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Master Degree Project in Finance

Industry dependent performance of initial public offerings

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Abstract

We analyze abnormal returns of initial public offerings (IPOs) in different industries from 2007 to 2015 in the main Swedish markets. We find that IPOs outperform a sample of matching firms from the initial time period (first trading day) to the aftermarket period (a three-year period). Furthermore, adjusted initial returns and offer size of IPOs are positively related to their aftermarket performance. "Oil & Gas, Basic Materials & Utilities" and "Health care" are the two best performing sectors and they are the only two sectors that significantly outperform "Industrials", with the latter being the worst performing sector.

keywords: *IPO, event study, performance, CAR, buy-and-hold*

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Contents

1 Introduction

This study examines the performance of initial public offerings (IPOs) during 2007-2015 listed on the main Swedish stock markets. The primary purpose of the research is to evaluate how IPOs performance differ between industries, where industries are specified according to the Industry Classification Benchmark (ICB). Several other factors are tested to evaluate if and how they affect IPOs performance. These additional factors are adjusted initial return, firm age, lockup period, offer size and volume of IPOs issued. According to Porter (1979), companies' industry sector is one of the most important dimensions in analyzing company performance. Studying 3-year aftermarket performance of U.S IPOs, Ritter (1991) finds that there are major differences in performance between industries. Ritter documents that only 3 of 14 industries outperform its benchmark. Therefore, we are interested in studying IPOs performance across industries.

From 2009, Swedish stock markets have been thriving, and so have the number of Swedish IPOs listed. Issuing stocks to the public for the first time plays an important role for both founders and investors. For founders, it is a source to raise capital, create a public market to trade the stocks and to realize profits. For investors, it is an opportunity to increase wealth by buying unseasoned stock issues (Ritter and Welch 2002). Examining IPOs performance are of interest for both issuers and investors. For example, there are large variations in the number of firms going public between time periods, suggesting that market conditions are of great importance for issuers of IPOs. For investors, it is interesting because there might exist price patterns of IPOs that investors could exploit to achieve superior returns when investing in IPOs.

There are many papers that investigate the anomalies of IPOs performance, most regarding U.S stock issues. For example, Ibbotson (1975) investigates the performance of IPOs in the 1960s and finds that initial- and long run performance are both positive. Ritter (1991) finds that IPOs on average underperform in the 3-year aftermarket period during 1975-1984 in U.S stock markets. The literature on Swedish IPOs, however, is scarcer. Eckbo (2007) and Loughran, Ritter, and Rydqvist (1994) provide evidence that Swedish IPOs on average are underpriced in 1970-2003. Additionally, they document that average Swedish IPOs 3-year aftermarket performance outperformed the market in the 1980s. More recent studies are hard to find, and it is even more difficult to find any research that investigates Swedish IPOs performance across industries. The lack of relevant studies of Swedish IPOs performance along with increasing interest in Swedish IPOs, especially in "Health Care" and "Indus-

trial" sectors, in 2007-2015 encourages us to dig into this area. For full distribution of IPOs by industry during this period, see Figure 2.

IPOs during 2007-2015 are used in this study, thus providing enough time horizon to analyze the 3-year aftermarket performance. Furthermore, IPOs are from main Swedish markets, which include NASDAQ Stockholm, First North, and Spotlight, and provide 121 subjects during the research period.

Inspired by Ritter (1991), we apply cumulative average return (CAR), buy-and-hold return (BHR) method and regression analysis to our research. OMX Stockholm allshare index (OMXSPI) and matching firms are added as benchmarks to adjust the IPOs returns. In addition, the initial return period is defined as the first trading day, and the aftermarket period is defined as a three-year time period after the first trading day. The analysis of how aftermarket performance is affected by industry, offer size, initial return, firms age, the volume of IPOs leads us to find the patterns for our research subjects.

We find that IPOs generally outperform in the initial period. Among industries, IPOs in the "Consumer goods" sector has the highest average abnormal return. We also find that IPOs outperform in the aftermarket period by applying both CAR and BHR methods. "Oil & Gas, Basic Materials & Utilities" sector has the best aftermarket performance when adjusted by the matching firm benchmark, while "Health care" has the best aftermarket performance when adjusted by the market benchmark. Compared to the worst performing industry "Technology", only "Oil & Gas, Basic Materials & Utilities" and "Health Care" perform significantly better. For relevant factors, both adjusted initial return and offer size show a positive relationship with IPOs aftermarket performance at different significant levels.

2 Literature Review

Pricing and performance of IPOs are recurrent topics in the financial literature, where financial economists for decades have documented how well issuers and investors have fared by selling and/or purchasing unseasoned stock issues. In this section, we review articles that focus on initial- and long-run performance of IPOs and factors that might be related to IPOs performance.

Reilly and Hatfield (1969) evaluate "the new issue fever", defined as time periods when investors exhibit remarkably large interest in new stock issues. Using a

sample of 53 IPOs selected from two subperiods during 1963-1965, they find that investors on average received superior returns in the short run, varying from 1-5 trading days, and in the one-year aftermarket period. The returns of IPOs are superior to returns from investing in the Dow Jones Industrial Average (DJIA), the National Quotation Bureau Over-the-Counter Industrial Average (OTC) index and a stock portfolio consisting of randomly selected listed companies. Further, Reilly and Hatfield find that investors are equally likely to gain or lose wealth by investing in IPOs instead of in the secondary market.

Ibbotson (1975) examines the risk-adjusted initial- and aftermarket performance of a sample of randomly selected unseasoned stocks offerings in the 1960s. In line with Reilly and Hatfield (1969), Ibbotson finds that unseasoned stock issues have on average positive returns during the first year after listing followed by negative returns for the next three years and then positive returns in the fifth year. However, Ibbotson argues that it is difficult to draw any conclusions about IPOs performance due to the large standard errors in his study.

Studying IPOs in the 1960s, Ibbotson and Jaffe (1975) document the "hot issue market" that is characterized by time periods when new stock issues experience abnormal initial returns, returns over a one-month period after listing. They find that initial returns are serially dependent, which suggests that initial returns to some extent are predictable.

Examining the "hot issue market" in the early 1980s, Ritter (1984) documents extremely high average initial returns, defined as average first trading day returns, of 48.4% during some time periods. Ritter also finds that initial returns are serially correlated, which supports the result of Ibbotson and Jaffe (1975). Testing whether riskiness of IPOs can explain hot issue markets, Ritter finds no evidence that this is the case. Instead, Ritter finds that IPOs in the natural resource industry count for the extreme performance in the time period studied. IPOs in other industries are not remarkably affected by the hot issue market. Ritter's results support the theory of "windows of opportunities" or "fads".

Studying 1,598 IPOs issued in 1977-1987, Aggarwal and Rivoli (1990) find that IPOs purchased at their first-day closing price and held for 250 days generally leave investors with a negative wealth of 13.73% relative to NASDAQ-index return. However, investing at IPOs offer price and holding for one year would on average yield better returns. The results thus suggest that returns of IPOs are positive only in the short run. According to Aggarwal and Rivoli, positive first trading day returns

are not due to underpricing by investment banks. Instead, there seems to be misvaluation by over-optimistic investors on the first trading day.

Ritter (1991) analyzes the performance of new stocks issued during 1975-1984. Focusing on the 3-year aftermarket performance and using several benchmarks to calculate wealth relatives, Ritter shows that IPOs on average underperform, which is consistent with Ibbotson (1975) result. Moreover, Ritter finds that small firms going public during years with high volumes of unseasoned stock issues did even worse than average. According to Ritter, these results of long-run underperformance support explanations such as fads and over-optimism for IPOs. In line with Aggarwal and Rivoli (1990), Ritter's results suggest misvaluation of IPOs on their first trading day.

In line with Ritter (1991), Loughran and Ritter (1995) find that investing in new U.S stock issues during 1970-1990 would on average leave investors with less wealth relative to invest in similar listed stocks matched by market capitalization. Further, they find that the underperformance tends to decrease in the fifth year after listing, which follows the price path documented by Ibbotson (1975). This research also documents that the volume of IPOs affects performance and firms going public during low IPO volume years suffer less from underperformance.

Loughran and Ritter (2002) discover that issuers of IPOs on average leave $9.1 million on the table, suggesting that IPOs are underpriced. For example, $37 billion were left on the table in 1999 and 117 IPOs prices doubled on their first trading day. Moreover, in the year 2000, 77 IPOs doubled their prices during their first trading day and a value of approximately $27 billion was left on the table. In contrast, only 29 IPOs prices doubled during 1995-1998, suggesting less underpricing of IPOs. Loughran and Ritter find that more money is left on the table during boom markets compared to a bear market. This finding supports previous studies result mentioned above.

While previous studies focus on unseasoned stock issues in the U.S, Loughran, Ritter, and Rydqvist (1994) assemble and discuss results on performance for companies issuing unseasoned stocks in 25 countries. Combining results from studies by Ridder and Rydqvist, they show that Swedish IPOs in the years 1970-1991 have on average an initial return of 39%. This is similar to what Loughran, Ritter, and Rydqvist find for IPOs in Sweden during the 1980s. Moreover, they find that the average 3-year aftermarket benchmark-adjusted return is 1.2%. As for the Swedish market, Eckbo (2007) documents that underpricing of IPOs in Sweden has continued from the 1990s until 2003.

Based on a study of 121 IPOs performances in Sweden during 2007-2015, our result regarding the initial returns of IPOs are in line with Ritter (1984,1991), Aggarwal and Rivoli (1990) and Loughran, Ritter, and Rydqvist (1994). Moreover, we find positive 3-year aftermarket returns for IPOs, which also is documented on Swedish IPOs by Loughran, Ritter, and Rydqvist (1994). However, Ibbotson (1975), and Ritter (1991) find negative 3-year aftermarket returns (benchmark-adjusted) among industries. The difference among results might be due to studying IPOs listed on different stock markets and during another time period. Among industries, we find that "Oil & Gas, Basic Materials & Utilities" and "Health care" are the two best performing sectors, and the "Industrial" is the worst while Ritter (1991) finds that "Financial institutions" is the best performing sector and "Oil & Gas" is the worst. The difference might also be caused by similar reason which causes the difference in 3-year aftermarket returns.

3 Data and Methodology

3.1 Data selection

Our sample comprises data from 121 IPOs during 2007-2015 in the following three Swedish stock markets: NASDAQ Stockholm, First North, and Spotlight. Following Ritter (1991), we also include IPOs that are delisted or switch exchange within 3 years after being listed to avoid survivorship bias. A 3-year period is the maximum aftermarket period we will look at. For IPOs that are delisted before the 3-year period after listing, the research period is shortened till IPOs' last listing date. For IPOs switched to other markets, the research period is shortened till the last listing date on the market where IPOs are issued. All data are collected using Bloomberg, Swedish House of Finance, IPOs prospectus, annual reports and from Skatteverket. As Figure 1 shows, there is no specific pattern for the volume of IPOs during 2007-2015. Ritter and Welch (2002) discuss that the decisions of firms going public are related to market conditions. This would explain the low volume of IPOs in 2009 after the global financial crisis. We suspect the low volume in 2012 and 2013 are due to the disturbance in the eurozone during 2010-2015.

3.2 General description

We are interested in studying both initial- and aftermarket returns of Swedish IPOs. Following Ritter (1991), we define the initial period as the period from IPOs offer

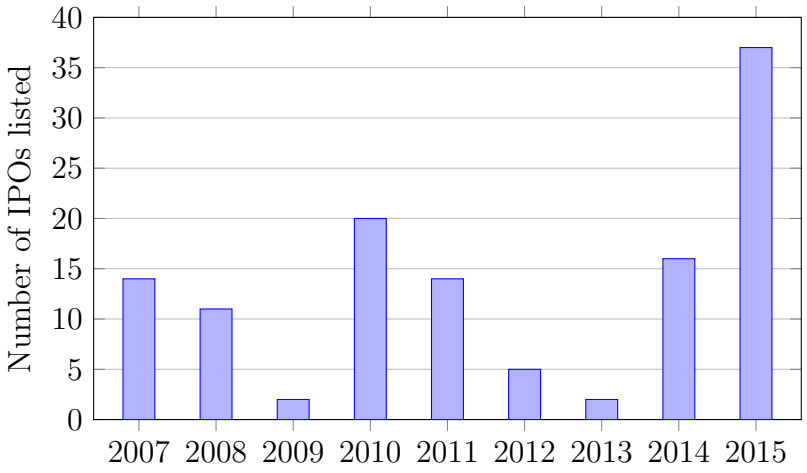

Figure 1: Volume of IPOs by year

price being set until the closes of the first trading day. The aftermarket period starts on the second trading day and continues for 36 months or until delisted. To measure aftermarket performance we calculate monthly returns, where each month consists of 21 trading days. For example, month 1 includes trading days 2-22 and month 2 includes trading days 23 to 43 and so on. Note that the initial period is treated as month 0. Using monthly returns based on 21 trading days gives more accurate time intervals compared to extract monthly returns directly from Bloomberg. This is because IPOs can be listed whenever during a calendar month and therefore, IPOs will have been traded for a different amount of days before the aftermarket period begins. Moreover, calendar months consist of different amount of days due to holidays, etc., which affects the initial- and aftermarket period. For missing observations on closing prices, which do occur in our sample, we replace the missing prices with previously observed closing prices. This problem concerns mostly stocks listed on the Spotlight market.

We use two different benchmarks: the first one is OMXSPI and the second one is a set of matching firms. Because we consider the IPOs listed on Swedish markets, we use OMXSPI to represent the trend of main Swedish markets to adjust the raw return for the IPOs. For the second benchmark, matching companies by industry and market capitalization are used. The process of matching firm selection is as follows: first, find all of the companies that are listed from NASDAQ Stockholm, First North, and Spotlight. Second, categorize them into different industries. Finally, calculate their market capitalization at the end of 2006 and at the end of 2010 for matching firms. Pair IPOs with matching firms that are within the same industry and are of similar size. For a more detailed description of matching firms, see Appendix.

Two methods are applied to calculate the return of long-run performance in the aftermarket. The first one is the cumulative average return (CAR) and the second one is Buy and hold return (BHR). The CAR method is applied to draw the trend of aftermarket performance after adjusted by a benchmark. The BHR method is used for investigating if the IPOs underperform or outperform its benchmark during the period under consideration in different sectors. BHR is also applied in the regression analysis.

3.3 Equations

Raw return for stock i in month t is denoted by r_{it} and calculated as

$$r_{it} = \frac{p_{it}}{p_{it-1}} - 1, \tag{1}$$

where p_{it} denotes the closing price in month *t=1,...,36* for stock *i*. Initial period, which is the first trading day, is defined as month 0 (i.e. *t=0*). When t=0, p_{it-1} is the offer price of the IPO for stock *i*.

Benchmark-adjusted return is denoted by ar_{it} for stock i in month t and calculated as

$$ar_{it} = r_{it} - r_{benchmark,t}, \tag{2}$$

where $r_{benchmark,t}$ denotes the raw return for the benchmark (OMXSPI or matching firms) in month *t=1,...,36*.

Defining n_t as the number of stocks that are still listed in month t, average benchmark-adjusted return is calculated as

$$AR_t = \frac{1}{n_t} \sum_{i=1}^{n_t} ar_{it}, \tag{3}$$

Cumulative average return (CAR) in month t from an equally weighed portfolio of IPOs, using monthly rebalancing, is given by

$$CAR_t = \sum_{s=1}^{t} AR_s, \tag{4}$$

where the CAR is the benchmark-adjusted aftermarket performance from event month *1* to event month *s*.

The 3-year buy-and-hold return (BHR) for stock i is defined as

$$BHR_i = \prod_{t=1}^{36}(1 + r_{it}), \tag{5}$$

If an IPO is delisted or switch markets before the end of the 3-year period, BHR is truncated. Wealth relative (WR) is defined as

$$WR = \frac{Average\ BHR_{IPOs}}{Average\ BHR_{benchmark}},^{1} \tag{6}$$

Wealth relative measures long-run performance, defined as the ratio of average buy-and-hold for IPOs to average buy-and-hold for the benchmark. A value above 1 indicates that IPOs outperform its benchmark and a value below 1 indicates that IPOs underperform its benchmark.

3.4 Variable descriptions

To analyze the performance of IPOs, we apply several variables which are relevant in the following sections.

IPO return: As for measuring the long-term IPO performance, IPOs three-year total return is calculated by using the BHR method. There are two reasons to use BHR instead of CAR here. First, CAR is a biased predictor of BHR. For example, only focusing on the result from using the CAR method but not using results obtained by the BHR method, a researcher may draw incorrect conclusions. Secondly, even if the CAR method correctly estimates if the long-run return is positive or negative, it might fail to correctly estimate the return for the average/median IPO in the sample compared to an appropriate benchmark. Estimating the magnitude of the abnormal return is one of the purposes to do the event study of IPOs performance(Barber and Lyon 1997).

Initial & Benchmark returns: Since we apply two benchmarks (OMXSPI and matching firms), there are also two types of adjusted initial returns and benchmark returns used in our regressions.

Industries: In order to measure industry dependent performance of IPOs, we group

[1]Ritter (1991) defines WR on page 8, where he adds 1 to the average 3-year total return. This seems to be a typo, because he redefines the total return (percentage form) in Table 3, where the definition is equivalent to ours.

companies by their first digit in their industry classification benchmark (ICB) number. This benchmark is used by NASDAQ for Nordic companies and the first digit ranges from 0 to 9. This implies there are only ten main industries, which we find suitable since we have a small sample of IPOs. Figure 2 shows the number of IPOs in each industry. We notice that most IPOs belong to "Industrials" and "Heath Care" industry and only quite few IPOs belong to "Oil & Gas" and "Utility" industry. Since some industries only contain a very small number of IPOs, it is difficult to conduct and draw any conclusions about dispersion in performance for these industries. Therefore, we group some industries with less than 10 observations with other industries, and this is done in two ways. First, we merge "Oil & Gas"(2 observations), "Basic Materials"(7 observations) and "Utility"(1 observation) together, and "Telecommunications"(4 observations) with "Consumer Service"(12 observations) together. This merging is referred to as "industry constellation 1" in tables. Second, we combine "Oil & Gas", "Basic Materials", "Utility", and "Telecommunications". This merging is called "industry constellation 2" in tables. We will use these new industry compositions in our coming analyses and regressions.

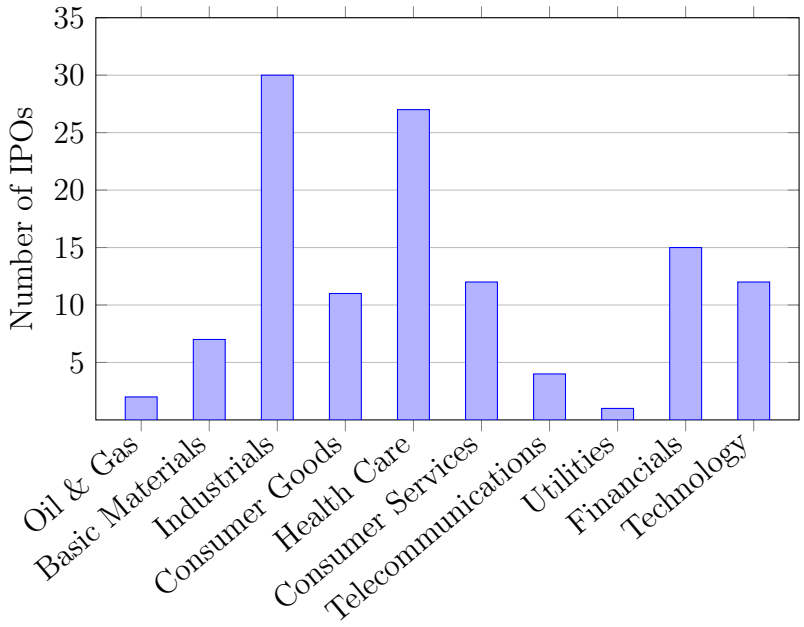

Figure 2: Number of IPOs by industry

Log Firm age: It is believed that there is a connection between firms age and IPOs performance. Loderer and Waelchli (2010) find a trend that if firms grow older, the profitability would decrease. Furthermore, David (2002) shows that the relationship between firm age and return depends on industries. In this research, the natural logarithm of firm age is used instead. This is due to the large spread in age between the IPOs in the sample. As Figure 3 shows, most firms that went

public during 2007-2015 have already been established over 5 years. Ritter (1991) defines firms age as the difference between the year of foundation and the year the company issuing stocks to the public for the first time. Since some firms are of age 0, we follow Ritter (1991) by applying log (1+age) in regression analysis.

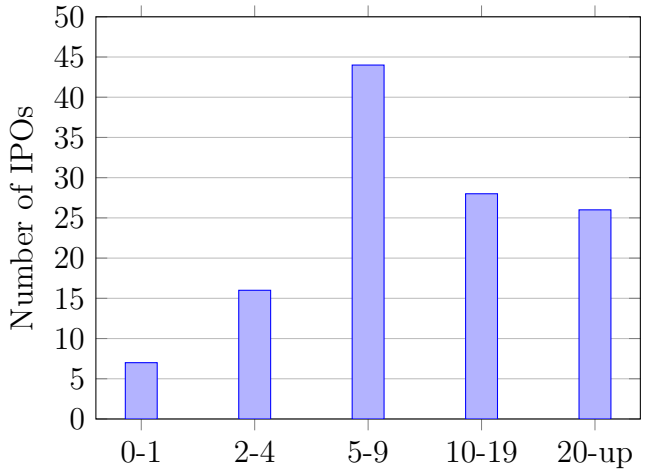

Figure 3: Firm age (Years)

Log Lockup period: For some IPOs, an agreement between current shareholders and underwriters exists that prohibits the shareholders from selling shares without permission from the underwriters during a specific period after going public (Arthurs et al. 2009). This specific time period is referred to as the lockup period. Some companies that go public have multiple lockup periods. For example, the first lockup period can be a few months and the second could be several years. Since the lockup period affects liquidity, it is worth studying how the length of the lockup period influences the performance of the issuing firm. According to Mohan and Chen (2001), most IPOs just report one restricted period. Moreover, longer periods represent a larger risk which can provide more information to our analysis. Therefore, we will only use the longest lockup periods for each IPOs in our study, and for ease of exposition, we simply call this the longest lockup period "the lockup period". According to this definition in our study, the shortest lockup period is 0 days and the longest lockup period is 1095 days. Because of the large spread, we take the natural logarithm of 1 plus the number of lockup days and use this instead.

Log Offer size: For the same reason as for firm age, we use the natural logarithm of offer size. Figure 4 shows that most companies issuing stocks for the first time to the public have an offer size between 0-25 million SEK. There are also some very big IPOs, with offer size being above 5000 million SEK.

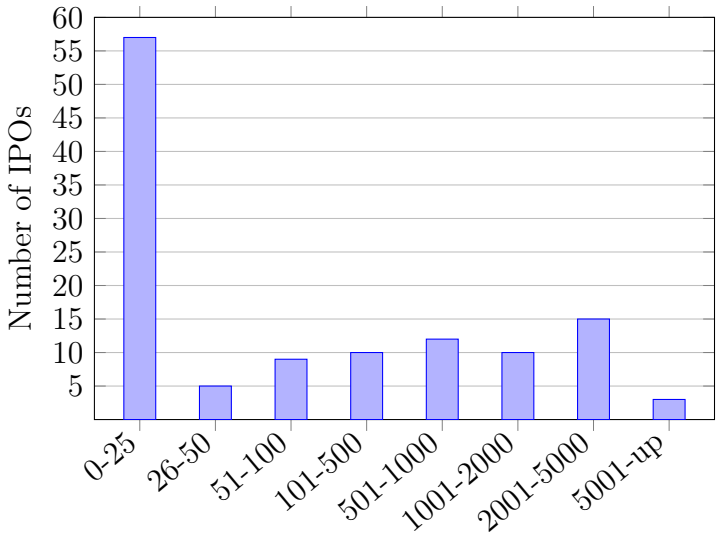

Figure 4: Offer size IPOs (MSEK)

Volume of IPOs: The volume of IPOs represents the number of companies going public each year. As mentioned above, the willingness for companies to go public is related to market conditions. The volume of IPOs is considered to have an impact on IPOs performance. We thus include it as an independent variable as well.

Summary statistics: Table 1 shows the overall description of variables that are mentioned above.

Table 1: Summary statistics

Variables	No. of obs.	Mean	St. dev.	Min	Max
Initial return IPOs	121	0.094	0.280	-0.599	1.334
Market adj. initial return IPOs	121	0.094	0.280	-0.610	1.349
Matching firm adj. initial return IPOs	121	0.091	0.287	-0.599	1.334
IPOs return (3 years)	121	0.260	1.101	-0.989	5.271
Market return (3 years)	121	0.181	0.187	-0.256	0.771
Matching firms return (3 years)	121	0.202	1.241	-0.995	7.389
Log (1+age)	121	2.388	0.937	0	4.934
Log (1+lockup days)	121	1.881	2.747	0	6.999
Log offer size IPOs (MSEK)	121	4.398	2.438	0.718	8.758
Volume of IPOs per year	121	21.248	11.210	2	37

4 Results and Analysis

In this section, we first study the initial returns, and then long-run performance by applying the CAR method. Afterward we calculate IPOs total returns using the

BHR method. The total returns are then used to measure both wealth relatives sorted by several factors and regression analyses where we include several independent variables.

4.1 Initial returns using matching firms as benchmark

In this section, we evaluate IPOs first trading day returns using matching firms as benchmark. Calculating the matching firm adjusted initial return, we find that IPOs on average perform well, with an average adjusted initial return of 9.068%. Performing a t-test, see Figure A1 in Appendix, we find that this result is statistically significant at the 1% level. Table 3 shows that matching firm-adjusted initial returns vary between industries. We can see that the "Consumer goods" sector has the highest matching firm-adjusted initial return while "Consumer service & Telecommunications" has the lowest matching firm-adjusted initial return among all industries. The spread of initial returns between industries is 23.66%. We also notice that "Consumer service & Telecommunications" is the only industry with negative matching firm-adjusted initial returns. Table 4 shows that firms with an offer size below 5 million SEK have the highest average matching firm-adjusted initial returns as of 16.53%. Firms with offer size 100-500 million SEK have the lowest average matching firm-adjusted initial return as of 3.09%. Table 5 shows that younger firms on average have higher matching firm-adjusted initial returns. Table 6 shows matching firm-adjusted initial returns by quartiles. We notice that higher matching firm-adjusted initial return seems to be positively related to wealth relative, which measures aftermarket performance. In regression Table 7, we show that matching firm-adjusted initial return is positively related to 3-year aftermarket performance and statistically significant at the 5 percent level.

4.2 Post IPO performance using matching firms as benchmark

In this part, we analyze the 3-year post IPO performance using matching firm as benchmark. We start by using the CAR method to evaluate the aftermarket performance for IPOs. Then we evaluate the aftermarket performance by applying the BHR method to measure wealth relatives categorized by several variables. Last we perform ordinary least square regressions where BHR of IPOs are used as the dependent variable, and several independent variables are included.

4.2.1 Abnormal monthly returns of IPOs

Table 2 describes the abnormal returns for IPOs from 2007 to 2015. 22 of 36 monthly average matching firm-adjusted returns (AR_t) are positive, and only AR_t in month 4 and 23 are statistically significant. Cumulative average returns (CAR_t) decrease slightly in the first few months and then increase till 21.69% at peak. Lastly, it goes down to 16.59% with 1.01 t-statistics at the end of 36 months. During this period, the number of IPOs decreases gradually from 121 to 110 due to IPOs being delisted or switched to other markets.

4.2.2 Cumulative Average Returns (CAR)

Three series of cumulative average returns are plotted in Figure 5, including raw returns, market-adjusted returns and matching firm adjusted returns. In Figure 5 we observe a decline for the raw returns during the first 6 months, and then a dramatic increase during the following 30 months. Market-adjusted and matching firm adjusted returns fluctuate for the first 8 months and then increase steadily in the following months. At the end of the period, the cumulative raw returns increase to 43.18%. The market adjusted and matching firm adjusted cumulative average returns increase to 24.18% and 16.60% respectively. For all three series, we find positive cumulative average returns, which are the opposite to what is discovered by Ritter (1991), except for raw returns he also finds a positive cumulative return. The difference might be caused by the quantity of IPOs and the stock market, benchmark and time period although similar methods are applied.

4.2.3 Aftermarket patterns by industry, offer size, firm age and initial returns

In this section, we provide tables consisting matching firm adjusted initial returns, wealth relatives, and 3-year holding returns for IPOs and matching firms sorted by industry, offer size, firm age, and initial returns. Similar tables where the market is used as a benchmark can be found in the Appendix.

It is mentioned in Section 3.4 that we use two different approaches to merge industries. Only "industry constellation 1" method is applied here. We do robustness test using "industry constellation 2" in Table A8 and find similar results. Table 3 illustrates that IPOs performance varies with industries. IPOs within the "Basic materials" industry have the highest wealth relative of 2.762, while the contrary can be noticed for companies within the Industrial sector that has a wealth relative of

Table 2: Abnormal returns of IPOs during 2007-2015

The table displays average returns (AR_t), adjusted by matching firm returns, cumulative average returns (CAR_t), and related t-statistics for event months 1-36. The decreasing number of firms trading is due to delistings. For the following formulas, n is the number of IPOs trading and t indicates the event month. AR_t is computed using equation (3). $AR_t * \sqrt{n_t}/sd_t$ is used to calculate t-statistics of AR_t, where sd_t is the cross-sectional standard deviation of AR_t. CAR_t is calculated using equation (4). $CAR_t * \sqrt{csd_t}$ is used to compute the t-statistic of CAR_t, where $csd_t = (t * var + 2 * (t-1) * cov)^{1/2}$ is the cumulative standard deviation, var is the average (over 36 months) cross-sectional variance, and cov is the first-order autocovariance of the AR_t series.

Event month	Number of firms trading	AR_t %	t-stat	$CAR_{1,t}$ %	t-stat
1	121	1.90	0.63	1.90	0.73
2	121	-2.40	-1.30	-0.50	-0.14
3	121	-0.35	-0.18	-0.85	-0.19
4	121	3.80*	2.20	2.95	0.56
5	121	0.50	0.29	3.45	0.59
6	121	-0.27	-0.13	3.18	0.50
7	121	2.24	1.01	5.42	0.78
8	121	-2.77	-0.65	2.65	0.36
9	121	2.57	1.28	5.22	0.67
10	121	2.26	1.05	7.48	0.90
11	121	1.34	0.48	8.81	1.02
12	121	1.16	0.42	9.97	1.10
13	121	-0.64	-0.30	9.33	0.99
14	121	1.17	0.58	10.50	1.07
15	121	2.51	0.97	13.01	1.28
16	121	-3.21	-1.22	9.80	0.94
17	121	0.54	0.28	10.34	0.96
18	121	-1.50	-0.67	8.84	0.80
19	120	2.92	1.16	11.76	1.03
20	120	-1.98	-0.78	9.78	0.83
21	120	-1.69	-0.64	8.09	0.67
22	120	3.82	1.43	11.91	0.97
23	119	4.86**	1.93	16.77	1.33
24	118	0.68	0.16	17.46	1.35
25	118	0.34	0.15	17.80	1.34
26	118	-0.73	-0.31	17.07	1.26
27	117	4.02	1.48	21.09	1.53
28	116	0.60	0.20	21.69	1.53
29	116	-0.48	-0.22	21.21	1.47
30	116	-6.98	-1.35	14.23	0.97
31	115	1.44	0.64	15.66	1.05
32	113	0.87	0.32	16.54	1.08
33	113	-0.20	-0.09	16.34	1.05
34	113	1.19	0.42	17.53	1.11
35	112	-2.61	-0.99	14.93	0.93
36	110	1.67	0.79	16.59	1.01

**p<0.05, *p<0.1

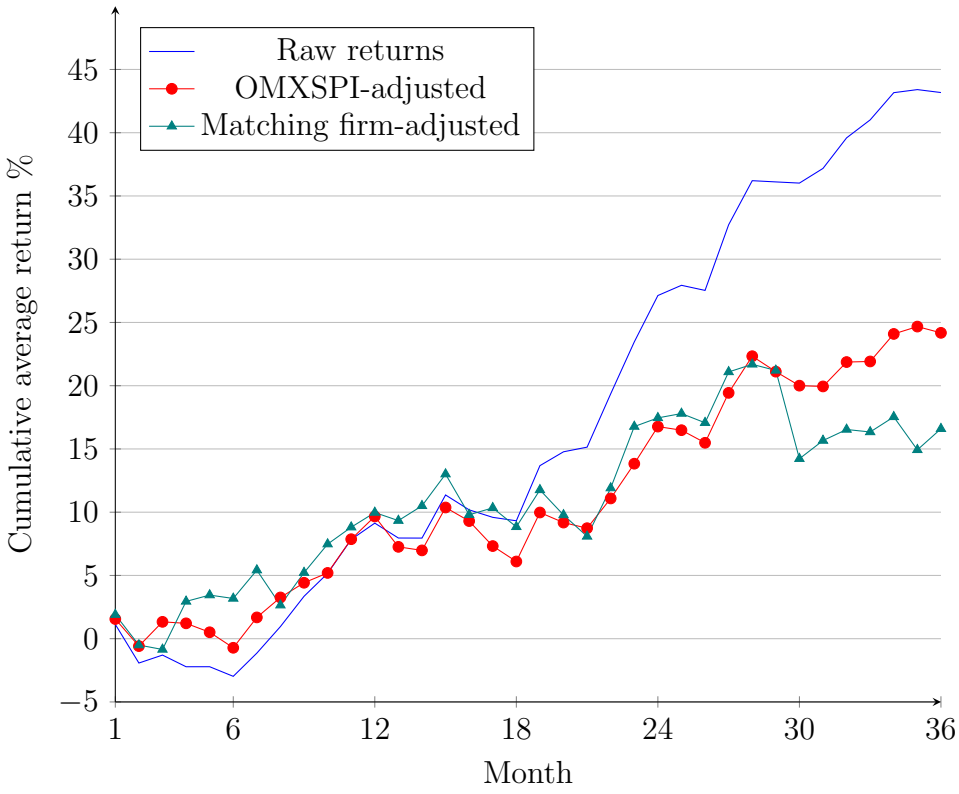

Figure 5: Cumulative average returns

only 0.664. In addition, the average performance for all IPOs is positive, which are in line with the result from the CAR method.

Table 4 presents 3-year mean performances for IPOs within eight different ranges depending on their offer size. It can be observed that IPOs with smaller offer sizes tend to have higher initial return and lower wealth relatives. These tendencies are similar to the findings in Ritter (1991).

From Table 5, it is noticeable that older firms tend to have lower matching firm-adjusted initial returns and wealth relatives. This result is consistent with the finding in Loderer and Waelchli (2010) regarding the relationship between firms age. Compared to Ritter (1991), our finding is similar regarding the initial return part. However, the wealth relative, which measure the 3-year aftermarket performance, is in the opposite direction. Ritter (1991) finds that smaller firms tend to have poorer aftermarket performance and argues that the strong pattern in age can be considered as an evidence for investor overoptimism and fads story since younger firms (many of them belonging to the "Oil & Gas industry") usually have higher market-to-book ratios than older firms. "Fads" means the overoptimistic investors are the investors that can affect the pricing of equity mostly in IPOs. But in our research, we could not find such evidence.

Table 6 shows a tendency that the larger the matching firm-adjusted initial return,

Table 3: Matching firm-adjusted performance categorized by Industry constellation 1
The *wealth relative* measures the aftermarket performance of IPOs and is computed using equation (6), where matching firms are used as benchmark.

			Excluding initial returns		
			Average 3-year holding period total return		
Industry	No. of IPOs	Average matching firm-adjusted initial return %	IPOs %	Matching firms %	*Wealth relative*
Oil & Gas, Basic-materials & Utilities	10	8.66	38.59	-49.82	2.762
Industrial	30	6.00	20.29	81.21	0.664
Consumer goods	11	21.28	38.91	-0.81	1.400
Health care	27	17.58	48.35	-12.98	1.705
Financial	15	4.68	20.60	15.38	1.045
Technology	12	7.46	-22.88	14.82	0.672
Consumer service & Telecommunications	16	-2.38	23.91	28.38	0.965
All firms	121	9.07	25.99	20.18	1.048

Table 4: Matching firm-adjusted performance categorized by Offer size
Offer size, measured in million Swedish Kroner. The *wealth relative* measures the aftermarket performance of IPOs and is computed using equation (6), where matching firms are used as benchmark. Total number of IPOs is 121.

Offer size (MSEK)	No. of IPOs	Av. matching firm adj. initial return %	IPOs return %	Matching firms return %	*Wealth relative*
0-5	8	16.53	14.60	4.07	1.101
5-10	31	9.31	-1.22	17.23	0.843
10-50	23	11.93	-22.59	20.93	0.640
50-100	9	13.72	55.93	-25.86	2.103
100-500	10	3.09	30.43	16.30	1.121
500-1000	11	6.80	56.02	10.16	1.416
1000-5000	26	5.62	76.16	48.79	1.184
5000-up	3	8.91	60.56	27.60	1.258

the larger the wealth relative. This result is opposite to what Ritter (1991) finds. However, the relationship between initial return and long-run performance depends on a lot of factors. For example, Carter, Dark, and Singh (1998) find that the IPOs performance is positively related to the underwriters' reputation in both the short- and long run. In addition, the different time periods and regions could make big differences in IPOs performance.

Table 5: Matching firm-adjusted performance categorized by Age
Age, measured in years and is the difference between founding and listing date. The *wealth relative* measures aftermarket performance of IPOs and is computed using equation (6), where matching firms are used as benchmark.

Age	No. of IPOs	Average matching firm-adjusted initial return %	Average IPOs return %	Average matching firms return %	*Wealth relative*
0-1	7	12.27	64.60	19.39	1.379
2-4	16	16.55	2.98	-16.99	1.241
5-9	44	9.28	37.24	38.94	0.988
10-19	28	5.88	-10.00	-4.76	0.945
20-up	26	6.67	49.49	38.38	1.080

Table 6: Matching firm-adjusted aftermarket performance categorized by Initial return quartiles
Initial return, measured in first trading day return. The *wealth relative* measures aftermarket performance of IPOs and is computed using equation (6), where matching firms are used as benchmark. Total number of IPOs is 121.

Matching firm-adj. initial return quartiles %	No. of IPOs	IPO av. 3-year total return %	Matching firm av. 3-year total return %	*Wealth relative*
$14.60 <$ IR	31	71.76	-2.52	1.762
$3.28 <$ IR $\leqslant 14.60$	30	34.63	21.08	1.112
$-5.00 <$ IR $\leqslant 3.28$	30	-6.10	67.13	0.635
IR $\leqslant -5.00$	30	-10.06	-4.22	0.939

4.3 Regression analysis

The regression equation is presented below. Relevant variables are described in Section 3.4, which is applied in the equation to find out how long-run performance could be affected by different factors. For stock i,

$$BHR_i = \beta_0 + \beta_1 IR_i + \beta_2 BHR_{benchmark,i} + \beta_3 Log(1 + lockup_i) + \beta_4 Log(1 + age_i) + \beta_5 Volume_i + \beta_6 Log(offersize_i) + \sum_{j=1}^{7} \beta_{6+j} Industries_{ij} + u_i,$$

where BHR_i represents the buy-and-hold return,
IR_i is adjusted initial return,
$BHR_{benchmark,i}$ is the return of benchmark during three-year period,
$lockup_i$ is the lockup period measured in days,
age_i is firms age measured in years,
$Volume_i$ is the number of IPOs in the year that stock i got listed,
$offersize_i$ is offer size measured in MSEK,

$Industries_{ij}$ $j=1,...,7$, is a set of stock i's industry dummies.

Table 7: Ordinary Least Squares Regression Results with Buy-and-Hold Return of IPOs as the dependent variable, and using industry constellation 1

BHR IPO is the buy-and-hold return, measured from the first aftermarket day until a three-year anniversary or delisting day. Matching firm-adjusted initial return measures first trading day abnormal returns. *BHR matching firm return* is the buy-and-hold return of matching firm for the same time interval as the dependent variable. *Log(1+lockup)*, is the natural logarithm of one plus longest lockup interval measured in days. *Log(1+age)* is the natural logarithm of one plus time between funding till listing for a company measured in years. *Volume* is the number of IPOs issuing in the year. *Log offer size* is the natural logarithm of shares offer measured in MSEK. In regression (4), we include dummy variables for industries, where companies are categorized by the first digit in their ICB number. The left out industry is "Technology".

	(1)	(2)	(3)	(4)
Variables	BHR IPO	BHR IPO	BHR IPO	BHR IPO
Matching firm-adjusted initial return	0.885**	0.886**	0.925***	0.818**
	(0.375)	(0.375)	(0.329)	(0.333)
BHR matching firm		0.007	0.009	0.055
		(0.066)	(0.055)	(0.060)
Log (1+lockup)			0.034	0.002*
			(0.001)	(0.001)
Log (1+age)			-0.065	-0.062
			(0.109)	(0.099)
Volume IPOs			0.004	-0.009
			(0.011)	(0.012)
Log offer size			0.131***	0.146***
			(0.039)	(0.041)
Oil & Gas, Basic materials, Utilities				0.686*
				(0.392)
Industrials				0.277
				(0.200)
Consumer goods				0.145
				(0.280)
Health care				0.619**
				(0.285)
Consumer services and Telecommunications				0.438
				(0.347)
Financial				0.053
				(0.197)
Constant	0.180*	0.178*	-0.401	-0.673**+
	(0.093)	(0.096)	(0.325)	(0.316)
Observations	121	121	121	121
Adjusted R^2	0.045	0.037	0.119	0.158

Robust standard error in parentheses

***p<0.01, **p<0.05, *p<0.1

+ The left out industry is "Technology".

Several regressions are applied based on different benchmarks and categories of industries. Here we analyze the regression by utilizing matching firms instead of market. The results are similar if we use market as benchmark . We primarily dis-

cuss regressions when using "industry constellation 1". Others are relegated to the Appendix. It is noticed that we choose "Technology" sector as the left out industry in our regressions since this sector has a lower wealth relative value compared to other industries. Furthermore, robust regressions are applied to avoid heteroskedasticity and the presence of outliers.

From Table 7, we observe that matching firm-adjusted initial return is positively correlated to *BHR IPO*. The result is statistically significant in all four regressions. This is consistent with our previous finding of a positive relationship between initial returns and long-run returns. We also find that $Logoffersize_i$ is positively correlated to IPOs long-run return, and is significant at 1% level. As for industry sectors, "Oil & Gas, Basic materials & Utilities" is significant relative to the "Technology" sector at 10% level and "Health Care" is significant relative to the"Technology" sector at 5% level. Both of the industries are positively correlated with IPOs aftermarket return, which also verifies what we found before from Table 3. Using "industry constellation 2", we find similar results to those discussed above. Table A8 in Appendix shows the regression results when using "industry constellation 2".

4.4 Robustness check

To test the robustness of our regression results, we run similar regressions using both benchmarks (OMXSPI and matching firms) as before. However, now all industries are included without any industries being merged together. Table A10 and Table A11 show regression results. The main difference is that "Oil & gas" coefficient is now statistically significant when matching firms are used as benchmark. However, it is not statistically significant when the market is used as benchmark. Thus, it is difficult to conclude any relationship between aftermarket performance and the "Oil & gas" sector.

4.5 Initial- and aftermarket performance using market as benchmark

In previous sections, we apply matching firms as benchmark to analyze the initial- and aftermarket performance. In this section, we describe the results if we apply market as benchmark and then compare the main differences. Tables regarding market as benchmark are in Appendix.

Across industries, Table A1 shows that "Health care" has the highest wealth rela-

tive instead of "Oil & Gas, Basic Materials & Utilities". Despite of this difference, "Health care" and "Oil & Gas, Basic Materials & Utilities" are still the two best performing sectors while other results remain similar. As for offer size, Table A4 shows the same tendency as before: IPOs with smaller offer size have higher initial returns but lower wealth relatives. Table A5 illustrates that younger firms have higher initial returns but there is no specific pattern for aftermarket performance. For initial returns, Table A6 shows that IPOs with higher initial returns have higher wealth relatives. Furthermore, regression analysis from Table A7 also indicates similar results compared to the results from applying OMXSPI as benchmark. As we can see, there is no substantial difference in initial- and aftermarket performance by applying different benchmarks.

5 Conclusions

This thesis aims to study IPOs performance in the main Swedish markets from 2007 to 2015 in different industries. In addition, other factors are included, such as initial return, offer size and firms age, etc., to test if they are correlated with IPOs long-run performance.

By applying both CAR and BHR methods and adjusting based on OMXSPI and matching firms, we find that IPOs generally outperform both in the initial return period and the 3-year aftermarket period. In addition, we find that the initial return has a positive relationship with aftermarket performance. Furthermore, if an IPO's offer size is small, there is a tendency that this IPO is with higher initial return and worse aftermarket performance. As for firms age perspective, there is a trend that young firms have higher initial return and aftermarket performance than old firms, However, these results are not significant in regression analysis. Among industries, "Oil & Gas, Basic Materials & Utilities" and "Health Care" have the highest IPO performance, and these two sectors are also the only sectors whose IPO performance is significantly better than "Industrials", the sector with the worst IPO performance. In opposite, "Industrials" underperforms the benchmark mostly during this period. However, only "Oil & Gas, Basic Materials & Utilities" and "Health Care" are statistically significant relative to "Technology" in regression analysis for industries.

Our research results relate to previous literature in the following way. It finds out that our result about the initial return period is similar to Ibbotson and Jaffe (1975), Ritter (1984). As for long-run performance, our result contrasts sharply with the result in Ritter (1991). Ritter finds negative long-run performance, and we

find positive long-run performance. This result difference may be due to different stock markets and time periods. Ibbotson (1975) finds that long-run performance is positive one year after listing during the 1960s, but then underperform in the following three years. Loughran and Ritter (2002) argue that this phenomenon might be caused by over-optimism from investors. We do not observe such a pattern with our sample. This might suggest that there is no such over-optimism in Sweden during 2007-2015. The lack of over-optimism might be caused by the financial crisis during the research period. Ko, Lee, and Wu (2011) find that institutional investors are pessimistic in a bear market. This finding might support our speculative explanation here.

Among industries, Ritter (1991) finds that "Oil & Gas" has the worst long-run performance among industries. In contrast, in this paper "Oil & Gas" is merged in "Oil & Gas, Basic Materials & Utilities", which jointly has the best long-run performance. In Table A11 we perform a robustness check, where we treat "Oil & Gas" as a separate sector. We find that "Oil & Gas" is positively significant relative to "Technology" sector. The difference may be caused by the oil price decreases dramatically during the 1980s, while it reaches the peak price ever after 2007. However, according to our robustness check it is difficult to conclude any relationship between "Oil & Gas" and long-run performance. In addition, "Industrial" being the sector with the worst long-run performance in this paper does not have a match from previous literature due to the different method of classification. It is noticed that the long-run underperformance of "Industrials" is due to the matching firms having high total returns, which makes the wealth relative smaller than others after adjustment. As for offer size, we find that IPOs with lower offer size have higher initial adjusted return and lower long-run return. This finding is consistent with Ritter (1991).

As for further studies, it is helpful to study a different time period and add more IPOs. More benchmarks could also be applied in measuring IPOs performance such as small matching firms which Ritter (1991) does to have a more general perspective in research. Additionally, we do not discuss riskiness specifically in IPOs performance in this thesis. However, firm characteristics such as age, size, industry are considered to be related to risk (Eckbo 2007). Risk-adjusted returns could be applied in both systemic and unsystematic perspectives. It remains a puzzle why large Swedish IPOs have significantly higher abnormal returns compared to the small IPO counterparts in the 3-year post IPO period. It is interesting to develop a theory in the future to explain this puzzle.

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Appendix

Selection of matching firms approach

To find the matching firms, we use the following approach: Assemble all firms listed on NASDAQ, First North and Spotlight along with associated market capitalization on the dates of December 31st in 2006 and 2010. IPOs listed before 2010 are primarily matched by industry, using ICB number first two digits, and secondarily by market capitalization with companies listed as of 31st December 2006. For remaining IPOs, the same procedure is applied except that matching firms are listed as of 31st December 2010. The reason for separating matching firms in two periods is because our research period includes 9 years (2007-2015), in which case the market capitalization can change dramatically during this time period for reasons such as the financial crisis in 2009. If the matching firm is delisted before the three-year period after IPO, an additional matching firm is used for the remaining time. A firm can be matched with several IPOs over the full sample period but no more than once in a three-year period.

One-sample t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
IR_mat~t	121	.0906784	.0260607	.2866681	.03908	.1422769

mean = mean(IR_matchingadjust) t = 3.4795
Ho: mean = 0 degrees of freedom = 120

Ha: mean < 0 Ha: mean != 0 Ha: mean > 0
Pr(T < t) = 0.9996 Pr(|T| > |t|) = 0.0007 Pr(T > t) = 0.0004

Figure A1: One sample t-test, Matching firm-adjusted initial return

Table A1: Market-adjusted performance categorized by Industry constellation 1

The *wealth relative* measures aftermarket performance of IPOs and is computed using equation (6), where market is used as benchmark. OMXSPI represents the market.

			Excluding initial returns		
			Average 3-year holding period total return		
Industry	No. of IPOs	Average market -adjusted initial return %	IPOs %	Market %	*Wealth relative*
Oil & Gas, Basic-materials & Utilities	10	11.80	38.59	16.41	1.191
Industrial	30	5.60	20.29	18.41	1.016
Consumer goods	11	22.35	38.91	20.49	1.153
Health care	27	16.76	48.35	21.16	1.224
Financial	15	5.19	20.60	11.08	1.086
Technology	12	7.18	-22.88	13.73	0.678
Consumer service & Telecommunications	16	-0.61	23.91	21.77	1.018
All firms	121	9.41	25.99	18.12	1.067

Table A2: Matching firm-adjusted performance categorized by Industry constellation 2

The *wealth relative* measures aftermarket performance of IPOs and is computed using equation (6), where matching firms are used as benchmark. The industry category "All other firms" includes IPOs in following industries: Oil & Gas, Basic materials, Utilities and Telecommunications.

			Excluding initial returns		
			Average 3-year holding period total return		
Industry	No. of IPOs	Average matching firm-adjusted initial return %	IPOs %	Matching firms %	*Wealth relative*
Industrial	30	6.00	20.29	81.21	0.664
Consumer goods	11	21.28	38.91	-0.81	1.400
Health care	27	17.58	48.35	-12.98	1.705
Financials	15	4.68	20.60	15.38	1.045
Technology	12	7.46	-22.88	14.82	0.672
Consumer services	12	-2.58	30.81	32.75	0.985
All other firms	14	5.68	28.48	-31.22	1.868
All firms	121	9.07	25.99	20.18	1.048

Table A3: Market-adjusted performance measured by Industry constellation 2

The *wealth relative* measures aftermarket performance of IPOs and is computed using equation (6), where market is used as benchmark. OMXSPI represents the market. The industry category "All other firms" includes IPOs in following industries: Oil & Gas, Basic materials, Utilities and Telecommunications.

			Excluding initial returns		
			Average 3-year holding period total return		
Industry	No. of IPOs	Average market -adjusted initial return %	IPOs %	Market %	*Wealth relative*
Industrial	30	5.60	20.29	18.41	1.016
Consumer goods	11	22.35	38.91	20.49	1.153
Health care	27	16.76	48.35	21.16	1.224
Financial	15	5.19	20.60	11.08	1.086
Technology	12	7.18	-22.88	13.73	0.678
Consumer service	12	0.08	30.81	23.84	1.056
All other firms	14	7.67	28.48	16.17	1.106
All firms	121	9.41	25.99	18.12	1.067

Table A4: Market-adjusted performance categorized by Offer size

Offer size, measured in million Swedish Kroner. The *wealth relative* measures aftermarket performance of IPOs and is computed using equation (6), where market is used as benchmark. OMXSPI represent the market. Total number of IPOs is 121.

Offer size (MSEK)	No. of IPOs	Av. market-adj. initial return %	IPOs return %	Market return %	*Wealth relative*
0-5	8	17.19	14.60	27.71	0.897
5-10	31	10.13	-1.22	22.90	0.804
10-50	23	11.04	-22.59	18.25	0.655
50-100	9	15.17	55.93	11.48	1.399
100-500	10	2.99	30.43	13.09	1.153
500-1000	11	8.19	56.02	14.57	1.362
1000-5000	26	5.83	76.16	15.23	1.529
5000-up	3	8.40	60.56	16.87	1.374

Table A5: Market-adjusted performance categorized by Age
Age, measured in years, and is the difference between funding and listing date. The *wealth relative* measures aftermarket performance of IPOs and is computed using equation (6), where market is used as benchmark. OMXSPI represents the market. Total number of IPOs is 121.

Age	No. of IPOs	Average market-adjusted initial return %	Average IPOs return %	Average market market return %	*Wealth relative*
0-1	7	11.59	64.60	17.42	1.402
2-4	16	15.96	2.98	8.92	0.945
5-9	44	10.40	37.24	19.45	1.149
10-19	28	5.53	-10.00	19.28	0.755
20-up	26	7.30	49.49	20.48	1.241

Table A6: Market-adjusted after market performance categorized by Initial return quartiles
Initial return, measures first trading day return. The *wealth relative* measures aftermarket performance of IPOs and is computed using equation (6), where market is used as benchmark. OMXSPI represents the market. Total number of IPOs is 121.

Market adj. initial return quartiles %	No. of IPOs	IPO av. 3-year total return %	Market av. 3-year total return %	*Wealth relative*
$14.29 < \text{IR}$	31	66.36	16.92	1.423
$3.05 < \text{IR} \leqslant 14.29$	30	50.08	16.61	1.287
$-1.88 < \text{IR} \leqslant 3.05$	30	-2.27	23.65	0.790
$\text{IR} \leqslant -1.88$	30	-11.55	15.33	0.767

Table A7: Ordinary Least Squares Regression Results with Buy-and-Hold Return of IPOs as the dependent variable, and using industry constellation 1

BHR IPO is the buy-and-hold return, measured from the first aftermarket day until three-year anniversary or delisting day. *Market-adjusted initial return*, first day return where OMXSPI represents the market. BHR market return is the buy-and-hold return of OMXSPI for the same time interval as the dependent variable. *Log(1+lockup)* is the natural logarithm of one plus longest lockup interval measured in days. *Log(1+age)* is the natural logarithm of one plus time between funding till listing for a company measured in years. *Volume* is the number of IPOs issuing in the year.*Log offer size* is the natural logarithm of shares offer measured in MSEK. In regression (4), we include dummy variables for industries, where companies are categorized by the first digit in their ICB number. The left out industry is "Technology".

	(1)	(2)	(3)	(4)
Variables	BHR IPO	BHR IPO	BHR IPO	BHR IPO
Market-adjusted initial return	0.887**	0.906**	0.970***	0.937***
	(0.387)	(0.389)	(0.322)	(0.345)
BHR market		0.462	1.21**	1.100**
		(0.520)	(0.470)	(0.485)
Log(1+lockup)			0.035	0.052
			(0.044)	(0.045)
Log(1+age)			-0.120	-0.123
			(0.113)	(0.125)
Volume IPOs			0.002	0.008
			(0.011)	(0.010)
Log offer size			0.142***	0.155***
			(0.010)	(0.041)
Oil & Gas, Basic materials,Utilities				0.547*
				(0.277)
Industrials				0.344
				(0.219)
Consumer goods				0.155
				(0.272)
Health care				0.526**
				(0.261)
Consumer services and Telecommunications				0.155
				(0.272)
Financial				0.076
				(0.177)
Constant	0.176*	0.091	-0.705**	-1.003***+
	(0.093)	(0.137)	(0.285)	(0.265)
Observations	121	121	121	121
Adjusted R^2	0.043	0.041	0.153	0.138

Robust standard error in parentheses

***p<0.01, **p<0.05, *p<0.1

+The left out industry is "Technology"

Table A8: Ordinary Least Squares Regression Results with Buy-and-Hold Return of IPOs as the dependent variable, and using industry constellation 2

BHR IPO is the buy-and-hold return, measured from the first aftermarket day until three-year anniversary or delisting day. Matching firm-adjusted initial return.*BHR matching firm return* is the buy-and-hold return of matching firm for the same time interval as the dependent variable. *Log(1+lockup)* is the natural logarithm of one plus longest lockup interval measured in days. *Log(1+age)* is the natural logarithm of one plus time between funding till listing for a company measured in years. *Volume* is the number of IPOs issuing in the year. *Log offer size* is the natural logarithm of shares offer measured in MSEK. In regression (4), we include dummy variables for industries, where companies are categorized by the first digit in their ICB number. *All other firms* includes IPOs in following industries: Oil & Gas, Basic materials, Utilities and Telecommunications. The left out industry is "Technology".

	(1)	(2)	(3)	(4)
Variables	BHR IPO	BHR IPO	BHR IPO	BHR IPO
Matching firm-adjusted initial return	0.885**	0.886**	0.925***	0.891**
	(0.375)	(0.375)	(0.329)	(0.351)
BHR matching firms		0.007	0.009	0.026
		(0.066)	(0.055)	(0.070)
Log (1+lockup)			0.034	0.053
			(0.001)	(0.001)
Log (1+age)			-0.065	-0.075
			(0.109)	(0.125)
Volume IPOs			0.004	0.001
			(0.011)	(0.011)
Log offer size			0.131***	0.144***
			(0.039)	(0.042)
Industrials				0.363
				(0.255)
Consumer goods				0.220
				(0.286)
Health care				0.608**
				(0.289)
Consumer services				0.536
				(0.446)
Financial				0.075
				(0.195)
All other firms				0.570*
				(0.296)
Constant	0.180*	0.178*	-0.401	-0.769**+
	(0.093)	(0.096)	(0.325)	(0.300)
Observations	121	121	121	121
Adjusted R^2	0.045	0.037	0.119	0.111

Robust standard error in parentheses

***p<0.01, **p<0.05, *p<0.1

+The left out industry is "Technology"

Table A9: Ordinary Least Squares Regression Results with Buy-and-Hold Return of IPOs as the dependent variable, and using industry constellation 2

BHR IPO is the buy-and-hold return, measured from the first aftermarket day until three-year anniversary or delisting day. *Market-adjusted initial return*, first day return where OMXSPI represent the market. BHR market return is the buy-and-hold return of OMXSPI for the same time interval as the dependent variable. *Log(1+lockup)* is the natural logarithm of one plus longest lockup interval measured in days. *Log(1+age)* is the natural logarithm of one plus time between funding till listing for a company measured in years. *Volume* is the number of IPOs issuing in the year. *Log offer size* is the natural logarithm of shares offer measured in MSEK. In regression (4), we include dummy variables for industries, where companies are categorized by the first digit in their ICB number.*All other firms* includes IPOs in following industries: Oil & Gas, Basic materials, Utilities and Telecommunications. The left out industry is "Technology".

	(1)	(2)	(3)	(4)
Variables	BHR IPO	BHR IPO	BHR IPO	BHR IPO
Market adjusted initial return	0.887**	0.906**	0.970***	0.937***
	(0.387)	(0.389)	(0.322)	(0.345)
BHR market		0.462	1.210**	1.097**
		(0.520)	(0.470)	(0.485)
Log (1+lockup)			0.035	0.0518
			(0.044)	(0.0451)
Log (1+age)			-0.120	-0.123
			(0.113)	(0.125)
Volume IPOs			0.011	0.008
			(0.011)	(0.010)
Log offer size			0.144***	0.155***
			(0.038)	(0.041)
Industrials				0.344
				(0.219)
Consumer goods				0.155
				(0.272)
Health care				0.526**
				(0.261)
Consumer services				0.414
				(0.455)
Financial				0.076
				(0.177)
All other firms				0.547*
				(0.277)
Constant	0.176*	0.091	-0.705**	-1.003***+
	(0.093)	(0.137)	(0.285)	(0.265)
Observations	121	121	121	121
Adjusted R^2	0.043	0.041	0.153	0.138

Robust standard error in parentheses

***p<0.01, **p<0.05, *p<0.1

+The left out industry is "Technology"

Table A10: Robustness check: Ordinary Least Squares Regression Results with Buy-and-Hold Return of IPOs as the dependent variable, and without merging industries

BHR IPO is the buy-and-hold return, measured from the first aftermarket day until three-year anniversary or delisting day. *Market-adjusted initial return*, first day return where OMXSPI represent the market. BHR market return is the buy-and-hold return of OMXSPI for the same time interval as the dependent variable. *Log(1+lockup)* is the natural logarithm of one plus longest lockup interval measured in days. *Log(1+age*) is the natural logarithm of one plus time between funding till listing for a company measured in years. *Volume* is the number of IPOs issuing in the year. *Log offer size* is the natural logarithm of shares offer measured in MSEK. In regression (4), we include dummy variables for industries, where companies are categorized by the first digit in their ICB number. The left out industry is "Technology".

	(1)	(2)	(3)	(4)
Variables	BHR IPO	BHR IPO	BHR IPO	BHR IPO
Market adjusted initial return	0.887**	0.906**	0.970***	0.912***
	(0.387)	(0.389)	(0.322)	(0.344)
BHR market		0.462	1.210**	1.101**
		(0.520)	(0.470)	(0.493)
Log (1+lockup)			0.035	0.050
			(0.044)	(0.047)
Log (1+age)			-0.120	-0.144
			(0.113)	(0.132)
Volume IPOs			0.011	-0.0075
			(0.011)	(0.010)
Log offer size			0.144***	0.164***
			(0.038)	(0.042)
Basic materials				0.853
				(0.498)
Industrials				0.347
				(0.222)
Consumer goods				0.159
				(0.274)
Health care				0.522*
				(0.266)
Consumer services				0.413
				(0.459)
Financial				0.056
				(0.178)
Oil and Gas				0.426
				(0.206)
Telecommunications				0.314
				(0.199)
Utilities				-0.395
				(0.240)
Constant	0.176*	0.091	-0.620**	-0.983***+
	(0.093)	(0.137)	(0.297)	(0.271)
Observations	121	121	121	121
Adjusted R^2	0.043	0.041	0.189	0.127

Robust standard error in parentheses

***p<0.01, **p<0.05, *p<0.1

+The left out industry is "Technology"

Table A11: Robustness check: Ordinary Least Squares Regression Results with Buy-and-Hold Return of IPOs as the dependent variable, and without merging industries

BHR IPO is the buy-and-hold return, measured from the first aftermarket day until three-year anniversary or delisting day. *Matching firm-adjusted initial return*, first day return where OMXSPI represent the market. BHR matching firm is the buy-and-hold return of matching firms for the same time interval as the dependent variable. *Log(1+lockup)* is the natural logarithm of one plus longest lockup interval measured in days. *Log(1+age*) is the natural logarithm of one plus time between funding till listing for a company measured in years. *Volume* is the number of IPOs issuing in the year.*Log offer size* is the natural logarithm of shares offer measured in MSEK. In regression (4), we include dummy variables for industries, where companies are categorized by the first digit in their ICB number. The left out industry is "Technology".

	(1)	(2)	(3)	(4)
Variables	BHR IPO	BHR IPO	BHR IPO	BHR IPO
Matching firm-adjusted initial return	0.885**	0.886**	0.865***	0.857**
	(0.375)	(0.375)	(0.321)	(0.348)
BHR matching firm		0.007	0.026	0.030
		(0.066)	(0.053)	(0.070)
Log (1+lockup)			0.001	0.051
			(0.001)	(0.047)
Log (1+age)			-0.055	-0.096
			(0.096)	(0.131)
Volume IPOs			-0.005	0.000
			(0.012)	(0.011)
Log offer size			0.129***	0.154***
			(0.039)	(0.043)
Basic materials				0.853
				(0.522)
Industrials				0.363
				(0.258)
Consumer goods				0.225
				(0.287)
Health care				0.607**
				(0.293)
Consumer services				0.534
				(0.450)
Financial				0.054
				(0.196)
Oil and Gas				0.604***
				(0.196)
Telecommunications				0.292
				(0.292)
Utilities				-0.337
				(0.243)
Constant	0.176*	0.091	-0.620**	-0.744**+
	(0.093)	(0.137)	(0.297)	(0.307)
Observations	121	121	121	121
Adjusted R^2	0.043	0.041	0.189	0.098

Robust standard error in parentheses

***p<0.01, **p<0.05, *p<0.1

+The left out industry is "Technology"