LUND UNIVERSITY
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The Economic Cycle's Effect on IPOs

- Examining the initial return and long-term performance on the Swedish market, from a market timing perspective

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Abstract

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Authors:	Niklas Lindh and Viktor Pennsäter
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Key words:	IPO, initial public offering, economic cycle, market timing and IPO waves.
Purpose:	Investigate how the economic cycle influences IPO initial return and long-run performance.
Theoretical perspective:	Previous research and theories is used, including asymmetric information hypothesis, signaling theory, impresario hypothesis, divergence of opinion hypothesis, window-dressing hypothesis, window of opportunity hypothesis and the spillover effect.
Methodology:	An event study is conducted to identify abnormal returns. First day return and a long-run performance over 36 months are then used as dependent variables in several regressions. The economic cycle is an independent variable, complemented by other variables focusing on operating performance.
Empirical foundation:	162 IPOs from the stock exchanges Nasdaq OMX Stockholm and Aktietorget are studied from the time period 2001-07-01 to 2012-12-31.
Conclusion:	Economic cycles cannot explain any differences in initial return and long-run performance.

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1. Introduction

In the introductory chapter, the reader will be given a broad background to the field of research. This is followed by a problem discussion that ends up in a presentation of the research questions in this study. Finally, the study's academic contribution and limitations are discussed.

1.1 Background

The number of initial public offerings (IPOs) on Nasdaq OMX Stockholm set a new record 2014 (Svenska Dagbladet, 2015a). Twenty-one new listings were made during 2014, though this record was to be surpassed the year after, when as many as 26 new companies were listed on the same stock exchange (Nyemissioner, 2016). There has been a clear cyclical trend of the volume of IPOs historically (Yung, Çolak & Wang, 2008). Over the past few years this phenomenon has gained much attention due to the recent huge increase in new listings.

Initial offerings with sky rocket-returns on the first day followed by poor long-term performance are a common occurrence in the stock market. One prominent example from the Swedish market is the telephone and mobile network operator Telia Company, who had a first day return of 4.12% though six months later had dropped over 40% in value (Svenska Dagbladet, 2015b). This is in keeping with the most well-known findings in the literature, in that IPOs tend to be underpriced and underperform the market in the long-term. Though these are very interesting findings, an important question is do they always apply. In order to help address this question, the present study will focus on how initial pricing and long-run performance is affected by market timing.

1.2 Problem Discussion

The underpricing phenomenon has been identified by several studies including Ibbotson and Jaffe (1975), Ritter (1991) and Loughran and Ritter (2004). Loughran and Ritter (1995), Jakobsen and Sorensen (2001), Ljungqvist (1997) and Ritter and Welch (2002) all found a long-term underperformance for IPOs. Research has also investigated if market timing has any influence on underpricing and performance. The relationship between these factors and the economic cycle has more or less been ignored, instead focus has been on whether the IPO-market is hot or cold. Ibbotson and Jaffe (1975) identified significant cycles with high and low volumes of IPOs and were the first researchers to investigate this relationship academically. They divided the IPO market

cycles into hot and cold IPO-issuing-markets by classifying the market as hot if the IPO underpricing is abnormally high. Helwege and Liang (2004) found that IPOs undertaken in periods with few initial offerings, which they classify as a cold IPO-market, performs better in the long-run, than periods with high volume (hot issuing market).

However, there are limitations with restricting the market timing variable to the market conditions defined as a hot or cold issuing market. First of all, there are unclear distinctions of what a hot or cold market is. Helwege and Liang (2004) argue that it is the number of IPOs in a specified period that decides the classification. While Ibbotson and Jaffe (1975), as mentioned earlier, measures the underpricing. Allen and Faulhaber (1989) characterize hot markets as periods when high quality firms perform IPOs to a greater extent. Therefore, a drawback we identify with using hot and cold issuing markets as timing variable is the fact that there is no consensus of how to define the characteristics of the issuing market. The authors believe there is confusion of what actually are hot and cold issuing markets. Since these are well established terms in the literature, the confusion might create wrong expectations of which both managers and investors base decisions upon. Another factor that affects the classification is that the volume of IPOs could be driven by one or two specific industries (Ritter, 1984). The Internet-sector during the late 1990s is a clear evidence of this (Draho, 2004, p.12). This demonstrates that the classification can be distorted by industry and trend specific attributes that does not necessarily has to do with firms timing the market.

Draho (2004) argues that periods of economic growth drive IPOs, as there is a greater willingness to invest and risk appetite when the economic outlooks are positive. Economic growth is also related to an upsurge in profitable investment opportunities that attracts more firms to raise external capital in an initial offering (Draho, 2004, p. 12). This is confirmed by Berk and DeMarzo (2013), who acknowledge that there is a greater need for capital when the opportunities to grow are better (Berk & DeMarzo, 2013, p. 823). Furthermore, there are psychological biases that changes during the economic cycle. Watson (2005) argues that investors tend to be excessively optimistic to a greater extent in economic expansions and overestimates future expectations. Hayward and Hambrick (1997) states that CEO authority and self-confidence decreases in recessions and there are also higher requirements on the CEO from the organization in economic slumps that together puts more psychological pressure on her (Hayward & Hambrick, 1997). This suggests there are

both economic and psychological reasons for market timing that is directly connected to the economic cycle that may affect IPO underpricing and performance, effects that has not been captured so far.

Draho (2004) states that even though there are a positive correlation between trends in IPO volume and the economic cycle, this relation is not perfectly correlated. When comparing the economic cycle and the monthly IPO volume, it is clear that Draho's findings also are applicable to the Swedish market. There are periods that differ and hence would give a different classification of the timing variable.

1.3 Research Questions

With the problem discussion in mind, we aim to answer the following two research questions:

- *How does the economic cycle explain IPO initial return?*
- *How does the economic cycle explain long-term performance of IPOs?*

1.4 Academic Contribution

After reviewing previous literature, the authors of this thesis believe there are weaknesses in previously used market timing variables. To further develop existing IPO research, the authors choose to investigate how the economic cycle rather than the hotness of the IPO issuing market affects the first day return and long-term performance. This has to the authors knowledge not yet been performed. The authors believe and that this study will contribute to the research by putting the timing aspect and influences of IPO performance in a new light.

1.5 Research Limitations

This study treats IPOs conducted between 2001-07-01 and 2012-12-31, partly because of the actuality and partly to cover different phases of the economic cycles. IPOs conducted before 2001-07-01 could not be included due to unavailability of data. The Swedish IPO market was chosen as it has been very active lately and it is the authors' home market. This made it an interesting market to

study. Also, to be able to clearly see the impact of the economic cycle, only one relatively homogenous country was preferred. Including IPOs from several countries would impose complications as they likely are affected by different economic cycles. The performance measures used to evaluate these IPOs are based on the stock price of the individual firms. Other measurements of performance such as accounting based measures have been ignored due to data unavailability and problems with a standardized classification. As explanatory variables, mainly the economic cycle is evaluated, but variables to study size, profitability, leverage and valuation of the firm has also been included as control variables.

Exchange traded funds and secondary listings have been excluded from the sample. This limitation is done to ensure that no firm has previously been traded and priced, which would bias the IPO effect. Exchange traded funds is not of interest to this study. Excluding these listings will lead to a loss of observations, but as they differ in characteristics from the other listings, this exclusion was necessary.

A limitation to firms listed on Nasdaq OMX Stockholm and Aktietorget was chosen. This was done to study stocks with somewhat standardized reporting and disclosure routines. The reason for picking these stock exchanges is also a trade-off between including smaller firms in the sample, as IPOs in general are of interest to study and not only the biggest issues on the main exchanges, and data availability.

2. Literature and Theoretical review

This chapter aim to give the reader a broad theoretical insight and background of the research field. The motives of IPOs and the nature of economic cycles are presented. Main empirical findings of IPO performance and initial returns are discussed one by one. Each of these findings are directly followed by the theoretical framework underpinning them, to give the reader a better understanding of how the findings are explained in the IPO literature. Finally, the hypotheses that will be tested in regression are presented based on previous findings and theories.

2.1 Why Firms Go Public

According to Rydqvist and Högholm (1995), IPOs are mainly driven by the firm's strive to raise new capital to secure and exploit growth opportunities. Pagano, Panetta and Zingales (1998) further investigated the underlying motives and found that the likelihood of going public increases for firms with a higher market-to-book-value (M/B-value). The results also show a high correlation between a high M/B-value and a large number of new listings. This indicates, according to the authors, that companies either have large growth opportunities that requires capital or that existing owners of the firm tries to exit their position by timing the market (Pagano, Panetta & Zingales, 1998). Furthermore, firms are motivated by getting better credibility, the publicity of listing and the prestige of being listed (Pagano, Panetta & Zingales, 1998; Brau & Fawcett, 2006). Bancel and Mittoo (2009) also highlights increasing financial flexibility and improving financial leverage as factors that motivates IPOs.

Brau and Fawcett (2006) interviewed more than 300 financial managers on the European market and found that the most important motive for IPOs is to create public shares to facilitate future M&A activities and as an exit strategy for existing shareholders. Firms will then have the additional option to close the deal by paying with traded stocks instead of cash. Other motives the managers in same study mentioned is the willingness to decrease a firm's cost of capital and an increased brand reputation that attracts and facilitates to obtain the right competence (Brau & Fawcett, 2006).

2.2 Economic Cycle

To see the effect of economic cycles on IPO performance and initial return, it is important to understand how and why the economic situation fluctuates over time. The economic situation is defined as the instantaneous economic activity in relation to a long-term level of equilibrium. This equilibrium, referred to as the potential level of economic activity, is defined as the level of production when all available production factors, labor and capital, are normally utilized. An economic growth greater than this equilibrium is referred to as an economic expansion, in other words if the economy grows faster than the potential level. If the economic growth is below the potential level, the economic situation is defined as a recession. Thus, production factors are used more efficiently in an economic expansion than in a recession. This equilibrium does not change if the normal utilization level changes in the short-term, but focuses on long-term sustainability. The economic cycle can be explained as the variation in economic activity around the equilibrium, which includes both economic expansions and recessions and the cycle covers a period of 3 to 8 years on average. (National Institute of Economic Research, 2016c)

There are different approaches to measure economic activity. Gross Domestic Product (GDP) is probably the most well-known and measures the value of all goods and services in the whole economy (Nationalencyklopedin, n.d.). Another measure is the Economic Tendency Indicator (ETI), also known as Konjunkturbarometern, provided by the Swedish National Institute of Economic Research (NIER). ETI measures the monthly business and consumer confidence in the economy (National Institute of Economic Research, 2016a). GDP is a retrospective measure looking at historical figures, while ETI is a prospective measure based on future market expectations (Nationalencyklopedin, n.d.; National Institute of Economic Research, 2016a).

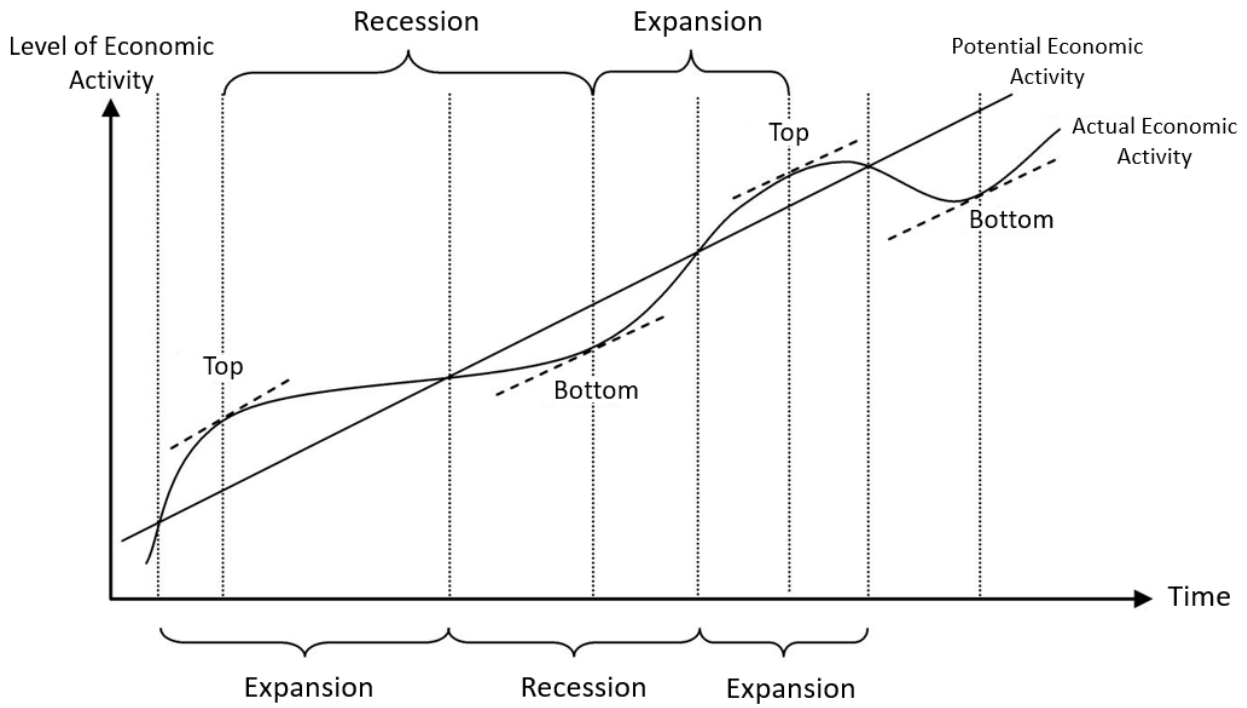

Figure 1: Illustration of the economic cycle's path.

Source: *National Institute of Economic Research (2016c)*

2.3 IPO Characteristics

Previous research has over the years identified several features that characterize IPOs. Some of the most notable and reappearing findings concerns the phenomenon long-run underperformance, underpricing and cyclicality that are presented below.

2.3.1 Underpricing

Underpricing of IPOs has been proved empirically numerous times in history and is defined as the difference between the offering and closing price of the first trading day divided by the offering price (Ritter & Welch, 2002). Ibbotson and Jaffe (1975) showed that the extent of the underpricing is highly cyclical and even classified the market as hot or cold depending on how much the studied IPOs were underpriced. They found that the average IPO underpricing was 11.4%. Later, Ibbotson, Sindelar and Ritter (1988) found evidence of even greater underpricing, where the average initial return was found to be 16.4%. Gajewski and Gresse (2006) find that underpricing is a global phenomenon, but the level of underpricing varies among countries.

2.3.2 Reasons for Underpricing

2.3.2.1 Asymmetric Information Hypothesis

One explanation of IPO underpricing is that it originates from information asymmetry between investors and insiders, where insiders has an informational advantage over investors (Draho, 2004, p.19). This problem can be illustrated with the Akerlof (1970) metaphor and his famous lemon example. As there is information asymmetry between potential investors and insiders regarding the true value of the firm, the investors do not know if the firm is a bad firm (lemon) or a good firm (cherry). To account for this uncertainty, they demand some sort of compensation or discount, which takes the form of underpricing. Unfortunately for the good firms, the investors cannot differentiate the lemons from the cherries and therefore all IPOs will, at least theoretically, be priced as lemons, thus, the underpricing phenomenon. Basically, insiders give investors this premium to compensate for information asymmetry. Lin (2015) explains that information asymmetry tends to be greater in periods of economic expansions as a result of investors being overconfident.

2.3.2.2 Signaling Theory

The signaling theory assumes there is information asymmetry in the market. The theory suggests that management can use this asymmetry to signal future expectations to the market and their investors. The effectiveness of the signaling depends on the performance and credibility of the management. Depending on how the market assess these factors, the signal can vary from positive to negative (Connelly, Certo, Ireland & Reutzel, 2010).

The initial offering price can send important signals to the market of what information insiders has and what to expect from the initial return and the long-term performance. Issuance can be a signal that issuing equity is the last resort to raise capital in line with the Pecking-order theory (Myers & Majluf, 1984). Or, it can signal the issuance is a strategic move to acquire competent labor, increase firm credibility and reputation as a natural step of the firm's cycle (Brau & Fawcett, 2006; Pagano, Panetta & Zingales, 1998). Allen and Faulhaber (1989) concludes that firms use greater underpricing to signal that their firm is of greater quality as the market perceives it to be of greater quality when the stock generates high returns at an early stage.

2.3.2.3 The Impresario Hypothesis

According to Shiller (1990), underwriters consciously set a lower offering price to get a higher first day return. This is done to fabricate an image of attraction around the stock. A great underpricing creates the impression that the underwriter gave the firm good investment advice (Shiller, 1990). This impression creates increased demand for subsequent issues. Derrien (2005) argues that underwriters have incentives to keep a low offering price as a higher price corresponds to a greater risk of price support if the short-term aftermarket price does not hold. Also, the underwriter's reputation is at risk if the offering turns out to be unsuccessful (Derrien, 2005).

2.3.3 Long-run Underperformance

Ritter (1991) is probably the most well-known and cited article that identifies a long-term underperformance for IPOs in relation to the market. He studied the performance of 1526 American IPOs from 1975 to 1984 over a three-year horizon and found that the IPOs on average generated a 34.5% return, while the benchmark of already listed firms generated 61.9% on average. What is notable with Ritter's study is that the long-run performance calculation starts from the first day closing price, while other studies use the opening price. Ritter argues that this distinct underperformance only can be concluded for the first three-year period after the IPO and refers to Ibbotson and Jaffe (1975) who did not find any underperformance over a five-year period. There are several studies that support the underperformance findings. One of them is Ritter and Welch (2002), who confirmed this for 6169 observations from 1980 to 2000 on the US market. The abnormal return was found to be 23.4% lower than the market. Another notable finding is that IPOs issued in cold market yield a higher return compared to hot market listings (Helwege & Liang, 2004). Overall it seems like long-run underperformance is a global phenomenon (Loughran, Ritter & Rydqvist, 1995).

2.3.4 Reasons for Long-run Underperformance

2.3.4.1 The Divergence of Opinion Hypothesis

This is a theory presented by Miller (1977) which states that the most optimistic investors are the ones who chooses to invest in the IPO, even when there is uncertainty about the valuation. As time goes by, more information reaches the market and the optimistic investors realizes that they might have been too optimistic (Miller, 1977). This puts a negative pressure on the price leading to a long

term price underperformance. Watson (2005) states that this over-optimism is more often found in periods of economic expansion.

2.3.4.2 The Window-dressing Hypothesis

Teoh, Welch and Wong (1998) claim that managers tend to manipulate a firm's result prior to an IPO. Common ways to achieve this is to frontload revenues and defer expenses in a company's accounts (Teoh, Welch & Wong, 1998). The purpose is to make the performance and outlooks of the company look brighter and thereby maximize the firm's stock price just in time for the IPO (Teoh, Welch & Wong, 1998). Gaining the highest possible share price of the issued shares is only beneficial for the existing shareholders in the short-term. The market will correct this mispricing as the firm cannot arrange the books constantly and the true earnings will be revealed. This phenomenon is called *the window-dressing hypothesis* and is another explanation why IPOs underperform in the long-run (Gajewski & Gresse, 2006).

2.3.5 Cyclicality

It is widely accepted in the IPO literature that the issuances of IPOs are highly cyclical and occur in waves. Ritter (1991) found that firms issued in periods of high IPO volume significantly underperformed in comparison to firms issued in periods with lower volume. For instance, he found that the difference of long-run returns for a firm that went public in a low volume year, 1976, and a high volume year, 1983, was 90,7%, ceteris paribus. Helwege and Liang (2004) support the finding that cold market issues outperform hot market issues.

Ibbotson and Jaffe (1975) showed that underpricing is highly cyclical and even classified the market as hot or cold depending on how much the studied IPOs were underpriced. IPOs issued during periods with high volume of new listings were significantly more underpriced compared to firms issued in periods with fewer IPOs (Helwege & Liang, 2004).

2.3.6 Reasons for Cyclicality

Ritter (1991) further shows that this is due to issuers trying to lower their cost of capital by timing the market. Furthermore, Baker and Wurgler (2002) saw that raising equity capital instead of debt is preferred in markets with high valuation and when investors are too enthusiastic about earnings

expectations. Watson (2005) finds these are attributes found in periods of economic expansion. This indicates that firms want to maximize the return for existing shareholders by issuing equity as expensive as possible. Graham and Harvey (2001) also found, in their study with anonymous surveys, that two thirds of the asked CFOs consider their own stock valuation of great importance when deciding to issue equity. Yung, Çolak and Wang (2008) argue that economic expansions are affiliated by an increased volume of IPOs, which is positively correlated with underpricing. To conclude, it seems like investors can benefit from a higher initial return in periods of high volume IPOs, but in the long-run these stocks seem to underperform.

2.3.6.1 The Window of Opportunity Hypothesis

Ritter (1991) argues that the high concentration of IPO volume is related to firms trying to exploit "Windows of opportunity". This suggests that firms take advantage of high market valuations and great investor optimism to maximize the raised capital by timing this window and seizing the opportunity (Ritter, 1998). More small growth companies of lower quality take advantage of this opportunity which subsequently leads to an overall long-run underperformance (Ritter, 1991).

2.3.6.2 Spillover Effect

Some researchers, including Benveniste, Busaba and Wilhelm (2002), conclude that the cyclicality derives from an information spillover effect. They explain that potential issuers can gather information that is spilled over from other firms attempting public offerings and use information regarding valuation and market reactions to their benefit. Given the right conditions, these potential issuers attempt to go public themselves with several others that follows this lead (Benveniste, Busaba & Wilhelm, 2002). This chain reaction is a part of what causes the cyclicality.

2.4 Overview of previous research

Title and aurthor(s)	Period of time and Sample	Purpose	Results
"Hot Issue" Markets - Ibbotson, R. G. & Jaffe, J. F. (1975)	Jan 1960 – Nov 1970. Number: 128	Tests of how new issue premium and aftermarket performance in a specific month depends on the premium and aftermarket performance of other issues in past months.	The results suggest that issuers obtain a higher offering price relative to the efficient price when they issue in cold issue markets. Furthermore, issuers should be able to use past data to select cold issue markets.
Initial Public Offerings in Hot and Cold Markets - Helwege, J. & Liang, N. (2004)	1975 – 2000 Number: 6419	Examine IPO over market cycle (hot and cold) to indicate any characteristics difference between IPOs in the two markets and evaluate theirs long-term performance.	Hot and cold IPO markets do not differ so much in the characteristics of the firms that go public. Both hot and cold IPOs are largely concentrated in the same narrow set of industries and they have few distinctions in profits, age, or growth potential. However, IPOs done in cold market performs better in the long-run than IPOs issued in hot market.
The 'Hot Issue' Market of 1980 - Ritter, J. R. (1984)	1977 – 1982 Number: 1028	Investigate the initial return of IPOs during the whole period of 1977 – 1982 to determine any difference between hot and cold market.	The average initial return of IPOs during the hot market of 1980 was 48.4%. This compares with an average of 16.3% during the 'cold issue' market comprising the rest of the 1977-82 period.

Table 1: Overview of previous findings.

2.5 Hypotheses

The first hypothesis is backed by previous findings by Ritter (1984). Ritter (1984) found that IPOs issued in hot markets, defined as periods of high IPO volume, yield a higher initial return compared to IPOs conducted in cold markets. These periods are found by Draho (2004) to have a considerable correlation with economic expansions. Watson (2005) also states that investors are more often excessively optimistic in expansions. The authors interpret this as an indication that investors face a greater risk of overbidding in expansions, which consequently would lead to a greater initial return. Therefore, the following hypothesis has been formulated:

H_1: IPO's initial return in economic expansion is greater than in economic recession.

Helwege and Liang (2004) found that IPOs conducted when the market is hot showed a weaker long-run performance than firms issued in cold markets. Also Helwege and Liang (2004) define hot markets as periods of high IPO volume. Based on the over optimism reasoning above, the authors believe that, in line with the divergence of opinion hypothesis, the stock price will decline as more information enters the market and the optimism decreases. With the empirical findings and the correlation between IPO volume and economic expansions in mind, hypothesis two is formulated as following:

> H_2: IPOs performed in economic expansion have weaker long-run performance than IPOs performed in economic recession.

3. Methodology

This chapter explains and discusses the methodology that has been used to answer the research questions in this study. The takeoff is to introduce the reader to the chosen research approach and literature study, followed by a description of how the data was collected. The chapter then continues to introduce the econometric model and the selected variables. Here a more detailed description of performance measures and the classification of economic cycles are introduced. Finally, a discussion of the drawbacks and limitations of the chosen method is presented.

3.1 Research Approach

Two common research methods are the deductive and the inductive approach. According to Patel and Davidson (2003), the deductive approach proceeds from previous research and theories that is the foundation for new hypotheses and logical conclusions. With the inductive approach, Patel and Davidson (2003) states that new hypotheses are based upon results drawn from other research. In this study, a deductive approach is used as Bryman and Bell (2011) suggests this approach is better for testing the validity of present theories on new hypotheses.

To investigate the hypotheses and to answer the research question there are different methodological approaches that can be undertaken. In this study a quantitative approach is used. Aliaga and Gunderson (2005) explain this as an analysis of collected data using mathematically founded methods. The just mentioned approaches will be conducted using an event study and an OLS regression to test the earlier presented hypotheses.

3.2 Literature Study

The literature and material used in this study has mainly been obtained from databases with academic articles. Books have also been used as literature to some extent, foremost when articles have not fully covered the subject of interest. Articles that are written scientifically undergo comprehensive scrutiny before being published and are therefore considered to have a high reliability. The books included in the literature study are rather well-cited and written by prominent authors within their field of research. To ensure a high quality of the studied articles, attention has been payed to what journal the articles have been published in. Articles from well-known journals

have been used to the extent that this was possible. Articles are preferred to books as they have a shorter time to publication and therefore contain more recent research. Therefore, the theoretical framework is mainly based upon scientific articles. The key words that have been used to obtain the literature follows: initial public offering, IPO, economic cycle, hot and cold markets, cyclicality, business cycle, IPO waves etc. With background of this, a theoretical framework was established based on the empirical findings obtained from the literature.

3.3 Data Collection

The sample data to this study has been collected from the database Zephyr provided by Bureau van Dijk, a database with comprehensive secondary data on IPOs. Stock prices and other firm specific data have been acquired from the Thomson Reuters DataStream database as they use adjusted prices and figures.

3.3.1 First Selection

Zephyr was used to filter out which firms that have gone public. A geographical limitation was set to Swedish IPOs and a stock exchange limitation to Nasdaq OMX Stockholm and Aktietorget as discussed in section 1.5. To ensure enough stock data was available to cover the intended event window, the time-frame was set to end at year-end 2012. Due to data limitations, the first possible IPO in the sample could not be conducted before 2001-07-01. The sample period does however cover two economic cycles and was sufficient to include enough disparity.

3.3.2 Selection Criteria of an IPO

Zephyr sorted out 229 IPOs that fulfilled the first criteria, but all of these firms did not fulfill the criteria of the IPO classification set in this study. The firms of interest are solely first time listings, meaning that the stock is traded publicly for the first time. Other new listings than firms are not of interest to this study. Therefore, some further restrictions were made:

- Secondary listing and list changes have also been excluded since those firms have already been public traded and might contain information that has an impact on the outcome.
- Exchange traded funds were excluded as they are not firms, but follows the values of the underlying assets.

3.3.3 Second selection

Out of the remaining sample, some were excluded to determine the final selection. Several observations also fell away when the firm specific data was acquired. Information regarding monthly stock data, first day opening and closing price, market capitalization, sales, total debt to total capital-ratio, price to book-ratio and was obtained. Observations with missing values were removed. To retain the standardized classification of data made by DataStream, no missing values were filled in or obtained from other sources as that would distort the standardized classification. Firms that was delisted during the event window was included in the sample, no matter if it was because of bankruptcy or buy outs. Excluding such observations would lead to a sampling error (Bryman & Bell, 2011, p.196).

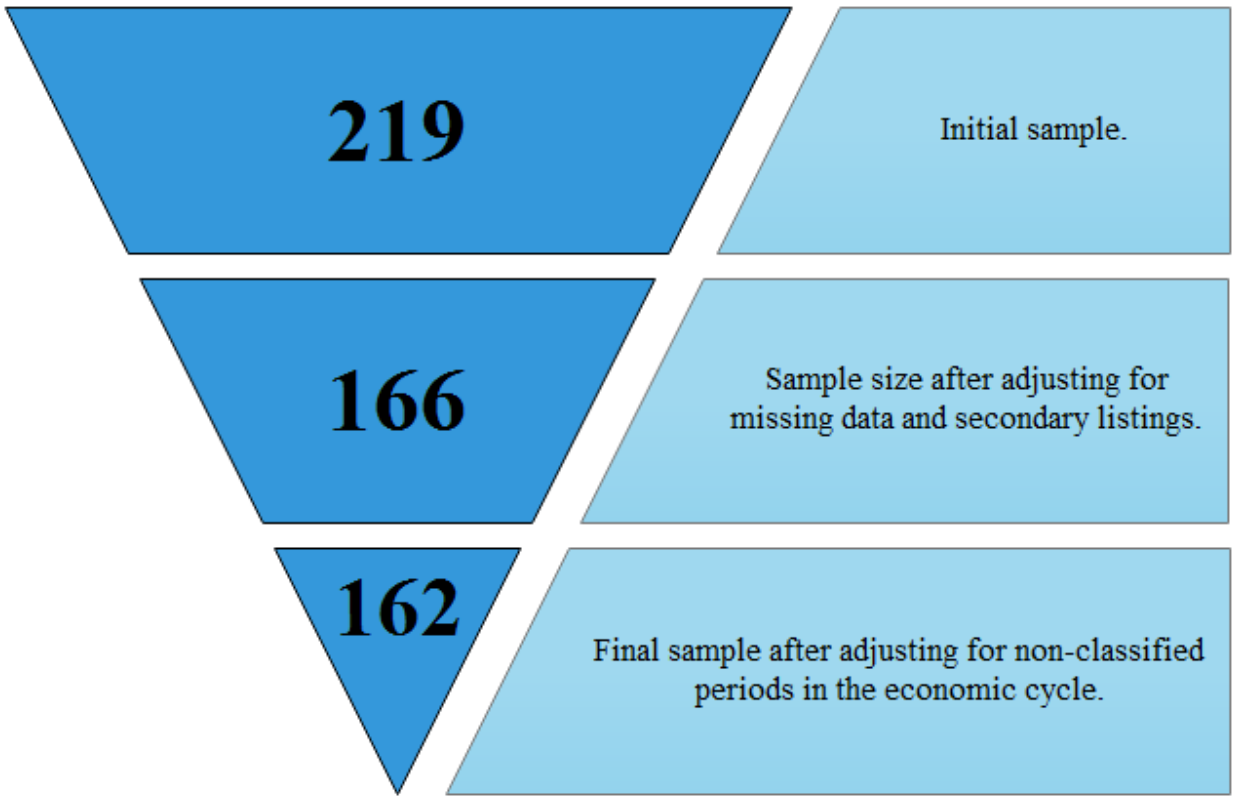

Figure 2:Overview of the sample selection.

3.3.4 Excluded Observations

The initial sample of 219 firms has during the work process been reduced to 162 relevant firms as shown in Figure 2. This is after adjusting for selection criteria, missing data and non-classified

phases of the economic cycle have been taken into consideration. A data loss of 26.1% is not unproblematic since the lost observations might contain important information. Nevertheless, it has been unavoidable to be able to run regressions with reliable data. As a last stage in the treatment of the sample, each of the excluded firm has been examined individually to identify any pattern. The majority of the excluded firms originate from Aktietorget, where missing data was the main issue. Therefore, the only pattern we could find was that the smallest firms had a higher dropout rate. This was expected and the drawback of including a smaller exchange market. No other distorting patterns were found.

3.4 Event Study

After obtaining the data, an event study was chosen to examine and analyze the long-run performance. The initial return is not included in the event study treatment as previous studies has used other methods to examine this effect. The treatment of initial return will be outlined in detail in section 3.6.1.1.

Event studies can be used to measure the economic effects due to a specific event over a number of days or years (MacKinlay, 1997). The first ones to introduce the event study methodology was Fama, Fisher, Jensen and Roll (1969) and has become one of the reference methodologies in the research community. Event studies aim to analyze how the event impacts the share price, or the wealth effect of the firm's shareholders (MacKinlay, 1997). This requires an assumption of efficient markets, that all available information about the firms has been accounted for in the stock price (MacKinlay, 1997; Fama, 1970), which also is assumed in this study. The event study methodology has been developed over the years and one of the more recent articles that covers the methodology suited for this study is MacKinlay (1997) and will therefore be followed hereafter.

3.4.1 Abnormal Returns

The starting point of an event study is to calculate abnormal returns (MacKinlay, 1997). Two components are needed to be able to do this. A normal return and a comparable return to calculate the abnormal return from. Preferably, this is done with the market model, which is a one factor model (MacKinlay, 1997). This model is to prefer because of its simplicity, as it assumes a linear

relationship between the individual stock returns and the market (MacKinlay, 1997). Furthermore, MacKinlay (1997) also argues that this model reduces the variance in the abnormal return, which increases the ability to detect event specific effects as it is explaining more of the variation in the normal return. Unfortunately, this model is not applicable in this study due to data unavailability. There is simply no data to estimate the relationship between the stock return and the market as the stock has not been publicly traded before. The market-adjusted return model, a multifactor model, is therefore used. This model can be considered as a restricted market model, with the restrictions $\alpha_i = 0$ and $\beta_i = 1$ (MacKinlay, 1997). As these restrictions are imposed, there is no need for an estimation period to estimate the parameters (MacKinlay, 1997). MacKinlay (1997) also states that a drawback of a multifactor model, such as the market-adjusted return model, is that empirical findings show there is limited explanatory power of including additional factors and therefore there is little reduction in variance of the abnormal return. It was further recommended to only use this type of model if necessary, but also adds that this type of model is explicitly suitable for studies of initial public offerings. As Ritter (1991) also uses this methodology, the market-adjusted return model will be used in this study. The formula is following:

$$AR_{it} = R_{it} - R_{mt}$$

Source: *MacKinlay (1997).*

Where AR_{it} is the abnormal return for firm i at time t, R_{it} is the stock return form firm i at time t and R_{mt} is the market return at time t.

3.4.2 Event Window

An event window has to be specified in order to use the market-adjusted return model. It is over this period that the abnormal returns will be calculated. According to MacKinlay (1997), designing too narrow event windows faces the risk of not capturing the full effect of the event, while using too broad event windows faces the risk of picking up effects that are unrelated to the event.

The length of the event windows replicates previous well-known research such as Helwege and Liang (2004) for comparability. By using the same length of event window, the risk of choosing a

too narrow or a too broad event window is minimized. The long-term event window is therefore made up of the opening price on the introduction day and the closing price 36 months later.

3.5 Regressions

To identify and test whether the economic cycle or other variables can explain the performance of the IPOs in this sample, a multiple linear regression analysis is done using the Ordinary Least Squares (OLS) method in Eviews. Such regression explains the relationship between the dependent variable, in this case the performance variables, and independent variables (Brooks, 2014, p.75). This method makes it possible to include and control for several independent variables (Brooks, 2014, p.135). The following main regression specifications have been used:

$$\boldsymbol{Initial\ Return} = \alpha + \beta_{dummyeconomiccycle} + \beta_{marketcapitalization} + \beta_{operatingprofitmargin} + \beta_{totaldebttototalassets} + \beta_{pricetobook} + \beta_{dummystockexchange} + \beta_{dummyindustries} + \varepsilon_i$$

$$\boldsymbol{BHAR} = \alpha + \beta_{dummyeconomiccycle} + \beta_{initialreturn} + \beta_{marketcapitalization} + \beta_{operatingprofitmargin} + \beta_{totaldebttototalassets} + \beta_{pricetobook} + \beta_{dummystockexchange} + \beta_{dummyindustries} + \varepsilon_i$$

For the model to be appropriate, the assumptions under the Gauss-Markov theorem has to be fulfilled (Brooks, 2014, p.91). This means that the estimators will have desired properties as they are consistent, unbiased and efficient known as Best Linear Unbiased Estimators (BLUE) (Brooks, 2014, p.91). These assumptions will briefly be specified below:

1. $E(u_t) = 0$
2. $var(u_t) = \sigma^2 < \infty$
3. $cov(u_i, u_j) = 0$
4. $cov(u_t, x_t) = 0$
5. $u_t \sim N(0, \sigma^2)$

1. Assumption 1 implies that the mean of the residuals equals zero. Since the equations contain an intercept, this condition is fulfilled and assumption 1 is presumed to hold (Brooks, 2014, s.181).

2. The variance of the error term is assumed to be constant and limited for all values of x (Brooks, 2014, s.91). If not, the estimated error terms are said to be heteroscedastic and heteroscedasticity exists in the model (Brooks, 2014, p.181). The presence of heteroscedasticity in the data can invalidate the statistical tests of significance and distort the conclusions that can be drawn from these tests (Brooks, 2014, p.183).

3. This assumption requires that the error terms are independent of one another (Brooks, 2014, p.188). The implication of this is that there cannot be any autocorrelation in the model and this can only be present in time-series data (Brooks, 2014, p.188). As cross-sectional data is used in this study, this assumption does not have to be tested.

4. There is assumed to be no multicollinearity in the data, which means that all independent variables are independent of one another (Brooks, 2014, p.209). The estimated coefficients can be severely distorted if there is presence of multicollinearity (Brooks, 2014, p.209). This can be controlled for by constructing a correlation matrix to study the correlation between all variables (Brooks, 2014, p.217). An independent variable correlation of 0.8 and above is considered to be a high value that indicates multicollinearity (Kennedy, 2003, p.209).

5. The error terms are assumed to be normally distributed (Brooks, 2014, p.209). Evidence of non-normality can be tested by using the Jarque-Bera test in Eviews. Even though the error terms do not follow a normal distribution, OLS can still be used as potential non-normality is of less importance if the sample size is great enough, in line with the Central Limit Theorem (CLT) (Brooks, 2014, p.210).

3.6 Statistical Tests

To test if specific variables are statistically significant or not, statistical calculations have been used. Three different significance levels are used, 1%, 5% and 10%. All test statistics are evaluated individually to see on what significance level the variable is. The interpretation of a significance level of 5% means that if the result is found to be significant, there is a 95% chance that the tested sample is statistically confirmed (Körner & Wahlgren, 2015, p.200). The test statistic is compared to a critical value that can be found in a table for the t-distribution. If the test statistics exceeds the critical value, the sample is found to be significant and vice versa (Körner & Wahlgren, 2015, p.200).

3.6.1 Hypothesis Testing of Means

The test statistics, t_{obs}, is calculated by the following ratio. The numerator is obtained by taking the sample mean, $\bar{X}$, subtracted by the population mean, μ_0. Calculating the denominator is done by dividing the sample standard error, s, by the square root of the number of observations, n.

$$t_{obs} = \frac{\bar{X} - \mu_0}{s/\sqrt{n}}$$

3.6.2 Student's t-test

The student's t-test tests if there is any significant difference between two population means. In this case, if there is any significant difference between the different phases of the economic cycle. $\bar{X}_1$ and $\bar{X}_2$ is the means for the two groups, μ_1 and μ_2 the population means, n_1 and n_2 is the sample size and s_1 and s_2 the sample standard error.

$$t_{obs} = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\sqrt{s_p^2(\frac{1}{n_1} + \frac{1}{n_2})}}$$

Where:

$$s_p^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}$$

3.7 Variables

All prices used in the variables are adjusted for stock splits, rights issues, dividends and similar corporate actions for comparability over time. Dividends have been included in the stock prices to reflect the total return an investor receives. To maintain comparability, the size variables have also been adjusted for inflation using the Consumer Price Index (CPI) with base year 1980 (Statistics Sweden, 2016).

3.7.1 Dependent Variables

3.7.1.1 Initial Return

First day return is the first dependent variable used in this study. The initial return is measured as the percentage increase in value from the stock's opening price to closing price at the first day of trading (Ritter & Welch, 2002). The following formula was used to calculate the initial return:

$$IR_i = \frac{P_{it} - E_i}{E_i} * 100$$

Where the initial return, IR_i, is the initial return, P_{it} is the closing price for stock *i* at time *t* and E_i is the opening price for stock *i*.

This variable is also used as an independent variable in the regression with BHAR as dependent variable. Ritter (1991) showed that underpricing was clearly linked to a long-run underperformance of IPOs, it is therefore of interest to see if this finding applies to this sample as well.

3.7.1.2 Buy-and-hold Abnormal Return

Buy-and-hold abnormal return (BHAR) is a well-known technique for measuring stock performance in a long-term perspective. The aim of BHAR is to simulate the return for a passive

investor that buys the stock and holds it for a perspicuous future (Barber & Lyon, 1997). It measures the relative return of two investments over a specified period (Barber & Lyon, 1997). To calculate the abnormal return, the return is compared to a benchmark, an expected return or a market portfolio (Barber & Lyon, 1997). A positive value on BHAR demonstrates that the firm have outperformed the market and a negative value of BHAR imply instead that the market return has yielded a higher return than the firm.

The following formula has been used to calculate BHAR:

$$BHAR_{iT} = \prod_{t=s}^{s+T}(1 + R_{it}) - \prod_{t=s}^{s+T}(1 + R_{mt})$$

Source: *Barber and Lyon (1997).*

Where, R_{it} is the total return for company *i* at month *t*, R_{mt} is the total return of the market portfolio *m* at month *t*, *s* is the starting point the return is calculated from and *T* is the time horizon in months of which the return is calculated (Barber & Lyon, 1997).

3.7.1.2.1 Market Portfolio

A stock index is chosen as the market portfolio to calculate BHAR. The abnormal return cannot be calculated using expected return, as no pricing of the stocks are available before the IPO. Several indexes are available on the Swedish stock exchange. OMXS30 is probably the most notable of them and represent the 30 most traded stocks on Stockholm stock exchange (Nasdaq OMX, 2013). Since the sample in this study also includes smaller firms, the authors believe an index that contains all listed shares on the Stockholm stock exchange is more appropriate. There are two such alternatives OMXS Gross Index (GI) and Price Index (PI) (Nasdaq OMX, 2013). GI was chosen over PI as it accounts for dividends by reinvesting them to reflect the total return and PI only reflects the price movements (Nasdaq OMX, 2013).

3.7.2 Independent Variables

There are countless variables that can be used to explain initial return and long-run performance. The main explanatory variable in this research is the economic cycle. As for the control variables,

focus has been on variables that measures operating performance. Most independent variables have been benchmarked to previous recognized and well-cited studies within this field of research to make sure proven variables are used. The other variables have been included since the authors believe their explanatory power is important and will contribute to a better understanding of the research question. All variables except the industry variables have been obtained from Datastream to consequently follow the classification made by the database.

3.7.2.1 Economic Cycle

Using the economic cycle as market timing variable, differentiates this study from previous ones. As mentioned earlier, existing research has instead used different classifications of hot and cold market. The classification of the economic cycle is described below.

3.7.2.1.1 Determining the Classification

The authors evaluated different approaches to find the most suitable method. Using the classic measure GDP to determine the economic cycle has a few shortcomings. GDP is rather inert, steady over time and normally with fewer measurement points than appropriate to the purpose of this study (Landefeld, Seskin & Fraumeni, 2008). This is problematic because the economic situation can oscillate quickly, as it did in the financial crisis of 2008, and would thus face the risk of misclassifying the offerings in connection to such turning points. Furthermore, GDP is a retrospective measure, as mentioned earlier, and the authors expects that managers make decisions such as IPOs dependent on future expectations rather than looking at historical figures.

A classification method that fulfills these criteria is the ETI. This measure is based on a comprehensive survey that captures business and consumers' sentiment on the present and future economy, future investments and interest and inflation levels (National Institute of Economic Research, 2016a). The respondents in this monthly survey are a random selection of 6000 firms and 1500 households (National Institute of Economic Research, 2016a). The different sectors are weighted in line with the EU Commission's Economic Sentiment Indicator and constitutes of industry (40%), service sector (30%), construction (5%), retail trade (5%) and households (20%) to best reflect their impact on economic activity (National Institute of Economic Research, 2016b). Compounded data from this survey has been collected from the statistical database of NIER and is presented in Figure 3. The ECI has a reference value of 100, values below this point are classified

as a recession and values above are classified as an expansion (National Institute of Economic Research, 2016b). Values from 100 to 110 indicate a stronger economic growth than normal and indicator witness a much stronger growth than regular if it surpasses 110 (National Institute of Economic Research, 2016b). Conversely, this means an indicator value from 90 to 100 indicates a weaker growth than the starting-point and values below 90 a much weaker growth than the normal position (National Institute of Economic Research, 2016b). The ETI has shown a high correlation with GDP growth (National Institute of Economic Research, 2016b).

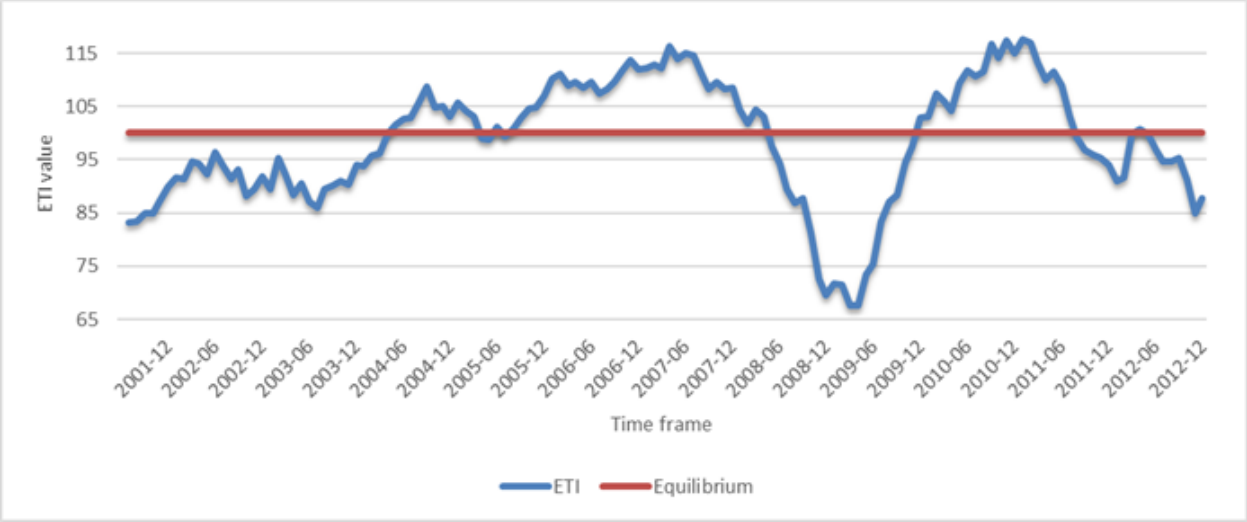

Figure 3: Illustration of ETI over the studied period.

3.7.2.1.2 Classification of Economic Cycles

Each month of the investigated period has been separately classified as either a phase of economic expansion or recession. However, to completely meet the criteria to be classified as a recession the time-span of economic downturn has to last for at least two quarters in a row (Nationalencyklopedin, n.d.). To be consistent in the classification, the same criteria have been applied to expansions. One drawback of using this method is that periods that do not fulfil these criteria are excluded from the sample. It was necessary to exclude those periods to remove any ambiguity regarding the classification. In this study, this resulted in a reduced sample of four firms that are issued during the five months that are excluded.

The economic cycle has further been divided into four parts; early recession, late recession, early expansion and late expansion. The median of each expansion and recession separates the early and

the late phase to observe if there is any difference depending on when in the respective expansion and recession the IPO is conducted. The different phases have been studied beyond both the start- and ending point of the economic cycle to avoid any bias and make sure the median is correct. This means that the economic situation beyond the studied period has been taken into account to determine the classification.

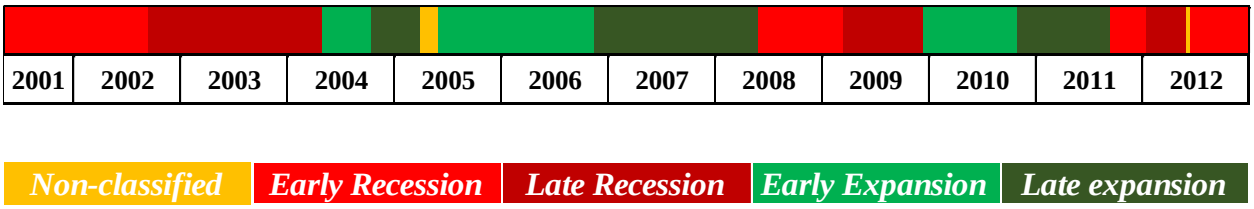

Figure 4: Overview after splitting the whole time frame into different economic phases.

3.7.2.1.3 Economic Cycle as a Variable

This classification has been transformed to a dummy variable were recessions have been given the value 1 and expansion the value 0. Furthermore, the sub-classifications of the economic cycle have been given the value 1 in four separate dummy variables.

3.7.2.2 Sales

Total Sales has been used by both Ritter (1991) and Helwege and Liang (2004) as an explanatory variable. Even though Ritter (1991) found the variable to be insignificant, other studies such as Brav and Gompers (1997) argue that it is new listings' modest size and not the fact that they are new listings that causes underperformance. Total sales at the fiscal year-end the firm was listed have been included to see if size has any impact in this sample.

3.7.2.3 Market Capitalization

Another variable used to test whether size has any impact on the dependent variables is the firm's market capitalization at the first day of trading. Using only sales as a measure of size omits some parameters such as future growth potential and profitability that can vary significantly from firm to firm even though they have similar amount of sales.

3.7.2.4 Operating Profit Margin

A profitability measure has also been included as a possible explanatory variable of initial return and long-run performance. Other profitability measures have been used by previous researchers such as Helwege and Liang (2004). Those measures have been neglected in this study in favor of operating profit margin due to data limitations in Datastream. The operating profit margin is obtained at the fiscal year end of the issuing year and the variable is given in percentage points.

3.7.2.5 Total Debt to Total Assets

The total debt to total assets-ratio has been used as a measure of leverage, in line with Helwege and Liang (2004). This measure is also given in percentage points and obtained at the fiscal year-end at the year of the IPO.

3.7.2.6 Price to Book

Previous research indicates that firms with higher Price to Book-ratio is more likely to go public (Pagano, Panetta & Zingales, 1998). Helwege and Liang (2004) has also used the valuation multiple Price to Book-ratio as an explanatory variable. Therefore, it has also been included in this study. The ratio is obtained from the closing price, the day of issuance.

3.7.2.7 Stock Exchange

An additional variable has been included to measure differences between stocks listed on the different stock exchanges. It is possible that firms from the different stock exchanges also is different in firm characteristics. As the sample consists of firms from both Nasdaq OMX Stockholm and Aktietorget, a dummy variable was included. The firms listed on Nasdaq OMX Stockholm have been given the value 1 and the firms listed on Aktietorget 0.

3.7.2.8 Industry Variables

Industry belongings are the final variables used in the regression to investigate if there is any difference in value development between the industries. Due to the quite small size of sample in this research, a broad industry classification was preferred since a too specific classification would end up with some industry with very few firms. The method that have been used to divide the firms is GICS classification methodology presented in Standard & Poor's (2006). GICS it is a global industry classification system that contains of 147 sub-industries, divided into the following ten main industries (Standard & Poor's, 2006):

- Consumer Discretionary
- Consumer Staples
- Energy
- Financials
- Health Care
- Industrials
- Information Technology
- Materials
- Telecommunication Services
- Utilities

3.7.3 Variable Transformation

3.7.3.1 Winsorized Variables

Winsorization is a method to treat outliers in a data sample with the aim of achieving robust statistics (Ghosh & Vogt, 2012). Any data above and below two specific percentiles are replaced with the value of that percentile (Ghosh & Vogt, 2012). This method assumes that the outliers does not look right and estimation will be better if the outliers looked like other data (Ghosh & Vogt, 2012). Replacing outliers with more plausible values causes statistical bias and might undervalue the outliers (Ghosh & Vogt, 2012). In this study, a 97.5% winsorization of all variables has been done as the data contained many outliers. This implicates that values below the 1.25 percentile and above the 98.25 percentile has been replaced. The high presence of outliers in every variable made it rational to winsorize both dependent variables and all independent variables considered. Using a 97.5% winsorization excludes a significant amount of data that possibly contains important information. To try to avoid this problem, a winsorization of 98.5% was initially performed. After this adjustment, there was still a considerable presence of outliers, as can be seen in Appendix A. A more extensive winsorization of 97.5% was therefore needed.

3.7.3.2 Logarithmized Variables

To fulfill the Gauss-Markov assumptions outlined earlier, some transformations can be done. Transforming variable to the natural logarithm can eliminate both the non-normality and the heteroscedasticity problem (Brooks, 2014, p.186). This is appropriate for variables with data that shows a positive skewness, which can be expected if the value only can drop 100% but there is no upper limit of how much the value can increase (Johnson & Wichern, 2007, p.192).

3.8 Methodological problems

3.8.1 Heteroscedasticity

To examine whether heteroscedasticity exists in the sample or not, a White's test was performed in Eviews (Brooks, 2014, p.186). The test showed no presence of heteroscedasticity in the data as seen in Appendix B. Therefore, the original standard errors were used and White's adjusted standard errors were not necessary.

3.8.2 Multicollinearity

The correlation matrix of all variables showed that some variables had higher correlation than others. Sales and market capitalization had a correlation of 0.8635 as seen in Appendix C. Another variable that is highly correlated with sales and market capitalization is the dummy variable for stock exchange. This variable has a correlation of 0.5896 to market capitalization and 0.5176 to sales. As the correlation was below 0.8, it is not classified as multicollinearity and the correlation is acceptable. However, the correlation between market capitalization and sales does qualify as multicollinearity and has to be corrected. Due to this, one variable has to be dropped as independent variable. The sales variable was chosen to be dropped as market capitalization was statistically significant. Some of the economic cycle dummy variables also showed a high correlation. These variables will not be run together as independent variables and is therefore not an issue.

3.8.3 Normality

The residuals in this sample were found not to be normally distributed, see Appendix D. The variables market capitalization, sales and price to book was logarithmized in an attempt to remove the non-normality. This transformation did not have any effect and the residuals were still far from being normally distributed. As the sample size is great enough, according to CLT, these variables were transformed back to their original state and no further adjustments were done to eliminate this non-normality.

3.9 Methodology Discussion

Statistical methods have usually their shortcomings and the one chosen for this study is no exception. A thorough discussion of the chosen methodology will be presented below. Three identified limitations with the methodology in this research is discussed in detail.

3.9.1 Sample

One criticism that can be presented against the sample is that it is too narrow and thus, is not representative of the entire population. Previous research has used both greater and smaller sample sizes. Helwege and Liang (2004) used 2054 firms in their final sample, while Ibbotson and Jaffe (1975) only used 128 observations. A greater sample size is of course to prefer. As Ibbotson and Jaffe (1975) used an even smaller sample size than is used in this study, the sample size is considered to be credible.

Another potential shortcoming in the choice of sample is that smaller firms have been included in the sample to this study. The risk is that the results are less homogenous with a greater variance, which can make it harder to do a univocal interpretation. However, as mentioned earlier, this study aims to study IPOs initial return and long-run performance regardless of the size or what stock exchange the firm is listed on. The authors are aware of the potential drawback, but choose to include these firms to avoid sampling error and the risk of non-generalizable results (Bryman & Bell, 2011, p.196).

3.9.2 Estimation of Abnormal Return

The estimation of abnormal returns in an event study is usually calculated by estimating the expected return for that particular stock. When calculating the abnormal return for IPOs, no historical prices to calculate the abnormal return were available. Therefore, an index has to be used to proxy the expected return. The use of a stock index is far more imprecise as it can be thought of a measure of expected return of the market. By using an index, firm specific attributes such as the stock betas are not accounted for. This makes to estimation of abnormal returns less precise. However, this is hard to get around and previous researchers such as Helwege and Liang (2004) have also used this approach. An advantage of using index as the benchmark is that the issues

associated with calculating the expected return are eliminated. The estimation window is highly sensitive to the conditions related to the time period of which the expected return is calculated. This problem is omitted when using the index approach. Therefore, the authors consider the index approach to be the best available method to use in this study.

3.9.3 Performance Measure

The aim of the BHAR is to capture the long-run returns of passive investors. When investing in IPOs, investors risk to be allocated a smaller amount of shares in the good IPOs and get full subscription in the bad ones (Berk & DeMarzo, 2013, p. 822). Therefore, it is hard to implement the BHAR as an investment strategy in IPOs.

Fama (1998) criticize that the BHAR is calculated by multiplying the returns, which causes the return to grow with the investment period. The implication is that the return can get bigger even though there is no abnormal return after the first period (Fama, 1998). Fama (1998) further argues that it is inappropriate to use the assumption of normality when using BHAR. The normality is affected by the positive skewness, since the cross-correlation is not accounted for (Fama, 1998).

Barber and Lyon (1997) compares the BHAR method to *Cumulative Abnormal Return (CAR)*, which Fama (1998) advocates, and conclude that CAR tend to yield a higher abnormal return than BHAR when used on the same sample. The problem with using CAR is that the positive skewness increases over longer event windows, which ruins the assumption of normality and therefore biases the test statistics (Barber & Lyon, 1997). Using CAR as a performance measure also faces the problems of the winner's curse, like BHAR, which makes it as hard to implement as an investment strategy. Furthermore, Barber and Lyon (1997) argue that BHAR is the technique to prefer, since CAR does neither reflect a realistic investment strategy over a longer period.

As seen in the discussion above, there are both pros and cons with using the different approaches. As previous researchers have used BHAR to a greater extent, comparability is easier with BHAR. Therefore, the BHAR measure was preferred over CAR in this study.

3.9.4 Validity

The validity of the study is considered as high if there are no systematical measurement errors, so that safe conclusions can be drawn from the results (Bryman & Bell, 2011, p.42). Validity can be divided into internal and external validity (Bryman & Bell, 2011, p.42). A high internal validity ensures that the study measures what it is intended to measure. External validity refers to whether the results can be generalized in other contexts and in other samples.

The chosen methodology follows several well-cited studies, which vouches for a high internal validity. No previous studies have used economic cycles as market timing variable, but simply changing previous variables with another should not impose any validity problem. Using the ETI as a determinant of the economic cycle is considered to be most appropriate. This measure captures future expectations of the economy which should be of greater importance than looking at historical figures. Therefore, the chosen method is judged to be valid.

As for the external validity, other studies with similar approach have been conducted on different markets and samples, which confirm a high external validity. The economic cycle variable can tough be questioned for its generalizability. This definition is a specific for the Swedish market, which is problematic for conducting the study in other markets. However, alternative indicators exist in other markets and all members of the EU uses similar indicators (National Institute of Economic Research, 2016a). The results from this study can also be applied to other firms on the Swedish market. The findings cannot be applied to samples from other markets as they might have other characteristics.

3.9.5 Reliability

According to Bryman and Bell (2011, p.41) the character of a high reliability is that the data collection and used methodology would yield the same results, no matter when or by whom it is conducted. To maintain a good reliability in this study, both the chosen method and collected data have been defined thoroughly.

The collected data has been gathered from the trusted and reliable sources Zephyr, Datastream and NIER. These sources have access to primary data about the companies and use a standardized classification of the data. To ensure the reliability of these sources, some observations were cross-referenced with annual reports and stock quotes. All figures were found to be consistent. No missing data were acquired from elsewhere to maintain the uniform classification. Excluded observations are strictly based on missing data or theoretical assumptions. In total, the data collection has not been subject to any random component.

All methodological steps and measures have been outlined in detail to facilitate for any replication. These steps are also based on the methodology from previous studies that further increases the reliability. The reliability is also considered to increase by using a standardized variable for market timing. Regressions and statistical calculations have been performed with trusted softwares such as Eviews and Microsoft Excel. The overall reliability is considered to be high and replicating the study should yield the same results.

4. Results

Characteristics of the chosen data and the results are exhibited in this chapter. Descriptive statistics are presented to get a better overview of the data and variables. Some statistical calculations are then showed to illustrate differences between phases in the economic cycle. Ultimately, the outputs from the different regressions are show in two separate tables with different dependent variables.

4.1 Data

The final sample consists of 162 observations (Appendix E). In Figure 5 below, all observations are classified after the current phase in the economic cycle at the time of the IPO.

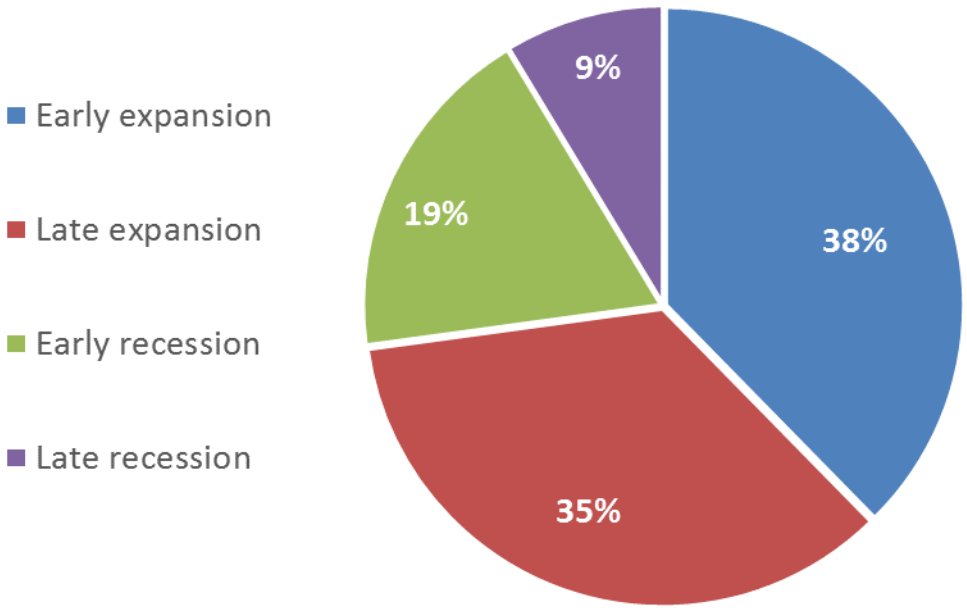

Figure 5: Distribution of IPOs in the economic cycle.

Figure 6 illustrates the distribution of IPOs after what year they were conducted. The results show a distinct peak in 2007 just before the financial crisis and a period of very few IPOs subsequently after the burst of the IT-bubble in the early 00's. An illustration of the initial return and BHAR depending on when over the time period the IPO was conducted is presented in Appendix F.

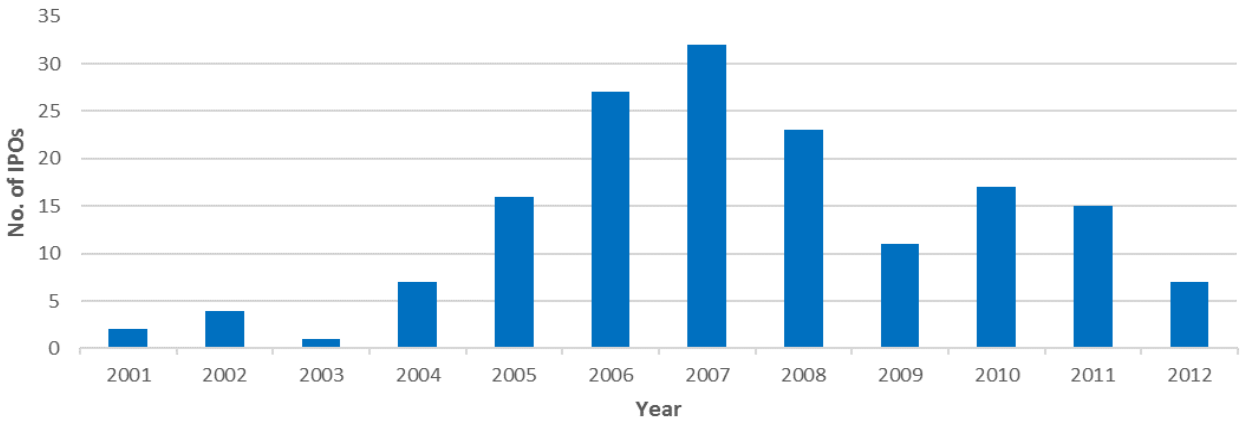

Figure 6: Number of IPOs per year.

4.2 Descriptive Statistics

To better visualize how the variables differs, descriptive statistics for each sub-sample are presented separately. The statistics are divided into three categories; all offerings, offerings conducted in expansions and offerings conducted in recessions.

	Mean	*Median*	*Std. Dev.*	*Maximum*	*Minimum*	*T-stat*	*P-value*
Dependent							
Initial Return %	2.74	0.00	17.75	80.16	-39.73	1.97	0.0510
BHAR %	6.11	-22.10	136.45	683.00	-156.72	0.57	0.5696
Independent							
Market Capitalization MSEK	911.37	52.05	2002.51	9956.63	4.32	5.79	0.0000
Sales MSEK	992.56	19.54	2542.63	14497.18	0.00	4.97	0.0000
Operating Profit Margin %	-395.37	0.00	1632.77	229.83	-12002.68	-3.08	0.0024
Total Debt to Total Assets %	21.81	13.09	24.71	95.75	-0.91	11.23	0.0000
Price to Book	5.73	4.25	5.57	27.36	-6.55	13.10	0.0000
Dummies							
Expansion	0.7284	1	0.4462	1	0	20.78	0.0000
Expansion - Early	0.3765	0	0.4860	1	0	9.86	0.0000
Expansion - Late	0.3519	0	0.4790	1	0	9.35	0.0000
Recession	0.2716	0	0.4462	1	0	7.75	0.0000
Recession - Early	0.1852	0	0.3897	1	0	6.05	0.0000
Recession - Late	0.0864	0	0.2819	1	0	3.90	0.0001
Aktietorget	0.6481	1	0.4790	1	0	17.22	0.0000
Nasdaq OMX Stockholm	0.3519	0	0.4790	1	0	9.35	0.0000
Consumer Discretionary	0.2407	0	0.4289	1	0	7.14	0.0000
Consumer Staples	0.0247	0	0.1557	1	0	2.02	0.0452
Energy	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Financials	0.0864	0	0.2819	1	0	3.90	0.0001
Health Care	0.0926	0	0.2908	1	0	4.05	0.0001
Industrials	0.2901	0	0.4552	1	0	8.11	0.0000
Information Technology	0.1049	0	0.3074	1	0	4.34	0.0000
Materials	0.1049	0	0.3074	1	0	4.34	0.0000
Telecommunication Services	0.0432	0	0.2040	1	0	2.70	0.0078
Utilities	0.0123	0	0.1108	1	0	1.42	0.1579

Table 2: Descriptive statistics of entire sample.

The descriptive statistics for all firms are presented in Table 2. Even though the variables have been winsorized, there is still a great dispersion in them. Both the initial return and the BHAR variables indicate that the gap between firms that have outperformed the market and those who have underperformed is substantial. The initial return variable shows a maximum of 80.16% and a minimum of –39.73%. Initial return is significant at the 10% level. For the BHAR, the observation with highest return in excess of the market outperformed it with 683.00%, while the lowest return underperformed the market with -156.72%. It is also notable that BHAR is the only variable that is far from being significantly different from zero, as the p-value is far above any levels of significance. The price to book variable indicates that the valuation of the firms that went public are widely dispersed. One observation has a multiple of 27.36 and another shows a negative multiple of –6.55. The coefficients for the dummy variables express what percentage of the total number of firms belongs to that particular industry. In the sample 29.01% of the firms are industrial firms followed by 24.07% that comes from the industry consumer discretionary. Based on the same reasoning, 64.81% of the firms in the sample were listed on Aktietorget.

	Mean	*Median*	*Std.dev*	*Max*	*Min*	*T-stat*	*P-value*
Dependent							
Initial Return %	2.32	0,00	18.01	80.16	-39.73	1.40	0.1636
BHAR %	10.16	-21.20	134.24	683.00	-156.72	0.82	0.4127
Independent							
Market Capitalization MSEK	977.39	63.46	2057.32	9956.63	4.32	5.16	0.0000
Sales MSEK	884.25	23.01	2225.76	14497.18	0.00	4.32	0.0000
Operating Profit Margin %	-270.14	0.00	1102.62	229.83	-8714.95	-2.66	0.0089
Total Debt to Total Assets %	21.70	13.63	23.98	95.75	-0.91	9.83	0.0000
Price to Book	6.04	4.71	5.55	27.36	-6.55	11.82	0.0000
Dummies							
Expansion - Early	0.5169	1	0.4997	1	0	11.24	0.0000
Expansion - Late	0.4831	0	0.4997	1	0	10.50	0.0000
Aktietorget	0.6186	1	0.4857	1	0	13.84	0.0000
Nasdaq OMX Stockholm	0.3814	0	0.4857	1	0	8.53	0.0000
Consumer Discretionary	0.2458	0	0.4305	1	0	6.20	0.0000
Consumer Staples	0.0254	0	0.1574	1	0	1.75	0.0820
Energy	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Financials	0.0847	0	0.2785	1	0	3.31	0.0013
Health Care	0.0932	0	0.2907	1	0	3.48	0.0007
Industrials	0.3051	0	0.4604	1	0	7.20	0.0000
Information Technology	0.1102	0	0.3131	1	0	3.82	0.0002
Materials	0.0847	0	0.2785	1	0	3.31	0.0013
Telecommunication Services	0.0424	0	0.2014	1	0	2.29	0.0241
Utilities	0.0085	0	0.0917	1	0	1.00	0.3173

Table 3: Descriptive statistics for IPOs performed in expansions.

There are differences in the descriptive statistics, when comparing IPOs performed in expansions and recessions. The p-value for the initial return variable has deteriorated to a non-significant level for both expansion and recession. BHAR is still not significant in expansions or recessions, as seen in Table 3 and Table 4 respectively. One can see that the market capitalization, operating profit margin and price to book variables are greater both in terms of mean and median for the firms who went public in an expansion. Leverage in terms of total debt to total assets seems to be fairly consistent in the two groups. The stock exchange dummies show that firms list on the Nasdaq OMX Stockholm to a greater extent in expansions than they do in recessions. Firms from the materials industry constitute 8.47% of the total firms in expansion, while that figure is 15.91% in recessions. Other industries show no specific pattern or cluster to be overrepresented in either expansions or recessions.

	Mean	*Median*	*Std.dev*	*Max*	*Min*	*T-stat*	*P-value*
Dependent							
Initial Return %	3.86	0,00	16.77	80.16	-30.04	1.53	0.1338
BHAR %	-4.76	-28.40	140.14	540.51	-156.72	-0.23	0.8229
Independent							
Market Capitalization MSEK	734.30	34.88	1810.84	9956.63	4.32	2.69	0.0101
Sales MSEK	1283.02	9.39	3202.25	14497.18	0.00	2.66	0.0110
Operating Profit Margin %	-731.23	-5.06	2517.84	18.65	-12002.70	-1.93	0.0607
Total Debt to Total Assets %	22.08	10.38	26.32	95.75	0,00	5.57	0.0000
Price to Book	4.91	2.66	5.49	27.36	-6.55	5.94	0.0000
Dummies							
Recession - Early	0.6818	1	0.4658	1	0	9.71	0.0000
Recession - Late	0.3182	0	0.4658	1	0	4.53	0.0000
Aktietorget	0.7273	1	0.4454	1	0	10.83	0.0000
Nasdaq OMX Stockholm	0.2727	0	0.4454	1	0	4.06	0.0002
Consumer Discretionary	0.2273	0	0.4191	1	0	3.60	0.0008
Consumer Staples	0.0227	0	0.1490	1	0	1.01	0.3174
Energy	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Financials	0.0909	0	0.2875	1	0	2.10	0.0419
Health Care	0.0909	0	0.2875	1	0	2.10	0.0419
Industrials	0.2500	0	0.4330	1	0	3.83	0.0004
Information Technology	0.0909	0	0.2875	1	0	2.10	0.0419
Materials	0.1591	0	0.3658	1	0	2.89	0.0061
Telecommunication Services	0.0455	0	0.2083	1	0	1.45	0.1550
Utilities	0.0227	0	0.1490	1	0	1.01	0.3174

Table 4: Descriptive statistics for IPOs performed in recessions.

4.3 Test of Significance Between Phases in Economic Cycle

No significant difference was found between the IPOs conducted in expansion versus recession, neither for BHAR nor for Initial Return as can be seen in Table 5 and Table 6.

Initial Return	*Expansion*	*Recession*
Mean	2.32	3.86
Variance	327.20	287.92
Observations	118	44
Hypothesized Mean Difference	0	
df	82	
t Stat	-0.5044	
P(T<=t) two-tail	0.6153	
t Critical two-tail	1.9893	

Table 6: Test of significant difference between expansion and recession for initial return.

BHAR	*Expansion*	*Recession*
Mean	10.16	-4.76
Variance	18174.64	20097.19
Observations	118	44
Hypothesized Mean Difference	0	
df	74	
t Stat	0.6036	
P(T<=t) two-tail	0.5479	
t Critical two-tail	1.9925	

Table 5: Test of significant difference between expansion and recession for BHAR.

When splitting up the results in the four different phases of the economic cycle, all phases in relation to late recession were found significant for BHAR. The significant results are presented in Table 7, 8 & 9, the rest of them can be found in Appendix G. This means that the BHAR for IPOs conducted in late recession are significantly different from offerings performed in early and late expansion and early recession. One has to notice that the sample size in late recession is only 14 observations, which is considerably lower than observations in the other phases. No significant difference among the phases was found for the initial return variable.

BHAR	*Early Recession*	*Late Recession*
Mean	19.06	-55.79
Variance	24842.81	6943.54
Observations	30	14
Hypothesized Mean Difference	0	
df	41	
t Stat	2.0569	
P(T<=t) two-tail	0.0461	
t Critical two-tail	2.0195	

Table 8: Test of significant difference between early recession and late recession for BHAR.

BHAR	*Late Expansion*	*Late Recession*
Mean	4.66	-55.79
Variance	12409.98	6943.54
Observations	57	14
Hypothesized Mean Difference	0	
df	26	
t Stat	2.2629	
P(T<=t) two-tail	0.0322	
t Critical two-tail	2.0555	

Table 7: Test of significant difference between late expansion and late recession for BHAR.

BHAR	*Early expansion*	*Late Recession*
Mean	15.30	-55.79
Variance	23802.39	6943.54
Observations	61	14
Hypothesized Mean Difference	0	
df	37	
t Stat	2.3879	
P(T<=t) two-tail	0.0222	
t Critical two-tail	2.0262	

Table 9: Test of significant difference between early expansion and late recession for BHAR.

Worth mentioning and highlighting is the means for the respective phases. The IPOs performed in late recession are the ones with by far lowest mean, as the average BHAR for these observations were –55.79%. Notable is also that the phase with highest mean also is in recessions, namely in early recession, where the mean is 19.06%. The two phases of expansion both shows a positive mean. As seen in Figure 7, the greatest mean for Initial Return are found in early recessions. The mean for Initial Return in early recessions is 4.82%, followed by 3.71% in late expansion, 1.83% in late recessions and 1.03% in early expansions.

Figure 7: Individual result of the initial returns for each economic phase separately.

4.4 Regressions

Three different regressions for each dependent variable was run. The difference between the regressions is that they have different independent variables for different phases of the economic cycle.

Variables	*Expansion vs Recession*	*Expansion - Early & Late*	*Recession - Early & Late*
C	8.2372 *0.1486*	7.2982 *0.2052*	8.0177 *0.1362*
Dummy - Expansion	-0.3280 *0.9192*		
Dummy - Expansion: Early		-2.0985 *0.5626*	
Dummy - Expansion: Late		1.6458 *0.6575*	
Dummy - Recession: Early			2.2246 *0.5509*
Dummy - Recession: Late			-3.9391 *0.4564*
Market Capitalization MSEK	0.0007 *0.4480*	0.0008 *0.3615*	0.0007 *0.4474*
Operating Profit Margin %	0.0009 *0.3250*	0.0008 *0.3677*	0.0008 0.3510
Total Debt to Total Assets %	-0.0065 *0.9186*	-0.0033 *0.9587*	-0.0115 0.8562
Price to Book	-0.0827 *0.7592*	-0.1088 *0.6880*	-0.0565 *0.8349*
Dummy - Nasdaq OMX Stockholm	-7.8103 *0.0445***	-7.9558 *0.0407***	-8.1693 *0.0364***
Dummy - Consumer Discretionary	-0.6939 0.9019	0.4041 *0.9436*	-0.4173 *0.9410*
Dummy - Consumer Staples	4.2515 *0.6794*	6.1599 *0.5550*	3.9637 *0.7001*
Dummy - Health Care	-3.7382 0.5832	-2.4742 *0.7202*	-3.9617 *0.5611*
Dummy - Industrials	-5.4842 *0.3229*	-4.8185 *0.3876*	-5.5925 *0.3135*
Dummy - Information Technology	-3.2863 *0.6160*	-2.0919 *0.7527*	-3.8538 0.5578
Dummy - Materials	2.9479 *0.6547*	3.6696 *0.5795*	2.8216 0.6686
Dummy - Telecommunication	-8.8607 *0.2865*	-8.1381 *0.3287*	-8.5307 *0.3050*
Dummy - Utilities	19.8613 *0.1423*	21.7152 *0.1115*	22.0610 *0.1077*
R2 Adjusted R2	0.0867 -0.0003	0.0939 0.0008	0.0932 0.0000
F-stat P (F-stat)	0.9964 0.4601	1.0091 0.4491	0.9999 0.4585

*Statistical significance at 1 %=***, 5 %=** and 10 %=*, respectively.*
Table 10: Regressions with initial return as dependent variable.

In the regressions with initial return as dependent variable, only one variable was found to be significant. That is the dummy variable for Nasdaq OMX Stockholm, who indicates that a firm listed on there has 7.81% less initial return than firms listed on Aktietorget. The dummy variable for expansions is not significant and the coefficient is close to zero.

The other two regressions have similar results on most independent variables as the first regression. However, the main variable has been divided into early and late phases of the economic cycle. Also when doing this, these variables are still not significant. Conducting an IPO in early expansion and

late recession seem to have less initial return than doing it in other periods. Conversely, going public in late expansion and early recession is associated with a greater initial return than doing it in the other periods. These figures are indications and cannot be statistically confirmed.

Variables	*Expansion vs Recession*	*Expansion - Early & Late*	*Recession - Early & Late*
C	-79.5496 *0.0667***	-77.5363 *0.0759***	-71.3370 *0.0799***
Dummy - Expansion	8.4254 *0.7352*		
Dummy - Expansion: Early		12.5701 *0.6450*	
Dummy - Expansion: Late		1.9327 *0.9448*	
Dummy - Recession: Early			5.7029 *0.8386*
Dummy - Recession: Late			-37.2575 *0.3488*
Initial Return %	1.2233 *0.0505**	1.2460 *0.0472***	1.1738 *0.0606**
Market Capitalization MSEK	-0.0167 *0.1205*	-0.0158 *0.0244***	-0.0153 0.0268***
Operating Profit Margin %	0.0091 *0.1830*	0.0093 *0.1716*	0.0089 0.1920
Total Debt to Total Assets %	0.0116 *0.9811*	0.0193 *0.9678*	-0.0072 *0.9879*
Price to Book	0.3178 *0.8763*	0.3570 *0.8609*	0.4598 *0.8211*
Dummy - Nasdaq OMX Stockholm	85.5110 0.0042***	86.2959 *0.0039****	82.8166 *0.0056****
Dummy - Consumer Discretionary	44.0936 *0.3030*	41.9385 *0.3303*	46.9362 *0.2678*
Dummy - Consumer Staples	168.0246 0.0316***	163.2875 *0.0391***	167.0104 *0.0319***
Dummy - Health Care	82.7003 *0.1090*	79.7254 *0.1265*	81.4888 *0.1127*
Dummy - Industrials	61.0895 *0.1568*	60.9828 *0.1480*	61.7234 0.1402
Dummy - Information Technology	92.3341 *0.0637**	89.7531 *0.0739**	88.9539 0.0730*
Dummy - Materials	104.4457 *0.0398***	103.8407 *0.0386***	105.2228 *0.0347***
Dummy - Telecommunication	22.9608 *0.7150*	21.9676 *0.7265*	25.6814 *0.6812*
Dummy - Utilities	-26.9965 0.7916	-32.8641 *0.7499*	-10.8330 *0.9165*
R2 Adjusted R2	0.1374 0.0423	0.1383 0.0432	0.1426 0.0480
F-stat P (F-stat)	1.4441 0.1292	1.4541 0.1250	1.5071 0.1045

*Statistical significance at 1 %=***, 5 %=** and 10 %=*, respectively.*

Table 11: Regressions with BHAR as dependent variable.

The expansion-dummy variable was found to be insignificant as the p-value is way over the significance levels of both 5% and 10%. The variables that were found to be significant on the 5% level were initial return, Nasdaq OMX Stockholm-dummy and the industry dummies consumer

staples and materials. For every one additional percent of initial return, the BHAR will increase by 1.22%. The Nasdaq OMX Stockholm-dummy indicates that the BHAR will be 85.51 percentage points better for firms listed on the Nasdaq OMX Stockholm stock exchange than firms listed on Aktietorget. The industry dummies tell us that firms from the industries consumer staples and materials performs 168.02 percentage points respective 104.45 percentage points better than firms from the Financial industry.

Similar to the first regression, none of the market timing variables in the other two regressions were found to be significant. The results give a hint that the long-run performance seem to be better for IPOs conducted in both early and late expansion compared to recessions. Lastly, the coefficients for late recession are negative, indicating that the worst long-run performance is obtained for IPOs conducted in late recession. All these coefficients are insignificant and cannot be statistically confirmed, but are just indications.

5. Analysis

The presented results are analyzed with background of theoretical and empirical findings in this chapter. Initial return and long-run performance will be analyzed separately. The significant variables will be analyzed at first and then indicative results that are not found significant are interpreted. Theories are interpreted together with the results and compared to differences and similarities of previous findings. Explanations to these differences and similarities are also discussed. This analysis and discussion renders in a confirmation or rejection of the hypotheses.

5.1 Summary of Results

Summarizing the results from previous chapter:

- None of the variables for different phases in the economic cycle was found significant.
- Some variables show a wide dispersion even though they have been winsorized.
- The variable late recession is significantly different from all other phases of the economic cycle.
- The dummy variable for stock exchange shows that firms listed on Nasdaq OMX Stockholm tend to be less underpriced and have a better long-run performance than firms listed on Aktietorget.
- Initial return has a positive effect on long-run performance.
- Market capitalization has a negative effect on long-run performance.
- Firms from the consumer staples and materials industries have a better long-run performance than firms from the financial industry.

5.2 Initial Return

The only variable that have been found to be statistical significant in the three regressions with initial return as dependable variable are the stock exchange dummy. The outcome reveals a difference in the level of underpricing when comparing these two. Aktietorget listed firms seem to yield a higher initial return compared to firms listed on Nasdaq OMX Stockholm. The variation might be due to different characteristics of the issuing firms between the markets, mainly in terms of size and age. Since the IPOs of Aktietorget are characterized by smaller and more anonymous firms, it is therefore likely that those firms suffer from a greater information asymmetry compared

to issues on Nasdaq OMX Stockholm. This supports the earlier mentioned Asymmetric Information Hypothesis, which state that investors demand compensation or discount for the uncertainty. As firms listed on Aktietorget are assumed to have a higher uncertainty and information asymmetry compared to firms listed on Nasdaq OMX Stockholm, the investors will claim a higher premium to invest in those IPOs. The different level of uncertainty between the two markets are therefore likely to be one of the reasons for the difference in underpricing.

An overall finding in this study is that the sample in general tends to be underpriced, which is in line with previous findings of Ibbotson & Jaffe (1975) and Ritter (1984). The first research hypothesis in this study, H_1, states that IPO initial return in economic expansion is greater than in economic recession. As can be found in Figure 7, the indicative outcome for the initial return partly supports and partly contradicts this hypothesis. The part that clearly contradicts the hypothesis is both that the results indicate that IPOs yields a higher initial return when issued in recession compared to IPOs issued in expansion and that the IPOs performed in early recessions showed the highest average initial return in the sample. This is an opposite result to both H_1 and to what Ibbotson and Jaffe (1975) and Ritter (1984) found for hot and cold issuing markets. On the contrary, the results also show a great dispersion in the level of underpricing over the different phases. IPOs in late expansions showed the second highest average initial return, which is favor of the hypothesis. One could speculate in that there is a presence of outliers in early recession that distorts the true initial return. Though, a glance at the descriptive statistics quickly dismisses that idea. Expansions are simply not characterized by a greater initial return than recessions in this sample.

The authors speculate that the Impresario Hypothesis might change over the economic cycle and thereby can explain the results. As mentioned earlier, Draho (2004) and Watson (2005) argue that there is a discrepancy of risk appetite and investors optimism between various phases in the economic cycle. Specifically, they argue that there is greater risk appetite and investor optimism in expansions. Some previous studies argue that these factors lead to a greater initial return in expansions. However, the authors to this study identifies that this might have an opposite effect. The greatest underpricing takes place in early recessions, in a period when the investor optimism and risk appetite are assumed to be low. If this is the situation, it is likely that underwriters are

forced to put an even higher price-premium to obtain any attraction from the market. The initial return is then driven by an offering price at discount rather than excessive optimism and overbidding. Thereby, the Impresario hypothesis could explain why the underpricing actually is higher in recessions.

As mentioned earlier, none of the dummy variables that represent the different economic periods were found to be significant but are indications, which consequently means that we cannot draw any conclusion from the above discussion. Therefore, we can conclude that the economic cycle cannot explain IPO initial returns and H_1 is rejected.

5.3 Long-Term Performance

The significant industry dummies, indicate that the long-run performance is significantly better for firms from the consumer staples and materials industries in comparison to financial firms. However, most firms seem to have performed better than the financial firms. This might not be an indicator that firms from the consumer staples and materials industries is outperforming, but rather that the financial firms appear to be underperforming significantly. Except for that, the results do not provide any convincing evidence that some industry differs significantly in long-run performance. As the used industry classification led to that some industries only was represented by a handful of firms and some industries, for instance industrials, contains a wide variety of businesses, it is hard to draw any conclusions from the sample. A greater sample size would possibly show other results, but the long-run performance in this sample does not seem to differ significantly between the industries except for financial firms.

The Nasdaq OMX Stockholm-dummy is one of the significant control variables. It shows that the long-run performance is significantly better for firms listed on this stock exchange. The total sample outperformed the market slightly, but the firms listed on Nasdaq OMX Stockholm outperformed the Aktietorget listed firms considerably. This suggests that the firms listed on Nasdaq OMX Stockholm had an extraordinary long-run performance in relation to the Aktietorget listed firms. Therefore, the high rate of firms from the smaller stock exchange Aktietorget has lowered the overall performance of the sample. However, the Market Capitalization variable suggests that a greater size is not the decisive factor for long-run outperformance as it shows the

opposite. For every one million the market capitalization is increasing, that corresponds to a lowered BHAR of approximately 0.015-0.016% depending on the chosen regression. This suggests that there is not the size in itself that is the reason for the outperformance, but some other factor. Unfortunately, investigating that would be a study of its own and will not be elaborated further here.

Initial return has a positive effect on the long-run performance by definition. As BHAR is measured from the opening price of the introduction day, a high initial return also implies a greater BHAR. The interesting thing to notice here is that a one percentage point increase in the initial return variable corresponds to a 1.17-1.25 percentage points increase in BHAR and not an increase by 1 percentage point that the increase by definition would be. This suggests that the BHAR increases 0.17-0.25 percentage points in excess of the expected increase for every additional percentage point of the variable initial return. This can be linked to the signaling theory and the findings of Allen and Faulhaber (1989) who believes that firms use a greater underpricing to signal greater quality of the firm. One can therefor assume that the highest quality firms sets a lower price at the introduction day to signal their quality. These firms will also be rewarded by the market with a better long-run performance. Thus, this can be an explanation for why firms with greater underpricing outperforms the market. This finding appears to be in contrast of what Ritter (1991) found, as he found that the firms with greatest underpricing are the ones with poorest long-run performance. Ritter (1991) does however measure the long-run performance differently and starts measuring from the closing price of the introduction day as mentioned in section 2.3.3. This means that a great initial return is excluded from the long-run performance and hence, gives a lower long-run performance than is found in this study.

The second hypothesis, H_2, states that IPOs performed in economic expansions have weaker long-run performance than IPOs performed in economic recession. The indicative results contradict the hypothesized outcome for long-run performance as it indicates that the long-run performance is better for firms that performed the IPO in expansions than firms who did it in recessions. The only phase in the economic cycle that indicated a long-run underperformance was late recession. On the contrary, the other phases indicate a long-run outperformance in relation to the market. These are

surprising indications, as the economic cycle and previous used market timing variables have been proved to be correlated.

Looking at the mean for the respective phases, one can see that the two most extreme values were found in recessions. The greatest mean of BHAR were found in early recessions and the lowest in late recessions. Furthermore, all phases of the economic cycle were found to be significantly different from late recession. The authors can find no theoretical explanation for why this result occurs. It indicates that the relationship between long-run performance and the economic cycle is weak or even non-existing and that the results appear to be of more random nature. Consequently, it is hard for the regressions to explain a variable that is not significant in the first place as shown in the descriptive statistics.

The indications from the outputs suggest that the Window-dressing phenomenon does not exist to any greater extent in the studied sample. The authors believe it to be unlikely that firms would manipulate their books only in late recessions. It might be that this phenomenon was of greater extent before stricter regulatory framework within accounting was implemented as a result of several accounting scandals. Therefore, one can speculate that problems with Window-dressing are of less proportion in this context.

Similarly, one can argue that there might have been an absence of excessively optimistic investors in the studied period. The divergence of opinion hypothesis suggests that the presence of excessively optimistic investors is a reason for long-run underperformance. A lack of these investors could explain why the firms in the sample do not underperform. There is however likely that the investors optimism changes with the economic cycle, which also is confirmed by Watson (2005). It is possible that the investor optimism increases in late recessions, when the economy is beginning to turn upwards. Watson (2005) argues that the excessively optimistic investors are overrepresented in expansions, but our findings suggest that it potentially occurs in late recessions. If that is the case, this would explain why the result indicates a long-run underperformance in those periods.

Furthermore, Ritter (1991) found that a larger concentration of firms of lower quality take advantage of windows of opportunity and explains that this is a reason for underperformance. This does not seem to be true in all cases. Helwege and Liang (2004) did not find any difference in firm characteristics between hot and cold markets. The result in this study also points more to that firms of lower quality is forced to conduct their IPOs in late recessions. Even though this is not to prefer from a window of opportunity point of view, it might be that these firms are in desperate need of capital and have no other choice. This could signal to the market that going public and issuing equity is the last resort to attract capital as suggested in the Pecking order-theory. It is clear that firms still take advantage of windows of opportunity, as the IPO volume increases with stock market valuations, but those windows in this study does not seem to be overrepresented by lower quality firms as Ritter (1991) suggests.

None of the dummy variables for the different phases of the economic cycle was found to be significant. The authors conclude that the economic cycle neither explains the long-run performance of IPOs. Therefore, H_2 is rejected. As H_1 also was rejected, this suggests that IPO performance seem to be a phenomenon that is isolated to the stock market and disconnected from the real economy. It is more likely that the cyclicality arises from a spillover effect, that succeeding firms takes advantage of information associated with previous IPOs. IPO initial return and long-run performance are therefore not affected by the economic situation at the time of issuance, but rather related to how other firms in the market choose to act. Even though the periods of high IPO activity may coincide with economic expansions, they do not seem to be the decisive factor of IPO initial return and long-run performance.

5.4 Sample

A possible explanation for the difference and insignificance found in this study, can be the chosen sample. Smaller firms have been included in this sample that might differ in characteristics and have other potential investors. Smaller firms are generally riskier and have at the same time a higher expected return due to the greater risk. Looking at the standard deviation of the dependent variables, it is relatively high as noted in the descriptive statistics. One can see that this high standard deviation comes from more extreme values in the dependent variables in both directions. This is likely to be due to the fact that smaller firms are included as their higher risk and expected return

are associated with both greater gains and greater losses. This is also confirmed by the great dispersion in the price to book variable, indicating a great variation of quality and expectations of the firms in the sample.

The dispersion is also illustrated in the BHAR variable. Even though it has been winsorized, there are still observations with a BHAR of 683% at maximum and -156.72% at minimum. Having many outliers in the sample implies a statistical problem, in this case as there are a skewness in the distribution of the outliers. Theoretically, there is no lower or upper limit for how much BHAR can decrease or increase. In practice though, BHAR does not take on infinite negative numbers. The stock only can drop by 100% and the benchmark never takes on infinite figures in practice. Thereby, there is skewness towards positive outliers. It is plausible that the number and size of the outliers increases when including smaller and riskier firms in the sample.

Other factors that might cause the insignificant results are that there are more variables that can explain the results. It is unlikely that the included variables in this study explains all the variation in long-run performance. The low R^2 scores in the regressions indicate that there is much more to explain. There is for instance likely that firms with operations abroad are affected by the economic situation and characteristics of that particular market to a greater extent than firms with pure domestic operations. Furthermore, there are numerous variables that can be used to explain the long-run performance and but all of them cannot and have not been included and accounted for.

6. Conclusion

In this chapter, conclusions are drawn from the analysis presented in chapter 5. These conclusions aim to answer the research questions of the study. Lastly, suggestions for further research are proposed.

The aim of this study was to answer the following research questions:

- ***How does the economic cycle explain IPO initial return?***
- ***How does the economic cycle explain long-term performance of IPOs?***

After studying and analyzing the results, the authors can conclude that the findings are unanimous; the economic cycle cannot explain neither initial return nor long-run performance. Even when the economic cycle was divided into more specified phases, it still could not explain underpricing and long-term performance. The only significant finding related to the economic cycle was that long-run performance of IPOs performed in late recessions was substantially weaker in comparison to other phases. However, this observation seems to be of random nature. Therefore, both hypotheses, H_1 and H_2, are rejected.

Another important finding in this study is that initial return and long-run performance differs from the two stock exchanges on the Swedish market. This is believed to be mainly caused by differences in information asymmetry. For managers this implies that it is preferable to list at Nasdaq OMX Stockholm to serve the interest of their shareholders. Less compensation to new shareholders is paid as new investors does not benefit from the initial return at the expense of existing shareholders as much as they do on Aktietorget. Furthermore, the shareholders are also rewarded with a better long-term performance. However, it is not always up to the managers to decide what stock exchange to list on. There are certain criteria to list on Nasdaq OMX Stockholm that is not fulfilled by all firms and hence is forced to list on smaller stock exchanges. For investors, the choice to invest in different stock exchanges is free. This finding contains important information that can be used to establish future expectations of IPOs on these markets. In general, one can conclude that short-term investments are more profitable if invested in IPOs

at Aktietorget since they are characterized by a greater initial return albeit a weaker long-run performance. Long-term investors in IPOs are instead recommended to look at Nasdaq OMX Stockholm. Even though they do not have as high initial return, the long-run performance is significantly better.

As a deductive approach is undertaken, the established theoretical framework has been tested. The differences in initial return between the stock exchanges confirm that the asymmetric information hypothesis is of great relevance to explain initial return. Even though it could not be proved statistically, the other findings also indicate that the characteristics of the IPO market might have changed over time. Therefore, the theoretical framework may have to be reconsidered or developed. The used theoretical framework was developed several decades ago and there is reason to believe that the market characteristics might have changed since then. Easier access to information, a greater globalization and a stricter regulatory framework might be factors that have changed these characteristics and put new driving forces in play. As the market never sleeps and always adjust, there might be reasons for the theoretical framework to do the same.

6.1 Further Research

After conducting this study, the authors identified some views that could be of interest for further research. First of all, it would be interesting to see if the same results would be found in other markets. That way the variable could either be fully rejected on an international level, or it could show this market is an exception from the norm.

As this study also included smaller firms from smaller stock exchanges in the sample, a replication of the study with a sample that excluded these firms could have yielded a different result. A floor could be set on market capitalization or sales, alternatively excluding the smaller stock exchanges. This would impose some problems with sample size, but could be solved by looking at a broader market for instance.

It would also be of interest to measure performance with measures that is based on other factors than the stock price. A study that examines customer's, supplier's and employee's relationships with

the firm after the IPO could captures other important performance aspects that is hard to extract from the stock price information.

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8. Appendices

Appendix A: Descriptive statistics with and without winsorization

Unwinsorized

	Mean	Median	Std. Dev.	Maximum	Minimum
Dependent					
Initial Return %	3.41	0.00	22.99	200.38	-52.75
BHAR %	8.83	-22.10	153.55	1124.97	-159.88
Independent					
Market Capitalization MSEK	1007.86	52.82	2539.70	22653.79	2.70
Sales MSEK	1085.17	19.54	3217.62	29402.00	0.00
Operating Profit Margin %	-43.62	0.00	5201.94	61499.00	-16166.67
Total Debt to Total Assets %	19.82	13.09	39.17	130.51	-357.01
Price to Book	5.37	4.25	9.52	48.53	-85.93

98.5% winsorization

	Mean	Median	Std. Dev.	Maximum	Minimum
Dependent					
Initial Return %	3.26	0.00	21.59	173.77	-49.91
BHAR %	8.24	-22.10	149.28	1027.40	-159.32
Independent					
Market Capitalization MSEK	972.95	52.05	2396.85	19926.04	3.05
Sales MSEK	1064.83	19.54	3043.22	26107.42	0.00
Operating Profit Margin %	-122.22	0.00	4196.71	47868.16	-15268.68
Total Debt to Total Assets %	20.27	13.09	34.53	122.87	-277.79
Price to Book	5.45	4.25	8.38	43.83	-68.33

97.5% winsorization

	Mean	Median	Std. Dev.	Maximum	Minimum
Dependent					
Initial Return %	2.74	0.00	17.75	80.16	-39.73
BHAR %	6.11	-22.10	136.45	683.00	-156.72
Independent					
Market Capitalization MSEK	911.37	52.05	2002.51	9956.63	4.32
Sales MSEK	992.56	19.54	2542.63	14497.18	0.00
Operating Profit Margin %	-395.37	0.00	1632.77	229.83	-12002.68
Total Debt to Total Assets %	21.81	13.09	24.71	95.75	-0.91
Price to Book	5.73	4.25	5.57	27.36	-6.55

Appendix B: Test for Heteroscedasticity

Heteroskedasticity Test: White

F-statistic	0.774251	Prob. F(100,61)	0.8726
Obs*R-squared	90.61122	Prob. Chi-Square(100)	0.7384
Scaled explained SS	425.2617	Prob. Chi-Square(100)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/17/16 Time: 17:54
Sample: 1 162
Included observations: 162
Collinear test regressors dropped from specification

R-squared	0.559329	Mean dependent var	15961.18
Adjusted R-squared	-0.163084	S.D. dependent var	54803.55
S.E. of regression	59103.63	Akaike info criterion	25.08216
Sum squared resid	2.13E+11	Schwarz criterion	27.00715
Log likelihood	-1930.655	Hannan-Quinn criter.	25.86374
F-statistic	0.774251	Durbin-Watson stat	1.933189
Prob(F-statistic)	0.872598		

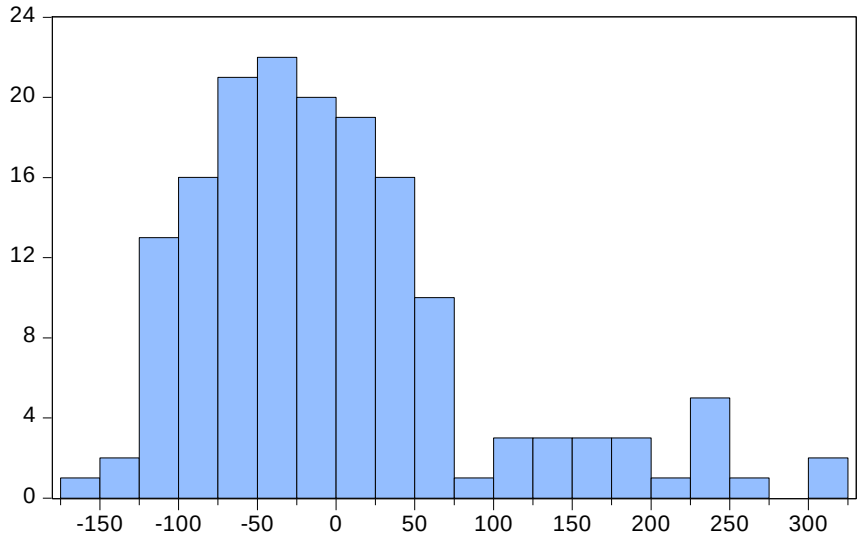
Appendix C: Test for Multicollinearity

Covariance Analysis: Ordinary
Date: 05/16/16 Time: 17:16
Sample (adjusted): 1 163
Included observations: 162 after adjustments
Balanced sample (listwise missing value deletion)

Correlation t-Statistic	BHAR	DUMMYEXPA...	INITIALRETU...	MARKETCAPI...	SALESMSEK	OPERATING...	TOTALDEBT...	PRICE2BOO...	DUMMYOMX...	DUMMYCON...	DUMMYCON...	DUMMYINFO...	DUMMYTELE...	DUMMYMATE...	DUMMYINDU...	DUMMYHEAL...	DUMMYUTILI...
BHAR	1.000000																

DUMMYEXPANSIO...	0.061429	1.000000															
	0.778492	---															
INITIALRETURN	0.118876	-0.026692	1.000000														
	1.514409	-0.337755	---														
MARKETCAPITALIZ...	0.053016	0.063479	-0.011818	1.000000													
	0.671554	0.804574	-0.149496	---													
SALESMSEK	0.070743	-0.036501	-0.006713	0.863453	1.000000												
	0.897082	-0.462018	-0.084915	21.65203	---												
OPERATINGPROFI...	0.169273	0.126610	0.095802	0.179567	0.184160	1.000000											
	2.172510	1.614501	1.217407	2.308889	2.369994	---											
TOTALDEBT2TOTA...	0.015505	-0.009663	0.022886	0.306285	0.393227	0.238750	1.000000										
	0.196142	-0.122234	0.289568	4.069823	5.409776	3.109908	---										
PRICE2BOOK	-0.051557	0.079127	0.033329	-0.169001	-0.182818	-0.113705	0.072643	1.000000									
	-0.653020	1.004028	0.421817	-2.168907	-2.352125	-1.447660	0.921299	---									
DUMMYOMXNASDA...	0.179136	0.113585	-0.136370	0.672631	0.591130	0.229280	0.235713	-0.238817	1.000000								
	2.303160	1.446104	-1.741226	11.49787	9.270372	2.979568	3.068005	-3.743985	---								
DUMMYCONSUME...	0.138314	0.082570	0.035162	0.262442	0.128923	0.053837	0.012742	-0.077683	0.092708	1.000000							
	1.766532	1.048017	0.445038	3.440245	1.644479	0.681973	0.161192	-0.985594	1.177749	---							
DUMMYCONSUME...	-0.077444	0.020012	0.049657	-0.030953	0.012920	0.044202	0.153345	0.090696	-0.054996	-0.078652	1.000000						
	-0.982542	0.253180	0.628893	-0.391716	0.163436	0.559667	1.962896	1.151967	-0.696711	-0.997975	---						
DUMMYINFORMATI...	0.014864	0.023370	0.032117	-0.051733	-0.043039	0.050206	-0.017963	0.118301	-0.121823	-0.047033	-0.196061	1.000000					
	0.188034	0.295693	0.406461	-0.655248	-0.544914	0.635869	-0.227253	1.506985	-1.552520	-0.595585	-2.529078	---					
DUMMYTELECOMM...	-0.035238	-0.009761	-0.105970	-0.090307	-0.082387	0.063214	-0.025196	-0.006570	0.037040	-0.029191	-0.121684	-0.072765	1.000000				
	-0.446003	-0.123477	-1.348012	-1.146986	-1.045681	0.801206	-0.318802	-0.083112	0.468839	-0.369394	-1.550717	-0.922861	---				
DUMMYMATERIALS...	0.138463	-0.111472	0.080207	0.049049	0.110563	-0.055285	-0.089247	-0.058976	0.005228	-0.047033	-0.196061	-0.117241	-0.072765	1.000000			
	1.768467	-1.444651	1.017823	0.621180	1.407145	-0.700380	-1.133414	-0.747300	0.066136	-0.595585	-2.529078	-1.493298	-0.922861	---			
DUMMYINDUSTRIA...	-0.026809	0.045446	-0.112578	0.028821	0.090430	-0.106955	0.051946	0.054892	0.050139	-0.087814	-0.366058	-0.218897	-0.135857	-0.218897	1.000000		
	-0.339237	0.575442	-1.433122	0.364715	1.148560	-1.360684	0.657955	0.695384	0.635009	-1.115072	-4.975661	-2.837676	-1.734557	-2.837676	---		
DUMMYHEALTHCA...	0.090297	-0.000893	-0.067546	-0.041212	-0.126029	-0.063367	-0.260517	-0.063559	-0.008292	-0.043878	-0.182910	-0.109377	-0.067884	-0.109377	-0.204215	1.000000	
	1.146865	-0.011297	-0.856357	-0.521735	-1.606974	-0.803154	-3.413171	-0.805595	-0.104893	-0.555556	-2.353348	-1.391877	-0.860663	-1.391877	-2.638743	---	
DUMMYUTILITIES	-0.040777	-0.059392	0.138476	-0.015804	-0.047360	0.038137	0.013594	-0.019990	0.036278	-0.015357	-0.064018	-0.038282	-0.023760	-0.038282	-0.071475	-0.035714	1.000000
	-0.516228	-0.752590	1.768642	-0.199930	-0.599729	0.482745	0.171973	-0.252908	0.459192	-0.194280	-0.811441	-0.484589	-0.300622	-0.484589	-0.906415	-0.452042	---

Appendix D: Test for Non-normality



Series: Residuals	
Sample 1 163	
Observations 162	
Mean	-6.85e-16
Median	-17.60558
Maximum	304.6060
Minimum	-159.0483
Std. Dev.	92.12504
Skewness	1.239535
Kurtosis	4.376908
Jarque-Bera	54.28124
Probability	0.000000

Appendix E: Final Sample

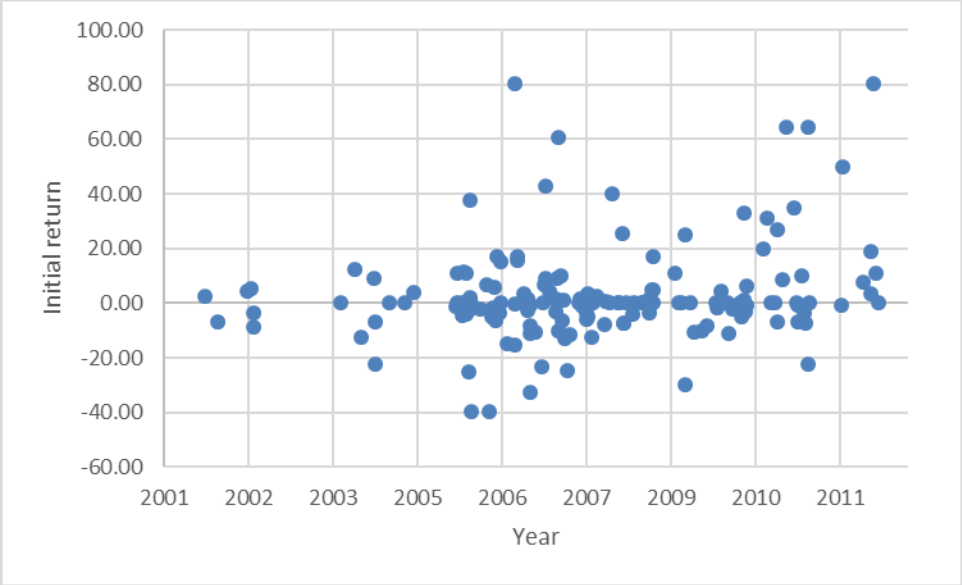
IPO firm	Date
1618 STRICT	11-19-2007
203 WEB GROUP	2-18-2010
A+ SCIENCE HOLDING	6-10-2004
AARHUSKARLSHAMN	9-29-2005
ABELCO	1-17-2011
ADDTECH 'B'	9-3-2001
ADTAIL	5-26-2009
ALFA LAVAL	5-17-2002
ALLENEX	12-12-2006
ALLTELE	3-1-2007
ALPHAHELIX MOLEDIAG	9-15-2006
AMASTEN HOLDING	9-1-2004
ARCTIC GOLD	7-16-2009
ARISE	3-24-2010
AROCELL	5-25-2011
AU HOLDING	12-28-2005
AVEGA GROUP 'B'	11-1-2007
AVONOVA SVERIGE	11-29-2005
BAHNHOF 'B'	12-19-2007
BALLINGSLÖV	6-19-2002
BE GROUP	11-24-2006
BESTIN	8-18-2008
BILLERUD KORSNÄS	11-20-2001
BIOSENSOR APPLICATIONS SV	6-22-2006
BIOTECH	12-21-2005
BOTNIA EXPLORATION	12-14-2009
BOULE DIAGNOSTICS	6-23-2011
BRINOVA FASTIGHETER	11-20-2003
BULTEN	5-20-2011
BYGGMAX GROUP	6-2-2010
CATENA	4-26-2006
CATERING PLEASE	8-7-2007
CELLAVISION	5-28-2007
CHERRY	9-12-2006
CLINICAL LASERTHERMIA	4-16-2009
CLOETTA	12-8-2008
COMMUNITY ENTM.	8-11-2008
CONCENTRIC	6-16-2011
COPPERSTONE RESOURCE	2-22-2007
CREATIVE ANTIBIOTICS	2-12-2004
CWS COMFORT WINDOW	5-12-2009

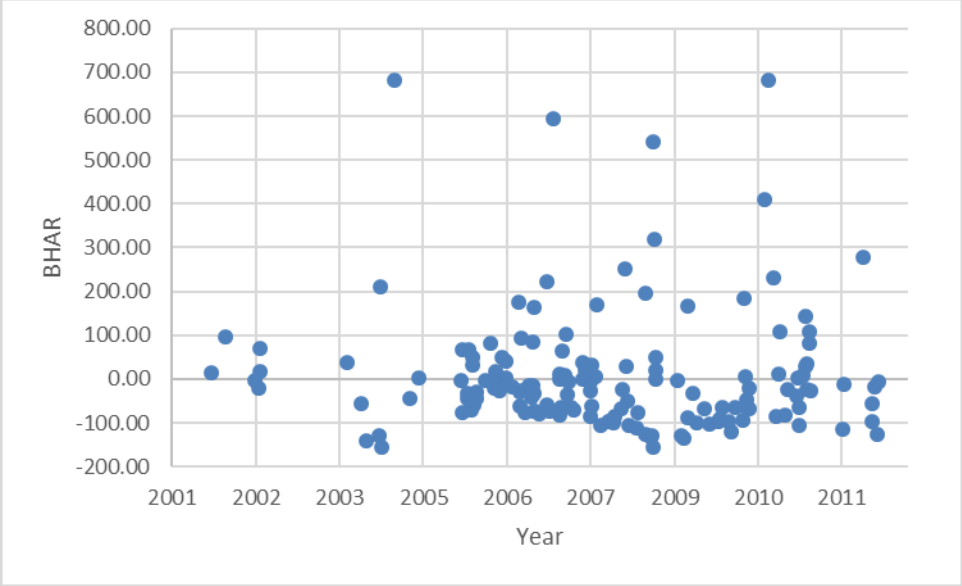
IPO firm	Date
DEDICARE	5-4-2011
DEVICOM	6-29-2007
DGC ONE	6-16-2008
DIGNITANA	6-18-2009
DIOS FASTIGHETER	5-22-2006
DUNI	11-14-2007
EAST CAPITAL EXPLORER	11-9-2007
EASY FILL	5-22-2007
ECO BYGGOLIT	12-28-2011
ECOMB	2-2-2011
ELECTRA GRUPPEN	5-4-2006
ENZYMATICA	6-14-2011
EPISURF MEDICAL	11-8-2010
EUROCINE VACCINES	12-12-2006
EUROCON CONSULTING	12-14-2007
EWORK SCANDINAVIA	5-22-2008
EXINI DIAGNOSTICS	8-10-2009
FAST TV NET	1-11-2007
FDT SYSTEM HOLDING	8-3-2012
FOLLOWIT HOLDING	1-21-2005
FX INTERNATIONAL	4-15-2011
G5 ENTERTAINMENT	11-19-2008
GANT COMPANY	3-28-2006
GENESIS IT	10-15-2010
GIFTTODAY SWEDEN	3-4-2008
GLOBAL GAMING FACTORY	11-29-2005
GLOBALFUN	3-26-2008
GULLBERG & JANSSON	6-19-2012
H1 COMMUNICATION	7-2-2008
HAMMAR INVEST	3-7-2007
HAMMARBY BANDY	5-15-2008
HEART OF BRANDS	5-14-2007
HEMTEX DEAD	10-6-2005
HEXPOL	6-9-2008
HMS NETWORKS	10-19-2007
HOMEMAID	11-14-2005
HUBBR	11-30-2010
HUSQVARNA	6-13-2006
ICA GRUPPEN	12-8-2005
INDUTRADE	10-5-2005
INTERFOX RESOURCES	12-1-2008

IPO firm	Date
INTRUM JUSTITIA	6-7-2002
IRONROAD	1-11-2010
JAMES CONCEPTS	11-20-2007
JAYS	5-18-2010
JELLO	12-15-2005
JOJKA COMMUNICATIONS	7-18-2007
JUNEBUD	10-26-2009
KAPPAHL	2-23-2006
KAROLINSKA DEVELOPMENT	4-15-2011
KLICK DATA	3-15-2004
KOGGBRON FASTIGHETER	3-25-2011
LAPPLAND GOLDMINERS	6-7-2004
LATVIAN FOREST	6-19-2012
LINDAB INTERNATIONAL	12-1-2006
LOOMIS	12-9-2008
LOVISAGRUVAN	11-14-2007
LUNCHEXPRESS I SVERIGE	5-12-2010
MABI RENT	6-16-2010
MAHLER INTERNATIONAL	12-12-2005
MASSOLIT MEDIA	12-20-2005
MAVSHACK	10-8-2008
MAXPEAK	10-18-2006
MEDFIELD DIAGNOSTICS	5-2-2012
MEDICPEN	12-11-2006
MICROPOS MEDICAL	12-21-2009
MINERAL INVEST INTL	9-21-2009
MIRIS HOLDING	6-22-2006
MOBERG PHARMA	5-26-2011
MQ HOLDING	6-18-2010
NCS NDC.CAMPING & SPS.	11-8-2006
NEDERMAN HOLDING	5-16-2007
NETENT	4-5-2007
NEUROVIVE PHARMACEUTIC.	10-3-2008
NISCAYAH GROUP	9-29-2006
NOBIA	6-19-2002
NORDIC ACS.BUYOUT FUND	5-14-2007
NORDIQ GOTEBORG	1-2-2012
NOVUS GROUP INTL.	6-1-2007
ODD MOLLY INTL.	6-18-2007
OPUS GROUP	4-18-2006

IPO firm	Date
ORASOLV	6-1-2004
OREXO	11-9-2005
PARANS SOLAR LIGHTING	6-4-2010
PEAB INDUSTRI	10-1-2007
POLYPLANK	12-30-2005
PROCAST MEDIA	6-15-2009
QLIRO GROUP	12-15-2010
RELATION AND BRAND	7-31-2006
RESPIRATORIUS	7-5-2012
REZIDOR HOTEL GROUP	11-28-2006
RW CAPITAL	2-28-2008
SAFE AT SEA	1-10-2008
SCIROCCO	12-7-2006
SEAMLESS DISTRIBUTION	5-30-2006
SECURITAS DIRECT	9-29-2006
SENZIME	6-18-2008
SPORTJOHAN	3-2-2010
STAR VAULT	9-28-2007
SWEDISH ORPHAN BIOVITRU	9-15-2006
SYSTEMAIR	10-12-2007
SYSTEMATISK KAPFORV	11-4-2008
TIGRAN TECHNOLOGIES	11-20-2008
TILGIN	12-15-2006
TITANA	3-15-2007
TOWORK SVERIGE	11-12-2007
TRADEDOUBLER	11-8-2005
TRANSFERATOR	3-15-2007
TRANSMODE	5-27-2011
TRUE HEADING	5-28-2010
UNITED MEDIA SWEDEN	7-23-2012
VARMLANDS FINANS	12-8-2008
WATER JET SWEDEN	7-6-2007
WIKING MINERAL	5-15-2006
VINDICO SECURITY	4-4-2011
VJ SINCE 1890	4-8-2008
WNTRESEARCH	12-17-2010
WONDERFUL TIMES GROUP	11-11-2008
XEZZEX	12-2-2004
XRF ANALYTICAL	6-11-2007
ZINZINO	9-20-2010

Appendix F: Illustration of Initial Return and BHAR over sample period





Appendix G: Insignificant Student's t-test for differences between group

Initial Return	*Early expansion*	*Late expansion*
Mean	1.03	3.71
Variance	303.79	354.32
Observations	61	57
Hypothesized Mean Difference	0	
df	114	
t Stat	-0.8031	
P(T<=t) two-tail	0.4236	
t Critical two-tail	1.981	

Initial Return	*Early Expansion*	*Early Recession*
Mean	1.03	4.82
Variance	303.79	262.1
Observations	61	30
Hypothesized Mean Difference	0	
df	62	
t Stat	-1.0232	
P(T<=t) two-tail	0.3102	
t Critical two-tail	1.999	

Initial Return	*Early expansion*	*Late Recession*
Mean	1.03	1.83
Variance	303.79	361.09
Observations	61	14
Hypothesized Mean Difference	0	
df	18	
t Stat	-0.1439	
P(T<=t) two-tail	0.8871	
t Critical two-tail	2.1009	

Initial Return	*Late Expansion*	*Early Recession*
Mean	3.71	4.82
Variance	354.32	262.1
Observations	57	30
Hypothesized Mean Difference	0	
df	67	
t Stat	-0.285	
P(T<=t) two-tail	0.7765	
t Critical two-tail	1.996	

Initial Return	*Late Expansion*	*Late Recession*
Mean	3.71	1.83
Variance	354.32	361.09
Observations	57	14
Hypothesized Mean Difference	0	
df	20	
t Stat	0.3339	
P(T<=t) two-tail	0.742	
t Critical two-tail	2.086	

Initial Return	*Early Recession*	*Late Recession*
Mean	4.82	1.83
Variance	262.1	361.09
Observations	30	14
Hypothesized Mean Difference	0	
df	22	
t Stat	0.509	
P(T<=t) two-tail	0.6158	
t Critical two-tail	2.0739	

BHAR	*Early expansion*	*Late expansion*
Mean	15.3	4.66
Variance	23802.39	12409.98
Observations	61	57
Hypothesized Mean Difference	0	
df	109	
t Stat	0.4312	
P(T<=t) two-tail	0.6672	
t Critical two-tail	1.982	

BHAR	*Early Expansion*	*Early Recession*
Mean	15.3	19.06
Variance	23802.39	24842.81
Observations	61	30
Hypothesized Mean Difference	0	
df	57	
t Stat	-0.1077	
P(T<=t) two-tail	0.9146	
t Critical two-tail	2.0025	

BHAR	*Late Expansion*	*Early Recession*
Mean	4.66	19.06
Variance	12409.98	24842.81
Observations	57	30
Hypothesized Mean Difference	0	
df	45	
t Stat	-0.445	
P(T<=t) two-tail	0.6584	
t Critical two-tail	2.0141	