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A study of IPOs in the Nordic markets between 2007 and 2017 – Are underwriting analysts' recommendations outperforming or suffering from overoptimism?

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ABSTRACT

This thesis presents a study of the credibility on underwriting analysts' recommendations issued on 100 initial public offerings (IPOs) in the Nordic markets between 2007 and 2017. By following the methodology presented in a study by Michaely and Womack (1999), we investigate four main hypotheses. The first hypothesis investigates whether underwriting analysts issue biased recommendations, this is referred to as the conflict of interest hypothesis. The second hypothesis investigates whether underwriting analysts issue more accurate recommendations as they benefit from superior information obtained in the marketing and due diligence processes of the IPO, this is referred to as the superior information hypothesis. The third hypothesis investigates whether underwriting analysts attempt to boost stock prices of poor preforming IPOs. The fourth hypothesis investigates whether the market discounts recommendations issued by underwriting analysts immediately after the announcement.

By investigating 274 buy recommendations in an event study, we find no evidence that underwriting analysts issue biased recommendations. This indicate no appearance of the potential conflict of interest in between investment banking and the research department. Although we find that firms recommended by underwriting analysts overall perform better, we cannot conclude that underwriting analysts have superior information to others as the difference is not significant. These findings conflict with the findings of Michaely and Womack (1999). We present the implementation of new regulations and legislations in the financial markets as one possible explanation to this. The analysis is extended to test if there are characteristics that are more important for the performance of a recommended IPO. We find some evidence for the conflict of interest hypothesis on small sized IPOs. These results suggest that smaller IPOs, which is likely to receive less analyst coverage, allow underwriter analysts to issue biased recommendations. We find some evidence for the superior information hypothesis for IPOs receiving six or more recommendations.

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1 INTRODUCTION AND MOTIVATION

This thesis presents a study of 100 IPOs listed on the Nordic stock exchanges between 2007 and 2017. The main objective is to analyse the credibility of stock recommendations on IPOs issued by underwriting analysts. To evaluate the credibility of underwriting analysts' recommendations, the performance of these recommendations is compared with those of nonunderwriting analysts'.

Underwriter analyst's close involvement in due diligence, the price setting of IPOs and ultimately the aftermarket price support, raises concerns regarding the credibility of their recommendations (Michaely and Womack, 1999). Other arguments suggest that underwriters have potential for precommitment and self-justification compared to external analysts. In this thesis, two possible theories to explain the performance of IPOs recommended by underwriter analysts are investigated. Firstly, if IPOs underperform, recommendations may be positively biased, as there exists a conflict of interest in the mindset of underwriter analysts. Secondly, if recommended IPOs outperform, underwriter analysts may issue more accurate recommendation as a consequence of their close involvement in the IPO process.

The thesis conducts an event study to investigate the performance of recommended IPOs. The event date represents the date when the recommendation was issued. The performance of IPOs prior to the event date, and the long-term performance of IPOs following on from the event are also investigated.

The thesis follows the study by Michaely and Womack (1999), and the main hypotheses are developed based on three main problems in their article. Namely; (1) does an underwriting relationship bias analysts' recommendations, or does it result in them being more accurate? (2) do underwriter analysts tend to be overly optimistic about the stock prices of firms they underwrite? and (3) does the market correctly discount the overly positive recommendations of affiliated underwriters?

SDC Platinum reports a total of 206 listings on the main markets in Oslo, Stockholm, Helsinki, or Copenhagen between 2007 and 2017. Michaely & Womack (1999) based their study on US firms that conducted an IPO between 1990 and 1991. This thesis focuses on the Nordic stock exchanges with a time horizon from 2007 to 2017. Thus, this thesis represents more stock exchanges, and captures the changing market conditions and new regulations that have dominated the market for the last decade.

2 LITERATURE REVIEW

Previous studies evaluate the relationship between the research department and investment banking department. Authors disagree in the whether there is a conflict of interest, which affects the quality of the recommendations issued by underwriting analysts. Furthermore, this section presents relevant findings in the studies by Michaely & Womack (1999), Ljungqvist, Marston & Wilhelm (2006) and Bradley, Jordan & Ritter (2003).

At the time of Michaely and Womack's (1999) article, it became commonplace to use equity analysts in the process of due diligence and marketing for IPOs. Thus, raising concerns of biased behaviour, as the *wall* between the research department and the investment banking department appears to be less clear. From this argument, the authors developed two hypotheses. The first hypothesis investigated by Michaely and Womack (1999) states that underwriting analysts will issue more accurate recommendations as they are more involved in the due diligence process. This hypothesis is referred to as the *superior information hypothesis*. The second hypothesis states that the analysts have a stronger incentive to recommend IPOs that their firm has taken public. This hypothesis is referred to as the *conflict of interest hypothesis*.

Michaely and Womack (1999) find support for the conflict of interest hypothesis, where they find significant evidence for biased recommendations made by underwriting analysts. They find no support for the superior information hypothesis, as their findings show that IPOs recommended by underwriters underperform compared to IPOs recommended by nonunderwriter analysts.

Ljungqvist et al. (2006) investigate whether analyst behaviour influences investment banks likelihood of winning an underwriting mandate. Contrary to the other studies presented in this section, they investigate *all* equity and debt offerings in US from 1993 to 2002. This involvement of all capital market transactions might de-emphasise the effect of IPOs.

Ljungqvist et al. (2006) find no systematic evidence that analyst behaviour influenced the chances of attracting an underwriting mandate. Instead, they recognise that the reputation of the investment firm is far more determining in the competition of different underwriting mandates. In addition, they find that the strength of the relationship between the investment bank and issuing firm is important for attracting underwriting mandates.

Bradley et al. (2003) perform a similar study to that of Michaely and Womack, in which they examine the performance of IPOs by the expiration of the quiet period. They find that 76 % of all IPOs receive immediate analyst coverage, and that almost all recommendations are in a favourable manner. Further, they find that firms receiving coverage experienced a positive, significant, abnormal return of 4.1 % obtained for a five-day event window surrounding the quiet period expiration, compared to a 0.1 % for those that did not receive any analyst coverage. In contrast to Michaely and Womack (1999), they find no support for either the conflict of interest hypothesis or the superior information hypothesis. Bradley et al. (2003) conclude that the abnormal return does not depend on the presence of a lead underwriter analyst.

Bradley et al. (2003) conclude that the highest abnormal returns for firms receiving coverage is obtained in the days prior to the expiration of the quiet period. This conflicts with Michaely and Womack's (1999) findings that IPOs recommended by underwriters perform poorly in the days prior to the recommendations. This is explained by the argument that underwriters attempt to boost the price of the stock by its recommendation, and underwriters therefore choose to recommend poorly performing firms.

2.1 Contribution to previous literature

Michaely and Womack (1999) argue that the compensation structure for equity research analysts is one source to the conflict of interest. However, regulations on the compensation structures for research analysts has become stricter over the last decade. According to The Norwegian Securities Dealers Association (2018),

analysts' compensation cannot be directly linked to transactions and deals completed by the investment banking department.

Over the last decade, several EU directives such as the Markets in Financial Industries Directive II (MiFID II) and Market Abuse Directive (MAD) have been made applicable to the financial markets (European Securities and Markets Authorities, 2018). The main objective of these regulations is to ensure that the financial markets is more robust and transparent, by closing loopholes in their structure. This gives an expectation of more accurate investment advice given in analysts' recommendations. One specific extension to previous literature is therefore to include a discussion on how new rules and regulations in the financial markets may affect the complexity of this thesis.

3 THEORY

This section presents various theories and suggested determinants on the conflict of interest hypothesis. First, the basic theory of IPO and underwriters' role in an IPO syndicate are presented. Further, the section presents the concept of a sell-side analyst recommendations, and finally, relevant legislations that regulate the relationship between the research and investment banking departments are introduced.

3.1 IPOs and the role of the underwriter

An IPO is in most cases driven by a firms' desire to raise equity capital, and to create a public market for present and future shareholders (Ritter and Welch, 2002). In the process of an IPO, a company evolves from private to public, from a concentrated to a dispersed ownership, and being required to share all information relevant for the market.

After deciding to go public, the issuing firm usually engages an investment bank, the underwriter, to manage its offering. Large IPO offerings often include a group of underwriters, where the lead underwriter is the primary investment bank managing the IPO (Berk and DeMarzo, 2007). For this thesis, the restriction when selecting underwriters for the IPOs is that the investment bank is a participant in the group of underwriters. The underwriting firm will agree to a firm commitment IPO, where they guarantee to sell the entire issue at offer price. The underwriter purchases the entire issue at a slightly lower price than that of the offer price, and resells at the offer price. If the demand is low, the underwriter must sell the remaining shares at a lower price and take on the loss from the low demand (Berk and DeMarzo, 2007).

Underwriting analysts provide services to the issuing firm such as marketing, advice on the necessary filings, and by setting the offer price (Michaely and Womack, 1999). In the process of setting the correct price range, the investment bank often gets assistance from an analyst in the research department.

3.2 Sell-side analysts

A sell-side analyst is responsible for distributing research reports on a list of companies, typically within the same industry, to the investors. Compared to a sell-side analyst, a buy-side analyst focuses more on being right and avoid major mistakes (Simpson, 2017). Buy-side analysts typically work in institutions, such as mutual funds and hedge funds. This thesis focus solely upon the recommendations issued by sell-side analysts.

Sell-side research reports contain a description of the company and its industry, an explanation why the analyst believes that the company will succeed or not, a target price for the stock, and finally, a recommendation or rating for that company's stock. The recommendations can suggest a *buy, hold* or *sell* strategy depending on the analyst's earnings forecast.

The analysts' dissemination of information to their investor can be categorised into three different time circumstances: *urgent, timely* or *routine*, depending on the information (Michaely and Womack, 1999). An urgent communication often happens when there have been surprising events in the market, while timely- or routine information contains the daily information, and can be communicated through a call, or a daily mail.

3.3 The conflict of interest and agency theory

Jensen (1976) defines the agency relationship as a contract between one or more person (principal) who engages another person (agent) to perform some services on their behalf, which involves delegating some decision-making authority to the agent. This relationship can potentially create the principal-agent problem, where the agents does not act in the best interest of the principal. This problem occurs as the parties have conflicting interests.

A conflict of interest describes a situation in which an individual has competing interest and loyalties, that can lead to irrational behaviour (Murray, 2017). One example of a situation in which a firm can suffer from a conflict of interest is when the interests of managers deviates from the interest of shareholders.

Dugar and Nathan (1995) presents another conflict of interest, which arise between the investment banking department and the research department. This relationship may create a conflict of interest due to the investment banking department's desire to complete transactions, and the research analyst's need to providing accurate recommendations to enhance their reputation (Michaely and Womack, 1999). This may lead the research analyst to portray a client in an optimal manner, and as such evidently could lead to optimistic earnings forecasts and biased analyst recommendations.

3.4 Regulations

Investment firms are faced with several legislations to be compliant and mitigate potential conflicts of interests. These legislative requirements are detailed within the MiFID II and MAD.

The investment banking department are, by regulation, required to be separated from the brokerage and research department (The Norwegian Securities Dealers Association, 2018). This separation is referred to as *Chinese walls*. In circular 1995/39, The Financial Supervisory Authority of Norway defines these *Chinese walls* as the following: *"*Each and every measure that endeavours to prevent confidential information, particularly price sensitive information, which people in one part of the enterprise are privy to, from being received by people in another part of the enterprise*"*.

Employees in the investment banking department will typically receive inside information in relation to the completion of a transaction, e.g. when acting as an underwriter in an IPO. In these situations, the investment banking employee is, cf. The Securities Trading Act, under a duty of confidentiality to unauthorised parties (Norwegian Securities Dealers Association, 2018). Chinese walls are designed to prevent any leak of this inside information from the investment banking department to the brokerage and research departments (Seyhun, 2007).

An analyst from the research department can assist the investment department with advice about possible transactions if the information is solely provided one way by the research analysts. If the transaction is completed, the research analysts is undertaken an IPO quiet period. According to the Norwegian Securities Dealers Association (2018), the IPO quiet period begins seven days before the prospect is released and lasts until 30 days after the date of the IPO. This means that the underwriter analysts cannot issue recommendations or comment on the firm in this period, and investors must solely rely on an IPO's prospectus and audited financial information (Dugar & Nathan, 1995). Nonunderwriters are allowed to issue analysis during the quiet period, but they rarely do (Michaely & Womack, 1999). There are stricter rules for the quiet period in situations where an analyst from the research department is brought *over the wall* and receives inside information. Research analysts then undertake a quiet period of six months (Norwegian Securities Dealers Association, 2018).

The Market in Financial Instrument Directive has been applicable across the European Union since 2007. In January 2018, MiFID II, a new legislative framework, came into force in Norway. MiFID II aims to ensure fair, safe, and efficient markets that facilitate greater transparency for market participants (ESMA). With the new rules following MiFID II, investment firms are forced to incorporate stricter practice when issuing analyst recommendations, in which investors must pay investment firms directly for research instead of combining the cost with execution charges.

4 HYPOTHESES

4.1 Main hypotheses

We have developed four main hypotheses, to test if there exist differences in the behaviour of analysts, and whether this leads to differences in the performance of IPOs. The hypotheses are examined in an event study developed over different periods surrounding the recommendations.

4.1.1 Hypothesis 1

H_1: Underwriting analysts issue positively biased recommendations on IPOs.

The first hypothesis suggests a conflict of interest, in which underwriter analysts are overoptimistic and issue positively biased recommendations. To confirm this hypothesis, IPOs recommended by underwriting analysts underperform relative to those recommended nonunderwriting analysts.

4.1.2 Hypothesis 2

H_2: Underwriting analysts have superior information about the IPO.

The second hypothesis suggest that underwriting analysts gain valuable information on the issuing firm through the marketing and due diligence process. Theory suggest that this information lead to more accurate recommendations. To confirm this hypothesis, IPOs recommended by underwriting analysts outperform relative to those recommended by nonunderwriting analysts.

4.1.3 Hypothesis 3

H_3: Underwriter analysts attempt to boost the stock price of poor performing firms in the aftermarket of an IPO.

This theory supports the existence of biased recommendations. "If underwriters attempt to boost stock prices of firms they have taken public, the time to administer the shot is when it is really needed – is when a firm is performing poorly" (Michaely and Womack, 1999, p. 620). To confirm this hypothesis, IPOs recommended by underwriting analysts perform poorer in the pre-event.

4.1.4 Hypothesis 4

H_4: The market discounts the value of underwriter analysts buy recommendations.

Based on hypothesis 3, rational market participants should discount recommendations from underwriting analysts as they believe these recommendations are biased. To confirm this hypothesis, IPOs recommended by underwriting analysts will underperform immediately after the recommendation is issued relative to those of nonunderwriter analysts.

4.2 Sub-hypotheses

Sub-hypotheses are developed to test if there are any characteristics more important for the performance of the IPOs. All sub-hypotheses are developed inspired by the analysis presented in Michaely and Womack's (1999) article. The sub-hypotheses are investigated in the multiple regression analysis, and are elaborated in the methodology section. The tests on the sub-hypotheses are presented in the analysis section and the robustness section.

Hypothesis 5: Size

H_5: A buy recommendation issued on a large-sized IPO will obtain a higher excess return

Hypothesis 6: Time

H_6: IPOs with buy recommendations issued closer to the IPO will obtain a higher excess return

Hypothesis 7: Number of recommendations

H_7: IPOs that receive a large number of buy recommendations obtain a higher excess return

Hypothesis 8: Internationally ranked underwriter

H_8: IPOs with an internationally ranked investment firm involved as an underwriter obtain a higher excess return

5 METHODOLOGY

5.1 Event study

An event study is commonly used to capture the effect of an event on the price of a specific security (MacKinlay, 1997). The thesis performs an event study to capture the market reaction to recommendations issued by underwriter and nonunderwriter analysts. The return obtained from a buy-and-hold strategy are analysed in the period before, during and after a recommendation is issued on an IPO. This section present the methodology proposed by MacKinlay (1997), and our application of this framework. We will also include the methods and assumptions used to further analyse this reaction in a multiple regression analysis. All analyses are conducted with the statistical software, Stata.

The focus of an event study is to define and capture the impacts surrounding a specified period of time where a security is encountering an event. This specified time period is known as the *event window*. The event window will include the day of the announcement, day *t*, but can also be larger than the specified period of interest to capture the pre- and post-effects on the security surrounding the announcement. The event window attempts to examine the short-run performance around recommendations issued on an IPO, and is defined at day [-1,+1], a three-day event window. Our pre-event window examines the pre-recommendation return and is defined at day [-21,-2]. An analysis of the pre-event window is included to detect if underwriters attempt to boost the stock price of firms which they have taken public (Michaely and Womack, 1999). To capture the post-recommendation stock price performance, the excess return for a buy-and-hold strategy from day [-1,+63], [-1,+126], and [-1,+252] is investigated.

MacKinley (1997) proposes use of abnormal returns, which is defined as the actual ex post return of the security over the event window minus the normal return of the firm over the event window. To properly examine the impact of an event, the excess return is calculated for the IPOs included in the sample over the different periods. MacKinley (1997) argues that the two most common choices for modelling normal returns is *(1) the constant mean return model* and

(2) the market model. Both models estimate the normal return over the estimation window, usually 120 days prior to an event. However, as we are investigating the market reaction to recommendation issued on new public traded stocks, there are no historical stock prices. Therefore, we are unable to calculate the normal return by historical prices. As a proxy for normal return we will use the appropriate benchmark indices in each of the Nordic stock exchanges, OSEBX, OMXSBPI, OMXCBPI, and OMXHBPI.

Barber and Lyon (1996) argue that researchers should calculate excess return as the simple buy-and-hold return on a sample firm, less the simple buy-and-hold return on a reference portfolio or a sample firm. The excess return on an individual security is defined as:

$$ER_{i,t} = R_{i,t} - R_{m,t} \quad (1)$$

$R_{i,t}$ is the return on stock *i* on day *t,* $R_{m,t}$ is the return on the benchmark index on the stock exchange where stock *i* is listed, on day *t.* We calculate the return of both the individual securities and the benchmark indices by the logarithmic approach. The return calculated by the logarithmic approach is defined as:

$$R_{it} = Log\left[\frac{R_{it}}{R_{i,t-1}}\right] \quad (2)$$

According to Strong (1992), logarithmic returns are more likely to be normally distributed and then conform to the assumptions of standard statistical techniques.

To draw overall inferences for the event of interest, the excess return observations need to be aggregated (MacKinley, 1997). The aggregated excess return will go across time and securities. The excess return across time is defined as the geometrically compounded (buy-and-hold) return on the stock minus the compounded return on the relevant stock exchange benchmark index:

$$ER^{i}_{a\ to\ b} = \left[\prod_{t=a}^{b}(1 + R_{i,t}) - \prod_{t=a}^{b}(1 + R_{m,t})\right] \quad (3)$$

$ER^i_{a\ to\ b}$ is the excess return for stock *i* from period *a* to *b*. We have calculated the excess return for all pre- and post-event periods by using equation (2), where *a* is day -1 (the day before the recommendation is issued) and *b* is day +63, +126 or +252 for the post-event periods. For the pre-event period, *a* is 21 days prior to event day and *b* is day -2. For the three-day event window, we have calculated the excess return across the securities for each day t = -1, 0, +1, in addition to the total excess return for each security where *a* is day -1 and *b* is day +1. One month is defined as 21 trading days.

The average excess return for each period and the event window is the mean of $ER^i_{a\ to\ b}$:

$$Average\left(ER^i_{a\ to\ b}\right) = \frac{1}{n}\left(\sum_{i=1}^{n} ER^i_{a\ to\ b}\right) \qquad (4)$$

The variance is equal to:

$$Var\left(Average\left(ER^i_{a\ to\ b}\right)\right) = \frac{1}{N^2}\left(\sum_{i=1}^{n} \sigma^2_{\varepsilon_i}\right) \qquad (5)$$

5.1.1 Hypotheses testing

To compare the performance of IPOs recommended by underwriter versus nonunderwriter analysts, the mean excess return for two different samples are examined. To test hypothesis 1, that underwriter analysts issue positively biased recommendations, we examine differences in mean cumulative excess returns obtained by the two samples. Therefore, the hypothesis represents a two-sided alternative hypothesis and we will apply a two-sided student t-distribution to decide the rejection region (Stock and Watson, 2015). In addition, differences in medians are investigated by the nonparametric Wilcoxon signed-rank test which is equivalent to the dependent t-test (Wilcoxon, 1945).

Following McKinley (1997), we assume that the cumulative excess returns can be drawn using this equation:

$$Average\big(CER(\tau_1,\tau_2)\big) \sim N\left[0, Var\left(Average\big(CER(\tau_1,\tau_2)\big)\right)\right] \quad (6)$$

Since the variance of the error term is unknown, we need to use an estimator of the variance in equation (4) to calculate the variance of the cumulative excess returns. Thus, the variance can be written as expressed in equation 7.

$$Var\left(Average\big(CER(\tau_1,\tau_2)\big)\right) = \sum_{\tau_1}^{\tau_2} Var\big(Average(ER_i)\big) \quad (7)$$

The null hypothesis, suggesting that the mean cumulative excess return (CER) for IPOs recommended by underwriter and nonunderwriter analysts are equal to zero, can be tested using this equation:

$$\theta_1 = \frac{Average\big(CER(\tau_1,\tau_2)\big)}{Var\Big(Average\big(CER(\tau_1,\tau_2)\big)\Big)^{1/2}} \sim N\,(0,1) \quad (8)$$

As we are investigating two different samples, we need to estimate the standard error for the difference in the mean CER by using the sample variances. This can be estimated using this equation:

$$SE(Average(CER_U) - Average(CER_{NONU})) = \sqrt{\frac{S_U^2}{n_U}} + \sqrt{\frac{S_{NONU}^2}{n_{NONU}}} \quad (9)$$

After estimating the weighted average of the standard errors, we can compute the two-sided t-test statistic for the null hypothesis as:

$$t = \frac{Average(CER_U) - Average(CER_{NONU})}{SE\big(Average(CER_U) - Average(CER_{NONU})\big)} \quad (10)$$

The t-statistic presented in equation (9) is calculated and compared to the appropriate critical value, to evaluate the significance for the difference in the

mean cumulative excess return. The critical value for t-statistics can be found in the table for the two-sided student t distribution (Stock and Watson, 2015).

5.2 Multiple regression analysis

To investigate if there are other factors affecting the performance of an IPO, we have conduct a multiple regression analysis. The model is estimated by the ordinary least squares (OLS) method, where the model aims to show a relationship between the dependent variable (mean excess return) and the independent variables (explanatory variables) (Stock and Watson, 2015).

The multiple regression model is similar to the regression model used by Michaely and Womack's (1999), and is as follows:

$$ER^{i}_{a\ to\ b} = \propto_i + \beta_1 UR_i + \beta_2 Size_i + \beta_3 Time_i + \beta_4 No.BRec_i + \beta_5 Int.U_i + \varepsilon_i \quad (11)$$

$ER^{i}_{a\ to\ b}$ is the mean cumulative excess return from period a to period b, UR_i is a dummy variable that takes the value of one if an underwriter analyst issued the recommendation and zero if a nonunderwriter analyst issued the recommendation, $Size_i$ is the proceeds of the IPO in million US dollars, $Time_i$ is the number of days between the IPO and the date of which the recommendation is issued, $No.BRec_i$ is the number of buy recommendations issued on the IPO, $Int.U_i$ is a dummy variable that represents the value of one if an underwriter participating in the IPO is ranked among the top ten European sell-side research firms, and ε_i represents the error term.

The explanatory variables are estimated under the OLS assumption, where the estimators of the coefficients are the values of the coefficient that minimises the sum of squared prediction mistakes (Stock and Watson, 2015).

5.2.1 Explanatory variables

The sub-hypotheses presented in section 4.2, are tested by running a multiple regression analysis on the dependent variable, mean excess return from period *a*

to b. The following section will identify and describe the choice of our explanatory variables presented in the multiple regression.

5.2.1.1 Underwriter recommendations

This variable confirms if IPOs recommended by underwriting analysts obtain a higher or lower excess return. We define an underwriter analyst recommendation as a recommendation issued by one of the investment firms in the participating group that is involved in the IPO process. The variable is denoted by UR_i in the regression, and represents one if the recommendation is made by an underwriting

5.2.1.2 The proceeds of the IPO

Ritter (1991), and Michaely and Shaw (1994) argue that the long-run performance of an IPO has been shown to be related to size of the IPO. Logue et al. (2002) argued that underwriters are typically selected by the size of the IPO. The variable *size* represents the proceeds of the IPO in million US dollars and is denoted by $Size_i$ in the regression model. We expect to find that size is positively correlated to performance on IPOs.

5.2.1.3 The time of the recommendation issue

Michaely and Shaw (1994) found in their article that the long-run performance of IPOs is related to time until dividends are paid. Similarly, we believe the performance of an IPO is dependent upon the amount of time between when the firm went public to the recommendation was issued. Furthermore, recommendations issued closer to IPO date is expected to yield higher returns. The variable represents the number of days from the IPO to the recommendation was issued. The variable is denoted by $Time_i$ in the regression model.

5.2.1.4 The number of recommendations

As our dataset includes IPOs with multiple buy recommendations issued by both underwriter and nonunderwriter analysts, the number of recommendations issued on each IPO is likely have an impact on the performance of the IPO. Bradley et al. (2003) find support for the confirmation hypothesis, which

explains that firms with multiple initiations experience significantly larger abnormal returns than firms with single or no initiations. We expect that IPOs recommended by one or few analysts, have more inaccurate recommendations as there are no or few consensus estimates. The variable is denoted as $No.BRec_i$ in the regression model.

5.2.1.5 Internationally ranked underwriter

Ljungqvist et al. (2006) recognised that the reputation of the investment firm was far more determining in the competition of winning underwriting mandates. Moreover, James and Karceski (2006) argue that an underwriters' rank and the IPO stock price performance are potentially related. They also find that top-ranked underwriters appear to have a higher likelihood of analyst coverage, which potentially supports an increase in stock returns if performance is poor in the aftermarket. Hence, we expect that the involvement of a ranked underwriter in the IPO process will impact the performance on the IPO. The variable is denoted as $Int.U_i$ in the regression model.

The ranking of the underwriters is based on Institutional Investor's 2017 All-Europe Research Team's ranking, and it includes Bank of America Merrill Lynch, UBS, J.P. Morgan, Deutsche Bank, Morgan Stanley, Exane BNP Paribas, Bernstein, Barclays, Citigroup, and Credit Suisse (Institutional Investor, 2017).

6 DATA

6.1 IPO sample

The IPOs are extracted from the SDC Platinum's database. This database provides detailed financial transaction information on global equity and bond transactions. This enables us to extract historical information on primary equity issues (IPOs), including information about the bookrunners, proceeds raised in the IPO, and the stock exchange on which the IPO was listed.

From SDC Platinum, 206 listings are extracted on the main markets in Oslo, Stockholm, Copenhagen or Helsinki between 2007 and 2017. Among these stock exchanges, the Oslo Stock Exchange is the only independent exchange within the Nordic countries. The other stock exchanges in the Nordic belongs to Nasdaq Nordic. IPOs in Iceland are excluded from the data sample, as the number was insufficient. In addition, IPOs listed on other trading facilities like Aktietorget, Frist North, Oslo Axcess or Merkur Market are excluded. These markets are often small, illiquid, and there are less requirements for listing.

The data sample consists of 100 IPOs, of which 31 IPOs were listed on the Oslo Stock Exchange, 50 were listed on the Nasdaq Stockholm, 9 were listed on the Nasdaq Copenhagen and 10 were listed on the Nasdaq Helsinki. The significant reduction in the data sample is due to lack of analyst coverage on the IPOs. The IPOs are required to receive coverage from at least one underwriter or nonunderwriter analyst within one year.

Table 1 presents this distribution by year and country. We observe that the financial crisis lead to almost none new listings, and that the markets subsequently of the crisis has been strong for listings.

Table 1: Distribution of IPOs per country

Country	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Norway	3	1	0	3	2	2	5	6	3	1	5	31
Sweden	3	0	0	1	1	0	1	10	14	11	9	50
Denmark	1	0	0	2	0	0	1	1	1	1	2	9
Finland	1	0	0	0	0	0	2	0	4	3	0	10
Total	8	1	0	6	3	2	9	17	22	16	16	100

None IPOs are excluded due to size, however, it is likely that many small IPOs are left out as they lack coverage. Table 2 presents a distribution of the proceeds of the IPOs in million dollars. We observe that the largest proportion of IPOs in the data sample are *small sized IPOs*, which represents 43 % of the IPOs. *Medium sized IPOs* represents 35 % of all IPOs, while *large sized IPOs* are represented by 22 % of all IPOs in the data sample.

Table 2: Proceeds of IPOs in dollar million

Proceeds	Number of firms	%
$ 0 - $ 100	43	43.00 %
$ 100.1 - $ 350	35	35.00 %
Greater than $ 350	22	22.00 %
Total	100	100.00 %

$ 0- $ 100 million are defined as "small sized IPOs", $ 100,1-$ 350 million are defined as "medium sized IPOs" and greater than $ 350 million are defined as "large sized firms".

6.2 Analyst Recommendations

The data sample of analyst recommendations is extracted from Thomson Reuters' I/B/E/S database. The requested variables from I/B/E/S are broker specific recommendation description, ticker (RIC-code in Thomson Reuters), broker specific recommendation date, and broker name. Recommendations issued on stocks listed on the Nordic stock exchanges are matched with the IPOs, to obtain a final data sample of IPOs and their related recommendations.

The first step proceeding with our data is to separate the different recommendations on IPOs into the analysts´ opinion. Research analysts use different terms when expressing their opinion on a company. We observe that investment firms use different rating system, such as *strong buy, outperform, accumulate, buy, neutral, equal-weight, sell* and *downgrade*. To standardise the recommendations in the data sample, recommendations divided into *buy, hold* or *sell*.

Some investment firms reserve the right to withhold publishing their identity on the recommendations. The number of recommendations with an unidentified investment firm were significant. Those investment firms were identified by using information obtained in the Bloomberg Terminal.

Table 3 presents the total number of recommendations, which equates to a total of 430. Buy recommendations represent approximately 70 % (297), hold recommendations represent 21 % (92), and sell recommendations represent 9 % (41). Not surprisingly, buy recommendations account for the largest proportion of the recommendations issued.

We further categorised the recommendations into two groups, those issued by underwriter analysts and those issued by nonunderwriter analysts. The proportion of buy recommendations is larger for underwriter analysts, with 74 %, compared to 65 % for nonunderwriter analysts. The proportion of hold recommendations is similar for both underwriter and nonunderwriter analysts, at around 20 %, while the proportion of sell-recommendations is 2 % for underwriter analysts and 15 % for nonunderwriter analysts. This implies that IPOs often receive positive recommendations from analysts.

Table 3: Proportion of buy, hold and sell recommendations

	All	%	Underwriters	%	Nonunderwriters	%
Buy	297	69.07 %	134	74.03 %	163	65.46 %
Hold	92	21.40 %	43	23.76 %	49	19.68 %
Sell	41	9.53 %	4	2.21 %	37	14.86 %
Total	430	100 %	181	100 %	249	100.00 %

All recommendations issued on IPOs in the Nordic countries between 2007 and 2017 within one year.

6.2.1 Time of recommendations

Underwriter analysts are prohibited from issuing recommendations in the quiet period. This means that the first recommendation is likely to take place one to two months after the IPO, depending on the length of the quiet period. Nonunderwriters have no restrictions on when to issue their recommendations, but their recommendations are usually issued around the same time as underwriters (Michaely & Womack, 1991).

The IPOs are categorised into two time periods within the first year; recommendations issued within the first two months, and recommendations issued within the first year. As observed in Table 4, there is an approximately

equal proportion of the recommendations issued within two months and after two months. In addition, when we separate the recommendations made by underwriter and nonunderwriter analysts, underwriter analysts issue recommendations earlier, compared to nonunderwriter analysts. According to Michaely and Womack (1999), early in a company's public life, nonunderwriter analysts are most likely less informed about a firm, compared to a competitive investment firm that has participated in the IPO process. This may be one explanation to why nonunderwriter analysts issue their recommendations later than underwriter analysts.

Table 4: Time of recommendation issue

A: All recommendations	Number of recommendations	%
Within two months	216	50.23 %
Within a year	214	49.77 %
Total	430	100 %
B: Underwriter recommendations		
Within two months	122	67.40 %
Within a year	59	32.60 %
Total	181	100 %
C: Nonunderwriter recommendations		
Within two months	94	37.75 %
Within a year	155	62.25 %
Total	249	100 %

The time of issue for all buy, hold and sell recommendations in the sample. Time of recommendation represents the period from the IPO was listed, until the recommendation was issued.

6.3 Buy recommendations

Buy recommendations are clearly more weighted in the aftermarket of IPOs. In table 3, we observe a total of 297 buy recommendation, of which 134 buy recommendations are issued by underwriter analysts and 163 are issued by nonunderwriter analysts. However, as we are investigating the markets' reaction to the different recommendations made, we will not include more than one buy recommendation issued on an IPO at the same day. Therefore, the analysis in this thesis is based upon a total number of 274 buy recommendations, of which 120 buy recommendations were issued by underwriter analysts and 154 buy recommendations were issued by nonunderwriter analysts.

Inspired by Michaely and Womack (1991), we categorise the recommendations into four groups; 1) IPOs receiving buy recommendations from only underwriters, 2) IPOs receiving buy recommendation from only nonunderwriters, 3) IPOs receiving buy recommendations from both the underwriter and nonunderwriter, and 4) IPOs with no buy recommendations.

Table 5 A presents an overview of the number of IPOs for each category. We observe that 33 IPOs received buy recommendations from only the underwriter analysts. This means that a nonunderwriter has given either a hold or sell recommendation, or no recommendation at all. 16 of the IPOs received a buy recommendation from only nonunderwriter analysts, and 47 IPOs received a buy recommendation from both underwriter and nonunderwriter analysts. We therefore observe that there are only four IPOs that did not receive any buy recommendations within the first year of trading. This number is significantly small, and we have therefore decided to exclude these companies from the analysis. Hence, the analysis carry out during the remainder of this thesis focus solely on buy recommendations.

Table 5 B presents the frequency of all buy recommendations on IPOs. The four IPOs receiving no buy recommendations are excluded for further analysis. In Table 5 B, we observe that most IPOs receive between two and five buy recommendations within the first year. In addition, we can see that very few IPOs received more than ten recommendations within the first year of public trading activity.

Table 5: Source and frequency of buy recommendations

A: Buy recommendations differentiated by issued	Number of IPOs	%
IPOs with buy recommendations only by underwriters	33	33.00 %
IPOs with buy recommendations only by nonunderwriters	16	16.00 %
IPOs with buy recommendations by both underwriters and nonunderwriter	47	47.00 %
IPOs with no buy recommendations (underwriters or nonunderwriters)	4	4.00 %
Total	100	100 %

B: Number of buy recommendation	Number of IPOs	%
IPOs where 1 recommendation was made	27	28.13 %
IPOs where 2-5 recommendations were made	53	55.21 %
IPOs where 6-10 recommendations were made	13	13.54 %
IPOs where more than 10 recommendations were made	3	3.13 %
Total	96	100 %

Panel A shows the distribution of recommendation for the total of 100 IPOs included in our sample. The IPOs only appear in one subsample, so there are no overlapping observations. Panel B presents the frequency of buy recommendations. The four IPOs with no buy recommendations are excluded in panel B.

6.3.1 Time of buy recommendation

Table 6 presents the time of issue for buy recommendations. Compared to what we observed in table 4, there is only a marginal disproportionate weighting of recommendations between the two time periods for all buy recommendations. However, there is a marked increase in the number of recommendations issued within two months for underwriting analysts. Buy recommendations issued by nonunderwriter analysts are more often issued after the first two months of trading. Unsurprisingly, the conclusions drawn from table 4 and table 6 are in line, and underwriter analysts are more likely to issue recommendations earlier than nonunderwriter analysts.

Table 6: Time of first buy recommendations issued on an IPO

A: All buy recommendations	Number of recommendations	%
Within two months	130	47.45 %
Within a year	144	52.55 %
Total	274	100 %
B: Underwriter buy recommendations		
Within two months	74	61.67 %
Within a year	46	38.33 %
Total	120	100.00 %
C: Nonunderwriter buy recommendations		
Within two months	56	36.36 %
Within a year	98	63.64 %
Total	154	100 %

The time of issue for all 297 buy recommendations in the sample, also separated by underwriter and nonunderwriter. Time of recommendation represents the point at which the IPO was listed, up until the recommendation was issued.

6.3.2 Size of IPO receiving buy recommendation

Observed in table 2, the largest proportion of our data sample consists of small-sized IPOs. To further investigate the sample of buy recommendations, we have separated the buy recommendations issued on IPOs into categories based on the size of the IPO.

Table 7 presents the distribution of companies receiving a buy recommendation from either underwriter or nonunderwriter analysts, and both, differentiated by the size of the IPO. Underwriter analysts issue approximately the same number of buy recommendation independent of size, while nonunderwriter analysts issue 50 % of the buy recommendations on IPOs with proceeds greater than $ 350 million.

Table 7: Proceeds of IPOs receiving buy recommendations in $ million

Proceeds	Underwriter	%	Nonunderwriter	%	All buy	%
$ 0 - $100	40	33.33 %	36	23.38 %	76	27.74 %
$ 100.1 - $350	46	38.33 %	41	26.62 %	87	31.75 %
Greater than $ 350	34	28.33 %	77	50.00 %	111	40.51 %
Total	120	100 %	154	100.00 %	274	100 %

$ 0- $ 100 million are defined as "small sized IPOs", $ 100.1-$ 350 million are defined as "medium sized IPOs" and greater than $ 350 million are defined as "large sized firms".

7 RESULTS AND ANALYSIS

This section presents the results obtained in the matter of answering our main hypotheses, following by the sub hypotheses. Firstly, to test the main hypotheses, an event study on the 274 buy recommendations is conducted. Secondly, to test sub hypothesis 5 and 7, we test the implication of an IPOs' size and the number of recommendations issued on the performance of the IPOs. To conclude the analysis, we will test the strength of our results by preforming robustness tests. These robustness tests consist of an extended event study test and a multiple regression analysis to test all sub hypotheses.

7.1 Price reaction to all buy recommendations

Table 8 shows the stock price reaction to recommendation announcements made by all analysts, underwriter analysts, and nonunderwriting analysts in the period prior, at, and after the announcement. The immediate stock price reaction indicates whether the market discounts buy recommendations made by underwriting analysts (hypothesis 4).

Michaely and Womack (1999) argue that underwriter analysts attempt to boost the stock price of firms performing badly in the aftermarket of the IPO. This can be detected by poor pre-event excess returns for firms recommended by underwriters. The long-run performance, represented by the three-, six-, and 12-month excess return, detects if underwriter analysts are biased or have superior information relative to nonunderwriter analysts (hypothesis 1 and 2). If IPOs recommended by underwriter analysts outperform IPOs recommended by nonunderwriter analysts, then one can argue that the underwriter analysts have superior information which is not yet absorbed in the price.

Table 8: Excess return in the period prior, at, and after an analyst recommendation

	All	Underwriter	Nonunderwriter	Difference
Pre 21-days ER				
Mean	1.16%** (2.09)	0.2% (0.22)	1.93%*** (2.86)	-1.73% (1.53)
Median	0.9 %	-0.5 %	2.3 %	-2.8%** (2.27)
N	*264*	*118*	*146*	
Three-day ER				
Mean	0.92%* (1.87)	1.52%*** (3.64)	0.45% (0.55)	1.07% (1.18)
Median	1.4 %	1.6 %	1.2 %	0.4% (0.785)
N	*274*	*120*	*154*	
Three-month ER				
Mean	1.52%* (1.74)	1.8% (1.42)	1.31% (1.08)	0.49% (0.28)
Median	2,3 %	1,4 %	3,2 %	-1.8% (0.61)
N	*274*	*120*	*154*	
Six-month ER				
Mean	0.83% (0.57)	2.32% (1.05)	-0.26% (0.13)	2.06% (0.88)
Median	3.2 %	4.1 %	3.0 %	1.1% (1,02)
N	*260*	*110*	*150*	
12-month ER				
Mean	-4.34%* (1.73)	-2.23% (0.60)	-5.76%* (1.73)	3.53% (0.69)
Median	5.3 %	5.3 %	5.2 %	0.1% (0.70)
N	*247*	*101*	*146*	

*The excess return(ER) obtained by the 274 buy recommendations issued on the 100 IPOs included in our sample, differentiated by IPOs recommended by underwriter and nonunderwriter analysts. T-statistics are reported in parenthesis and in absolute value below the coefficients. *, ** and *** implies 0.10, 0.05 and 0.01 significance level.*

7.1.1 Event window – the immediate market reaction

There is a significant positive average excess return equal to 0.92 % (t-stat = 1.87), when observing the immediate market reaction to all 274 buy recommendations in the three-day event window. The immediate market reaction to firms recommended by underwriter analysts obtains a significant average excess return of 1.52 % (t-stat = 3.64), whilst firms recommended by

nonunderwriter analysts obtain an insignificant average excess return of 0.45 % (t-stat = 0.55). The mean difference between underwriters and nonunderwriters is insignificant with a t-statistic equal to 1.18.

We cannot find support for hypothesis 4, as IPOs recommended by underwriter analysts yield higher immediate average excess return than those of nonunderwriters. This difference is not significant. However, the increase in average excess return on firms recommended by underwriters is significant, which may indicate that the market believes in these buy recommendations.

7.1.2 Pre-recommendation performance

Table 8 shows that the average excess return for firms recommended by underwriter analysts is 0.2 % (t-stat = 0.22) compared to 1.9 % (t-stat = 2.86) for nonunderwriting analysts. This indicate that underwriter analysts attempt to recommend poorly performing firms, which might support hypothesis 3. The difference is marginally significant at 20 % level. The difference in medians is equal to a decrease of 2.8 %, this result is significant at 5 % level.

7.1.3 Post-recommendation performance

Overall, firms recommended by underwriters perform better than firms recommended by nonunderwriter in all post-recommendation periods. The difference is increasing with the time since the announcement. However, none of the differences are significant. Hence, we cannot find evidence for neither the conflict of interest nor the superior information hypotheses.

In summary, this event study find no evidence that the market discounts buy recommendations issued by underwriting analysts. From the pre-event reaction, we find some evidence of bias behaviour as underwriter analysts tend to recommend firms that performs poorly in the aftermarket of the IPO. Finally, as found in the long-run performance, there are no evidence for the conflict of interest or the superior information hypothesis.

7.2 Price reaction for differentiated data set

The following section presents two event studies where the data is differentiated by the size of the IPO (hypothesis 5) and the number of recommendations (hypothesis 7). This extension is conducted to see if the results from the main event study will change as the dataset is differentiated.

7.2.1 Excess return differentiated by the size of the IPO

Our data sample include all IPOs regardless of its size. As presented in table 2, the size of the IPOs differs across the sample. Furthermore, observed in table 7, most underwriters issue buy recommendations on medium-sized IPOs, whilst nonunderwriters issue most buy recommendations on large-sized IPOs.

Table 9: Excess return, differentiated by the size of IPOs

	Panel A: Underwriter			Panel B: Nonunderwriter			Panel C: Difference test		
Size of IPO	$0-$100	$101-$350	>$350	$0-$100	$101-$350	>$350	$0-$100	$101-$350	>$350
Prior 21-days ER									
Mean	-1.42% (0.56)	-0.08% (0.08)	2.59%** (2.07)	-1.74% (1.05)	1.66% (1.26)	3.78%*** (4.31)	0.10	1.05	0.78
Median	-3.48 %	-0.64 %	1.49 %	-1.47 %	3.66 %	3.47 %	0.41	1.28	0.72
N	31	43	31	35	38	71			
Three-day ER									
Mean	0.1% (0.16)	2.94%*** (4.27)	1.25% (1.59)	1.99%** (2.18)	1.18%* (1.68)	-0.53% (0.34)	1.70*	1.79*	1.02
Median	0.49 %	2.78 %	1.37 %	1.46 %	1.95 %	0.99 %	1.97**	1.48	0.81
N	40	46	34	35	41	76			
Three-month ER									
Mean	-4.00% (1.6)	7.16%*** (3.68)	1.42% (0.94)	1.81% (0.74)	1.32% (0.65)	0.62% (0.33)	1.66*	2.07**	0.33
Median	-6.77 %	8.11 %	3.21 %	1.28 %	4.77 %	3.21 %	1.81*	1.45	0.50
N	40	46	34	35	41	75			
Six-month ER									
Mean	-8.22%* (1.70)	9.11%*** (2.99)	4,87%* (1.7)	1.61% (0.38)	3.17% (1.21)	-3.13% (1.01)	1.52	1.48	1.89*
Median	-2.90 %	0.04 %	5.22 %	-4.58 %	5.60 %	3.26 %	1.14	1.05	1.71*
N	35	42	33	33	39	75			
12-month ER									
Mean	-13.4%* (1.65)	7.78%** (2.34)	-3.11% (0.4)	3.27% (0.54)	-1.38% (0.35)	-12.5%** (2.23)	1.65	1.77*	0.99
Median	-3.14 %	0.05 %	9.94 %	4.16 %	4.15 %	6.92 %	1.17	1.34	0.93
N	*31*	*37*	*33*	*32*	*37*	*74*			

*Panel A and B of this table shows the ER (excess return) for firms recommended by underwriter and nonunderwriter analysts differentiated by the size of the IPO (Proceeds in $M). T-statistics in panel A and B are reported in parenthesis below the coefficients. Panel C represents the t-statistics for difference in means and Wilcoxon median test. *, ** and *** represents 0.10, 0.05 and 0.01 significance level, respectively. All t-statistics are in absolute values.*

The first column in table 9 panel A and B presents the excess return of small-sized IPOs. We observe that small-sized IPOs recommended by underwriters perform poorer than those of nonunderwriters. The mean differences, except the pre-event, are significant or marginally significant. By interpreting these results, buy recommendations issued by underwriter analysts of smaller IPOs might be biased, as firms they recommend underperform to firms recommended by nonunderwriters.

Interestingly, by interpreting the findings in column two of table 9 panel A and B, the pattern has changed as the size of the IPO increases. Underwriters seem to overperform as they yield an overall higher average excess return throughout all periods except the pre-event. These differences are significant or marginally significant in most of the periods. This may indicate that, as the size of an IPO increases, underwriter analysts benefit from superior information which leads to more accurate recommendations (hypothesis 2).

7.2.2 Excess return differentiated by the number of recommendations

"The likelihood of coverage within the first year is also related to initial return, firm size (as measured by assets), and the age of the company at the time of the offering" (James and Karceski, 2003, p.10).

As argued in James and Karceski's (2003) article, coverage is important for the performance of an IPO, and it is therefore interesting to see if more coverage leads to better performance. Reported in table 5B, we observe that 28 % of IPOs received only one buy recommendation, 55 % of IPOs received two to five buy recommendations, 14 % of IPOs received six to ten buy recommendations, and 3 % of IPOs received more than ten buy recommendations. To investigate whether this has an impact on the performance of an IPO, we run an event study differentiated by the number of buy recommendations the IPO have received within the first year. Table 10 panel A and B presents the excess return on IPOs recommended by underwriter and nonunderwriter analysts differentiated by whether the IPO received one, two to five, or more than six buy

recommendations. Table 10 panel C presents the test of the difference in the means by underwriter and nonunderwriter analysts.

Table 10: Excess return, differentiated by the number of buy recommendations

	Panel A: Underwriter			*Panel B: Nonunderwriter*			*Panel C: Difference test*		
# of buy recommendations	*1*	*2-5*	*>6*	*1*	*2-5*	*>6*	*1*	*2-5*	*>6*
Prior 21-days ER									
Mean	0.1% (0.02)	0.19% (0.13)	1.44% (0.99)	3.23% (1.43)	-0.51% (0.42)	3.70%*** (4.46)	1.03	0.17	1.34
Median	-2.0 %	-0.60%	0.30 %	2.19 %	0.70 %	3.49 %	1.09	0.20	1.54
N	14	68	27	8	56	76			
Three-day ER									
Mean	2.69%** (2.48)	0.82% (1.51)	2.69%*** (3.48)	3.05%*** (2.54)	1.11%* (1.74)	-0.29% (0.19)	0.23	0.36	1.76*
Median	3.3 %	0.92%	2.50 %	1.71 %	1.46 %	1.14 %	0.25	0.42	1.63
N	17	75	28	10	63	78			
Three-month ER									
Mean	5.71% (1.06)	0.31% (0.21)	3.38%* (1.95)	3.35% (0.59)	1.1% (0.79)	0.8% (0.41)	0.30	0.38	0.97
Median	2.2 %	-0.04%	2.28 %	3.52 %	-1.0 %	4.7 %	0.10	0.25	0.08
N	17	75	28	10	63	78			
Six-month ER									
Mean	6.35% (0.82)	-0.22% (0.08)	6.01% (1.56)	6.16% (0.68)	1.21% (0.55)	-2.45% (0.78)	0.02	0,41	1.70*
Median	8.1 %	0.72 %	8.02 %	4.95 %	-0.28 %	3.87 %	0.21	0,37	1.77*
N	16	66	28	10	59	78			
12-month ER									
Mean	-1.96% (0.16)	2.00% (0,56)	-11.58% (1.56)	15.68% (1,45)	0.72% (0.19)	-3,5%*** (2.54)	1.08	0.24	0.17
Median	12.5 %	1.11 %	8.02 %	19,97 %	1.12 %	5.38 %	1.17	0.44	0.51
N	13	60	28	9	56	78			

*Panel A and B of this table shows the excess return (ER) for firms recommended by underwriter and nonunderwriter analysts differentiated by the number of recommendations given on each IPO. T-statistics in panel A and B are reported in parenthesis below the coefficients. Panel C represents the t-statistics for difference in means and Wilcoxon median test. *, ** and *** represents 0.10, 0.05 and 0.01 significance level, respectively. All t-statistics are in absolute values.*

The IPOs that received only one buy recommendation from nonunderwriter analysts outperform those of underwriter analysts after 12 months. This might support the conflict of interest hypothesis, that underwriter analysts issue biased recommendations. Although the difference is large, it is not significant at any

conventional levels. This is not surprising, as there is a low number of observations for this coverage level.

IPOs recommended by nonunderwriters that receives two to five buy recommendations outperform those of underwriter analysts in the event window and the post-recommendation periods, except after 12 months. However, none of the differences are significant.

For IPOs receiving six or more recommendations, the immediate, the three- and six-month market reaction shows that IPOs recommended by underwriter analysts outperforms those recommended by nonunderwriter analyst. Two of the periods have significant differences at a 10 % level. This result might support the superior information hypothesis (hypothesis 2), where underwriter analysts provide more accurate forecasts due informational advantages gained during the marketing and due diligence process of the IPO.

8 ROBUSTNESS

The event studies applied in the analysis above may suffer from unobserved differences in our data sample. From the extended event studies in section 7.2, the results differ greatly depending on the characteristics applied in the event study. To control the validity of the results obtained, we have conducted three robustness tests. Firstly, we are interested in the sole effect of recommendations from either underwriter or nonunderwriter analysts. This is examined by an event study on a data sample including IPOs with recommendation from only underwriter or only nonunderwriter analyst. Secondly, we want to test if the IPO characteristics described in our sub-hypothesis influence the performance of the IPO. We test these sub-hypotheses by running a multiple regression. Finally, we want to investigate if there exist some differences across the years and countries included in the sample. This is examined by two fixed-effect regressions.

8.1 Event study on IPOs with recommendation from either underwriter or nonunderwriter analysts

For the total 100 IPOs included in our sample, 33 % received a buy recommendation only from its underwriters, while 16 % IPOs received a buy recommendation only from a nonunderwriter. These IPOs are included in this event study, which represents a total of 49 IPOs and 76 recommendations.

Table 11: Excess return, differentiated by the isolated recommendation from underwriter or nonunderwriter analysts

	Underwriter	Nonunderwriter	Difference
Pre 21-day ER			
Mean	0,06% (0,03)	2,12%** (2,02)	-2,06% (0,97)
Median	-2,64%	2,26%	-4,9%** (2,37)
N	*40*	*27*	
Three-day ER			
Mean	1,39%* (1,81)	1,43%** (2,55)	-0,04% (0,04)
Median	2,61%	11,34%%	-8,73% (0,48)
N	*44*	*32*	
Three-month ER			
Mean	0,82% (0,31)	5,36%** (2,14)	-4,54% (1,25)
Median	-0,3%	5,81 %	-6,11% (1,62)
N	*44*	*32*	
Six-month ER			
Mean	0,27% (0,06)	6,99% (2,26)	-6,73% (1,29)
Median	-0,46%	6,1%	-6,56% (1,65)
N	*36*	*30*	
12-month ER			
Mean	-1,73% (0,27)	18,1%*** (4,93)	-19,83%** (2,67)
Median	5,64%%	18,82%%	-13,18%** (2,49)
N	*30*	*28*	

Excess return (ER) obtained by underwriter and nonunderwriter analysts on IPOs that received a buy recommendation from underwriters or nonunderwriters only. This sample includes 76 recommendations on 49 IPOs. T-statistics are reported in parenthesis for the mean and median test, all in absolute value.

By analysing the results in table 11, there is a higher mean and median excess return for the IPOs receiving buy recommendations from nonunderwriters only in the pre-event. This is consistent with the hypothesis 3, that underwriter analysts attempt to boost the stock price of poor performing firms. The difference in median excess return is strongly significant and supports this hypothesis.

The immediate market reaction shows no significant difference. However, the post-recommendation performance of the IPOs recommended by nonunderwriters overall outperforms those recommended by underwriters. This

difference is significant in the 12-month post-event period. The findings are consistent with the findings of Michaley & Womack (1999), which indicate that nonunderwriters, acting as independent analysts, are better at predicting long-term performance of IPOs.

8.2 Multiple regression analysis

To conclude if recommendations issued by underwrites have an impact on the mean excess return, we examine the effects of the size of the IPO (hypothesis 5), the time between which the firm went public to when the recommendation was issued (hypothesis 6), the number of recommendations issued on each IPO (hypothesis 7), and if an internationally ranked underwriter was involved in the IPO process (hypothesis 8).

Table 12: Multiple regression analysis

	Three-day event	Pre-event	Post-event		
	(1)	(2)	(3)	(4)	(5)
Dummy = 1 if recommendation is from an underwriter	0.0001013 (0.01)	-0.0106183 (0.73)	0.0027457 (0.15)	0.0106204 (0.35)	0.0033309 (0.06)
Size	-0.000028*** (2.53)	-3.60e-06 (0.27)	-0.0000156 (0.78)	-0.0000994*** (3.08)	-0.0001248*** (2.28)
Time	-0.0001233*** (2.55)	-0.0001874*** (4.27)	-0.0001074** (1.98)	-0.0001915*** (2.19)	0.0000838 (0.56)
Number of recommendations	0.0004207 (0.29)	-	0.001098 (0.41)	0.0007282 (0.17)	-0.0075685 (-1.03)
Dummy = 1 if underwriter is ranked as top 10 research firm in Europe	0.0097006 (0.76)	-	0.0143456 (0.62)	0.0828207*** (2.19)	0.1020165 (1.58)
Constant	0.0299516*** (2.39)	0.0544419*** (3.93)	0.0232704 (1.14)	0.0356475 (1.07)	0.0000676 (0.00)
N	274	264	274	260	247
R-squared	0,0508	0,0659	0,0182	0,0586	0,0332
Adjusted R-squared	0,0331	0,0551	-0,0001	0,0401	0,0131

*The regression results from estimating equation (11). The pre-event period does not include the number of recommendations variable and the dummy variable for ranking as there is no recommendation made in that period. Regression (3), (4), and (5) indicate the three-, six- and 12-months post-event regressions, respectively. T-statistics are reported in parenthesis below the coefficients. *, ** and *** indicates 0.10, 0.05 and 0.01 significance level, respectively. All t-statistics are in absolute value.*

From table 12 we can see that the variable representing recommendations issued by an underwriter has no significant impact on the excess return in the different periods. This is in accordance with the results presented in the event study in

table 8, in which we find no significant difference in average excess return between underwriters and nonunderwriters. Hence, we find no support for either the conflict of interest hypothesis (hypothesis 1), nor the superior information hypothesis (hypothesis 2).

The findings in column (1) and (4) show that size of the IPO and the time from the IPO to the recommendation was issued have a significantly negative impact on the average excess return in the three-day event period and the six-month post-event period. Column (2) and (3) show that time from the IPO to when the recommendation was issued has a significantly negative impact on the excess return in the pre-event and the three-month post-event period, respectively. Column (5) shows that size of the IPO has a significantly negative impact on the excess return in the 12-month post-event period. Hence, we cannot reject the null hypothesis of hypothesis 5. However, we find support for hypothesis 6, that less time between the IPO and the recommendation lead to a higher excess return.

In column (4), the variable representing whether an underwriter is ranked among the top ten research firms in Europe has a positive significant impact on the average excess return in the six-months post-event period. This is in accordance with the findings by James and Karceski (2006), who find that a top-ranked underwriter being involved in the IPO process increases the likelihood of receiving coverage by 5%, which also relates to an increase in initial return.

In summary, the multiple regression analysis find no evidence that a recommendation issued by an underwriter analysts have any impact on the excess return. On the other hand, it shows that size of the IPO and time of the announcement are more important for the excess return on an IPO.

8.3 Fixed effect regressions

This research is carried out over a period of ten years, which are affected fluctuations and developments in the market that potentially affect our result. The period between 2007 and 2010 were affected by the financial crisis, while the market yield impressive returns in the Nordic stock exchanges in the period

subsequent of the financial crisis. Each of the stock exchanges have different composition of sectors, which leads to different level of diversification. The fixed-effects regressions check the validity of our regression results and the characteristics included over time and country.

8.3.1 Year fixed effect regression

Table 13: Regression results by year fixed effects

	Three-day event	Pre-event	Post-event		
	(1)	(2)	(3)	(4)	(5)
Underwriter dummy	-0.0045498 (0.42)	-0.0337536** (2.22)	-0.0045586 (0.23)	0.0165047 (0.51)	0.0151045 (0.28)
Size	-0.0000227* (1.93)	4.40e-06 (0.31)	-0.0000162 (0.76)	-0.0000851** (2.49)	-0.0001087* (1.91)
Time	-0.0001622*** (2.92)	-0.0002951*** (3.78)	-0.0001834* (1.83)	-0.000101 (0.62)	0.000118 (0.42)
# of recommendations	0.0024517 (1.39)	-	0.0013471 (0.42)	0.0034834 (0.68)	0.0016827 (0.20)
Ranked underwriter dummy	-0.0000111 (0.00)	-	0.0010444 (0.04)	0.0595882 (1.51)	0.072776 (1.11)
Constant	0.0078254 (0.17)	-0.01356 (0.21)	-0.0380329 (0.45)	-0.1406465 (1.05)	-0.0911486 (0.41)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes
Country-fixed effects	No	No	No	No	No
R-squared	0.0874	0.1880	0.0647	0.0770	0.1195
Adjusted R-squared	0.0306	0.1423	0.0065	0.0476	0.0624

*Regression results by estimating equation four with fixed year-effects. Column (3), (4), and (5) indicate the three-, six- and 12-months post-event regressions, respectively. T-statistics are reported in parenthesis below the coefficients. *, ** and *** indicates 0.10, 0.05 and 0.01 significance level, respectively. All t-statistics are in absolute value. Please see appendix A for the complete regression.*

In table 13, we cannot find any significant relationship between an underwriter recommendation and the mean excess return in the event window or the post-event recommendations. This result is in line with what we found in both the event study (table 8, 9 and 10) and the multiple regression (table 12). However, we find a significant negative relationship between underwriter recommendation and the excess return in the pre-event period. This supports that underwriting analysts attempt boost stock prices of poor performing firms (hypothesis 3).

Column (1), (2) and (3) show that the variable, time, has a significantly positive effect on the mean excess return in the three-day event, the pre-event and three-month post-event. This is in line with the results presented in the table 12, that time has a negative impact on excess return which support hypothesis 6. Also, columns (1), (4), and (5) suggest that recommendations issued on larger IPOs obtain lower excess return. This result conflicts with hypothesis 5, which states that larger IPOs obtain higher excess returns.

8.3.2 Country fixed effect regression

Table 14: Regression results by country fixed effects

	Three-day event	Pre-event	Post-event		
	(1)	(2)	(3)	(4)	(5)
Dummy = 1 if recommendation is from underwriter	0.0017969 (0.17)	-0.0123169 (0.76)	-0.0020979 (0.11)	0.023529 (0.74)	0.0348524 (0.64)
Size	-0.0000211* (1.68)	2.79e-06 (0.16)	-4.47e-06 (0.20)	-0.000048 (1.28)	-0.0000603 (0.95)
Time	-0.0001206*** (2.47)	-0.0001926*** (2.59)	-0.0001488* (1.69)	0.0000351 (0.24)	0.0005616** (2.25)
# of recommendations	0.0009095 (0.53)	-	0.0038359 (1.25)	0.0081263 (1.61)	0.0021319 (0.25)
Dummy = 1 if underwriter is ranked as top 10 research firm in Europe	0.0096789 (0.74)	-	0.0071366 (0.30)	0.0766136** (2.00)	0.0914174 (1.40)
Constant	0.0050848 (0.20)	0.0397991 (1.16)	-0.012078 (0.27)	-0.1896336** (2.32)	-0.3169779** (2.27)
Year-fixed effects	No	No	No	No	No
Country-fixed effects	Yes	Yes	Yes	Yes	Yes
N	274	264	274	260	247
R-squared	0.0558	0.0308	0.0318	0.0770	0.0668
Adjusted R-squared	0.0273	0.0082	0.0026	0.0476	0.0355

*Regression results by estimating equation four with fixed country-effects. Column (3), (4), and (5) indicate the three-, six- and 12-months post-event regressions, respectively. T-statistics are reported in parenthesis below the coefficients. *, ** and *** indicates 0.10, 0.05 and 0.01 significance level, respectively. All t-statistics are in absolute value. Please see appendix B for the complete regression*

In table 14, there is no significant relationship between the underwriter recommendation and the mean excess return. However, as presented in columns (1), (2), (3) and (5), time has a significant effect on the mean excess return. The coefficients in column (1), (2) and (3) all show that time has a negative impact on the mean excess return, suggesting that IPOs with recommendations made closer to the IPO will obtain higher excess return (hypothesis 6).

In summary, the fixed-effects regressions are in line with the results from the multiple regression analysis, that underwriter analysts' recommendation have no impact on excess return. Furthermore, the fixed-effects regressions again prove that size of the IPO and time of the announcement are more important for the excess return on an IPO.

9 DISCUSSION AND LIMITATIONS

We believe there are several reasons causing the contradictory results to the findings of Michaely and Womack (1999). Firstly, international regulations at EU level have strengthened the requirements of the information contained in analyst recommendations. Investment firms must carefully state their interest in, or the possible conflicts of interests with, the company that is recommended (Norwegian Securities Dealers Association, 2018). If an investment firm acts as an underwriter in an IPO, it must be clearly stated in the investment recommendation of the company. This makes the investors more conscious of who the underwriters are, which may affect their investment decisions.

Secondly, by the implementation of MiFID II, which are designed to make markets more transparent, investors must pay for analyst recommendations separately from the execution fee. As a result, investors might put more trust into their own abilities to find optimal investment strategies, instead of purchasing research services. Thus, the demand for research services will decrease, and analysts may experience more pressure to issue accurate recommendations to retain the investor as a customer for the research services.

9.1 Limitations

This study is particularly limited by the lack of observations in the data set. This becomes even more limited after differentiating the data on characteristics of the IPOs. By examining our hypotheses on a larger data sample, one might obtain stronger results. Moreover, we define an underwriter as an investment bank involved in the participating group of underwriters. We recognise that other studies define an underwriter as only the lead underwriter, which might give different results as it is likely that the lead underwriter have closer involvement to the IPO. Also, the multiple regression analysis may be affected by endogeneity issues. Finally, our thesis only investigates the market reaction of the first recommendations issued on an IPO. For future research, it would be interesting to extend this analysis by investigating the market's reaction to changing recommendations on IPOs.

10 CONCLUSION

In this thesis, we have studied the credibility of underwriter analysts' recommendations on IPOs in the Nordic countries between 2007 and 2017. Following Michaely and Womack's article from 1999, we have investigated the performance of recommended IPOs by conducting several event studies.

We see a clear overweighting in buy recommendations issued by both underwriter and nonunderwriter analysts. By examining the performance of the 100 IPOs receiving buy recommendations, IPOs recommended by underwriters seem to outperform, thus there is no evidence for the conflict of interest hypothesis. However, the outperformance of underwriter analysts cannot be supported by the superior information hypothesis as the difference in not significant.

After differentiating the data set, we find some evidence for the conflict of interest hypothesis on small-sized IPOs as small firms recommended by underwriter analysts underperform. In contrast, larger IPOs and IPOs receiving six or more recommendations recommended by underwriter analysts outperform. This suggests that underwriter analysts benefit from superior information on IPOs that receive more attention in the market.

There is some evidence for hypothesis 3, that underwriters attempt to boost stock prices of poorly performing firms. The market does not seem to discount recommendations issued by underwriters, which prevent us from confirming hypothesis 4. The only exception is small-sized IPOs, where we find some evidence for biased recommendations.

11 BIBLIOGRAPHY

Aitken, L. (1992). Chinese Walls and conflicts of interest. Monash UL Rev., 18, 91.

Binder, J. (1998). The event study methodology since 1969. *Review of quantitative Finance and Accounting*, *11*(2), 111-137.

Bradley, D. J., Jordan, B. D., & Ritter, J. R. (2003). The quiet period goes out with a bang. *The Journal of Finance*,*58*(1), 1-36.

Dugar, A., & Nathan, S. (1995). The effect of investment banking relationships on financial analysts' earnings forecasts and investment recommendations. *Contemporary Accounting Research*, *12*(1), 131-160

Eisenhardt, K. M. (1989). Agency theory: An assessment and review. *Academy of management review*, *14*(1), 57-74

European Securities and Markets Authorities (ESMA). 2018.

Hayes A. Investopedia. IPO basic tutorial. Extracted 04.01.2018 https://www.investopedia.com/university/ipo/

Hayward, M. L., & Boeker, W. (1998). Power and conflicts of interest in professional firms: Evidence from investment banking. *Administrative Science Quarterly*, 1-22.

Institutional Investor, 02.2017. Extracted 08.06.2018 from http://www.marketwired.com/press-release/institutional-investors-annual-ranking-europes-top-analysts-shows-there-is-no-room-complacency-2193853.htm

James, C., & Karceski, J. (2006). Strength of analyst coverage following IPOs. Journal of financial Economics, 82(1), 1-34

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, *3*(4), 305-360.

Jean Murray. (2017). The Balance. Extracted 03.01.2018: https://www.thebalance.com/what-is-a-conflict-of-interest-give-me-some-examples-398192

Kennon, Joshua. What is the quiet period on wall street? 08.11 2017 https://www.thebalance.com/what-is-the-quiet-period-on-wall-street-357644

Kothari, C. R. (2004). *Research methodology: Methods and techniques*. New Age International.

Lang, M. H., & Lundholm, R. J. (1996). Corporate disclosure policy and analyst behavior. *Accounting review*, 467-492.

Ljungqvist, A., Marston, F., & Wilhelm, W. J. (2006). Competing for securities underwriting mandates: Banking relationships and analyst recommendations. *The Journal of Finance*, *61*(1), 301-340.

Lim, T. (2001). Rationality and analysts' forecast bias. *The Journal of Finance*,*56*(1), 369-385.

McNichols, M., & O'Brien, P. C. (1997). Self-selection and analyst coverage. *Journal of Accounting Research*, *35*, 167-199.

Michaely, R., & Womack, K. L. (1999). Conflict of interest and the credibility of underwriter analyst recommendations. *The Review of Financial Studies*, *12*(4), 653-686.

Norwegian Securities Dealers Association. (2018). The relationship between corporate departments and analysis departments. *Industry Standard no. 3*.

Oslo Stock Exchange. Sammenligning av Oslo Børs, Oslo Axess og Merkur Market. Extracted 10.07.2018: https://www.oslobors.no/Oslo-Boers/Notering/Aksjer-egenkapitalbevis-og-retter-til-aksjer/Sammenligning-av-Oslo-Boers-Oslo-Axess-og-Merkur-Market

Seyhun, H. N. (2007). Insider trading and the effectiveness of Chinese Walls in securities firms. *JL Econ. & Pol'y*, *4*, 369.

Shiller, R. J. (2003). From efficient markets theory to behavioral finance. *The Journal of Economic Perspectives*, *17*(1), 83-104.

Simpson, Stephen. (2017). Buy-Side vs. Sell-Side Analysts. Investopedia. Extracted 06.01.2018: https://www.investopedia.com/articles/financialcareers/11/sell-side-buy-side-analysts.asp

Stickel, S. E. (1992). Reputation and performance among security analysts. *The Journal of Finance*, *47*(5), 1811-1836.

Strong, N. (1992). Modelling abnormal returns: a review article. Journal of Business Finance & Accounting, 19(4), 533-553.

Wilcoxon, F. (1945). Individual comparisons by ranking methods. *Biometrics bulletin*, *1*(6), 80-83.

Womack, K. L. (1996). Do research analysts' recommendations have investment value?. *The journal of finance*, *51*(1), 137-167.

12 APPENDIX

Appendix A – Complete fixed effects regressions

Table 15 Year fixed effects

	Three-day event	Pre-event	Post-event		
	(1)	(2)	(3)	(4)	(5)
Underwriter dummy	-0.0045498 (-0.42)	-0.0337536** (-2.22)	-0.0045586 (-0.23)	0.0165047 (0.51)	0.0151045 (0.28)
Size	-0.0000227* (-1.93)	4.40e-06 (0.31)	-0.0000162 (-0.76)	-0.0000851** (-2.49)	-0.0001087* (-1.91)
Time	-0.0001622*** (-2.92)	-0.0002951*** (-3.78)	-0.0001834* (-1.83)	-0.000101 (-0.62)	0.000118 (0.42)
# of recommendations	0.0024517 (1.39)	-	0.0013471 (0.42)	0.0034834 (0.68)	0.0016827 (0.20)
Ranked underwriter dummy	-0.0000111 (-0.00)	-	0.0010444 (0.04)	0.0595882 (1.51)	0.072776 (1.11)
2008	0.0417842 (0.76)	0.1570291** (2.07)	0.0597598 (0.60)	0.1487626 (0.94)	0.137214 (0.52)
2009	0.0356726 (0.38)	0.7019581*** (5.39)	-0.2054137 (-1.21)	-0.3489872 (-1.28)	-0.0017846 (-0.00)
2010	0.0145627 (0.28)	0.120794 (1.75)	0.0857953 (0.93)	0.063989 (0.43)	-0.2534713 (-1.03)
2011	-0.0119947 (-0.24)	0.0374626 (0.55)	0.0783423 (0.87)	0.1479863 (1.02)	0.0890189 (0.37)
2012	0.0009801 (0.02)	0.0604303 (0.83)	0.0501433 (0.53)	0.2187468 (1.43)	0.1578977 (0.62)
2013	-0.0019726 (-0.04)	0.0467533 (0.68)	0.0568976 (0.63)	0.107088 (0.75)	-0.0824314 (-0.35)
2014	0.0137818 (0.29)	0.0986231 (1.50)	0.0678385 (0.79)	0.1412048 (1.02)	-0.0138806 (-0.06)
2015	0.0445475 (0.92)	0.1152585 (1.74)	0.117345 (1.34)	0.2226399* (1.60)	0.1540317 (0.66)
2016	0.0311158 (0.65)	0.0684435 (1.04)	0.1027737 (1.19)	0.1771027 (1.28)	0.1069219 (0.47)
2017	0.0223148 (0.46)	0.077225 (1.16)	0.0362491 (0.42)	0.0882726 (0.63)	-0.0654034 (-0.27)
2018	0.0762546 (0.82)	0.0713591 (0.56)	0.1506168 (0.90)	-	-
Constant	0.0078254 (0.17)	-0.01356 (-0.21)	-0.0380329 (-0.45)	-0.1406465 (-1.05)	-0.0911486 (-0.41)
N	274	264	274	260	247
R-squared	0.0874	0.1880	0.0647	0.0770	0.1195
Adjusted R-squared	0.0306	0.1423	0.0065	0.0476	0.0624

*Regression results by estimating equation four with fixed year-effects. Column (3), (4), and (5) indicates the three-, six- and 12-months post-event regressions, respectively. T-statistics are reported in parenthesis below the coefficients. *, ** and *** indicates 0.10, 0.05 and 0.01 significance level, respectively. 2007 is excluded by Stata due to multicollinearity.*

Table 16 Country fixed effects

	Three-day event	Pre-event	Post-event		
	(1)	(2)	(3)	(4)	(5)
Dummy = 1 if recommendation is from underwriter	0.0017969 (0.17)	-0.0123169 (-0.76)	-0.0020979 (-0.11)	0.023529 (0.74)	0.0348524 (0.64)
Size	-0.0000211* (-1.68)	2.79e-06 (0.16)	-4.47e-06 (-0.20)	-0.000048 (-1.28)	-0.0000603 (-0.95)
Time	-0.0001206*** (-2.47)	-0.0001926*** (-2.59)	-0.0001488* (-1.69)	0.0000351 (0.24)	0.0005616** (2.25)
Number of recommendations	0.0009095 (0.53)	-	0.0038359 (1.25)	0.0081263 (1.61)	0.0021319 (0.25)
Dummy = 1 if underwriter is ranked as top 10 research firm in Europe	0.0096789 (0.74)	-	0.0071366 (0.30)	0.0766136** (2.00)	0.0914174 (1.40)
Dummy = 1 if IPO is listed in Finland	0.0259446 (1.01)	0.0054812 (0.14)	0.0686222 (1.49)	0.2096568*** (2.66)	0.2477721* (1.86)
Dummy = 1 if IPO is listed in Norway	0.0200615 (1.12)	0.0196498 (0.71)	0.0074153 (0.23)	0.107235* (1.89)	0.1438637 (1.51)
Dummy = 1 if IPO is listed in Sweden	0.02132 (1.04)	0.005023 (0.17)	0.0447474 (1.21)	0.1848353*** (2.82)	0.2436589** (2.17)
Constant	0.0050848 (0.20)	0.0397991 (1.16)	-0.012078 (-0.27)	-0.1896336** (-2.32)	-0.3169779** (-2.27)
N	274	264	274	260	247
R-squared	0.0558	0.0308	0.0318	0.0770	0.0668
Adjusted R-squared	0.0273	0.0082	0.0026	0.0476	0.0355

*Regression results by estimating equation four with fixed country-effects. Column (3), (4), and (5) indicates the three-, six- and 12-months post-event regressions, respectively. T-statistics are reported in parenthesis below the coefficients. *, ** and *** indicates 0.10, 0.05 and 0.01 significance level, respectively. Copenhagen is excluded by Stata due to multicollinearity.*