMXS30 index. With that said, the OMX CSPEI has not the same data range available appropriate to our research sample since the earliest data is available at 2002. Another reason for choosing the OMXS30 is because it is the index most appropriate to represent the return of the overall market, and therefore we can match the results to see if the IPOs on average have earned abnormal profits compared to the market. By choosing the OMXS30 the result of our research will be more applicable to the average investors since they can compare the results of this study directly to the market index.

When choosing between using the OMXS30 index and a matching firm benchmark, which has been the case for most studies conducted on IPOs (Loughran & Ritter 1995; Carter 2011), both methods have their pros and cons. The matching firm method have benefits since the results can be individually compared to a benchmark company of similar size, which is a more fitting comparison to estimate the actual performance difference between the sample and its benchmark. The method of using a matching firm as a benchmark also has drawbacks in terms of unsystematic individual risk exposure, to the companies used as a benchmark. This can skew the comparison in the wrong direction. Another point to note is that the amount of companies available on the Swedish market is fewer than that of the US stock market, where most related research articles are conducting their research upon. Therefore there will be less similarities between the IPO companies and its appropriate matching firm benchmark if we were to assign companies, since research on the US stock markets have a bigger selection of possible matching firms. Another issue of using matching firms is because another question is raised about the influence of the researchers when picking the matching companies that would best match the IPO companies. The choice will become a matter of personal preference when choosing the benchmark companies, which can influence the outcome of the research. We therefore choose to use the index as a benchmark.
instead of the matching firms since it would fit our data sample to a greater extent while also avoid us, as researchers, influencing the choice of matching firms. We are aware of that the choice have had a negative impact in the extent of comparison between our work and that of previous research using matching firms.

6.2 Buy-and-Hold Return of IPOs Compared to a Benchmark

Figure 5 in the empirical findings section shows the return from holding all the IPO companies over their specified buy-and-hold period of three years, compared to holding all the index buy-and-hold period specific to the time of the IPOs (one index at the same time period for every IPO company). We then see that both averages have received negative returns over the period. The portfolio of IPO companies have overperformed in regards to the index portfolio, since the number of times of overperformance occurs more often than the reversed. This result is contradictory to the results of the research conducted by Helwege & Liang (2004, p. 552), where their study resulted in overall underperformance of the IPOs compared to their index benchmark. Opposite results are also found in Loughran & Ritter (1995, pp. 35-36), who has used alternative benchmarks from different indices and matching firms where the results concluded IPO underperformance in each one of the different benchmark alternatives. The result from our sample seem to be in line with the results of Carter et al. (2011), who conducted a research with matching firms and disproved the underperformance of IPOs overall subnormal long-term returns. The results of our research was in contradiction to our expected outcome, as the long-term underperformance of IPOs was rejected from our sample compared to its index benchmark. Therefore the new issuance puzzle of Loughran & Ritter (1995) is rejected for the OMX Stockholm during our observational period.

The overall return of the collection of OMXS30 benchmark indices in our sample has negative three year buy-and-hold returns overall, as shown in figure 5 in the empirical findings section, even though the OMXS30 has had a positive return over the period. A reason for the OMXS30 showing negative returns is the distribution in number of IPO companies. The number of IPO issuance peaks during the period of 2000-2001 and also 2006-2007, which is at the end of the bull market condition periods, and these markets are also defined as hot IPO periods when defined by the number of issuance. Because the number of issuance is at the greatest at these periods, the number of index holdings is matching the number of periods, which is the year before the market switches from a bull market into a bear market. The number of index benchmarks is therefore the highest at these periods when the return from holding the index is negative. This can be a reason as to why the index have had a negative return over the holding period of our research. This is the same for the IPOs. As previously mentioned, the number of issuance is at its peak in the years 2000-2001 and 2006-2007, which is the moment when the market conditions has changed from a bull market into a bear market over the periods of 2000-2003 and 2006-2008. This can explain why the return from holding all the IPOs over three years are negative, since most of the IPO issuances are in the beginning of a bull market peak and continues the holding over the recession from a bear market in the market afterwards.

The following figures 8 and 9 is a graphical explanation of the results of our samples. Figure 8 describes the number of firms that conducted an IPO each year. Figure 9
describes the market value of our benchmark index OMXS30 for each day ranging from day one until 3031 (ten years).

Figure 8: Number of IPO Issuance

Figure 9: Market Price OMXS30

* We chose to combine these figures, as to make it easier for the reader to compare the two figures.

But why do cold IPO markets, defined by number of issuance, tend to receive abnormal long-term buy-and-hold returns, and hot IPO markets receive subnormal returns according to our research? As previously discussed in this thesis, Helwege & Liang (2004, p. 544) found no quality difference between IPOs issuing in hot market conditions or cold market conditions. We can therefore draw no conclusions from there. We can see that the distribution of number of issuance from our research is closely similar to the market price movement of the index over the ten year sample period as shown in figure 8 and 9. There seem to be a pattern between the number of issuing IPOs and the current market condition. The periods where the number of IPO issuance are at its peak, or when the IPO market is hot, it is followed by a bear market condition. In
reverse, when the number of IPO issuance is at its lowest, or the IPO market is cold, the following market condition appears to be a bull market condition. By analysing the results there is a relation between the bull and bear market conditions and the hot and cold IPO market conditions. If this is true, the number of issuance can be an explanatory factor to index market movements of predicting the bull and bear market conditions on the Swedish market. This result is in accordance with our initial thoughts from our expected outcomes. The number of IPOs is affected by the type of bull and bear market conditions that is currently consisting on the market. The IPOs hot and cold period can be predicted by the current bull- and bear market conditions. As an investor, it should be most appropriate to invest in IPOs when the IPO market is cold, in other words, when the number of issuance are few after sustained bear market conditions, since we are then able to predict that the market will change into a bull market according to the number of IPO issuance. Investors should in reverse stay away from IPOs when the IPO market is hot, according to our research.

Figure 10: Return of IPOs During Bull and Bear Market Conditions

If we look at the return from holding IPOs in bull market or bear market conditions during the full three year holding period, the overall return from all the IPOs received a 44% return from bull market condition investing, and a -33% return from bear market condition investing. The conclusion from these observations is when investing in IPOs in bull market conditions, the investor can receive a greater return overall than investing in IPOs in bear market conditions. The conclusion from these observations are inaccurate however. Because, according to figure 8 and 9, the number of IPO issuance is at its highest when the market index price is at the highest, the number of IPOs are also the lowest when the market index price is at its lowest. Therefore the period where the bear (bull) market theoretical long-term holding returns are the lowest (highest), (in the beginning of the period when the market conditions switches from bull into bear market), is also the period with the highest (least) amount of issuing companies. Therefore, the number of issuances is at its minimum (maximum) at the end of the bull (bear) market condition period where the returns should be the lowest (highest).

The difference between the bull- and bear market issuing periods is that the bull market conditions in our sample period lasts for longer periods of time, while the bear market
condition lasts for shorter periods of time, as shown in figure 8 and 9. This affects the outcome of the holding period returns as the worst condition for bull market IPO investing (at the end of the bull market period with the largest amount of issuance) is unaffected by the bear market conditions from time to time, since the holding period stretches over the bear market condition and into the next bull market condition. Therefore the bull market conditions receives a greater return on average than the bear market condition investing. On another note, all the six companies that delisted during its holding period where companies issued in bull markets. It seems that the bull market periods are connected with higher risk taking in terms of companies delisting, compared to bear market condition IPOs. This can also be a factor as to why the returns from the bull market condition buy-and-hold investing is higher.

6.3 Analysis of Wealth Relatives

If we take the average of all the wealth relatives for each holding period, the results were 0.98 for one month holding period, 1.01 average wealth relative for one year holding period and 1.03 average wealth relative for a three year holding period, as shown in table 1 in the empirical findings section. The average wealth relative is increasing for each holding period and therefore it seems, the longer the holding period, the more likely that the IPOs outperform an index benchmark overall.

If we compare the results of hot and cold IPO periods, according to the number of issuance definition, it is best to invest in IPOs when the IPO market is cold or normal, according to the table 2 in the empirical findings section. This shows similar results to Helwege & Liang (2004, pp. 551-552) where the cold market periods of IPOs clearly outperform that of the hot market periods on average. In the findings of Helwege & Liang (2004, p. 552), only 6 periods out of 18 hot IPO periods outperform the index while in the cold market periods there is not a single wealth relative below a value of one. Our results in accordance with the results of Helwege & Liang should lead to an indication that, investing in hot IPO market periods defined by number of issuance, gives subpar returns compared to the index benchmark and should therefore be avoided. The results from the hot and cold comparison is also in accordance with our expected outcome. Our research lead to similar results as of Helwege & Liang (2004) where cold period IPOs outperform hot period IPOs on average.

When analysing the hot and cold IPO market conditions, defined by the overall initial month returns of the IPOs, we can see that the wealth relatives of hot IPO periods clearly outperform the wealth relatives of cold IPO periods, according to table 3 in the empirical findings section. The results from the initial month return definition of hot and cold IPO market period is therefore opposite to the results from the definition of number of issuance. If we look at the average wealth relative result we can see that the initial month holding has a wealth relative of 0.99, while the next two holding periods show a wealth relative far above one which means that investing in IPOs in accordance to the initial return method leads to superior average returns compared to the index benchmark.

If we compare the results from the number of issuance definitions of hot and cold IPO market periods, to the result of hot and cold conditions according to the first initial month return definition, we see that the IPOs performance display contradictory results depending on what type of IPO market condition definition used. Therefore if we put
these results together we can use the result to come up with an investment strategy during different IPO market conditions. Hypothetically, the investor should initially buy all issuing IPOs as they issue on the market, after the initial month has passed, the investor should analyse the initial one month return of all the IPOs. Then compare the result to the index, if the IPOs are within a hot period the investor should keep it, if the IPO stocks were issued during a cold IPO period, then the investor should sell the IPO stocks. After a year of holding the IPO stock, the investor should then conduct a second analysis to see in what type of market condition the investors IPOs were bought in accordance to the number of issuance definition. If the IPOs were bought under a hot market IPO condition, then according to our research, the investor should sell the stock. If the stock was bought under normal or cold IPO market conditions according to number of issuance, the investor should keep the stock for the full three year holding period. By doing this, according to the results of this thesis, he/she should earn abnormal profits.

If we analyse the results from the bull/bear market condition wealth relatives, we can not see a pattern within the bull market wealth relatives, according to table 4 in the empirical findings section. It increases at first from initial month to one year, and then decreases at the third year holding period. Therefore it does not seem to be a pattern of higher returns the longer the holding time period. If we look at the bear market conditions we can see a continuous increase in wealth relatives the longer the holding period. Therefore a pattern seems to exist for the bear market conditions and not for the bull market conditions based on the results from our research.

6.4 Analysis of Robustness Test

The first robustness test that removed the samples of the year with the least amount of issuing IPO companies during any year, indicated that the two samples that was removed in 2003 had a large effect on the overall return of the IPOs over the full ten year research period. Figure 6 displayed that the overall return changed from receiving abnormal returns when investing into IPOs into earning subnormal returns overall. Therefore the two samples removed had to have large positive returns in order to have the impact on the overall return it had. From the results of the robustness test it seems that in our sample the year with the least amount of IPO offerings display large positive gains on those IPOs. If the years with the least amount of IPO offerings receives large gains from investing, which would indicate that the companies issuing was largely underpriced by their issuer, why would any company wish to conduct an IPO during that period?

As previously mentioned in this thesis, Bancel & Mittoo (2009, p. 844) have from their study showed reasons for conducting an IPO is the company prestige, the increased ease of raising funding for growth projects and also financial flexibility. If we look at the period in which the removed sample in the robustness test was initiated, it is the turning point on the market after a large economic downturn. Therefore, reasons as to why the companies chose to do an IPO during this time might be explained out of financial flexibility reasons in time of desperate need of raising equity capital.

The second robustness test display, according to figure 7, an increase in the overall returns of IPOs which was expected, since we removed the worst sample outcomes during the period. The index overall returns increased as well, which indicates that the
negative returns of the IPOs during this period was caused by both systematic and
unsystematic risk. The result of this robustness test was expected and should therefore
increase the validity in the result of our buy-and-hold returns data.

6.5 Analysis of Variability

The average log return variability over the period remain stable independent of the buy-
and-hold period of the stock, according to table 6. The log return variability comparison
between the IPOs and their specific indexes increases from 45.11% to 45.30% and lastly
to 45.47% higher percentage variability of the IPOs compared to the index benchmarks.
That the variability values remains consistent is positive, since hypothetically, the
variability of the index can be a good estimator for the variability of an IPO on average,
although we can see that some values stray away as outliers in the data, ex. 29% higher
variability in 2009. A reason as to why the variability difference remains similar is that
the returns on average seems to be caused by systematic return movements of the
market and not by individual unsystematic causes for specific firms. If this is true, then
it is positive as it reduces the expected exposure of IPO returns since the average IPOs
follows the average log returns of the market index benchmark. The investor can then
expect to be exposed to a fairly constant 45% degree of greater exposure of log returns
movement than if he/she were to invest in the market index instead.

If we compare the percentage difference in standard deviation to different market
conditions, we can see that under all different circumstances the log return variability
between the IPOs and their specific index benchmarks remain relatively close to each
other. Apart from the outliers of the number of issuance of hot and cold periods, as the
1 month holding period of 51% in the hot IPO market and 36% in the cold IPO market,
the comparison remains relatively stable around the forties percentage range of higher
percentage log return movement of IPOs. Therefore the index can be a good estimator
of the variability of IPOs on average, according to our research data. This result
contradicts our initial thoughts of our expected outcome, since our predictions stated
that the variability of log returns would be severely higher for the initial month after
conducting an IPO. The results from our research shows that the variability comparison
remains fairly stable over all the holding periods. The results also neglected our
expectations of different average variability depending on the market conditions of the
IPO stock where we see that the variability is similar independent of the market
conditions. The cause for indifference between market conditions could be the same as
previously stated, that the log returns movements are generally caused by unsystematic
market movements to a greater extent than individual systemic events, which leads to
individual log returns. If this is true, then the effect of market conditions has little effect
on the variability as the logarithmic return movements on average are consistent with
that of the market logarithmic returns.

6.6 Analysis of Statistical Findings

\textit{Hypothesis 1}

The deduction from the result of our statistical testing of hypothesis is that there is no
statistical significance to the abnormal returns during the different market periods.
The first hypothesis regard testing the abnormal returns under the market conditions of hot and cold defined by number of issuance. We decided to include the time frames of one month (22 trading-days) and three years (756 trading-days) of both hot and cold market conditions in a shared hypothesis. As can be seen from Table 7, we accepted the null hypothesis in all of the different t-tests. All sampled firms under both hot and cold periods defined by number of issuance produce negative BHAR on average, with the exception of firms registered under the cold period with a time horizon of three years. However, neither test produced empirical evidence of statistical significance. This imply that the BHAR of our sampled firms under this particular market condition is statistically different from zero only due to chance.

As Helwege & Liang describe, in terms of a wealth relative analysis and t-tests of excess returns, firms issued during hot periods generally perform worse than firms issued during cold periods (Helwege & Liang, 2004, p. 551). However, upon reviewing our statistical analysis of market conditions under the number of issuance definition, we cannot find any evidence to suggest that firms issued under hot periods perform worse than firms issued under cold periods. In the time horizon of 22 days, firms issued during hot and cold periods produce an ABHAR of -3.11% and -3.18%, respectively. However, when accounting for the time horizon of 756 days, we can see that firms issued under cold periods produced positive abnormal returns on average, albeit quite small at 0.18%. Firms issued under hot periods during the same time horizon produce negative abnormal returns on average of -10.08%. This would imply that firms issued under cold periods fare better than firms issued under hot periods in the long-term, consistent with the statement made by Helwege & Liang (2004) and Schultz (2003, p. 486). Of Helwege & Liang’s 24 t-tests of excess return, 16 firms issued under hot periods produced significantly negative returns, whereas 6 of the firms issued under cold market periods produced significantly positive returns, and none significantly negative (Helwege & Liang, 2004, p. 551). However, though firms issued under the cold period achieved more favourable abnormal returns on average, our t-test did not indicate any statistical significance on a 95% confidence interval, with p-values ranging from 0.1468 to 0.997 for all four tests under hypothesis 1. This leads us to conclude that achieving excessive abnormal returns on a consistent basis is down to chance. We are therefore inclined to accept our null hypothesis.

As can be seen from table 7, there is a rather significant difference in terms of represented IPOs between the hot and cold market conditions. The cold market condition, when accounting for 756 days, records a very high standard deviation of 130%. Due to its small sample size, extreme outliers can skew the aggregate standard deviation towards a certain value. However, removing these potential outliers would cause misrepresentation as well, as we would no longer include all IPOs identified as being issued under the cold market condition. The high standard deviation in the cold market condition, when accounting for 756 days, is thus a result of certain subjects recording very high values of abnormal return. When looking at the ABHAR for this particular period these IPOs slightly overperform in general, which may have been falsely accounted for by certain extreme values.

The conclusion we can draw from these tests is that there are no abnormal returns to be gained on the IPO market during the specific market conditions. If we compare these results to the wealth relatives calculated earlier there seemed to be indications of abnormal returns existing on the different market conditions but according to our test
6.0 Analysis

Statistics, these results seem to be only attributed to chance. The results also show that the ABHAR has considerable negative average returns in three of the four tests, which indicate that there are possibilities of abnormal returns, but we were not able to statistically confirm these statements. If compared to the results of the wealth relatives, the results are opposite where positive returns of wealth relatives during the cold period and negative returns during the hot period.

Hypothesis 2

The second hypothesis regards testing the abnormal returns under the market conditions of hot and cold defined by initial month return. Similar to the first hypothesis, we decided to include the time frames of one month (22 trading-days) and three years (756 trading-days) of both hot and cold market conditions in a shared hypothesis. The results from the conventional two-tailed t-tests did not produce empirical evidence of statistical significance on three of the four t-tests. We thus accept the null hypothesis of the one month and three year hot period market condition, as well as the three year cold period market condition. However, the one month cold period market condition did produce results of statistical significance with a p-value of 0.0098, and we thus reject the null hypothesis in this particular case. With the ABHAR at -5.24% during a one month period in the cold market condition, we can conclude that negative abnormal returns have a continuous occurrence during the tested condition that is not due to chance alone. The three-year cold period show negative ABHAR of -8.67%, and the one month and three year hot periods show positive ABHAR of 2.00% and 7.65%, respectively. These results can be compared to the wealth relatives calculated earlier, which show similar results of positive wealth relatives during the hot periods and negative wealth relatives during cold periods when defining the market conditions according to initial return. However, according to Ibbotson & Jaffe’s study, IPOs issued under hot market conditions suffer worse aftermarket performance than that of IPOs issued under cold market conditions (1975, p. 1038). Our results show the contrary, although we can only statistically prove the opposite with the one month cold market period. According to our t-tests, the one month cold period is in accordance with the anomaly of IPO underperformance. Does this mean that we have evidence of long-run underperformance of firms issued under cold market conditions? Not really. When accounting for a three-year time-frame of firms issued under cold market conditions, we fail to produce results of statistical significance (p-value of 0.2507). This indicates that in the long-run, IPOs issued under cold market conditions when defined by initial return do not consistently underperform relative to the market index any more than it overperforms. Firms issued during hot periods produce similarly insignificant results implying that the aforementioned statement holds true in this regard as well, although in this case it implies overperformance (hot period when accounting for 22 days and 756 days records p-values of 0.14 and 0.588, respectively).

Our findings are not in line with Ibbotson & Jaffe’s conclusion of IPOs issued under hot periods performing worse than IPOs issued under cold periods in the aftermarket (1975, p. 1058). Although we cannot statistically prove our findings as either underperforming or overperforming, we cannot know for sure why the ABHAR in these cases contradict Ibbotson & Jaffe’s conclusion. However, as brought forward by Carter et al. (2011), the sensitivity in time period of which the study is conducted can have a significant impact. They concluded that IPOs issued during the 1980’s and early 1990’s yield a higher proportion of underperforming IPOs, whereas IPOs issued...
between 1998-2005 perform the same as the market or outperform on a risk-adjusted basis (Carter et al., 2011, p. 1085). As Ibbotson & Jaffe study IPOs issued from January 1st, 1960, through October 31st, 1970 (1975, p. 1028), the difference in time period studied is quite substantial. We are thus inclined to regard the difference in time period studied as a reason for our contradicting results.

**Hypothesis 3**

The third hypothesis is based on IPOs issued under the bull and bear market conditions. The result from the conventional two tailed t-test was that the null hypothesis was accepted in all four time frames tested. The tests produced no results of statistical significance, and we therefore conclude that the abnormal returns during these specific conditions are attributed to chance. Schultz state that IPOs should cluster around times when stock prices are particularly high, and firms can receive more for their equity (2003, p. 484). This means that firms should time their IPOs when the stock market prices reach their peak (Schultz, 2003, p. 484). IPOs issued during bull or bear market conditions do not differ greatly in our research, with IPO issuances of 44 and 53 IPOs, respectively. However, we have defined the bull (bear) periods as instances when the market is in incline (decline). According to Figure 8 & 9, we can see that the majority of our subjects issue their IPOs when the stock market is in and around its peak. A firm can thus fall in either the bull or bear period, depending on their actual timing of issuance. An IPO that is registered as being issued in the bull market period may have issued when the stock market have not yet fully reached its peak. Conversely, an IPO registered as being issued in the bear market period may have been issued when they stock market have just started to decline from its peak. In either case, the firms have attempted to time their IPOs to capitalize on the market price to receive as much as they can for their equity. Our results thus correspond to Schultz’s statement.

In three of the cases we can see a result of negative ABHAR where in only one case the result is positive. If compared to the result of the wealth relatives the ABHAR correlates in the bear market returns where the initial first month return is negative in both cases, on the contrary the ABHAR and the wealth relatives does not correlate during the bull period.

If we conclude the results from the hypotheses testing there are clear indications of accepting the efficient market hypothesis in the concerned IPO market under the different market conditions. The only rejection of the null hypothesis was the one month cold period under initial month return definition. Under this specific condition there exists abnormal returns unattributed to chance, but no clear benefits can be drawn from this since the one month initial return definition is defined when the result of the month has already been published. Therefore no arbitrage opportunity is possible, since the investor would need to wait one month in order to find out what month would have been attributed by abnormal returns. The result from our conventional two tailed t-test is in accordance to Ibbotson (1975) who found indications of consistent abnormal returns, but were not able to reject the null hypothesis. This indicates further validation of the efficient market hypothesis. The result of the new issuance puzzle of Loughran & Ritter (1995) indicates underperformance of long-term buy-and-hold of IPO stock during the long term, our research shows no such similar pattern of underperformance in the long time-horizon. Carter (2011) argues that Ritter’s data is based on old data and also disproves consistent abnormal returns within the IPO market which further
validates the EMH. Patterns of the returns in our data shows that the short time horizon is attributed to volatile earnings were possible abnormal returns can be realized even though we were not able to verify these returns statistically. The conclusion we draw in the long run is in conjunction with Fama (1998) that we have previously discussed in section 3.1 that there is equal distribution of chance between the positive and the negative returns wich indicates that the Efficient market hypothesis exists in the long run, and according to our result it also exists under different IPO market conditions.

The abnormal returns under the specific tests is purely attributed to chance, therefore we accept our null hypothesis and can not disprove the strong form of efficient market hypothesis since the expected return equal the actual return. This would indicate the strong form of market efficiency, which states that abnormal returns are not possible to achieve due to all information being reflected in the market price (Fama, 1970, p. 383). However, although our t-tests do not produce significant results, abnormal returns are nevertheless possible to achieve, albeit due to chance. This will thus turn us towards accepting the semi-strong form of market efficiency, as abnormal returns are not impossible to realize. The strong form of market efficiency is thus rejected, while we accept the semi-strong form.

Even though the efficient market hypothesis exists during our sample market condition, Schultz (p. 4842003) argues that the theory of Pseudo market timing will lead to the firms to issue equity during stock market peaks which will lead to underperformanme in the long-run even though the efficient market hypothesis is evident on the market (Schultz 2003 p. 484). This can lead to underperformance on our stock samples even though the semi-strong efficient market hypothesis is accepted. This contradicts the theory of (Fama, p. 284 1998) who says that in the long-run, abnormal return should have an equal chance of positive abnormal returns as negative abnormal returns which should even out in the long run. We could not find statistical significance of rejection of the null hypothesis and therefore we accept the semi-strong efficient market hypothesis while rejecting underperformance of the IPOs during the different market conditions according to the results of our research of sample of firms.

6.7 Improvements to the Research

By conducting research regarding variables dependent on the characteristics of different companies could lead to increased explanation value of the IPOs under the different market conditions, where company specific information might increase the depth of explanation value of our research. Individual variables to be discussed could be those of Demers & Joos, (2007, p. 335) discussed in the problem background of this thesis where accounting measures such as financial leverage, pre-IPO performance and age, which are explanatory variables for post-IPO failure.

Further improvements could be made by adding additional benchmarks to compare our IPO samples against. This could have improved the comparativeness to past research, since articles such as Loughran & Ritter (1995) and Helwege & Liang (2004) use several benchmarks to compare their results to. The additional benchmarks could also have been used as a robustness test to further solidify the results of our thesis.
7.0 Conclusion

In this section we will present the conclusion we can draw from our analysis. We will answer our research question, and discuss if our purpose and research gap of the thesis has been filled. We will present suggestions for further research and make predictions about the future. Lastly we discuss ethical and societal implications.

We initiated this thesis by collecting data from previous research that influenced our research question. The choice to base our thesis upon previous academic research was beneficial, since we were able to compare our empirical results to that of previous research. The objective of our thesis was to analyze the long-term performance of IPOs under different market conditions by comparing it to an index benchmark while also adding statistical testing of the abnormal returns to improve the reliability of the research, along with analyzing the standard deviation of the IPOs log return movements. We sampled data from all companies issuing equity for the first time on the OMX Stockholm Stock Exchange, who were not foreign companies listed for a second time on several stock exchanges at the same time. Our sample consisted of 97 companies which we compared to several index periods matching each one of the IPO time periods. Therefore each IPO and index was matched in accordance to time. We did this to compare the buy-and-hold periods of each IPO to its benchmark under different holding periods, in order to answer our research question. The conclusion of our research question will be found below.

7.1 Answers to our Research Question

“What is the effect of different stock market conditions on IPO buy-and-hold returns, compared to an index benchmark under the same period?”

We find that there is a strong relation between the market movements of the OMXS30 index and the number of issuing IPOs each year. This will lead to the hot and cold periods of the IPO markets to be, according to number of issuance, directly linked to the highs and lows of the index OMXS30. The index can thus become an indicator to hot and cold IPO periods, and vice versa.

We see that the returns from the different buy-and-hold periods explain patterns in the returns of holding IPOs. We can see a pattern of underperformance of hot IPO periods according to the number of issuance definition, while the normal and cold periods over perform in the one and three year buy-and-hold periods. When we turn our attention to the definition by the initial first month return, we see that the results are the opposite to that of the number of issuance definition. Under the initial first month return definition, we see that hot IPO markets have a pattern of increasing wealth relatives the longer the holding period, while also outperforming the market. The cold IPO markets show a decreasing return the longer the holding period while under performing compared to the market.

The outcome of our research shows that there is no specific pattern of the buy-and-hold returns compared to the index benchmark under the different bull and bear market conditions. The comparison between hot and cold market conditions is sufficient to answer our research question, as we have clearly stated the effect hot and cold market conditions have on the IPOs compared to an index benchmark. The incorporation of
bull and bear market conditions serves as a discussion topic that leaves room for further research in order to validate the results. The purpose of this thesis has also been fulfilled through our research question, as we have given investors a general idea of what to expect when investing in IPOs under different market conditions.

We cannot find patterns of increasing/decreasing variability depending on holding period time or current market conditions. We can see that the average standard deviation remains relatively constant around 45% higher variability of the IPOs, compared to the index benchmark with small movements in variability occurring. We can also see that there is a pattern of average beta values increasing the longer the holding period. Therefore, the investor buy-and-hold exposure to log return movement can be said to remain fairly constant at around 45% higher than the index benchmark, independent of market conditions. This is sufficient as an estimation for the exposure to logarithmic returns movements of IPOs, compared to an index benchmark, as we have analysed the exposure under the different market conditions. The purpose of comparison on the variability of log returns have also been fulfilled as the investors now have a general idea of what to expect, in terms of log return exposure, when investing in IPOs under the discussed market conditions.

According to our statistical analysis we could not reject the efficient market hypothesis in any IPO markets under different market conditions. There were a single test where we were able to reject the null hypothesis, under the one month initial return cold IPO period, but a single indication is not sufficient to reject the efficient market hypothesis under this condition. We could deduce a certain pattern of co-movement between the ABHAR and the wealth relatives, but we were not able to statistically accept this pattern. We therefore conclude that the efficient market hypothesis is evident on the IPO market in its semi weak form, during the tested market conditions in accordance to previous research such as Helwege & Liang (2004) and Ibbotson & Jaffe (1975). We also see consistent patterns of ABHAR in the different market conditions, of which can become a topic for further investigation. We also do not accept the EMH in its strong form in regards to the occurrence of abnormal returns.

In addition to the efficient market hypothesis, we have not found statistical evidence proving the underperformance of IPOs. Regardless of condition, we find that in the long-term, IPOs have an equal chance of outperforming as underperforming the market. We did, however, find the negative ABHAR of IPOs under the cold period accounting for 22 days to be statistically significant. Thus, we find that the effect of IPO buy-and-hold returns under different stock market conditions correspond to the semi-strong form of efficient market hypothesis. This imply that there is no higher probability of achieving excess return than there is of experiencing deficit returns. Although we have found indicators in support of IPO underperformance, and differences in performance relative to the market condition in which the IPO is issued, we have not been able to statistically confirm these observations.

7.2 Theoretical and Practical Contribution
As stated previously in this thesis, most scientific articles available investigates US-based IPOs. During the process of writing this thesis, we have not come across any research related to IPOs based in Sweden, nor any countries closely situated to Sweden. We thus determine that our theoretical contribution is substantial, in the sense that we
are adding knowledge to a field of study that is unexplored in terms of our geographical orientation. However, that is not to say that any new research of Swedish IPOs can add knowledge simply because the topic in itself is rather extraneous. By examining the stock return of IPOs listed on the OMXS30 during different market conditions, we have contributed to knowledge as we now know there are certain time periods where one should refrain from conducting or investing in IPOs, and other periods where it would benefit investors and firms alike in the conduction of an IPO. The relationship of IPO performance to the different market conditions have not been examined on the Swedish market before, and we thus feel we have managed to fill a gap in previous research. We initiated a discussion regarding the implications of bull- and bear market conditions, which is an undiscussed subject connected to IPOs, even outside the focus of the Swedish IPO market. We have concluded that the market conditions have little effect on the variability within IPOs compared to its index benchmark. Under the different market conditions we can see no consisting patterns in the ABHAR according to the result of our t-test. In the long-run, the ABHAR will even itself out leading to the acceptance of the efficient market hypothesis. Further, we accepted the semi-strong form of market efficiency on the IPO market conditions and reject the strong form of efficient market hypothesis. The rejection is based on the evidence of consistent long-term ABHAR, where abnormal indicates a return different from zero, under the different market conditions which contradicts the theory of the strong market efficiency hypothesis. In terms of the practical contribution, our research can be of help to both firms and investors. Through the analysis of our research, we can see that the number of issuing IPOs is a good indicator for the bull- and bear market conditions, which is important for investors who try to avoid market downturns. Practitioners can use our analysis to carefully plan the timing of their issuance, whereas investors can contemplate whether investing in an IPO is worthwhile depending on the state of the market condition, based on our descriptive analysis. Hypothetically, the investor can use our mentioned investment strategy of selling hot period IPOs according to the initial return definition of hot and cold IPO periods, and buying cold period IPOs according to number of issuance definition. By using this strategy the investor could hypothetically earn abnormal buy-and-hold returns on average, according to the results of our research. The strategy is based on the buy-and-hold average returns in accordance with the two hot and cold IPO period definitions. The investors can use this information when investing to gain a historical perspective of recent IPO performance, characteristics and logarithmic returns exposure, to aid them in their investment decision-making. Our findings prove the existence of an efficient aftermarket in its semi-strong form and find no evidence of continuous long-run IPO underperformance according to our t-test. Investors should not be deterred to invest in the IPO market since abnormal returns will be evenly distributed in the long-run. The results from our descriptive statistics show patterns of abnormal buy-and-hold returns, whereas the result of our t-test does not. The investor can therefore use our hypothetical investment strategy, but has to keep in mind that in the long-run, the statistical t-test has proven the semi-strong market efficiency under all of the different market conditions.

7.3 Ethical & Societal Implications

We have previously discussed the ethical considerations we as researchers must be aware of during the process of writing our thesis. Vetenskapsrådet state that research
can only be approved if executed with the respect of human dignity, and that human rights precede the need for scientific and societal contributions (2011, p. 48). Ethical awareness should thus extend further than the direct risks associated with the research process, as previously discussed in Chapter 2. We thus feel it is important for us as researchers to be aware of the implications our study have on the prosperity of the financial market and the welfare of our immediate society, as a result of our research.

It is possible that the outcome of our research will affect the behaviour of financial investors and institutions. They may choose to withhold, or execute, any investments based on our assumptions, which may affect the welfare of these people or institutions negatively. This entail that if people choose to interpret our conclusions and base their investment strategy upon our research, our research will have a direct impact on social welfare. Original owners of private firms may use our research to find the opportune time to conduct an exit strategy. This may be to the detriment of outside investors who may see the stock plummet as a result of the firm not being in it for the long run. This results in an ethical dilemma as a result of our research, where certain individuals may seek to find a suitable time period to take advantage of opportunistic investors, or “windows of opportunity” as expressed by Ritter (1991, p. 4).

This is not say that practitioners cannot take anything positive from our research. Our research has shown that firms and investors alike would benefit from conducting and investing in an IPO, respectively, during cold IPO market conditions defined by number of issuance. As certain firms may seek the most opportune time to find an exit strategy, other firms may look to identify the most suitable time to help their company prosper and grow. Likewise, outside investors may find that there is an increasing amount of IPOs issued when compared to previous years, and through our research they can refrain from investing as IPOs conducted during hot market conditions, as they usually underperform compared to the general market. In contrast, investors might take the opportunity to invest in an IPO when there is a low number of issuances, as these cold periods imply that the IPO firm will outperform the market as documented in our paper.

Under the initial month return definition, the investors receive abnormal first month returns in hot periods, which can lead to over-speculation of the company’s post IPO stock price. After a while, when the stock is overpriced, a declining trend may begin as investors follow fads that results in severe decline of the IPO stock, which is not beneficial for the issuing company. On the opposite, during the cold IPO period the low optimism about the company can lead to dwindling stock prices and under-speculation of the company. This can in the long run lead to bankruptcy of the company, as the amount of capital gained from the IPO was not sufficient to keep the company sustainable in the long run.

These speculative scenarios would all affect the welfare of society, in that successful firms imply more job opportunities, and the increase of private wealth may induce entrepreneurship and the subsequent creation of new firms. Unsuccessful companies would be suppressed on the market, which can lead to bankruptcy of the issuing company. This would have a negative effect on society, as the amount of job opportunities would decline.

In respect to the literature that influenced this research, we find that the existing research is predominantly conducted by males. This should not be a problem per se, but
it could be argued that men and women interpret results differently and come to different conclusions. Previous research have documented that men and women differ in terms of risk staking, where women tend to be more risk averse (Byrnes et al., 1999, p. 377). Felton et al. (2003) examined the level of riskiness undertaken by comparing male- and female students who handled their own investment portfolios in an investment portfolio simulation. Their research added to the fact that men were evidently more prone take on investments risks as their portfolio returns had, on average, a higher degree of variability compared to their female counterparts (Felton et al., 2003, p. 37). In terms of conducting research in the field of investments, the procedure and eventual results can thus differ when conducted by males or females. Even while examining a similar topic, males and females may have a different focus in how they approach a problem, and can yield different results. For instance, when conducting research in the field of investments, male researchers may instinctively target male investors whereas female researchers may be more inclined to target female investors. A certain gender dominated sample may thus influence the eventual results on research. We as authors do not believe this particular field of study would yield different results, however, as the analysis conducted in the articles connected to this study generally rely on mathematical- and statistical models. Thus the results and conclusions brought forward by these studies would most likely be the same regardless of the gender of the author.

7.4 Predictions about the Future

By using the results of our thesis, we are here trying to make a highly speculative guess about the future of the market. The OMXS30 has had a bull market period in 2010-2011 while having a short bear market in the early period of 2012, and afterwards having a continuous bull market. The number of issuance these years are 14 in 2010, 11 in 2011, 6 in 2012, 10 2013, and 3 up until this moment in time of 2014. These results show that the distribution of number of IPO issuance are following the index. The number of issuing companies in 2013 is high, but is not as high as the previous market crashes of 19 in 2000 and 15 in 2006, which means that the index should continue to increase depending on the number of issuance outcome of 2014. Currently, the number of planned IPOs during 2014 is 25, this would suggest that a market downturn should commence during this year or the beginning of the next year as the number of IPO issuances are higher than the market crash post-2000 and 2006, respectively. Since the IPO market is currently high, as an investor you should stay away from long-term holding of the IPOs issuing this year, as our results show long-term underperformance of IPOs during hot periods. Only after the market has entered bear market conditions, should you as an investor consider to invest in the IPO market.

7.5 Further Research

By first looking at what improvements or changes could be made to this thesis, the researcher could use a different index or use matching firms as a benchmark in order to see and compare the results. This would be interesting since there are distinctive rewards and consequences to each method. The results of that research could then be compared to this thesis and past academic research, to see if the results can be further validated or see if the results differ.
The buy-and-hold period of the research could also be changed, to see if the outcomes of the long-term holding changes. The holding periods could be shortened down or increased. Previous articles such as Loughran & Ritter (1995), have used a buy-and-hold return of five years and proves IPOs underperform for the full length of the period. Increasing the holding period to five years make the results of another thesis more comparative to past research of Loughran & Ritter (1995) among others.

Further interesting topics of research is to investigate the underpricing of IPOs, instead of using buy-and-hold returns when comparing IPOs to a benchmark under different market conditions. Past research has, as discussed earlier, pointed towards IPOs being underpriced on average, which could be investigated in comparison to certain market conditions having higher or lower occurrences of underpricing. This research can be based on behavioural finance of both investors and underwriters.

Another addition to further research could be to conduct a similar study on another market. The results can then be compared to see if similar patterns can be observed on both markets. The researcher have to bear in mind that the difference in exposure to market effects reduce the comparativeness between the market, and thus the comparativeness of the research.

A similar research can also be conducted with the approach of the issuing company in focus instead of the investor. The research can then be compared in addition to this thesis to include every aspect of both the investor and the issuing company, during different market conditions.

Further adjustments to the statistical testing can be conducted, by adding bootstrapped skewness-adjusted t-test which has the benefit of avoiding influence from skewness in the result which is the preferred method according to Lyon et al. (1999, p. 166), but can lead to a biased interpretation of the investigated sample because of this omission of skewness. The method, similar to our conventional t-test, has benefits and drawbacks, which if used in conjunction with our analysis can lead to a thorough understanding of IPO characteristics under different market conditions.

A different approach to the analysis of market conditions can be investigated by using explanatory variables of firm specific characteristics, in order to understand how these characteristics affect performance of IPO buy-and-hold-return under different market conditions. The variables can give an insight into the firm characteristics and performance behaviour of IPOs under different market conditions. Variables that can be investigated could be similar to previous research within this subject, such as Demer & Joos (2007) and Carter et al. (2011).
Reference List


