Do IPOs create profitable opportunities for retail investors?

-a quantitative study on the Nordic markets

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ABSTRACT

The purpose of this study was to investigate if retail investors have profitable opportunities in the Nordic markets. We found from previous research on Initial Public Offerings (IPOs) that they have documented abnormal returns and we made the assumption that if abnormal returns exists, there are profitable opportunities for retail investors. We want to contribute with up-to-date research to help retail investors make a better investment choice in the Nordic markets. Previous research have linked different theories and models to explain why underpricing might occur and amongst the most cited theories by researchers are the information asymmetry, winner’s curse and signaling hypothesis.

To investigate if there are profitable opportunities for retail investors we chose to conduct a quantitative cross-sectional study on 68 IPOs from the years 2005 to 2011 in the Nordic markets. This contributes with valuable information for different stakeholders such as retail investors, researcher institutions and companies interested in listing. Furthermore we tested underpricing in three different time lags; first trading day, five and twenty days after the first trading day. The empirical results reveal that there is underpricing in the Nordic markets and that the price is stable up to one month after the IPO. The results did not find any statistical differences in time lags or in industries.

Moreover we discussed other factors that might have an impact on the outcome of our test results, such as market information and the economic climate. Further research is needed in those areas to gain a deeper understanding. Finally we conclude that retail investors have profitable opportunities in the Nordic markets by investing in all IPOs and that investors should sell as soon as possible and apply to all similar markets.

Key words: Underpricing, Initial Public Offerings, IPO, Retail investors, Information asymmetry, Market information, Nordic markets, Nordic countries, Nordic OMX, Oslo Stock Exchange
Table of Contents

Chapter 1: INTRODUCTION ......................................................................................... 4
  1.1 Problem Background .................................................................................. 4
  1.2 Research question .................................................................................... 6
  1.3 Thesis purpose ......................................................................................... 6
  1.4 For whom .................................................................................................. 6
  1.5 Preconceptions ........................................................................................ 7
  1.6 Choice of Subject ..................................................................................... 7
  1.7 Delimitations ............................................................................................ 7
  1.8 Key concepts ............................................................................................. 8
  1.9 Disposition ............................................................................................... 9

Chapter 2: METHODOLOGY ..................................................................................... 11
  2.1 Research philosophy ................................................................................ 11
  2.2 Theoretical research method ................................................................... 12
    2.2.1 Relation to theory .............................................................................. 12
    2.2.2 Research strategy .............................................................................. 13
  2.3 Research design ........................................................................................ 14
  2.4 Literature review and critique ................................................................. 15
    2.4.1 Literature review .............................................................................. 15
    2.4.2 Literature search ............................................................................... 15
    2.4.3 Choice of sources ............................................................................. 15
    2.4.4 Critique of secondary sources .......................................................... 16

Chapter 3: THEORETICAL FRAMEWORK ............................................................... 18
  3.1 IPOs ........................................................................................................... 18
    3.1.1 What is an IPO? ................................................................................ 18
    3.1.2 Underwriter ....................................................................................... 18
    3.1.3 Why go public? ................................................................................ 18
    3.1.4 Benefit & opportunity costs of going public .................................... 19
    3.1.5 Indirect cost – Underpricing ............................................................... 21
    3.1.6 Valuing of IPOs ............................................................................... 21
    3.1.7 Retail & Institutional investors’ roles in IPOs ................................ 22
  3.2 Underpricing ............................................................................................. 23
3.2.1 Definition of underpricing ................................................................. 23
3.2.2 Research on underpricing ................................................................. 23
3.3 Theories explaining underpricing .......................................................... 24
  3.3.1 Agency costs ................................................................................. 24
  3.3.2 Information asymmetry ................................................................. 24
  3.3.3 Hot markets .................................................................................. 25
  3.3.4 IPO clustering .............................................................................. 25
  3.3.5 Efficient market hypothesis ............................................................ 26
  3.3.6 The winner’s curse ...................................................................... 26
  3.3.7 The signaling hypothesis ............................................................... 26
3.4 Market information & IPOs ................................................................. 27
3.5 Nordic markets ................................................................................... 27
  3.5.1 Brief history of the Nordic markets .................................................. 27
  3.5.2 Listing requirements for the Nordic countries .................................... 29
3.6 Summary of the theoretical framework ............................................... 30
3.7 Derivation of Hypotheses .................................................................... 31

Chapter 4: PRACTICAL METHOD ............................................................... 32
  4.1 Population ......................................................................................... 32
  4.2 Data collection .................................................................................. 33
  4.3 Sample method ................................................................................ 33
  4.4 Hypotheses ...................................................................................... 35
  4.5 Statistical tests ................................................................................ 36
    4.5.1 Wilcoxon signed-rank test ............................................................. 37
    4.5.2 Friedman test ............................................................................... 37
    4.5.3 Kruskal-Wallis test ..................................................................... 37

Chapter 5: EMPIRICAL FINDINGS .............................................................. 39
  5.1 Completed IPOs over time ............................................................... 39
  5.2 Test of normality ............................................................................. 39
    5.2.1 Test of normality for whole population .......................................... 39
    5.2.2 Test of normality for separate industries ....................................... 44
    5.2.3 Non-parametric versus parametric .............................................. 46
  5.3 Testing for underpricing ................................................................. 47
  5.4 Testing for time lags ................................................................. 48
5.5 Testing for industries ................................................................. 49
5.6 Summary of the process .......................................................... 50
Chapter 6: DISCUSSION & CONCLUSIONS ..................................... 51
  6.1 Discussion .............................................................................. 51
  6.2 Conclusions ........................................................................ 53
  6.3 Contributions ....................................................................... 53
    6.3.1 Theoretical contributions ............................................... 53
    6.3.2 Practical contributions .................................................. 53
  6.4 Suggestions for further research ............................................ 54
Chapter 7: TRUTH CRITERIA .......................................................... 55
  7.1 Reliability ............................................................................ 55
  7.2 Replicability ........................................................................ 55
  7.3 Validity ................................................................................ 55
REFERENCES .............................................................................. 57
APPENDIX ................................................................................ 60
Chapter 1: INTRODUCTION

In this chapter we will first present the problem background, our research question and its sub-questions and then continue with the thesis purpose. We will continue with explaining for whom this study concerns as well as our own preconceptions when conducting this study. Finally we will argue why we wanted to make this study and also explain what limitations we have, followed by key concepts and the dispositions of this thesis.

1.1 Problem Background

Investment opportunities have always been an interesting topic for academics to study, and researchers have tried to explain and understand why investors act in a certain way. Generally speaking, there are two distinctive ways in which investors act. The first one is “Sentiment investors”, in which investors are overoptimistic and only tend to buy at a higher-than-market-price (Cornelli et al., 2006). Second, there are “Rational investors”, whom act in their best self-interest and they tend to buy only at the fair value, which is assumed to be the market price in an efficient market. Researchers have also been curious on how different investment decisions affect the market. One interesting subject for researchers has been to study ‘Initial Public Offerings’ (IPOs) because of the documented high initial returns (Rock, 1986; Ibbotson & Jaffe, 1975). IPOs occur when a company decides to go public by issuing stocks to the general public for the first time. This will change the company from being a private one to a publicly traded one. A company can in later times decide to issue more securities to the general public, which is called Seasoned Equity Offering (SEO) and will not be dealt with in this thesis. The main focus of this research will be on IPOs on the Nordic countries, specifically Sweden, Norway, Denmark and Finland. Retail investors can choose to subscribe for these offerings before they are publicly traded. These offerings are traded on the primary market, which is exclusive for the subscribers only. After the IPO the stocks will be traded on an official stock exchange available for the public such as the OMX Nordic. This is referred to as the secondary market.

There are several general benefits and opportunity costs for companies to go public. The benefit according to Ogden et al. (2003, p. 389) is primarily that the company receives funds to invest in other securities. Usually companies do so to reduce their cost of capital due to diversification among public investors, which make future capital investment projects more profitable. Another reason for going public is to reduce corporate debt. Ogden et al (2003, p. 389) states “By reducing leverage, the firm’s original owners reduce the risk of their private portfolio even if they do not sell their shares in IPO”. This also creates two more advantages, first; the firm can establish stock and stock option plans for its employees and executives. Second, the firm can issue shares rather than use cash to pay for acquisitions.

Furthermore some opportunity costs are loss of control, disclosure requirements, performance pressures and underpricing (Ogden et al., 2003). The loss of control is due to dilution of ownership which gives the company less control over investments, financing and dividend policy. The cost of giving up private information might reduce the company’s strategic position and reveals sensitive key information which can reduce competitiveness. Consequently, the firm needs to allocate time and money to disclosure their performance for the investors and obligations to perform as promised. One of the highest opportunity costs however, is that companies’ IPOs appear to be substantially underpriced (Ogden et al., 2003, p. 390).
Previous researches on IPOs such as McDonald & Fisher (1972), Rock (1986) and Lowrey et al. (2010) have shown that undervaluation is a common phenomenon and one of the reasons is due to information asymmetry between institutional investors and retail investors. Other researchers such as J. Chemmanur et al. (2010) support the argument that institutional investors possess significant private information about IPOs, and that they receive good compensation for this. Furthermore Cheong Chan (2010) concludes that the hotter the IPO is, the more undervalued it will be. Moreover, Boreiko & Lombardo (2011) suggest that in Italian IPOs the retail investors are able to identify “extreme underpriced” IPOs. Similar conclusion was drawn in the Chinese IPO market. Guo et al. (2011) identified several interesting characteristics that can help explain why the Chinese IPO’s are so underpriced. Among them was the ownership effect and regulatory interference. It is also believed that the IPO market in China has a substantial number of optimistic investors.

IPOs have historically been of interest for investors due to the documented high initial returns on the first day of trading as previous research suggest. To benefit from IPOs investors need to acquire private information about it in order to select the profitable IPOs (Chemmanur et al., 2010). This leads to that institutional investors will receive this private information while the retail investors will not. To compensate for the risk to invest in an “unknown” company as a retail investor, the IPO needs to be underpriced (Chemmanur et al., 2010). In other words, information asymmetry is one of the explanations for underpricing.

Another identified characteristic of IPOs is that ‘hot’ IPOs tend to me more underpriced compared to ‘cold’ IPOs. A ‘hot’ IPO is defined as “periods in which the average first month performance (or aftermarket performance) of new issues is abnormally high” (Ibbotson & Jaffe, 1975, p. 1027). According to Cheong Chan’s (2010) empirical findings, the effect of first-day secondary market pricing depends on the hotness of the IPO and thus cold and neutral IPOs should be better priced. However Cheong Chan (2010) concludes that if the hotness of the IPO is defined as open-to-close return rather than by volume, retail investors will be more aggressive in their trading.

An important hypothesis when studying IPOs is the efficient market hypothesis (EMH). EMH was first discussed by Fama (1970) and stated that an efficient market would reflect all available information available to investors. If the market is efficient then all participants will have the same information. However to measure the efficiency of a market, Fama (1970) stated that there are three different types of efficiency. First, the weak form in which information only reflects historical prices. Second, the semi-strong form in which prices adjusts to new information such as earnings announcement. The last form is strong efficiency in which all participants have access to all information. Since IPOs are generally underpriced, we can assume that the primary market is not fully efficient. According to Fama (1970), an efficient market should reflect all information available to the public and stocks will be valued at their fair price, which is not the case for the IPO market.

Furthermore a study by Westerholm (2006) on the Nordic markets concludes that industry clustering or concentration is weakly and positively related to high initial returns. This would indicate that there could be differences between IPOs depending on the type of industry.
From the problem background we have developed a research question which can be found in the next section. The research question is complemented by two sub-questions that focus on the time aspect and type of industry.

1.2 Research question
Based on previous research we believe that there is a knowledge gap regarding IPOs in the Nordic markets. According to our findings, the main researches on IPOs have been in the US, EU and Asian markets and we believe that there has not been enough research that investigates differences among industries. Therefore we want to look at IPOs in the Nordic markets to determine if an investor can take advantage of an undervalued IPO and if the price stays stable in the short run. Finally we want to look at differences among industries in terms of return. In order to answer our research question we want to look at retail investment opportunities in the Nordic markets to evaluate if retail investors can make a higher return by investing in IPOs than the expected secondary market value, measured as the offering price.

This leads us to our research question;

- **Do IPOs create profitable opportunities for retail investors in the Nordic markets?**

Another interesting aspect of this is to explore if there are price changes from the first trading day up to one month. We want to empirically test the impact of the time frame for retail investors, thus we have developed a sub-question;

- **Are there significance differences among time lags in regard to initial return?**

Furthermore we want to investigate if there are any performance differences among industries regards to the initial returns. Thus we have developed a second sub-question;

- **Are there significant differences among industries in regards to initial return?**

1.3 Thesis purpose
The purpose of this research is to explore if retail investors can make a higher return than the market by engaging in IPOs. Furthermore we want to evaluate and analyze if there are any differences between industries in the Nordic markets by looking at the initial returns of IPOs. We will be able to identify if the offering initially is undervalued, fair or overvalued by comparing it with the first day trading price and price movements up to one month. This research is intended to help retail investors interested in the Nordic markets to make a better investment choice in the IPO market. We also want to help retail investors to decide whether to hold or sell the security in the short term by investigating different time lags up to one month. Finally this thesis is intended to help quantify research on IPOs in the Nordic markets for future studies.

1.4 For whom
This research is primarily intended for investors interested in IPOs and wants to explore the investment opportunities in the Nordic markets. Since IPOs are in general a high risk investment due to the uncertainty associated with the issue, it is a good way for an investor to diversify a portfolio. Furthermore we are obliged to send a copy of this study to the Oslo Stock Exchange (OSE) because they supplied us with data on successful IPOs from 1st of January 2005 to 31st of December 2010. This shows the
practical relevance for affected stakeholders. Therefore this paper has a strong practical contribution in this research field.

Secondly, this research will help companies to get an overview of the performance of the IPOs in the Nordic markets. By reading this study companies can see to what extent, if any, underpricing occurs in the Nordic markets and can make decision based on this information. For example if a company should decide to go public in a ‘hot’ or ‘cold’ market.

Finally, this study is intended to help business researchers who want to investigate or analyze the Nordic markets more thoroughly. Researchers will have data from completed IPOs in the Nordic markets from 2005 to 2011 which they can use when conducting new research as well as suggestions for future research.

1.5 Preconceptions
The preconceptions we have for this study are quite similar since we are both finance students at the same university. Since we are students and we have little work experience in the finance sector the experiences we have are based on theoretical knowledge rather than practical.

Furthermore we have been looking at trends and different cases during our study time that have influenced our mindset. For example we have seen that IPOs tend to be underpriced by looking at statistics and data. This has contributed to shape our preconceptions regarding IPOs. However since we are aware that most of our knowledge is relative we try to be open-minded for new information.

1.6 Choice of Subject
The choice to study IPOs was mainly due to our previous knowledge and preconceptions. We have both studied corporate finance and other finance courses where IPOs are mentioned and explained. The courses have mainly had the company’s perspective, which have taught us that there are both benefits and costs for a company that considers an IPO. However investors can affect the benefits and costs of the company, for example by choosing to subscribe to an IPO. This has motivated us to focus on the investors’ point of view. Moreover one cost in particular seemed very interesting for us which are the pricing of IPOs. When looking at previous research in this area we have found that it is a much discussed topic among many stakeholders including academics, investors, managers and so forth.

Since we are interested in IPOs from an investor’s perspective we would like to gain a deeper understanding on the general behavior of an IPO in terms of price. Furthermore we have a personal interest in this topic because investments can generally be of interest for any individual or organization.

Our choice of conducting a research on this subject is to test whether or not the theories on IPOs can empirically be supported in the Nordic markets. This will help us understand how the different actors in the financial markets operate. Another reason is to contribute to a specific academic field of finance where we believe research is lacking.

1.7 Delimitations
There are numerous of different considerations to be aware of when conducting a research on the Nordic IPO markets. We have chosen to concentrate only on variables
relevant for the retail investor to make a better investment choice. We will examine Nordic markets, its industries and if underpricing is identified. As such we are not including any other IPO markets in this study. We are not interested in the gross proceeds of IPOs because we chose not to investigate relationships between gross proceeds and the pricing of an IPO. Moreover it is very time-consuming to find the gross proceeds since there are no disclosure requirements on how to present it. We have also chosen to exclude the Icelandic stock exchange for practical reasons. The reasons will be further motivated in chapter 4.

Another important limitation that needs to be taken into consideration is the time frame. The research is to be completed within a three months period which restricts us to go deeper into this field. If we had more time we could perhaps include more years or time lags that would help us investigate the research question further, or include more variables such as the market conditions, market information and IPO trading volumes. We also chose to exclude the behavioral aspect of investors in our research.

Furthermore we choose to work with IPOs from the years 2005-2011 because we want this study to reflect current market trends. Another reason is that the rules for listing and disclosure have changed over time and therefore an up-to-date study will have similar rules compared to a longitudinal study. Therefore this restricts us to a limited number of IPOs. The time restriction also prevents us from considering additional external economic factors e.g. the state of the economy or inflation.

1.8 Key concepts
In this section we will outline the important concepts in this thesis and how we define them in context with the current thesis.

IPOs: Initial Public Offering (or stock market launch) is a process of selling a collection of shares or stocks of company to raise cash. The stocks or shares can give different privileges and/or rights to the investor in the given company. The IPO leads to the company changing from being private to a publicly traded one.

Initial return: The initial return is the return from the first day of trading a new security. Usually it is measured as a percentage between the subscription price and the closing price of the first trading day.

Underpricing: The anomaly associated with stock issues where the closing market price exceeds the subscription price in the first day of trading. A more detailed definition of underpricing will be found in chapter 3.

Subscription price: A fixed price that is determined by the underwriter in which investors may purchase the stock before it goes public. It is also called offer price by some authors.

Expected market value: In our study it is defined as the subscription price, since underwriters are expected to estimate the true value of the security in a fully efficient market.

Primary market: The primary market is a market where companies can issue new securities for the first time on a stock exchange through an underwriter, such as an investment banks. The securities are intended directly towards investors. E.g. IPOs are traded on the primary market.
Secondary market (aftermarket): In the secondary market investors can buy securities from other investors instead of the issuing company directly. This is usually done in an official stock exchange market such as the Nordic OMX.

Retail investors: Individual or small investors that invest for the personal account and not for another company or organization.

Institutional investor: Organizations and institutions such as investment banks, mutual funds and pension funds that trade with large volumes.

IPO clustering: Periods in time when IPOs tend to cluster. For example since IPOs are not random over time there will be waves, or concentrations of IPOs a particular point in time.

1.9 Disposition
Chapter 1: INTRODUCTION:

In chapter 1 we will first present the problem background, our research question and its sub-questions and then continue with the thesis purpose. We will continue with explaining for whom this study concerns as well as our own preconceptions when conducting this study. Finally we will argue why we wanted to make this study and also explain what limitations we have, followed by key concepts and the dispositions of this thesis.

Chapter 2: METHODOLOGY:

In chapter 2 we will discuss the most known philosophical considerations outlined by Bryman et al. (2007) and Saunders et al. (2009). We will present and argue for our ontological and epistemological choices as well as outline our research strategy and research design. After we will discuss the importance of conducting a literature review and critically review our choice of sources. At the end we will show the three hypotheses we derived.

Chapter 3: THEORETICAL FRAMEWORK:

In chapter 3 we will explain important theoretical concepts and theories relevant for this study. First, we start by explaining IPOs; their advantages and disadvantages, and then we continue with underpricing and theories explaining this particular phenomenon. Amongst the theories we will discuss are the agency cost, information asymmetry, efficient market hypothesis and others. The end of the chapter will contain a brief history of the Nordic markets and a summary of the theoretical framework as well as how we derived the three hypotheses.

Chapter 4: PRACTICAL METHOD:

In chapter 4 we will present the practical method for our study. We will start by presenting our population and explain why it was selected. Then we will show how and where we collected the sample. After we will present our sample method and at the end of the chapter we will present the hypotheses subject for testing and explain the statistical tests we will do in this study.
Chapter 5: EMPIRICAL FINDINGS:

In this chapter we will present our empirical findings. First we present an overview of the completed IPOs over time. We then continue with the results of our normality tests on the population as a whole and in different time lags, then in separate industries. Due to the results we will test if there is underpricing in all three time lags with a Wilcoxon signed-rank test. After this we will test differences among time lags and industries with a Friedman test and a Kruskal-Wallis test respectively.

Chapter 6: DISCUSSION & CONCLUSIONS

In chapter 6 we will start with a discussion of the findings and relate them to the context of our theoretical framework. After the discussion we will present the conclusions along with theoretical and practical contributions. Finally we will end the chapter with suggestions for further research.

Chapter 7: TRUTH CRITERIA

In chapter 7 we will lay down the most well-known criteria for conducting business research and we will explain the reliability and validity criteria and try to discuss how our study fulfills each and every one. We will follow the guidelines presented by Bryman (et al. 2007 p. 40-44, p. 58).
Chapter 2: METHODOLOGY

There are several ways of conducting research which depend on the researchers’ philosophy and how one interprets the world. There are two major philosophies when conducting scientific research, namely ontology and epistemology. The ontological and epistemological positions influence the research methods and the design of the study (Saunders et al., 2009, p. 108). These philosophies guide the researchers throughout the whole study. In this chapter we will explain the two major philosophies, the research methods and the most known research designs. Thereafter we will justify our position for this study and select an appropriate research design. At the end of the chapter we will comment on the choice and validity of our literature.

2.1 Research philosophy

“The research philosophy you adopt contains important assumptions about the way in which you view the world. These assumptions will underpin your research strategy and the methods you choose as part of the strategy” (Saunders et al., 2009, p. 108). The research philosophy includes our epistemological and ontological stances. We have chosen a positivist epistemological standpoint and an objectivist ontological standpoint. The stances we have chosen for this paper will be justified in this section.

An epistemological issue is concerned with what is to be regarded as knowledge, and how to regard what is knowledge. There are two major opposing epistemological standpoints in business research, notably positivism and interpretivism (Bryman et al., 2007, p. 16). Positivism is often connected with quantitative research, and interpretivism with qualitative research. To have a positivist position means to apply the ways of conducting a research in the social world the same way as to do in natural science (Bryman et al., 2007, p. 17).

Bryman et al. (2007, p. 16) mention five principals that are relevant for positivism:

- Principle of phenomenalism: it can only be considered knowledge if it can be confirmed by the senses
- Principle of deductivism: the purpose for theory is that it generates hypothesis/hypotheses subject for testing
- Principle of inductivism: knowledge is arrived through the gathering of facts that provides the basis for laws
- Science must be conducted in a way that is value free
- There is a clear distinction between scientific statements and normative statements, and the former are the true domain of the scientist

(Source: Bryman et al., 2007, p. 16)

The opposing epistemological standpoint is interpretivism, and it entails that research in the social world (like this one) should be studied in a different manner because the social world should not be regarded the same way as the natural world. Researchers with interpretivist standpoint often believe that they need to study the subjective meaning of a social action (Bryman et al., 2007, p. 19). This epistemological standpoint does not fit the purpose of our study which is to investigate if we can find significant evidence for underpricing in the Nordic markets. The study will be descriptive and we will either confirm or reject the hypotheses, but we will not be able to incorporate all variables that might affect the outcome of our tests. We will however consider variables that might have an effect on our results, such as market information, the signaling
hypothesis and hot markets. They will be presented in chapter 3 and discussed in chapter 6. Our epistemological standpoint is positivism because we are testing if underpricing can be identified in the Nordic markets. All tests will be done without any room for interpretation, and we will determine the results based on the statistical tests we will do. This study will follow the five principles of positivism that Bryman et al. (2007, p. 16) outlines. The most relevant principle for our study will be ‘Principle of deductivism’ because the purpose of theory collection will be to generate hypothesis/hypotheses that we are able to test.

Furthermore there are ontological considerations to be taken into account as well. Ontology concerns the nature of the social world and how it should be viewed. The ontological choice is essential because the choices we make will influence the conduct of the research. Should the social world be viewed as objective and external from its social actors or is it a construction by its social actors (Bryman et al., 2007, p. 22)? Both assumptions have ramifications on the conduct and outcome of the research. There are two different ontological standpoints: objectivism and constructionism. Adherents of constructionism believe that social phenomena are of constant interaction with each other and are constantly changing and therefore are in need of re-study and re-define. They believe that social phenomena are dynamic and are not to be explained from only one single view point to get the full explanation of it (Bryman et al., 2007, p. 23). The other major ontological standpoint is objectivism and is in opposition to constructionism. Adherents of objectivism make assumptions on the social world and accept its behaviors as objective and non-changing (Bryman et al., 2007, p. 22). Objectivism also assumes that the social world cannot be affected by its social actors, rather the social actors have to adapt to their environment. The constructionist point-of-view will not be suitable for this research since we have defined concepts such as underpricing and assumed that the definition is unchangeable. Moreover we regard the results of our tests to be objective and generalizable to other similar environments. Constructionism fits better with qualitative research since there is more room to explain the results from a subjective standpoint. Our ontological choice is therefore objectivism because we aim to conduct as value free and neutral research as possible. In our study, we assume that rational investors will always invest in the most profitable opportunity given the information they have access to. We make this assumption to be able to present data, conduct tests and draw conclusions on the findings.

2.2 Theoretical research method
Research method includes the relation to theory a study has and the research strategy it chooses. The relation to theory and research strategy is very much linked with each other and with the research philosophy of the study. The relationship between theory and research is highly relevant in the conduct of a study. Are theories generated by testing of data or is collection of data made based on theory? There are two approaches: the deductive approach and the inductive approach (Bryman et al., 2007, p. 7-11) as well as two different research strategies: qualitative and quantitative. We will first explain the relation to theory that includes our approach to the research and then we will continue to explain and motive our research strategy.

2.2.1 Relation to theory
As mentioned earlier, there are two well-known approaches to choose when conducting a research, the deductive and the inductive approach. Deductive entails that the researchers use theories already established and create hypotheses based on these theories. The researcher then collects the data and tests it against the hypotheses and
theories (Rubin & Babbie, 2010, p. 40). Simply put, one chooses theory and hypotheses first, test data second. Deductive approach is often linked with the quantitative research strategy because there are structured and well established ways in selecting the theories and collecting the data. It often entails the data sample being subject to statistical testing. The inductive approach is the opposite, where the researcher begins with collection of data and observations, seeks patterns and generates conclusions from the findings (Rubin & Babbie, 2010, p. 39). This could in the end help construct a new theory based on the observations and findings. The inductive approach is often linked with the qualitative research strategy.

The aim of this research is to collect data from the Nordic markets to see if there are any profitable opportunities for retail investors when investing in IPOs. To do so we need to present the most recognized and accepted theories on the underpricing issue, and collect data to test these theories, thus making it a deductive study. The deductive approach is the most common way of linking research with theory. According to Bryman et al. (2007, p. 11) the process starts with collecting the theory or theories of the given area of research, then form a hypothesis based on what the research will be about. Next step is to collect relevant data. This data will then be tested on the Nordic markets and finally discussed and analyzed in contrast to relevant theories. From this we will be able to draw conclusions and give suggestions for future research.

2.2.2 Research strategy

There are two common strategies that could be applied for a research. The most common one being a quantitative research and is normally applied to the natural science. The other is the qualitative research where its adherents argue that social phenomena should be studied differently than in the natural science.

The simplest way to distinguish them is to say that quantitative research is mostly based on numbers and qualitative is based on words. For instance, in quantitative study an interview is most likely structured and can be re-interpreted by numbers, and collected in different segments and divisions. This is to be able generalize the sample to apply for the population. A qualitative interview on the other hand would most likely be less structured (it does not always have to be) and emphasize on the individual, and try to find unique characteristics in the subject (Bryman et al., 2007, p. 28-29).

We chose to conduct a quantitative research strategy because we are going collect data on IPOs which is incorruptible and unchangeable, and we will test the data to see if we can find underpricing in the Nordic markets. Moreover we have deducted our hypothesis from previous research on this subject. We will answer our research question “Do IPOs create profitable opportunities for retail investors in the Nordic markets?” with the help of the results we get from testing the IPOs collected in the Nordic markets. We will answer the first sub-question “Are there significant differences among time lags in regard to initial return?” by testing three time lags (t+0, t+5 and t+20) and see if we can identify differences among them in regards to initial return. Furthermore, we will answer the second sub-question “Are there significant differences among industries in regards to initial return?” by categorizing the IPOs into six different industries, and test the difference between them in regards to initial return. The six industries will be “Financials”, “Health Care”, “Materials, Energy and Basic resources”, “Technology, IT and telecommunications” and “Industrials.”
In essence, our paper will be a strictly quantitative, deductive research based on the principles of positivism and objectivism. In Model 1 below, you will find our research process:

2.3 Research design
The design of the research is very important and tells you what kind of research it will be, what it will be about and how to do so to reach that goal. There are several different research designs that we could choose from. Bryman et al. (2007, p. 44) identifies five different research designs: experimental design; cross-sectional design; longitudinal design; case study design; and comparative design. Our research will follow a cross-sectional research study. We will study several IPOs and observe their change in price, thus determining if there is an underprice phenomenon. This will be tested on the closing price of the first, 5th and 20th trading day.

One could argue that we are following a longitudinal study design. A longitudinal study entails to collect or examine data at one point of time, and then re-collect or re-examine it at least one more time. It could of course be more than one time and that is often the case (Bryman et al. 2007, p. 60). As written earlier, our research will be about comparing price change in different time periods; however our study will not strictly be a longitudinal design, rather only have some elements of it. This is because the price is compared in different times, but the time period is very short. This is why our research fits better with the cross-sectional research design. Making a cross-sectional research design entails the collection of data in more than one case, and often much more, for one period of time to compare them with each other and see if there are similarities or differences or if the findings can be generalized. This means that there are different cases where you collect data from, but all from the same time or time frame (Bryman et al. 2007, p. 55). We are collecting data from different IPOs and observing their closing price in the first trading day, approximately one week and one month (t+0, t+5, t+20).
This is done to all the IPOs, and they are all compared with the same criterion, which would fit to the cross-sectional study very well.

2.4 Literature review and critique
In this section we will explain the importance of our literature review and criticize the choice of sources by following the guidelines of Saunders et al. (2009) and Bryman et al. (2007).

2.4.1 Literature review
The purpose of a literature review is to gain as much knowledge about the research subject as possible. This enables the researchers to have sufficient knowledge to contribute in the research subject (Saunders et al. 2009 p. 61). We need to know of earlier research about IPOs and what results it generated, and what research has not been done. Since we are doing a deductive research, one big part of our literature research will also be about identifying theories and test them in relation our collected data.

There are also other reasons which can be of advantage for the researchers to do a literature review. Saunders et al. (2009 p. 61-62) lists these:

- to help you to refine further your research question(s) and objectives;
- to highlight research possibilities that have been overlooked implicitly in research to date;
- to discover explicit recommendations for further research. Theses can provide you with a superb justification for your own research question(s) and objectives;
- to help you avoid simply repeating work that has been done already;
- to sample current opinions in newspapers, professional and trade journals, thereby gaining insight into the aspects of your research question(s) and objectives that are considered newsworthy;
- to discover and provide an insight into research approaches, strategies and techniques that may be appropriate to our own research question(s) and objectives.

Bryman et al. (2007, p. 95) also discusses the importance of literature review and the advantage it brings to one’s research. Among the advantages are the importance to know about earlier work in the field, the relevant theories and if there is any unanswered research questions in this particular field.

2.4.2 Literature search
Our literature search and collection consist of peer-reviewed scientific articles and journals retrieved mainly via the Umeå University library and its search engine, but also from articles made available through Google Scholar and Business Source Premiere. Furthermore we have used books and literature written by highly regarded researchers in the given fields. Most of books are in fact the same that we have studied throughout the years as students in Umeå University.

2.4.3 Choice of sources
There are three different types of sources identified in Saunders et al. (2009, p. 68); primary, secondary and tertiary sources. Knowing the difference and the use for them is highly relevant for business students conducting a research study like ours, since all
three have different use and purpose. Primary literature sources are sources that are written by someone without having the advantage of hindsight. For example letters written, government publication, press releases and planning documents are all primary sources since they are “the first occurrence of a piece of work” (Saunders et al. 2009, p. 69). Secondary literature sources are saved or archived literature from journals, books and newspapers. Secondary sources are usually interpretation and analysis of primary sources. Tertiary literature sources are anything that would help find primary or secondary sources, this could be search engines, indexes, bibliography and such (Saunders et al., 2009, p. 69).

In this paper we are only using secondary sources. We collect data such as the subscription price of an IPO directly from press releases from the Nordic OMX and the Oslo Stock Exchange archives, which is available for the public. We also use textbooks and peer-reviewed scientific articles and journals, which was required for the theoretical framework. We have used Thomson Reuters DataStream to obtain the non-adjusted raw data of the closing price for statistical tests, which is also considered as a secondary source. We chose DataStream because it is widely used in financial research and it provides up-to-date and historical prices of different stocks which might be difficult to obtain manually. Our research requires the raw unadjusted prices from stocks in the Nordic markets, which was available via DataStream. Due to its wide use it is considered to be reliable. We have found most of our sources through search engines such as Business Source Premiere which has been provided to us by the Umeå University Library and the Google Scholar search engine. Below we reproduce a model made by Saunders et al. (2009, p. 69) that shows the different sources and their connection:

![Model 2](image)

2.4.4 Critique of secondary sources
To have as accurate and valid secondary sources we have used peer-reviewed scientific articles or textbooks by well-known authors in their field. Most of the textbooks have been used by us as course material in Umeå University. Using secondary sources have the primary advantage of saving resources and time, and it is less expensive to use secondary sources than to collect it yourself. This also yields the advantage of analyzing
larger data sets and also gives you more time to consider its theoretical aims and substantive issues (Saunders et al., 2009, p. 268).

The disadvantages of secondary sources are that they are collected, processed and analyzed by other authors and therefore the interpretations or values of the authors may influence the material in question. Other disadvantages presented by Saunders et al. (2009 p. 269-272) are:

- No real control of the data - since we receive the information from someone else it cannot be guaranteed that the information is always correct
- Initial purpose may affect how data is presented - when data is presented as a part of a report the presentation might be biased
- Access may be difficult or costly - if we would not have access to the university library to collect scientific journals and books it would be very difficult and expensive for us to get this information
Chapter 3: THEORETICAL FRAMEWORK

In this chapter we will present our theoretical framework to help understand and answer the research question by collecting and reviewing literature in the subject of IPOs.

The high documented initial returns of IPOs have been an interesting topic for researchers in this field to study since in an efficient market there should not be any abnormally high returns. As such, this phenomenon is well studied and well documented by many researchers in finance. There is a large amount of research in this specific area whereas names such as Rock (1986) and McDonald & Fisher (1972) were among the first to investigate IPOs and their price behavior.

Due to the complexity of the behavior of IPOs in different countries or regions there is no single superior theory on IPOs but several well-known that we will discuss in this chapter. We will start by presenting IPOs from a general perspective and then continue with the definition of underpricing and previous research in this field. We will thereafter present some theories such as the winner’s curse, agency-principal theory and hot markets. Finally we have a brief history of the Nordic markets and some information regarding the current listing and disclosure rules and end the chapter with a summary of the theoretical framework.

3.1 IPOs

In this section we will present a definition of IPOs and discuss relevant information around it.

3.1.1 What is an IPO?

An Initial Public Offering (IPO) is the name for the first time a company sells stock to the public on an official Exchange market. According to Ogden et al. (2003, p. 392) the typical IPO company is a very young company and has taken a high speculative position in a growing industry. Furthermore IPOs are among the riskiest equity investments that you can find the stock market since the company usually has a short earnings history and no history of public valuation. This results in principal-agent and information asymmetry problems (Ogden et al. 2003, p. 392).

3.1.2 Underwriter

When companies go public they usually hire several partners to assist with the offering, such as an investment bank or another major financial institution. The most common is generally an investment bank. This entity is referred to as the underwriter. The underwriter then helps the company to assist with all legal procedures, and negotiates with potential investors that are interested in the company. Furthermore the underwriter is used to help structuring the deal in order to mitigate the principal-agent problems by, for example, using temporary share lockups (Ogden et al. 2003, p. 392).

3.1.3 Why go public?

There are numerous reasons why companies decides to go public, such as risk reduction, lower cost of capital and leverage reduction (Ogden et al. 2003, p. 389-390). However, according to Pagano et al. (1995) most textbooks limits themselves to only write about the institutional aspects of the decision without mentioning the motives. There is a “conventional wisdom” that going public is simply a natural stage in a company’s growth but this reason cannot alone explain the observed pattern of listings (Pagano et al. 1995). Furthermore Mantecon & Poon (2009) states that by creating a public market for its shares to conduct either acquisition or to diversify the owners
personal wealth are among the most important reasons for a company to go public. The liquidity following an IPO is also very beneficial for the company because stock liquidity is positively correlated to company value (Mantecon & Poon 2009).

3.1.4 Benefit & opportunity costs of going public
One of the main benefits of going public is the capital raised by selling stock. Going public provides a lower cost of capital due to the access of a liquid market and allows the company to raise new capital on more favorable terms (Ibbotson & Ritter, 1995). However there are also other benefits and opportunity costs accompanying an IPO and below we present the main benefits and opportunity costs of going public.

Benefits
Access to New Capital
Pagano et al. (1995) states that gaining access to alternative sources of finance rather than banks and venture capitalists, is the most cited reason for companies to go public. Also companies with large current and future investments, high leverage and high growth enjoy a greater benefit from gaining access to the public markets in particular. Pagano et al. (1995) concludes that all these factors should be positively related with the likelihood of an IPO.

Liquidity and Portfolio Diversification
The decision to make an IPO has a direct effect on the liquidity of the company’s stock as well as the scope for diversification by the initial shareholders of the company. Since private companies shares can only be traded by informal searching for an investor, this result in a high cost for the initiating party. Trading on an organized stock exchange is cheaper and more efficient, especially for small shareholders who want to sell their stocks on a short notice (Pagano et al. 1995). Furthermore as a result by raising money by ‘en masse’ diversification among shareholders, the initial owners factor in the liquidity benefit provided by being listed on a stock exchange. To achieve diversification the owners can chose to directly divest from the company and reinvest in other assets, or indirectly diversify by raising new equity capital after the IPO and acquire stakes in another company (Pagano, 1993).

Monitor
The listing on a stock exchange provides a managerial discipline device, by creating the danger of hostile takeovers and also by exposing the market’s assessment of managerial decisions. Another consequence is that the shareholders of the public company can use information implied in the stock price to create more efficient compensation schemes for their managers, e.g. by indexing their salaries to the stock price, or offering them stock options (Holmström & Tirole, 1993; Pagano & Röell, 1998).

Investors’ recognition
Most investors hold portfolios that contain small portions of existing securities, often because they ignore that a certain company exists. Therefore by listing on a major stock exchange they can help to overcome this problem by act as an advertisement for the company. Moreover Merton (1987) has captured this in a capital asset pricing model with incomplete information which shows that stock prices are higher the greater number of investors that are aware of the company’s securities. Other researcher have
found indirect support for when already known companies lists on another exchange that their stock yields a 5 percent abnormal return on average (Pagano et al. 1995).

Greater Bargaining Power

A potential problem with bank loans is that the banks can extract rents from their privileged information by having the credit worthiness of their customers. When gaining access to the stock market and becoming more transparent it leads to competition among its lenders and ensures a lower cost of credit, a larger supply of external finance, or both (Rajan, 1992).

Change of control

From an IPO the initial owner can change the proportion of cash flow rights and control rights, but still keep the bargaining power when negotiating with a potential buyer. For example, if the market for corporate control is not perfect competitive but the market for shares is, this will have an effect on the total surplus that the owner can extract from a potential buyer of the company. By selling these rights to the disperse shareholders, the incumbent will succeed to extract the surplus that derives from the increased cash flow without having to bargain with a buyer. However, since the incumbent retains control, he extracts some of the surplus that derives from the buyer’s larger private benefits in a direct negotiation. Thus the benefit from the IPO is that the owner can achieve the structure of ownership for the company that will maximize his total process from a future sale (Zingales, 1995).

Windows of opportunities

If stocks are mispriced from time to time in the market there are companies that recognize that companies in the same industry are overvalued, thus creates an incentive for them to go public. Furthermore a high market-to-book ratio may indicate that rational investors will place a higher valuation on future growth opportunities in the industry. Thus if these opportunities require large investments it creates incentives for companies to go public in order to raise the necessary funding (Ritter, 1991).

Opportunity costs of going public

There are also several opportunity costs for a company to go public. The monetary costs include compensating the underwriter, legal services, printing and auditing. The typical underwriter spread for an IPO is 7 percent of the offering proceeds (Ogden et al. 2003, p. 396). Other costs would be adverse selection and the loss of confidentiality. Below we explain further opportunity costs.

Adverse selection

Investors are in general less informed than the issuers about the true value of the IPO because the issuer possesses private information about the true value of the offering. This information asymmetry adversely affects the average quality of new IPOs share price and the magnitude that of underpricing needed to sell them. Furthermore the adverse selection cost is higher for small and young companies that have little track of record and low visibility compared to old and large companies (Leland & Pyle, 1977; Chemmanur & Fulghieri, 1999).
Administrative Expenses and Fees

Excluding the initial underpricing cost, there are underwriting fees, registration fees and so on, that are direct costs. On top of the direct cost there are yearly layouts of auditing, certification, and dissemination of accounting information, stock exchange fees and so on. An estimation of fixed costs in the United States for an IPO equal approximately 7 percent of the gross proceeds (Ritter, 1987).

Loss of Confidentiality

Since companies are exposed to disclosure rules when listing on stock exchanges it forces companies to unveil private information that may be crucial for their competitive advantage such as their R&D and future marketing strategies. Furthermore companies are also exposed to scrutiny from tax authorities and moreover reduce the possibilities for tax elusion and evasion relative to private companies (Campbell, 1979; Yosha, 1995).

3.1.5 Indirect cost – Underpricing

One of the most expensive costs for a company that decides to go public is that they can be much underpriced. In a paper by Lee et al. (1996) they support the indirect costs of short run underpricing for IPOs. Their sample covers a time period from 1990-1994 from the US market in which the average initial return was 12 percent. This anomaly is a well-documented phenomenon and Ogden et al. (2003) provides evidence of this with a sample of stock only IPOs of US non-financial firms between the years 1991-2000. In this sample the average initial return for non-venture capitalist backed firms yield 18.8 percent. Ogden et al. (2003) states that the general conclusion of these kinds of studies are that IPOs are underpriced in the offering market and therefore have high documented initial return. Another study from Westerholm (2006) that is made on the Nordic countries between 1991 and 2003 found an average initial return of 17.11 percent in the Nordic countries excluding Iceland. These findings also support our research purpose of exploring the return opportunities in the Nordic markets for retail investors.

3.1.6 Valuing of IPOs

Valuing IPOs is a difficult task given the general properties of a private company mentioned earlier. To value an IPO the underwriter needs to make a price discovery based on previous historical numbers of the company such as: future cash flows, potential risk and the state of the market. Then the underwriter needs to conduct a book-building process where he looks for interested investors and write down the amount they are willing to purchase at a specified price. From this the underwriter can sum up the different demand for shares at each price and look at where the aggregated demand intersect with the aggregated supply and then determine the offer price (Ogden et al. 2003, p. 400-401).

However according to Kim & Ritter (1999) pricing of IPOs based on historical numbers rather than forecasts only has a limited use. They argue that using comparable firm multiples, a procedure recommended by academics, practitioners, is a standard practice in IPO valuation, will be more precise if they are based on forecasts. The multiples used are: price-to-earnings, price-to-sales, enterprise value-to-sale, and enterprise value-to-operating cash flow ratios. This contradicts Ogden et al. (2003) since according to them valuation should be based on historical numbers.
Another important concern for valuing IPOs is the selecting offering method. There are two choices of issuing shares. The first one is called a firm commitment method, in which the underwriter agrees to purchase all shares offered at a fixed price and then accepts the risk of reselling them to the public. The other method is the best effort method, in which the underwriter agrees to conduct a search for potential buyers but makes no guarantee about the price (Ogden et al. 2003, p. 401). Since both methods used should reflect the true theoretical value in an efficient market the impact of each method should not affect the valuation. However the agent (underwriter) accepts more risk when the company uses a firm commitment method compared to the best effort method.

3.1.7 Retail & Institutional investors’ roles in IPOs
When looking at previous research on IPOs such as Chemannur et al. (2010) and Chan (2010) there is a distinction between retail investors and institutional investors and their role in IPOs. According to Chan (2010) previous literature has established a link between retail sentiment and the pricing of IPOs shares. Previous literature also suggests that retail demand on pre-IPO markets reflects the retail investors’ optimism towards the IPO stock and that pre-IPO market demands are able to predict the short run aftermarket prices (Chan 2010). Furthermore Chan (2010) gives some examples of studies that have documented a positive relationship between retail investors’ demand for IPO shares and IPOs short term aftermarket performance, which indicates that retail investors are able to pick high first-day returns IPOs. Chan (2010) also states that individual investors are subject to sentiment and sometimes they can be overly optimistic while on other times they can be very pessimistic, which reflects the pricing on IPOs shares.

Institutional investors on the other hand are organizations such as investment banks, pension funds and insurance companies, which should be specialists in trading. However their role in the IPO market is quite different than that of the retail investors. The institutional investors play an important role in supporting IPOs in the aftermarket by holding weaker post-issue demand for a relative longer period of time, and are thus compensated with more allocations from the underwriters (Chemmanur et al. 2010). They also possess significant private information about the IPO companies even after the IPO which helps them outperform the market in the short run (Chemmanur et al. 2010). Consequently this would lead to that the informed (institutional investor) compete with the uninformed (retail investor) which suggest that the informed would have a disadvantage when investing in IPOs if they are not being compensated.
3.2 **Underpricing**
In this section we will give a definition of underpricing and present research on this phenomenon.

### 3.2.1 Definition of underpricing
The term underpricing refers to the anomaly associated with the process of going public and the frequent incidence of large initial returns. The initial return is measured as the price change from the offering price and to the market price within a few weeks of offering date (Ibbotson & Ritter 1995). This is the formula we use when calculate initial return:

\[
IR_i = \frac{CP_{t+i} - SP}{SP}
\]

(Formula 1)

IR = Initial Return  
CP = Closing price  
SP = Subscription price  
t = First trading day  
i = number of days after First trading day

### 3.2.2 Research on underpricing
Underpricing is an anomaly related to IPOs and is concerned with stocks being undervalued due to several reasons. One of the first to investigate the price behavior of IPOs was McDonald and Fisher (1972). They based their model on the efficient market model and found that the average initial return for 142 IPOs in the first quarter of 1969 was 28.5 percent which supports the existence of underpricing. They also found evidence that prices adjust rapidly to available information which is in conjunction with the efficient market hypothesis.

Furthermore Rock (1986) presents a model that tries to explain why this phenomenon occurs and that it could be generalized to firm committed offerings. However for this model to work there are five assumptions:

- The informed investors have perfect information about the realized value of the new issue
- Informed investors cannot borrow securities or short-sell. They cannot sell their private information
- Informed demand, is no greater than the mean value of the shares offered
- Uninformed investors have homogeneous expectations about the distribution of shares
- All investors have the same wealth and the same utility

(Rock, 1986)

Rock (1986) suggests that institutional investors are more informed than retail investors and thus only bid on undervalued shares. This leads to an adverse selection for retail investors since they do not have the same information. To mitigate this problem the IPO must be undervalued in order to keep retail investors from withdrawing from the IPO market. Rock (1986) introduces the ‘winner’s curse’ as one of the explanations for this. In essence, Rock (1986) claims that the uninformed compete with the informed and
consequently the uninformed must be compensated for their disadvantage which leads to underpricing.

3.3 Theories explaining underpricing

In this section we will present the most prominent and well-known theories explaining underpricing.

3.3.1 Agency costs

One theory that explains the agency costs and gives explanation for this is the research conducted by Jensen & Meckling (1976). In their paper they define an agency relationship as “a contract under which one or more persons (the principal(s)) engage in another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent” (Jensen & Meckling, 1976).

The agency costs arising from this relationship is the sum of:
1. the monitoring expenditure by the principal
2. the bonding expenditures by the agent
3. the residual loss.

(Jensen & Meckling, 1976)

The principal can establish appropriate incentives for the agent and incurring ‘monitoring costs’ with the intention to limit the aberrant activities of the agent to ensure that the agent act in the best interest of the principal. The ‘bonding expenditures’ by the agent includes giving additional resources (bonding costs) to guarantee that the agent will not take certain actions that will be in conflict with the principal, or that the principal will be compensated if the agent does not act in the principals best interest. Last, the ‘residual loss’ includes the dollar equivalent of the reduction of in welfare experienced by the principal (Jensen & Meckling, 1976).

Furthermore the purpose of the agent is to maximize the principal’s welfare by making the most optimal decision for the principal. Thus if there is not perfect information between the agent and the principal there might arise problems such as information asymmetry or adverse selection, this will be discussed more in detail later in this chapter (Jensen & Meckling 1976). In the context of IPOs, a pure agency relationship exists between the corporation (principal) and the underwriter (agent) since the corporation gives the underwriter power to sell the company’s stocks to the public by an IPO. As a result, the agent wants to act in the best interest of the principal to sell all the stocks at a fair price. However there might not be enough demand for the issue. Thus a way for the agent to sell out all the stocks, he could for example underprice the issue to attract investors, which might not be in the best interest of the principal since underpricing results in a high indirect cost.

3.3.2 Information asymmetry

Theoretical literature on IPOs argues that underpricing is due to information asymmetry and that institutional investors possess private information while retail investors do not (Chemmanur et al, 2010). Chemmanur et al. (2010) found that 70.2 percent of the institutional investors did sell their IPO allocation in the first year and fully realized the “money left on the table” without dissipate the profits in post IPO trading. Furthermore they found that institutional investors have predictive power about the long run performance of the IPOs, especially in the ones they received allocations. They concluded that institutional investors possess signification private information about
IPOs, play an important supportive role in the IPO aftermarket and receive good compensation for this. This suggests that information asymmetry is one of the main reasons why IPOs are underpriced.

3.3.3 Hot markets
Hot markets are defined as “periods in which the average first month performance (or aftermarket performance) of new issues are abnormally high” (Ibbotson & Jaffe, 1975). In a study by Ibbotson & Jaffe (1975) they have found a correlation between hot markets and IPO performance during a period of 1960-1970. Their study investigates the existence and implication of hot issue markets which can help investors to make a better choice when investing in IPOs. Their research concludes that one is able to predict if the market is hot or cold by looking at the history of the market, and they also found evidence that implies that the series of the first month’s residual does not follow a random walk. Thus issuers should be able to obtain a higher offering price relative to the efficient price when they want to issue in a cold market. However the study did not found any evidence that issuers were able to predict the degree of underpricing accurately in the past.

A study by Lowrey et al. (2010) that investigates the variability of IPO returns for 11,734 IPOs from 1965 to 2005 states that there is a strong positive relationship between mean and the volatility of IPO returns over time. It also states that the information learned during the registration period have a large effect on the pricing error. Moreover the information learned during the ‘road-show’ to market an IPO to institutional investors appears to be unable to resolve the true aggregate demand for the stock. Also, companies that have higher information asymmetry such as young technology firms, and choose to go public in a ‘hot market’ have greater initial return variability (Lowrey et al., 2010).

3.3.4 IPO clustering
In an article from Lowrey & Schwert (2002) the authors investigates the specific factors why companies decides to go public following periods of high initial returns for investors. The authors suggest that underwriters ignore the market’s valuation of recent IPOs in their pricing of new offerings and that period of high initial returns appear to be bubbles, but could be avoided if the market for underwriting services was more competitive. A second issue that the authors found was that in spite of this correlation with initial return bubbles, more companies chose to go public in times when one can observe high initial returns. Lowrey & Schwert (2002) research suggest that the cycles of initial returns mostly reflect investment banker’s learning process and because the registration of periods of IPOs overlap, the information that the underwriters acquire during the firm’s registration period contributes to the first day return of several IPOs and causing initial returns to be serially correlated.

Moreover while it appears that many companies decide to go public following periods of high initial return, it does not mean that they will be underpriced. The level of initial returns at the time when a company files for an IPO contains no information about a possible underpricing (Lowrey & Schwert, 2002). Rather, more companies files for IPO following periods of high initial returns because the high returns are related with positive market information learned during the registration period of that offering. This is also consistent with Ritter’s (1984) findings about firms raising more money directly after a period of high initial returns.
3.3.5 Efficient market hypothesis
The Efficient market hypothesis was introduced by Fama (1970) as an explanation of how stocks behave in the secondary markets. According to Fama (1970) there are three different kinds of forms, namely weak-, semi- and strong-forms, in which stock prices are adjusted or set. The weak form states that the price is based only on historical information. The semi-strong form states that prices react rapidly to newly information available, such as earnings, stock splits and so on. The strong-form states that stock prices will reflect all available information, including insider information. However Fama’s (1970) research has some limitations to the model since there are several assumptions made. The model is based on the assumption that the available market equilibrium can be stated in terms of expected returns, and since expected returns is purely a mathematical concept it does not necessarily imply the general notion of the market efficiency. This theory can be used to explain how IPOs reacts to the market when new information is available.

3.3.6 The winner’s curse
The winner’s curse hypothesis was introduced by Rock (1986) to explain why IPOs are underpriced. Rock (1986) states that there are more or less a fixed number of shares that is sold at a fixed offering price and if demand is unexpectedly strong this leads to rationing. However rationing does not lead to underpricing on its own, but when some investors have more information than others, the uninformed will be worse off. Rock (1986) divides investors onto two categories; the perfectly informed and the completely uninformed, in regards to the future market price of the IPO. The informed investor will only invest in an issue if it is underpriced, meanwhile the uninformed investor do not know which issue is underpriced. Thus the uninformed investors will only get a fractional of the most desirable IPOs, while they will be able to invest in all least desirable. The uninformed investor are thus exposed to the winner’s curse; if they receive all their shares which they demand, the reason is that the informed investors do not want them because they are not underpriced.

3.3.7 The signaling hypothesis
The signaling hypothesis suggests that new underpriced issues “leave a good taste” with investors which allows firms and insiders to sell their future offerings at a higher relative price Ibbotson (1975). It also suggests that high-value firms tend to underprice their IPOs as a way of signaling that they are high value. However for this to be worthwhile the firm needs to benefit sufficiently in the future when they decide to make a seasoned offering. Other researchers did not find a relationship between initial returns and subsequent seasoned new issues, which contradicts the signaling hypothesis as a reason for underpricing (Ibbotson & Ritter 1995).

Moreover Francis et al. (2010) conducted a study on 413 foreign IPOs in the American markets from 1985 to 2000 to examine the relationship between initial returns of the IPO and a following SEO. They found strong support for the signaling hypothesis in financially segmented markets but not in the financially integrated markets. They were able to show that firms that experience relatively larger underpricing are more likely to issue SEOs.
3.4 Market information & IPOs
There are several researchers that have investigated the impact of the announcement effect on the market value for stocks. Bamber et al. (2011) conducted a meta-analysis on previous literature that examines trading volumes around earning announcements and other financial reports. Their research confirms that trading volume reflects an agreement over company value among investors. Moreover the trading volume captures changes in expectations of individual investors while price reactions reflect changes in expectations of the market as a whole. This means that while returns reflect the average change in investors’ beliefs, the trading volume reflects the sum of investors’ reactions to announcements (Bamber et al., 2011).

Another study by Patton & Verado (2012) conducted on 17,936 events during the time period of 1996 to 2006, investigated how the beta of a company reacts to company specific news such as the earnings announcements. They found that the betas increase on earning announcement days but is reversed to its average level two to five days later. This suggests that the effect is short-lived and difficult to detect using lower-frequency methods that most studied base their research on (Patton & Verado 2012).

Furthermore How and Yeo (2001) conducted research in Australia using 158 industrial IPOs that looked at the impact of forecast disclosure and accuracy of earnings and dividend forecasts from the IPO perspective on equity pricing. They found that earnings and dividend forecast errors are important in explaining the performance of post-IPO returns up to 12 months. They also found a significant relationship between forecast errors and IPOs post-listing performance. Moreover they found that despite legal penalties, the market itself is able to impose financial penalties for inaccurate forecasters by using adverse price reaction when the forecasts are not met. However they did not find any relationship between including forecasts in the prospectus and initial market valuation of IPO companies and their long-run performance. Moreover a study by McCaffry & Hamill (2000) examined the market reaction of dividend initiation announcements by IPOs in the UK. They found that the market, in line with previous research, reacts favorably to this kind of announcement.

Our research will include the post-IPO performance of stocks up to one month (defined as t+20) but will not take into account the specific effects of good or bad market information since we wanted to investigate if the Nordic markets are underpriced, in accordance with previous research conducted elsewhere.

3.5 Nordic markets
In this section we will present a brief history of the Nordic markets and the listing requirement for an IPO.

3.5.1 Brief history of the Nordic markets
In 1998 the Stockholm stock exchange and Copenhagen stock exchanged merged into one strategic alliance called the NOREX Alliance. This entity was unique because it was the first stock exchange alliance to implement a joint system for equity trading and harmonization of the listing and disclosure rules between the exchanges in respect to trading. Then in 2006 the ‘OMX Nordic exchange’ was launched which harmonized the listing and requirements for Stockholm, Helsinki and Copenhagen and Iceland stock exchanges, further strengthening the Nordic markets as a homogeneous market (NASDAQ OMX 2012). However the Oslo stock exchange is not included in the Nordic OMX and is a separated regulated stock exchange (Oslo Börse, 2012). Therefore
we wanted to explore the listing and disclosure requirements for the Nordic OMX compared to Oslo stock exchange if there are any major differences between them which can be found in section 3.5.2.

We also present some key statistics of the Nordic markets to get an overview about the size and number of listings that occurs on these markets.

![Turnover EUR Billion](Graph 1)

As one can see the Stockholm Stock exchange is the largest exchange in term of turnover, followed by Copenhagen and Helsinki. Unfortunately we were not able to find the yearly turnover for Oslo Stock exchange. Moreover the turnover can also reflect downturns and booms in the markets, as such; we can see that the turnover was highest in 2007 for all markets while there was a deep fall in 2008 which could reflect the financial crisis.

In this graph all ‘new listings’ of the different markets is presented to get an understanding of how many new companies that lists on these markets.

![New listings](Graph 2)
As presented above the numbers of new listings does not follow the same pattern as the turnover. For instance the turnover was highest in 2007 while the numbers of new listings all went down in 2007 which could indicate that IPOs are not very correlated with different states of the economy, and there might be other factors that determine if a company decides to list on a stock exchange or not.

3.5.2 Listing requirements for the Nordic countries

The Nordic markets all share similar listing rules regarding shares. Since Stockholm, Helsinki, Copenhagen and Iceland are all part of the OMX corporation, their listing rules have been harmonized in order to create a Nordic equity market that have greater opportunities for issuer to attract capital (NASDAQ OMX 2012). Therefore the following general listing rules apply to all the OMX integrated markets. Since we find it unnecessary for our study to list all listing rules we present similar highlights as Westerholm (2006)

General Listing requirements for Nordic OMX:

- At least 25% of the stocks needs to be distributed to the public
- At least 500 shareholders holding shares with a value of around 1000 EUR
- Expected aggregate market value of the shares needs to be at least 1 million EUR
- The company shall have published annual accounts for at least three years in accordance with the accounting laws applicable to the company in its home country

Since Oslo stock exchange is independent from the other Nordic countries, they have their own rules regarding listings. Since we cannot present all listing rules we present similar highlights as Westerholm (2006). According to ‘Listing Rules for equities on Oslo Børs’ (2011) the general listing rules are:

- At least 25% of the shares needs to be distributed to the public
- At least 500 shareholders holding shares with a value of at least NOK 10 000
- Market value of shares must be at least NOK 300 million
- The company must have produced annual account and annual reports in accordance with the legislation on accounting for the last three years prior for stock exchange listing
- Expected market value of each stock must be at least NOK 10

In summary, these listing rules are quite similar which supports the assumption that the Nordic markets can be treated as one homogeneous market. However the main difference is that the minimum required market value of shares is NOK 300 million which is approximately EUR 40,7 million (Xe.com, 2012) compared to EUR 1 million for the OMX integrated markets. Another observed difference is that Oslo stock exchange has a minimum requirement for shares of at least NOK 10 which is approximately EUR 1.36 (Xe.com, 2012) while there was no information regarding this in the NASDAQ OMX ‘Rule book for Issuer’ (2012).
3.6 Summary of the theoretical framework

To summarize this chapter we started out with some general information regarding IPOs, such as explaining ‘what is an IPO?’, benefits versus costs of going public and the complexity of valuing new issues. Furthermore we have explained how retail investors differ from institutional investors in terms of their different role in IPOs. Then we have detailed the theoretical knowledge about the agency-principal relationship and the costs of this in the context of IPOs. We have also defined underpricing as well as explained the theoretical reason behind it, and looked at how IPOs tend to cluster in periods how high initial return, or ‘hot markets’. Then we have explained the most common theoretical explanations for this anomaly such as the ‘efficient market hypothesis’, the ‘winner’s curse’, the ‘signaling theory’ and how market information can affect the underpricing. Finally we have also gone through the listing requirements for IPOs in the Nordic markets which have given us arguments for treating the Nordic countries as one homogeneous market.

In the model 3 we present an ‘onion’ that demonstrates how our research is structured. First we wanted to explore the general view of IPOs and the previous research of it. Then we wanted to specify our research further to be applicable to one social actor and therefore we chose to explore it from retail investors’ point of view. Furthermore we wanted to focus on the Nordic markets because we think that there should be more research on this. Finally we chose to explore if IPOs can give profitable opportunities for retail investors in the Nordic markets. If underpricing is statistically significant, we assume that there are profitable opportunities.

\[(Model\ 3)\]
3.7 Derivation of Hypotheses

We have developed three hypotheses for testing, and they are formed to answer these questions: ‘Do IPOs create profitable opportunities for retail investors in the Nordic markets?’, ‘Are there significance differences among time lags in regard to initial return?’ and ‘Are there significant differences among industries in regards to initial return?’.

The first hypothesis will be constructed to answer whether or not the initial returns from IPOs are higher than the expected market value. The expected market value is defined as the subscription price since in the case of perfect valuation of the IPO and efficient stock market, the subscription price should reflect the expected value of the stock at the time of the IPO. Since it is rather difficult to determine what is the exact time of an IPO, we have decided to consider three different dates, t+0 (the official first trading day), t+5 and t+20. We will test to see if closing price is higher or lower than the subscription price, which reveals if there are profitable opportunities for retail investors. The second hypothesis is structured to show any differences regarding the initial returns for time lags. Therefore we want to test the significance of all three time lags are equal to each other. The result will therefore tell us if one can identify underpricing up to approximately one month. The third hypothesis is constructed to test whether there are any significant differences between industries in regards to initial return. Perhaps there are larger profitable opportunities in some industries than others, and this information is of course of interest for retail investors wanting to make a better decision to invest in IPOs.
Chapter 4: PRACTICAL METHOD

In this chapter we will present the practical method for this study. We will start by presenting the population to explain why it was selected. Then we will elaborate on the sample collection and then present our sample method. At the end of the chapter we will present the three hypotheses that will be tested. Finally, we will motivate the choice of our statistical tests.

4.1 Population

The objective of this research paper is to investigate if retail investors can invest in IPOs and make short-term profit measured as the difference between subscription price and the closing price. Therefore we have collected all IPOs in the Nordic countries from 1st of January 2005 to 31st of December 2010 that have been available for retail investors. We chose to not exclude any IPOs to increase the external validity of the study.

To be able to measure the return we have collected the subscription price of IPOs from the Swedish, Norwegian, Danish and Finnish lists. Some IPOs were provided to us directly by Oslo stock exchange and NASDAQ OMX, and the rest were collected from companies’ press releases made available through NASDAQ OMX and Oslo stock exchange website. Additional information regarding the data collection can be found in ‘4.2 Data collection’.

The population is composed of IPOs which have not been traded before in regulated or unregulated growth markets and which successfully went public between 1st of January 2005 to 31st of December 2010. We have criteria for selecting the sample which are found below. Some companies that were listed as IPOs in the NASDAQ OMX and Oslo stock exchange were excluded because of these criteria.

Since our research question concerns only retail investors we have selected a population of IPOs that match the following criteria:

- IPOs available to retail investors
- Companies not being listed in smaller unregulated markets prior to the IPO
- Companies that went public between 1st of January 2005 to 31st of December 2010
- Companies that are listed in either Sweden, Norway, Denmark or Finland

This means that ‘new listings’ because of private placement, merger of or demerger of companies will not be included in the population.

We excluded the Icelandic list because of the limited availability of data and because according to Westerholm (2006) it is an outlier. We have also excluded the alternative and small markets such as Oslo Axess, Nordic Growth Market, and Aktietorget. Due to the small size of our population we did not exclude any IPOs from our specified criteria. Our population consists of 68 IPOs that are divided into six industries that match these criteria.
4.2 Data collection
We have obtained a total of 68 IPOs from all the Nordic lists, and we have chosen to treat all markets as one, based on the listing rules. According to Westerholm (2006) the Nordic markets share similar cultural heritage and similar disclosure requirements. Furthermore, in 2006 Stockholm, Copenhagen and Helsinki merged into one market called Nordic OMX to harmonize the Nordic listing requirements (NASDAQ OMX, 2012). We collected data from Stockholm OMX, Copenhagen OMX, Helsinki OMX and Oslo stock exchange (OSE), which are the main stock exchanges of these four countries.

The Norwegian IPOs were directly retrieved from the Information Services of Oslo stock exchange and the information included the names of the companies going public, the date and subscription price. However we have used the OSE archive called ‘NewsWeb’ where all the official press releases can be found, to confirm the list we received from OSE. Furthermore the Finnish IPOs were received from the ‘Economic and Statistical Research department’ of NASDAQ OMX in Stockholm and the names, date and subscription price were included.

The IPOs from Sweden and Denmark were retrieved from NASDAQ OMX archive called ‘News for listed companies’ which contains the official press releases from all listed companies. As such we have confirmed all the IPOs by searching for official press releases that states and confirms the subscription price and date in the database. The first day unadjusted closing price and price movements of the offerings were retrieved from Thomson Reuters DataStream.

4.3 Sample method
We have chosen to test the population in three different time lags to answer our first sub-question ‘Are there significance differences among time lags in regard to initial return?’. We decided to have the time lags t+0, t+5 and t+20 to represent the first day, first week and first month closing prices. Therefore we have collected the prices of these three time lags from DataStream. We have not found any earlier studies in the Nordic markets testing these three time lags. Therefore we want this study to bring new information for retail investors and further research. We have also chosen to segment the IPOs into industries to compare them because of our second sub-question ‘Are there significant differences among industries in regards to initial return?’. We have identified six industries in total.

Some industries were not big enough so we merged them with similar industries and some industries had different names in Nordic OMX and Oslo stock exchange. Westerholm (2006) also chose to segment into six different industries, and most of them are similar to ours, the only industry that he did not include by its own is the ‘Health care’, instead he has ‘Transport and shipping’ as an industry. These six industries will be tested against each other to see if there are significant differences among them in regards to initial returns. This will be done with the statistical program SPSS and relevant statistical tests which we will further explain later in this chapter. We have identified the following 68 IPOs and 6 industries:
<table>
<thead>
<tr>
<th>List of IPOs sorted by sector</th>
<th>Total companies = 68</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Financials</strong></td>
<td><strong>Health care</strong></td>
</tr>
<tr>
<td>Spar Nord FormueInvest A/S</td>
<td>TopoTarget A/S</td>
</tr>
<tr>
<td>Bluewater Insurance ASA</td>
<td>Orexo AB</td>
</tr>
<tr>
<td>TrygVesta A/S</td>
<td>Curalogic A/S</td>
</tr>
<tr>
<td>Norgani Hotels ASA</td>
<td>Biovitrum AB</td>
</tr>
<tr>
<td>FIM Group Oyj</td>
<td>LifeCycle Pharma A/S</td>
</tr>
<tr>
<td>Diös Fastigheter AB</td>
<td>LinkMed AB</td>
</tr>
<tr>
<td>Norwegian Property</td>
<td>Suomen Terveystalo Oyj</td>
</tr>
<tr>
<td>Faktor Eiendom</td>
<td>SalMar ASA</td>
</tr>
<tr>
<td>Protector Forsikring</td>
<td>Exiqon A/S</td>
</tr>
<tr>
<td>Føroya Banki (BankNordik)</td>
<td>Pronova BioPharma</td>
</tr>
<tr>
<td>East Capital Explorer AB</td>
<td>Zealand Pharma A/S</td>
</tr>
<tr>
<td><strong>Total 11</strong></td>
<td><strong>Total 11</strong></td>
</tr>
<tr>
<td><strong>Industrials</strong></td>
<td><strong>Consumer goods/services</strong></td>
</tr>
<tr>
<td>Aker American Shipping ASA</td>
<td>Hemtex AB</td>
</tr>
<tr>
<td>Indutrade AB</td>
<td>TradeDoubler AB</td>
</tr>
<tr>
<td>Odim ASA</td>
<td>Hakon Invest AB</td>
</tr>
<tr>
<td>AKVA Group</td>
<td>KappAhl Holding AB</td>
</tr>
<tr>
<td>Lindab International AB</td>
<td>BWG Homes</td>
</tr>
<tr>
<td>Nederman Holding AB</td>
<td>Gant Company AB</td>
</tr>
<tr>
<td>SRV Yhtiö Oyj</td>
<td>Marine Farms</td>
</tr>
<tr>
<td>Systemair AB</td>
<td>Spits</td>
</tr>
<tr>
<td>SCF Technologies A/S</td>
<td>Nordic Tankers A/S</td>
</tr>
<tr>
<td>Hafslund Infratek ASA</td>
<td>Duni AB</td>
</tr>
<tr>
<td>Bakka frost</td>
<td>Cimber Sterling Group A/S</td>
</tr>
<tr>
<td></td>
<td>Byggmax Group AB</td>
</tr>
<tr>
<td></td>
<td>MQ Holding AB</td>
</tr>
<tr>
<td></td>
<td>Morpol</td>
</tr>
<tr>
<td></td>
<td>Pandora A/S</td>
</tr>
<tr>
<td></td>
<td>Statoil Fuel &amp; Retail</td>
</tr>
<tr>
<td></td>
<td>Chr. Hansen Holding A/S</td>
</tr>
</tbody>
</table>

*(Table 1)*
4.4 Hypotheses
Our main research objective is to identify if there are any profitable opportunities for retail investors in the Nordic markets. We are making the assumption that if there is underpricing then we would have identified profitable opportunities for retail investors. To test the underpricing of IPOs in the Nordic markets we will use the following formula:

\[ IR_i = \frac{CP_{t+i} - SP}{SP} \]

(Formula 1)

IR = Initial Return  
CP = Closing price  
SP = Subscription price  
t = First trading day  
i = number of days after First trading day

We will do the same test three times, for three different time lags. The first time lag is the closing price of the 1st trading day \((t+0)\), the second being the closing price of 5 trading days after the 1st trading day \((t+5)\) and last will be the closing price of 20 trading days after the 1st trading day \((t+20)\). This is of interest because it shows how the security moves up to one month, which we consider to be the short run. For all the testing we have decided to ignore the effect of currency movements since we want to make a consistence comparison between the IPOs. By using percent as a measure we do not need to convert the numbers into one single currency. In this way we ignore the currency problem. Moreover we are not taking into account the market information and its effect on the underpricing because of time constraints. We will discuss the effect, but it will not be incorporated in the tests.

To answer our main research question we need to determine if:

(1)
‘IPO Initial return at \(t+i\) is equal to zero’
or
‘IPO Initial return at \(t+i\) is not equal to zero’

‘To answer our two sub-questions we need to determine if:

(2)
‘There is no significant difference between the time lags in regards to initial returns’
or
‘There is a significant difference between the time lags in regards to initial returns’

And

(3)
‘There is no significant difference between industries in regards to initial returns at \(t+i\)’
or
‘There is a significant difference between industries in regards to initial returns at \(t+i\)’

Consequently we have developed the following null and alternative hypotheses:
1. \( H_0: IR = 0 \)
   \( H_1: \text{There is a significant difference between 0 and Initial Returns} \)

2. \( H_0: IR (t+0) = IR (t+5) = IR (t+20) \)
   \( H_1: \text{The return of at least one time lag differs} \)

3. \( H_0: IR (F) = IR (H) = IR (T) = IR (I) = IR (C) = IR (M) \)
   \( H_1: \text{The return of at least one industry differs} \)

\( IR = \text{Initial return} \)
\( t+i = \text{time lags at time i} \)
\( F = \text{Financials} \)
\( H = \text{Health care} \)
\( T = \text{IT & Technology} \)
\( I = \text{Industrials} \)
\( C = \text{Consumer good & services} \)
\( M = \text{Materials & Energy} \)

For hypothesis 1 we assume that if there is no significant difference between zero and initial return, then there is no underpricing or overpricing (i.e. initial return equals zero). If there is a significant difference, then we can assume that initial return is not equal to zero and depending on the results we can decide if it is a positive or negative deviation (i.e. underpricing or overpricing).

For hypotheses 2 if all time lags show no significant differences then we accept the null hypothesis, but if one or more of the time lags differs then we reject the null hypothesis.

For hypotheses 3 if all industries show no significant differences then we accept the null hypothesis, but if one or more of the industries differs we reject the null hypothesis.

4.5 Statistical tests

All statistical tests will be conducted with the statistical software SPSS because of practical reasons. It is made available to us by Umeå University and is well-known software used in business research.

In order to conduct statistical tests and draw conclusion of a test sample we must determine if the sample can be classified as a normal distribution. If the sample is normally distributed one can approximate the distribution of variables in the real world, and their statistical inference (Keller, 2008). An indicator of a normal distribution is that histograms are bell-shaped. When the distribution of data is concentrated around the mean or median, and data is less concentration on the “tails” it is being bell-shaped. If the sample is normally distributed one can perform parametric tests. However if the sample is not normally distributed one must perform non-parametric tests. The non-parametric tests make no assumptions of the shape of the population distribution, and therefore it contrasts the parametric tests. Furthermore non-parametric tests are more useful for small samples or when two groups have highly skewed distributions (Agresti & Finlay 2007, p. 205). There are two well-known tests of normality called Kolmogorov-Smirnov and Shapiro-Wilks, generally the former fits best samples with extremely large samples while the latter fits better for smaller samples.

Most of our samples are not normally distributed; therefore we will only conduct non-parametric tests in order to have consistency with all the tests. In a non-parametric test the median rather than the mean of the population is more relevant to investigate. The first test concerns the research question, which is to identify if there are profitable
opportunities. To know if there are profitable opportunities we need to know if underpricing exists. To test if underpricing is statistically significant the Wilcoxon signed-rank test will be used in all three time lags. The return will be tested against zero at a critical value of .05.

To answer the first sub-question we will conduct a Friedman test because all three time lags are related. The Friedman test tests if there are significant differences between the three time lags (t+0, t+5 and t+20). To answer the second sub-question we need to see if there are significant differences between the industries. We will use a Kruskal-Wallis test instead of the Friedman test due to the fact that it fits the sample better since the Kruskal-Wallis test is an independent measure test and the industries are non-related and differ in sample size.

4.5.1 Wilcoxon signed-rank test

The Wilcoxon signed-rank test is a repeated measure non-parametric test for independent samples that has the following characteristics (Keller, 2008, p. 727-728):

- The problem objective is to compare two populations
- The data are either ordinal or interval, where the normality requirement necessity to perform the equal-variances t test of 1 - 2 is unsatisfied
- The samples are independent

The Wilcoxon test is an ordinal-level method since it only uses the rankings of the observations, and the mean ranks are calculated for observations in each sample. Then the test statistics compares the sample mean ranks. For large samples the z test statistics has an approximate standard normal distribution and for small samples, an exact P-value is based upon how unusual the observed difference between the mean ranks is, in comparison to the difference between the mean ranks for all other possible rankings (Agresti & Finlay, 2007, p. 205).

4.5.2 Friedman test

The Friedman test is a non-parametric test designed to compare two or more populations of ordinal or interval data with the following characteristics (Keller, 2008, p. 757-758):

- The problem objective is to compare two or more populations
- The data are either ordinal or interval but not normal
- The data are generated from a randomized block experiment

The Friedman test is a repeated measure test to compare groups when the same subjects occur in each. It is an alternative to the F test which is a parametric repeated measure analysis of variance where one assume that the samples are dependent (Agresti & Finlay, 2007, p. 401-402).

4.5.3 Kruskal-Wallis test

The Kruskal-Wallis test is designed to compare two or more populations and applied to problems with the following characteristics (Keller 2008, p. 755-756):

- The problem objective is to compare two or more populations
- The data are either ordinal or interval but non-normal
• The samples are independent

The Kruskal-Wallis test is an independent measure test alternative to one-way ANOVA to compare several groups. The ANOVA test is used for parametric tests to compare several means. Since Kruskal-Wallis is a non-parametric test it does not assume a normal distribution. The test only uses ordinal information in the data and it ranks the observations and compares mean ranks for the groups. Furthermore the test statistics is larger when the differences among the mean ranks are larger and the test is especially useful for small samples in which abnormalities from normality may be influential (Agresti & Finlay, 2007, p. 401).

The findings and result of these tests will be presented and analyzed in the next chapter.
Chapter 5: EMPIRICAL FINDINGS

In this chapter we will present our empirical findings and analyze it. First we present an overview of the completed IPOs over time then we continue with the results of our normality tests on the population in different time lags, then in separate industries in regards to return. Since the population is not normally distributed we will use a Wilcoxon signed-rank test to test if there is significant underpricing in all three time lags. In later part of the chapter we will test differences among time lags and industries with a Friedman test and a Kruskal-Wallis test respectively. Finally we present a summary of the results from our statistical tests.

5.1 Completed IPOs over time
We have plotted the number of IPOs during our time frame of six years to show trends of when companies have decided to go public.

![Graph 3: Yearly IPOs in the Nordic Markets](image)

As seen in graph 3 most of the IPOs were completed during 2006 and could indicate that the market was ‘hot’ and the concentration of IPOs is between 2005 to 2007. However we have not integrated the trading volume in our tests to test the “temperature” of the market. In the next section we will test if our population is normally distributed in regards to return.

5.2 Test of normality
In this part of the chapter we will present the descriptive statistics of our population and comment on the findings. Tests of normality were first conducted on the whole population, then separately on each industry. The tests were conducted in three different time lags (t+0, t+5 and t+20). All normality tests are conducted with a 95 percent confidence level with the statistical software SPSS.

5.2.1 Test of normality for whole population
From the following table 4 we can see the descriptive statistics for the three time lags. An interesting observation is that the mean is highest at t + 20, which tells us that there is greater initial return on average in the Nordic markets after one month rather than the first trading day. However, standard deviation for t + 20 is also higher than t+0 and t+5,
which indicates higher dispersion of the distribution, which can be interpreted as higher uncertainty about the returns. The mean is also higher than the median for all three cases which indicates that most of the population is below average. To see if there is any statistically significance to this interpretation we will test if the data is normally distributed. The results will be used to determine if we should use parametric tests or non-parametric tests.

### Statistics

<table>
<thead>
<tr>
<th>N Valid</th>
<th>t+0</th>
<th>t+5</th>
<th>t+20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.0569</td>
<td>0.0543</td>
<td>0.0644</td>
</tr>
<tr>
<td>Median</td>
<td>0.0322</td>
<td>0.0476</td>
<td>0.0450</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>1.2928</td>
<td>1.1444</td>
<td>1.6431</td>
</tr>
<tr>
<td>Skewness</td>
<td>1.287</td>
<td>0.510</td>
<td>0.937</td>
</tr>
<tr>
<td>Std. Error of Skewness</td>
<td>0.291</td>
<td>0.291</td>
<td>0.291</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>4.551</td>
<td>1.551</td>
<td>2.422</td>
</tr>
<tr>
<td>Std. Error of Kurtosis</td>
<td>0.574</td>
<td>0.574</td>
<td>0.574</td>
</tr>
</tbody>
</table>

(Table 4)

In general if the skewness is within the range of -2 and 2 and the kurtosis around 3 we can assume the data being normally distributed, but depending on the researcher one might introduce stricter or looser conditions. A positive skewness means the tail to the right is longer and negative means the opposite. In our case, the skewness of t+0, t+5 and t+20 are all positive and under 2 (t+0: 1.287, t+5: 0.510, t+20: 0.937) and all range within the specified limit. The kurtosis concerns the concentration around the median. In our case, the kurtosis for t+0, t+5 and t+20 was 4.551, 1.551 and 2.422 respectively.
Graph 4

Graph 5
From these histograms one can tell that all graphs are skewed to the right, which is as mentioned earlier, is also indicated by the positive skewness. Another observation of these graphs is that most of the population is concentrated around the median, which is highlighted by the positive kurtosis.

Since the kurtosis abbreviate from the recommended guidelines and that there are also positive skewness we need to test the population for normality to see if we can perform parametric or non-parametric tests which can be found in table 8. The normality test uses a 95 percent confidence level.
Tests of Normality

<table>
<thead>
<tr>
<th>Statistic</th>
<th>df</th>
<th>Sig.</th>
<th>Statistic</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IR t+0</td>
<td>.140</td>
<td>68</td>
<td>.002</td>
<td>.888</td>
<td>68</td>
</tr>
<tr>
<td>IR t+5</td>
<td>.106</td>
<td>68</td>
<td>.058</td>
<td>.936</td>
<td>68</td>
</tr>
<tr>
<td>IR t+20</td>
<td>.096</td>
<td>68</td>
<td>.200*</td>
<td>.949</td>
<td>68</td>
</tr>
</tbody>
</table>

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

(Table 8)

From table 8 we can see that according to Shapiro Wilk’s test, none of the distributions can be classified as a normal distribution, since p-value is less than the critical value of .05. However the Kolmogorov-Smirnov test shows us that IR + 5 and IR + 20 are both accepted as normal distribution because p-value is greater than the critical value of .05. Since the results are contradicting and not overwhelming we decided to assume our populations to be not normally distributed.
5.2.2 Test of normality for separate industries

The descriptive statistics for industries can be found in tables 5, 6 and 7 below. We can see the means and medians across different time lags. For instance, ‘Industrials’ has the highest mean (10.02 percent) compared to ‘Financials’ that has the lowest mean (2.94 percent) in t+0. However since the industries are divided into six different categories the number of cases are quite small, e.g. ‘Technology’ only has 7 cases compared to ‘Consumer’ that has 17.

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Financials t0</th>
<th>Health care t0</th>
<th>Technology t0</th>
<th>Industrials t0</th>
<th>C S t0</th>
<th>Materials t0</th>
</tr>
</thead>
<tbody>
<tr>
<td>N Valid</td>
<td>11</td>
<td>11</td>
<td>7</td>
<td>11</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>Mean</td>
<td>0.029414</td>
<td>0.059405</td>
<td>0.074034</td>
<td>1.00224</td>
<td>0.04217</td>
<td>0.050348</td>
</tr>
<tr>
<td>Median</td>
<td>0.000000</td>
<td>0.079545</td>
<td>0.002083</td>
<td>0.050000</td>
<td>0.04910</td>
<td>-0.004237</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>0.0773884</td>
<td>0.0745681</td>
<td>1.497503</td>
<td>1.735069</td>
<td>1.4758</td>
<td>1.360372</td>
</tr>
<tr>
<td>Skewness</td>
<td>1.375</td>
<td>-0.311</td>
<td>0.469</td>
<td>2.804</td>
<td>0.049</td>
<td>1.203</td>
</tr>
<tr>
<td>Std. Error of Skewness</td>
<td>0.661</td>
<td>0.661</td>
<td>0.794</td>
<td>0.661</td>
<td>0.550</td>
<td>0.661</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>2.975</td>
<td>-0.766</td>
<td>-0.977</td>
<td>8.558</td>
<td>1.893</td>
<td>0.509</td>
</tr>
<tr>
<td>Std. Error of Kurtosis</td>
<td>1.279</td>
<td>1.279</td>
<td>1.587</td>
<td>1.279</td>
<td>1.063</td>
<td>1.279</td>
</tr>
</tbody>
</table>

(Table 5)

From table 5 we can see that the lowest median is -0.42 percent for ‘Materials’, compared to the highest median of 7.95 percent for ‘Health care’. Furthermore we can identify both positive and negative numbers for the kurtosis and skewness which means that the distributions are different among industries.
<table>
<thead>
<tr>
<th></th>
<th>Financials t+5</th>
<th>Health care t+5</th>
<th>Technology t+5</th>
<th>Industrials t+5</th>
<th>C S t+5</th>
<th>Materials t+5</th>
</tr>
</thead>
<tbody>
<tr>
<td>N Valid</td>
<td>11</td>
<td>11</td>
<td>7</td>
<td>11</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>Mean</td>
<td>0.035982</td>
<td>0.050645</td>
<td>0.050806</td>
<td>1.02653</td>
<td>0.035647</td>
<td>0.059034</td>
</tr>
<tr>
<td>Median</td>
<td>0.017857</td>
<td>0.071111</td>
<td>-0.006757</td>
<td>1.09195</td>
<td>0.043478</td>
<td>0.000000</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>0.0884643</td>
<td>0.0696731</td>
<td>1.455672</td>
<td>1.007295</td>
<td>1.380079</td>
<td>1.347342</td>
</tr>
<tr>
<td>Skewness</td>
<td>1.770</td>
<td>-0.614</td>
<td>2.036</td>
<td>0.421</td>
<td>-0.226</td>
<td>1.210</td>
</tr>
<tr>
<td>Std. Error of Skewness</td>
<td>0.661</td>
<td>0.661</td>
<td>0.794</td>
<td>0.661</td>
<td>0.550</td>
<td>0.661</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>4.583</td>
<td>0.043</td>
<td>4.364</td>
<td>0.371</td>
<td>1.895</td>
<td>0.711</td>
</tr>
<tr>
<td>Std. Error of Kurtosis</td>
<td>1.279</td>
<td>1.279</td>
<td>1.587</td>
<td>1.279</td>
<td>1.063</td>
<td>1.279</td>
</tr>
</tbody>
</table>

(From table 6 we can see that the lowest median is for ‘Technology’ (-0.68 percent) compared to the highest which is ‘Industrials’ (10.92 percent). We can also identify differences regarding skewness and kurtosis which means that the distributions are different among industries.)
From Table 7 we can see that the lowest median is for ‘Technology’ (-2.08 percent) and the highest is for ‘Industrials’ (11.67 percent). We can again identify differences among the skewness and kurtosis which means that the distributions are different among industries.

All three tables above show very different and ambivalent results and it looks like there are some differences among the six industries in regards to initial return. What is noteworthy is that median for t+5 and t+20 showed the same extreme values (‘Technology’ lowest and ‘Industrials’ highest). To determine if the differences are significant we need to test it. Thus we performed a test for normal distribution to decide whether to do parametric or non-parametric tests. The tests are performed on 95 percent confidence level. The results can be found in the appendix (from Table 9 to Table 14) and were ambivalent because all samples were not normally distributed. Therefore we decided to perform non-parametric tests on all samples.

5.2.3 Non-parametric versus parametric
We will perform non-parametric tests in order to test if underpricing is significant in the Nordic markets, since some of our data were not normally distributed. This was the case for the population as a whole and separated into industries. First we present the Wilcoxon signed-rank test which is a repeated measure test where we will see if underpricing is significant, this will be done in all three time lags. Then we will use the Friedman test which is a repeated measure test to see if there is any significant difference between the time lags. Lastly we will perform the Kruskal-Wallis test to see if there is any significant difference between industries.
5.3 Testing for underpricing
The Wilcoxon signed-rank test was performed for all three time lags with the following hypothesis:

\[ H_0: IR = 0 \]
\[ H_1: \text{There is a significant difference between 0 and Initial Returns} \]

**Test Statistics**

<table>
<thead>
<tr>
<th></th>
<th>t+0</th>
<th>t+5</th>
<th>t+20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>-3.661b</td>
<td>-3.754b</td>
<td>-2.993b</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>0.000</td>
<td>0.000</td>
<td>0.003</td>
</tr>
</tbody>
</table>

a. Wilcoxon Signed Ranks Test
b. Based on positive ranks.

(Table 15)

If the obtained value is less than the critical value of .05 we reject the null hypothesis, and that is the case in all three time lags. We can therefore say that there is a significant difference between the initial return and zero in all three time lags according to table 15. Since the median is positive this tells us that the concentration is above zero and therefore there is underpricing, from the first trading day up to approximately one month.
5.4 Testing for time lags
The Friedman test was performed to answer the following hypothesis:

\[ H_0: IR(t+0) = IR(t+5) = IR(t+20) \]
\[ H_1: \text{The return of at least one time lag differs} \]

The results are presented in the table below:

Friedman Test

<table>
<thead>
<tr>
<th>Ranks</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>IR t+0</td>
<td>1.98</td>
</tr>
<tr>
<td>IR + 5</td>
<td>1.98</td>
</tr>
<tr>
<td>IR + 20</td>
<td>2.04</td>
</tr>
</tbody>
</table>

Test Statistics\(^a\)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>68</td>
</tr>
<tr>
<td>Chi-Square</td>
<td>0.203</td>
</tr>
<tr>
<td>df</td>
<td>2</td>
</tr>
<tr>
<td>Asymp. Sig.</td>
<td>0.903</td>
</tr>
</tbody>
</table>

\(^a\) Friedman Test

(Table 16)

Since the obtained value is .903 and greater than the critical value of .05 according to table 16, the null hypothesis is accepted. This means there are no significant differences between the three time lags in regards to initial return. This tells us that holding or selling does not have any significant difference up to approximately one month in regards to initial return. Taking the time value in consideration, one should sell the securities as soon as possible.
5.5 Testing for industries

The Kruskal-Wallis test was performed to see if there are any statistically significant differences between the six industries, and this test is performed three times for all three time lags to answer the following hypothesis:

\( H_0: IR (F) = IR (H) = IR (T) = IR (I) = IR (C) = IR (M) \)

\( H_1: The \ return \ of \ at \ least \ one \ industry \ differs \)

The results are presented in the table below:

<table>
<thead>
<tr>
<th>Test Statistics(^a,b)</th>
<th>IR t+0</th>
<th>IR t+5</th>
<th>IR t+20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>2,857</td>
<td>4,449</td>
<td>3,851</td>
</tr>
<tr>
<td>df</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Asymp. Sig.</td>
<td>.722</td>
<td>.487</td>
<td>.571</td>
</tr>
</tbody>
</table>

a. Kruskal Wallis Test
b. Grouping Variable: Rank

(Table 17)

From table 17 we can see that the obtained value for all three time lags across industries are .772, .487, and .571 respectively. Since this is greater than the critical value of .05 we accept the null hypothesis and reject any differences among industries.
5.6 Summary of the process
This model shows the process of the proceedings, findings, and results of our statistical testing. First we conduct the test of normality which leads us to choose non-parametric tests. We chose the Wilcoxon for underpricing because there were two samples to compare and they were related. We chose Friedman test for the time lags because there were more than two samples that were related. Finally we chose the Kruskal-Wallis test to compare industries because we had six different samples to compare and they were non-related.

(Model 4)
Chapter 6: DISCUSSION & CONCLUSIONS

In this chapter we aim to answer our research question and the two sub-questions with the help of the results we obtained from the previous chapter. Our findings gave some interesting results, and we will discuss these results in relation to our theoretical framework. We will also state our contributions and give suggestions for further research. The results from the empirical chapter confirm that there is underpricing in the Nordic markets between 1st of January 2005 to 31st of December 2010. This is in line with our research question and tells us that retail investors do have profitable opportunities in the Nordic markets. We have also discovered that one cannot make any distinction between the types of industry to make a higher return in the Nordic markets.

6.1 Discussion

This research is based on all IPOs available for retail investors during the period between 1st of January 2005 to 31st of December 2010. With the Wilcoxon test we have statistically shown that the underpricing for IPOs in the Nordic markets is of significance and is not due to randomness. Our results show very strong evidence for this claim, since the obtained values for all three time lags were far from the critical value of .050. The obtained value of time lag t+0, which is the closing price of first trading day was .000, the obtained value of time lag t+5 was .000 and the obtained value of time lag t+20 was .003. We can therefore claim that there is underpricing up to at least one month. Since there is underpricing, then we conclude that there are profitable opportunities for retail investors, which answers our research question ‘Do IPOs create profitable opportunities for retail investors in the Nordic markets?’.

The fact that we could statistically show that there is underpricing is supported by earlier researcher such as McDonald & Fisher (1972) and Rock (1986). They concluded that IPOs are generally underpriced. More recent research such as Cheong Chan (2010), Boreika & Lombado (2011) and Westerholm (2006) have also concluded that IPOs are underpriced which further validates our findings. Since our research is in line with previous research on IPOs we think that the purpose of this study has contributed to help retail investors in making better investment choices because we can state that underpricing also exists in the Nordic markets. We do not know when the price stabilizes since our longest time lag is one month. To test for longer periods could be of interest for future studies. Some explanation for underpricing has been given by previous researchers such as the Rock (1986) which concludes that there is information asymmetry between the market participants when investing in IPOs and that this leads to underpricing since the uninformed (retail investor) needs to be compensated for participating. The signaling hypothesis is also given as a reason for underpricing since companies that tend to underprice want to signal that they are high value, so that the company can benefit sufficiently in a future seasoned offering according to Ibbotson & Ritter (1995).

Since the average underpricing for the first day returns in our study is 5.69 percent it is lower compared to a previous study by Westerholm (2006) which found an average underpricing of 17 percent in the Nordic markets. The difference between our results and Westerholm’s could be due to different time periods and because of the financial downturn that started 2008 but also due to a smaller population. Another explanation for the difference in underpricing found in our study might be explained by reduced information asymmetry between market participants. A reason for this could be that new disclosure and listing rules have reduced the private information gap between the market participants and therefore made the IPO market more efficient. Another factor
that might affect the results was the strict criteria we applied for what we constitute as an IPO. For instance, we included only IPOs from regulated stock exchanges. The unregulated markets have less disclosure and listing requirements, and this increases the information gap and is therefore prone to increased underpricing. The impact of choosing only regulated stock exchanges also reduced our population and could therefore have an effect on our findings.

Another research by Ibbotson & Jaffe, (1975) concludes that the degree of underpricing depends on the market condition. If markets are considered to be ‘hot’ then underpricing tend to be greater. We have observed that the number of IPOs differ between the years, e.g. in 2009 there was only one IPO in the Nordic markets, which was in Denmark. Most IPOs were clustered from 2005 to 2007, with its peak of 24 completed IPOs in 2006. Lowrey & Schwert (2002) concluded in their research on IPO clustering that the timing of an IPO seems to be relevant for the company. Companies choose to go public in times when one can observe high initial returns. We can observe that the period of 2005 to 2007 gave abnormal returns of around 5 to 10 percent which confirms that timing of IPOs is acknowledged by companies in the Nordic markets. We believe that our results capture the general behavior of IPOs in the Nordic markets since we did not screen any IPO during our time frame of six years. Furthermore we generalize our findings to apply for all of the western European and North American IPO markets that have similar disclosure and listing requirements with a developed financial sector like the Nordic markets. This is based on the fact that we have received similar results as earlier researchers.

To elaborate on our research question we wanted to investigate if the price of the IPO changes in the short run. The Friedman test was performed to see if there is any significant difference between three time lags, and therefore see if the retail investors should sell or hold the securities. The result was conclusive and showed that the three time lags did not have any significant differences in regards to return, thus ‘IR (t+0) = IR (t+5) = IR (t+20)’. The obtained value from the Friedman test was .903 which is far from the critical value of .050. Therefore selling or holding the securities does not make any difference up to one month in regards to return and the retail investor should sell as soon as possible due to time value. However we do not have theories to explain how the price changes in the short run and suggest more researchers to include this aspect when studying IPOs in the Nordic markets.

Moreover we have not been able to integrate the arrival of good or bad market information in this thesis since we have been focusing whether or not underpricing is statistically significant. However in line with Patton & Verado (2012), Bamber et al. (2011), and McCaffry & Hamill (2000) the theoretical framework suggests that the announcement effect of dividend or earnings have a strong influence on the market price of the stocks. As such, one way of interpret our findings could be that no good or bad news incurred during the three different time lags, since we did not find any statistical difference among them. On the other hand the short time horizon might not include any major announcement from the company except the offering itself.

The second sub-question was developed to test if there are significant differences among the six industries in regards to initial return. The Kruskal-Wallis test was conducted three times on the industries to cover all three time lags. The results were conclusive and no significant difference between industries in regards to return were identified, therefore ‘IR (F) = IR (H) = IR (T) = IR (I) = IR (C) = IR (M)’, in all three
time lags since all of them were above the critical value of .050. For IR (t+0) the obtained value was .772, for IR (t+5) the obtained value was .487 and for IR (t+20) the obtained value was .571. These findings are interesting because we thought that there would be significant differences among the industries in the Nordic markets. Due to our results, we recommend retail investors to buy IPOs in the Nordic markets without considering the industry factor.

6.2 Conclusions
The main purposes of the study were to explore if retail investors can make a higher return than the market by engaging in IPOs and also to evaluate if there are any significant differences in regards to return between time lags and industries. Therefore we conclude that the thesis purpose was fulfilled because we did find profitable opportunities for retail investors and brought new theoretical and practical knowledge for retail investors. We also found that retail investors should sell the securities as soon as possible and that there is no statistical difference between industries in regards to return.

The results from the time lags and differences between industries revealed new information, and we believe it has not been tested enough in previous research on the Nordic markets. Therefore this adds value to our study since we can present new statistical findings. However, we recommend more research in these two areas to strengthen our claims because of the relatively small sample sizes.

Therefore we conclude that underpricing exists in the Nordic markets during the time period of 1st January 2005 to 31 December 2010. We also conclude that there is no significant difference between the time lags in regards to initial return and finally we conclude that there is no significant difference among the industries in the Nordic markets in regards to initial return. Furthermore we generalize the findings to be applicable for all the Nordic markets and other markets that have similar listing and disclosure requirements.

6.3 Contributions
In this part we will discuss both the theoretical and practical contributions of this research and how it is applicable to relevant stakeholders. We will first present the theoretical contributions and then the practical.

6.3.1 Theoretical contributions
From a theoretical point of view we have contributed with testing previous knowledge to confirm that underpricing also exists in the Nordic markets. We have contributed to help quantify the theoretical knowledge regarding IPOs, so other business researchers who wish to analyze or investigate the Nordic markets can gain insight from this study. We have studied a time period of 6 years and covered the economic downturn that started 2008. As mentioned earlier, fewer IPOs were completed during that time. This finding can suggest that there are fewer IPOs during time of recession; however more research is needed to make this claim in the Nordic markets. Finally we believe that this research has contributed with filling a research gap that investigates the differences among industries in the Nordic markets in terms of return.

6.3.2 Practical contributions
The findings of this paper can be used by retail investors to help them make a better investment choice regarding investing in IPOs in the Nordic markets. Based on the findings that underpricing exists, we can recommend retail investors to invest in all
available IPOs in the Nordic markets and sell as soon as possible. The recommendation
is based on the fact that we did not find any significant difference between industries
and no difference between time lags in regards to initial return. Moreover the Oslo
Stock Exchange has requested access to the findings of this study which shows that the
research results are of practical value for many different stakeholders.

6.4 Suggestions for further research
Our findings and conclusions have empirically shown the existence of underpricing
since the return of the studied offerings have been higher than the subscription price up
to one month in our statistical tests. We have not investigated the specific reasons
behind the underpricing in the Nordic markets but we have discussed several theories
that might help explain it. However, we have not included the impact of market
information on the offering or the behavioral finance, which might have an effect on the
findings. These aspects are left for future researchers to investigate. Could the reasons
behind underpricing be due to investor behavior, or could it be due to other behavioral
aspects?

Moreover it would be interesting to make a qualitative research to try and study
individual IPOs in-depth, which would yield a better understanding of this behavior.
Also, to what extent does the company consider the investors before going public? This
aspect would have the company’s point of view which might give the investors a better
understanding for which companies that are better to invest in. Further research can also
be done that takes into account different factors that might affect an IPO in the Nordic
markets, such as the state of the economy, inflation, tax rules and clustering of IPOs. By
including these factors the result might yield better recommendations for the different
stakeholders. Another aspect is also to investigate the adverse selection that occurs in
IPOs and how it can be avoided. Is underpricing the only way to mitigate this problem
or is there another (cheaper) solution?

Our findings have also showed that there are no significant differences among industries
but more research is required because we do not consider a small sample to be sufficient
to make this claim. We did not segment the IPOs in markets because we treated them as
one homogeneous market, so an interesting aspect would be to test the markets against
each other and evaluate any differences. Since the Nordic markets are generally small,
the population of IPOs for six years was only 68, and therefore a research which has a
longer time period might give a better understanding for the stock behavior. It would
also be interesting to find out how long time after the IPO that the price stabilizes. Our
research has only focused on the retail investors in the Nordic markets, and the research
question has therefore been adapted to fit the purpose. We recommend further studies
that could focus what we suggested above.
Chapter 7: TRUTH CRITERIA

In this chapter we will critically evaluate our findings according to the truth criteria by Bryman et al. (2007 p. 40-44, p. 58). The truth criteria for a business and management research are Reliability, Replicability and Validity. These will be used to verify and measure the accuracy of our statements and claims.

7.1 Reliability
This criterion is about whether or not the statistical tests and its results are repeatable. Are our ways of conducting the measurement commonly used and are the results consistent with the results of earlier studies? This criterion is very important if we want to ascertain our claims as being true. In terms of reliability, for our first test (underpricing), it showed results that were expected and are of similar nature as earlier studies. There was little research prior to this study on the differences between time lags or differences among industries in the Nordic markets. To eliminate any other problems with the reliability we used the same way to process the data for each test. However a drawback of the test on industries is that the samples were not sufficient in size and could therefore not show the same reliability as a large sample (Bryman et al. 2007, p. 40).

7.2 Replicability
The idea of replication is that if other researchers want to replicate the same research there should not be any problems. Therefore if our process is clearly explained and referenced then the reader can follow every step to re-do the whole study. Since we have collected historical data from 2005-2011 and used well-known statistical tests, thus there should not be an issue for other researcher to replicate the research. Furthermore we have explained in detail the whole process of our tests in the practical method chapter and therefore one should be able to replicate the same tests using the same assumptions (Bryman et al. 2007, p. 41).

7.3 Validity
Validity could by many be considered as the most important criterion in a research since it concerns the correctness of measures, methods and practicality. There are four different measures of validity that researchers are expected to follow: ‘measurement validity’, ‘internal validity’, ‘external validity’ and ‘ecological validity’ (Bryman et al. 2007, p. 41).

Measurement validity
In the context of a cross-sectional study this criterion is very similar to reliability as it concerns the quality of the measures. However, as mentioned earlier the reliability criterion is more about if the results are consistent with earlier studies, but this criterion concerns the way of measurement. Is the way of measurement really measuring what we want to measure (Bryman et al. 2007, p. 41)? In our case, is the formula for initial return really measuring underpricing? Is testing differences among industries in regards to returns with a Kruskal-Wallis test really the correct way? Having strong measurement validity will strengthen the validity of the study a great deal. We believe we have strong measurement validity due to the fact that we use the same way to measure underpricing as earlier researchers. The reason for focusing on the returns when testing differences in time lags or industries we argue that the study focuses on retail investors and their interest for profitable opportunities.
Internal validity

According to Bryman et al. (2007, p. 58) the internal validity of a cross-sectional study in many cases are weak. The argument is that the results are not usually easy to explain, and in our case underpricing was identified but it is not easy to point out at a specific reason for it. We have mentioned several theories that help explain underpricing. However we have also been clear throughout this study that the purpose was not to explain underpricing or find a casual reason behind it, but only identify if it exists in the Nordic markets.

External validity

This criterion concerns the generalization, and if the findings of this study can be applicable for more than just the specific findings. Bryman et al. (2007, p. 58) state that external validity can be strong (and generalization can be made) in cross-sectional studies if the data collected has been randomly selected. In our case, we argue that our data is very strong because we have not screened or filtered any of the data available between the given time frames. We chose to base the study on a time frame of 6 years and included all 68 successful IPOs in the Nordic markets from that period. We believe the external validity is very strong in regards to underpricing because our findings are consistent with earlier studies on the Nordic markets and similar markets (mainly western European and North American countries). In the conclusion we have discussed the generalization based on our findings. The findings regarding the differences among time lags and among industries are harder to generalize due to the lack of previous studies supporting the findings and the small number of samples for industries.

Ecological validity

This criterion concerns if our study has any value in people’s everyday life, and if it has any practical contribution more than being purely for science (Bryman et al., 2007, p. 42). Does the fact that underpricing could be identified in the Nordic markets serve any value for people? We want to state that we have very strong ecological validity since:

- The findings and results of this study are of value for retail investors (which could be anyone who has savings to invest).
- Oslo Stock Exchange has requested access to the results of this study, which gives a strong practical contribution for this field.

As such, we firmly believe that the overall trustworthiness of the whole study is strong and that the truth criteria are satisfactory.
REFERENCES


Yeo, J. and How, J. (2001) 'The impact of forecast disclosure and accuracy on equity pricing: an IPO perspective', Available at SSRN 269858.


APPENDIX
In the appendix we will present all the tables and tests that have been used for the study but are not present in the paper.
Table 2 show in percentage the initial return for the three time lags for each IPO for years 2005 and 2006.

<table>
<thead>
<tr>
<th>Date</th>
<th>Company</th>
<th>Country</th>
<th>t+0</th>
<th>t + 5</th>
<th>t + 20</th>
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</thead>
<tbody>
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<td>2005-02-07</td>
<td>Spar Nord FormueInvest A/S</td>
<td>Denmark</td>
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<td>1,50%</td>
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<tr>
<td>2005-04-26</td>
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<td>-6,98%</td>
<td>0,00%</td>
</tr>
<tr>
<td>2005-05-27</td>
<td>AffectoGenimap Oyj</td>
<td>Finland</td>
<td>0,21%</td>
<td>-5,42%</td>
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<tr>
<td>2005-06-10</td>
<td>TopoTarget A/S</td>
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<td>7,11%</td>
<td>2,67%</td>
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<td>2005-07-11</td>
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<td>1,15%</td>
<td>-2,31%</td>
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<tr>
<td>2005-10-05</td>
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<td>Sweden</td>
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<td>15,38%</td>
<td>15,77%</td>
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<tr>
<td>2005-10-06</td>
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<td>12,95%</td>
<td>22,77%</td>
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<td>-0,67%</td>
<td>11,67%</td>
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<td>TrygVesta A/S</td>
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<td>-4,55%</td>
<td>6,36%</td>
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<td>17,53%</td>
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<tr>
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<td>Finland</td>
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<td>-3,75%</td>
<td>-1,25%</td>
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<tr>
<td>2006-03-14</td>
<td>Ahlstrom Oyj</td>
<td>Finland</td>
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<td>11,82%</td>
<td>10,45%</td>
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<td>Norway</td>
<td>11,52%</td>
<td>8,18%</td>
<td>9,09%</td>
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<td>33,33%</td>
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<td>-3,68%</td>
<td>-12,37%</td>
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<td>-16,13%</td>
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<td>2006-06-01</td>
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<td>16,00%</td>
<td>13,00%</td>
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<td>2006-10-10</td>
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<td>8,41%</td>
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<td>9,35%</td>
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<td>0,00%</td>
<td>11,29%</td>
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<td>18,41%</td>
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<td>Norway</td>
<td>-2,92%</td>
<td>-7,08%</td>
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</table>

(Table 2)
Table 3 shows in percentage the initial return for the three time lags for each IPO for years 2007, 2008, 2009 and 2010.

<table>
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<tr>
<th>Date</th>
<th>Company Name</th>
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<th>3rd Lag (%)</th>
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<td>Suomen Terveystalo Oyj</td>
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<td>Norway</td>
<td>8.33</td>
<td>7.78</td>
<td>4.72</td>
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<td>10.92</td>
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<td>Norway</td>
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<td>Denmark</td>
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<td>7.50</td>
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<tr>
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<td>16.44</td>
<td>11.67</td>
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<td>8.24</td>
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<td>Sweden</td>
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<td>Norway</td>
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<td>12.12</td>
<td>9.09</td>
<td>-7.27</td>
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<tr>
<td>2009-12-01</td>
<td>Cimber Sterling Group A/S</td>
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<td>-10.00</td>
<td>-7.00</td>
<td>-27.00</td>
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<tr>
<td>2010-03-24</td>
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<td>-1.82</td>
<td>-3.64</td>
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</table>
Tests of Normality for Financials

<table>
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<tr>
<th></th>
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</table>

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

(Table 9)

Tests of Normality for Health care

<table>
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*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

(Table 10)

Tests of Normality for Technology

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*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

(Table 11)
## Tests of Normality for Industrials

<table>
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*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

(Table 12)

## Tests of Normality for Consumer Goods/Services

<table>
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</thead>
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*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

(Table 13)

## Tests of Normality for Materials

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<tr>
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<td>.080</td>
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a. Lilliefors Significance Correction

(Table 14)