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IPO PRICING: EVIDENCE ON
NORDIC IPOS IN 2015-18

Master's thesis

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ABSTRACT

The thesis investigates the IPO underpricing and analysts' price targets relationship in the case of Nordic IPOs during the period of 2015-2018. For the Nordic regulated market IPOs the IPO discount was on average 6.8%. At the same time, while estimating the price after 12 months, the very first target price attributed to the newly listed company was on average 28.7% higher than IPO price. The analysis uses regression model to analyse the relationship of IPO underpricing and analysts' first target price set for the newly listed company. The model which includes explanatory factors like issue size, market sentiment and market price developments proves significant in describing that there exists positive relationship between the IPO underpricing and the target price difference to IPO price. The relationship of the analysts' price targets difference level from IPO price and actual target realization in market prices is also tested, but the model did not prove fully significant and thus would be an interesting topic for further research. The analysis includes interpretation of the results with same information from Baltic IPOs. While the sample for Baltic IPOs is extremely limited with only three IPOs qualifying during the same time period, then similar directions between IPO underpricing and target price difference levels can be observed.

Keywords: IPO underpricing, Analysts' price targets, Initiation price, Nordic, Baltic

INTRODUCTION

Efficient market theory says that the market prices reflect the value most accurately if there are no visible obstacles. Nevertheless, rarely does the fair value estimate expressed as the target price in a professional equity analyst's research report equal the market price of the company's share, even different analysts have different target price estimates. At the same time, it should as the essence of the research to present the fair value of the company analysed. This brings to question that as market price with different market obstacles (like liquidity, asymmetric information etc.) might not always reflect the true fair value of the company, then so doesn't the underpricing for an Initial Public Offering (IPO) specifically reflect the true discount to company's fair value but only to the market value.

In order to compare the IPO pricing to fair value, this master thesis focuses on the difference of the IPO pricing and the analysts' initiation report target price. The coverage initiation report is the first research report issued by market equity analysts after the IPO. While fair value is usually more constant as analysts change their view on the target price generally when something substantial has changed in the outlook of the market or the company, then the market value will change on a liquid stock market daily. Another aim of the thesis is to test whether the analysts' price targets have generally been achieved or not in a year's time.

The analyses tests the hypotheses by testing regression models on a sample of Nordic regulated market IPOs from 2015 through 2018. One aim of the thesis is to also gain more knowledge on underpricing of the Baltic IPOs. Is the difference in the IPO price and target price larger or smaller in the Nordic market compared to the Baltic IPOs? This will help to understand whether an IPO pricing outcome is more favourable in the lively Nordic market compared to the Baltic stock exchanges or not. As the number of Baltic IPOs is limited both in the time period under review as overall, then the chapter of Baltic IPOs is composed as a descriptive overview.

The thesis has been divided into three chapters. The first chapter of the thesis concentrates on the theoretical background of IPO underpricing and analysts' price targets. The chapter gives

overview on the theories explaining the IPO underpricing phenomenon, the factors affecting the level of underpricing and finally the analysts' research in the context of IPOs. To understand the pricing of the IPO the pricing process is also explained in this chapter.

The second chapter will form the empirical part of this thesis. An overview of the IPOs in Nordics from 2015–2018 is given and levels of market and analysts' price differences to IPO pricing presented. Also, in chapter two the specific hypotheses are constructed and regression analysis performed.

Finally, chapter three will analyse the results of the empirical models compiled in chapter two. In addition, the chapter three will give overview of the Baltic IPOs in the same time period.

The author of this thesis would like to thank her supervisor Karin Jõeveer for clear and constructive comments, colleagues for help with the data and family for overall support.

1. IPO UNDERPRICING AND ANALYSTS' PRICE TARGETS

The IPO underpricing *i.e.* the difference between the opening or closing price on the first day of trading and the price set in the IPO has been analysed in numerous research papers. The terms for underpricing include IPO discount as well as first-day returns or short-term returns. Nevertheless, like for any other publicly traded company, the market value might not always present the intrinsic fair value of the company when not trusting the theory of efficient markets. With this, the professional analysts' research coverage is generally something to be reckoned with. The "buy", "sell" or other recommendation the analysts provide when the fair value expectation is different to market value is backed up with professional research based on public data that the company has disclosed. In the current chapter of the thesis, the author provides an overview of the literature regarding IPO underpricing theories as well as issues about analyst coverage and their price targets for IPO companies.

1.1. Theoretical background

The first studies about the systematic first day returns in IPOs were conducted as early as in the 1970s, for example by Ibbotson (1975) which investigated the IPOs in the 1960s that had on average 11.4% initial performance. Since then, the literature regarding IPO underpricing has been vast and various theories and related empirical tests have been explored for getting closer to the explanation of why IPOs often generate significant first-day returns. The theoretical models almost always end with the conclusion that on average IPOs are undervalued compared to the market value represented by the first day of trading. As brought out in the overview of IPO literature by Ritter and Welch (2002) then IPOs of operating companies are underpriced on average in all countries.

The theories of IPO underpricing concentrate usually not on the reasons why the price changes from the offer date to first day of trading, but rather on the offer price setting or allocation process. This is due to belief that within one day, there isn't that steep changes in stock market in general as well as no specific new information will be distributed by the company. Thus, the

underpricing can be the result of the price setting process or other processes that have an direct or indirect impact on the aftermarket trading, for example also the allocation of shares in the IPO. The price setting process of the IPOs is explained in the next section. In following Figure 1, common underpricing theories are organized and essence of these theories explained below.
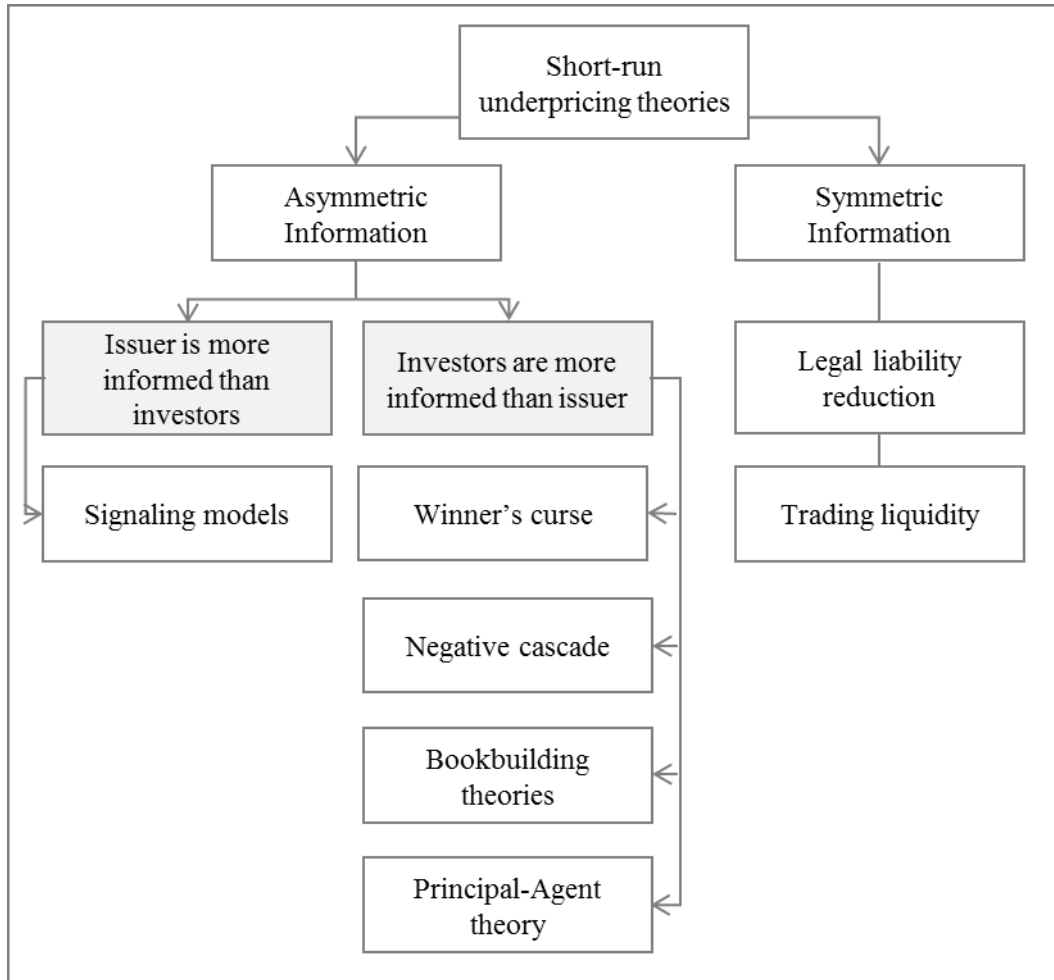

Figure 1. IPO underpricing theories
Source: Author's figure based on Ritter, Welch (2002)

The **asymmetric information theories** try to explain underpricing with different level of information available to the issuer and the investors and state that underpricing is positively related to the level of asymmetric information.

Signaling models base their theory on assumption that high-quality companies want to demonstrate their quality by "leaving money on the table" and determined to leave a positive experience from the first-day trading prices to their investors. The reason for that wish is often described by companies' forward-looking strategies that would need additional share issues in the future. So when the IPO is successful in the eyes of the investor, the company can thus more

easily also attract capital in the future. Empirical results based on signaling models have mixed results including for example Michaely and Shaw (1994) in their analysis rejecting the signaling theories. In their research addressing multiple theories on underpricing it is specifically found that companies who have higher levels of underpricing return to reissue market less often and in addition have in general lower financial performance (*Ibid.*). So, even though signaling models have logical explanations, then it has not always been proved with empirical analysis.

Winner's curse theory (Rock 1986) suggests that there exist investors with superior information level and in order to guarantee that also uninformed investors subscribe shares in an IPO then issuers need to price the shares at discount. Investors fear that they might be overly optimistic with their valuation if they get full allocation and thus in the end get return below the unconditional return. While Michaely and Shaw (1994) rejected the signaling theory in their research, they found grounds for winner's curse hypothesis. When investors are relatively homogeneous, there exists less underpricing *i.e.* in markets where the investors know that they do not have to compete with more informed investors, the IPOs are not underpriced.

Negative cascade is an information assessment cascade where investors try to assess the interest of other investors and adjust their valuations accordingly. Thus, issuers have to underprice issues to create a positive cascade rather than negative that would lead to undersubscription of the IPO. The theory was first introduced by Welch (1992) where they find that "Demand can be so elastic that even risk-neutral issuers underprice to completely avoid failure." The information cascade theory has empirical support from Amihud *et al.* (2003) where it is found that issues are either heavily oversubscribed or undersubscribed leaving a moderate oversubscription rather a case that in real life really does not happen often. The author of this thesis agrees based on practical experience of IPO price setting process, that there exist relationship with the desired level of oversubscription for a healthy aftermarket performance and respective pricing to get to the target level of IPO subscription.

Bookbuilding theories explain that underwriters have the motivation to offer underpricing for investors so that the investors in return would reveal their true valuation levels at which they are willing to subscribe to the IPO. Bookbuilding itself is an issuing mechanism where a range for the offer price is set and then based on investor feedback during the marketing of the company via for example road show *i.e.* investor meetings with the management is adjusted. This theory however has not find the answer to some very high underpricing cases. The bookbuilding theory

was first introduced by Hanley (1993). In 2003 analysis by Derrien and Womack based on French and U.S IPOs find that the auction mechanism is associated with less underpricing and lower variance of underpricing than bookbuilding and fixed price IPOs.

Agency theories in the case of IPO refer that issuers are less informed but not relative to investors, but compared to its underwriter. The theory was introduced by Baron (1982) where he believes that investment bankers are better informed about the capital markets than the issuer and under optimal contract the power to set the price is delegated from the issuer to the underwriter. Interesting results from empirical research regarding this theory include findings that when underwriters themselves go public, they experience underpricing the same way (Muscarella, Vetsuypens 1989). This result can of course not give final answers as well, as Ritter and Welch (2003) argue that it might be also a deliberate act by underwriters in order to show that underpricing is an indirect cost always needed when going public. A newer article (Krigman, Jeffus 2016) based on the high profile Facebook IPO that had no underpricing and thus was perceived as a failure from investor community finds that this occurrence had an impact on the same banks' underwritten IPOs underpricing levels going further. They discuss that this is due to underwriters' loyalty to their institutional investor client base which "propelled the Facebook underwriters to increase underpricing to compensate for the perceived losses on Facebook." (*Ibid.*) Agency theories concentrate very much on the underwriters' motivation and potential relationships with their investor base to explain why and what impacts the level of IPO discount potentially deliberately set by the investment bankers.

The **symmetric information** theories include legal liability reduction and trading liquidity theories. The symmetric information theories base their ideas on belief that the underpricing is a conscious choice for tackling other aspects of IPO success in addition to the price.

Legal liability reduction theory explains that issuers are willing to underprice to reduce their legal liability. Highes and Thakor (1992) discuss that motivation to sue the company for an underpriced IPO is lower than for an overpriced IPO and thus to minimize the risk of litigation, issuers underprice their shares in an IPO. Lin *et al.* (2013) use a sample of almost 14 thousand firms that went public from 1991 to 2011 and find that the degree of litigation risk in a given country affects the level of underpricing for firms that go public in that country. Thus in the analysis they find a significant positive relationship between litigation risk and underpricing in a cross-country framework. The legal liability risk can be illustrated with some examples about

when the first lawsuits from investors concerning the IPO and information given in the prospectus and during roadshow have been filed for different prominent IPOs. For example, Facebook that had its IPO in 2012 faced lawsuits within a week from the IPO and for a recent IPO of Lyft it took three weeks before the investors filed their claims after an IPO that had negative performance in the market prices shortly after the IPO (Bloomberg). Again, a simple risk and return relationship is found to be the reason for price adjustments to get to the IPO price.

Trading liquidity is another aspect potentially explaining underpricing. Ellis *et al.* (2000) have find evidence that greater the trading activity in the aftermarket, the greater the underpricing of that issue. Even though trading liquidity based theories explain why underwriter might want underprice the issue – they gain more secondary revenues from the IPO – it is not clear why the issuers themselves benefit from the underpricing. The author of this thesis suggests that the issuers' desire for trading liquidity might for example be related to their own remaining shares in the company (the higher the liquidity, the higher the flexibility to sell down additional shares after a period of time) or simply the elevated public attention (specifically for a company with consumer angle) for a stock with high trading liquidity which might have marketing effects for the company.

Ritter and Welch (2002) believe that various non-rational and agency explanations might be the focus of research going forward. They also think that in analysing the IPO underpricing the share allocation process in IPO might be an interesting issue to research besides the offer price setting process. In the referenced article a thorough overview about the research concerning the allocation of IPO shares is given. This means that while the previously explained theories mainly were focusing on the price setting process, then the research concentrating more on the allocation process of the IPOs is as important in explaining the theoretical background of underpricing.

1.2. IPO underpricing impacting factors

While IPO underpricing is common across countries and stock exchanges, then there exists differences in the gravity of underpricing between countries, years etc. This has driven researchers exploring various factors that could have impact on the level of IPO underpricing. To illustrate, Figure 3 demonstrates the IPO underpricing by country from 1995-2017:
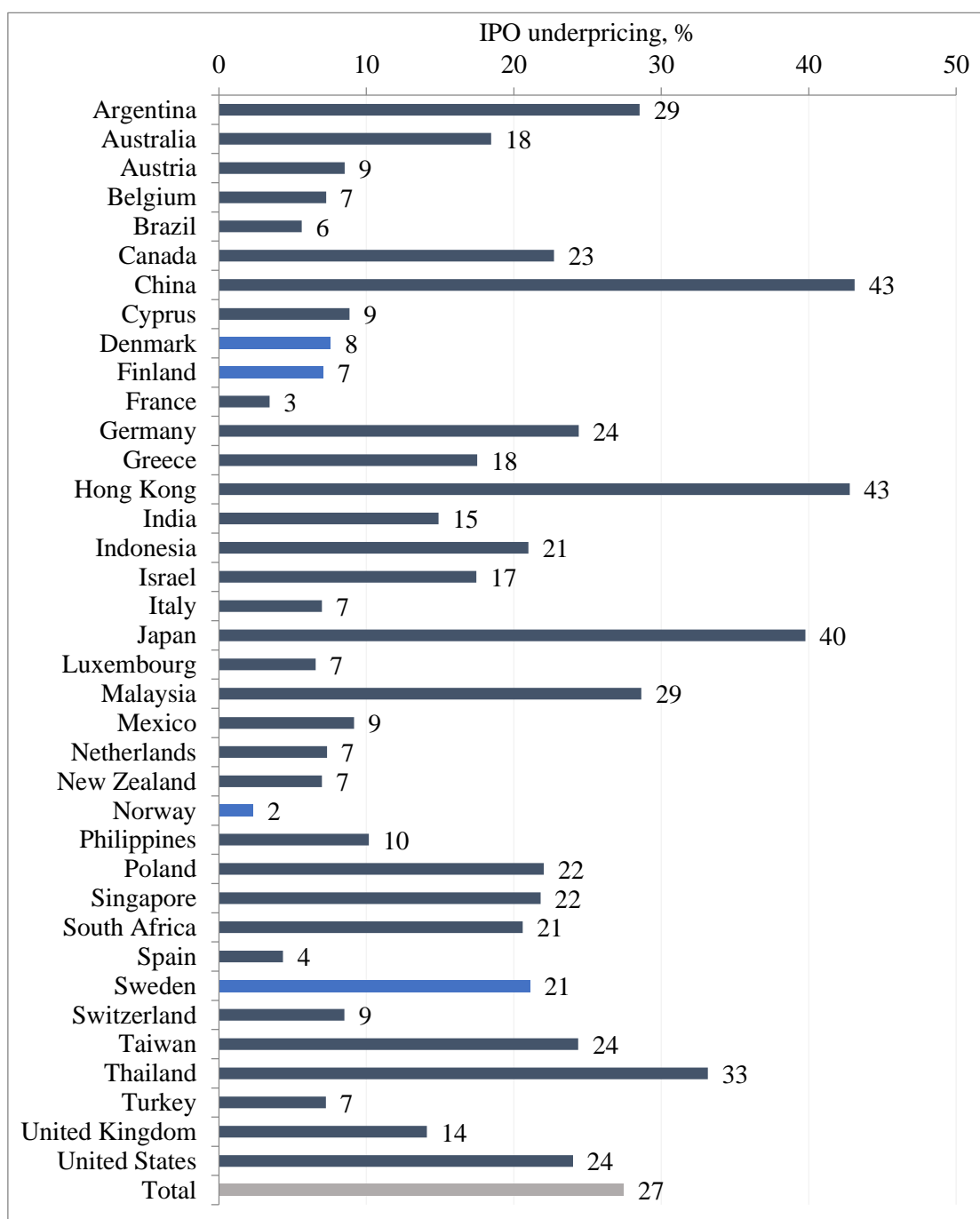

Figure 2. Average IPO underpricing by country from 1995 until 2017.
Source: Marcato *et al.* (2018, 93)

There exists wide empirical analysis performed on the potential factors of IPO underpricing and some of the factors tested with empirical analysis are listed below:

a. **Country** – Country-specific factors have been found to have an effect on the level of IPO underpricing (Loughran *et al.* 1994). Engel and Essen (2010) find that the quality of country's legal system decreases IPO underpricing significantly. At the same time, it is said that institutional settings of a country have become less important due to increased integration of financial markets (Doidge *et al.* 2013). Nevertheless, the latest research by Marcato *et al*. (2018) show that there exists differences in underpricing between markets with high and low financial integration levels. When looking at the Figure 2, the curiosity to find out whether there are sample specific factors like the composition of companies or the country of origin that affects the average IPO discount to be only 3% on average in France compared to 24% on average for neighbouring Germany.

b. **Offer size** – An inverse relationship has been attributed to the size of the offer and the underpricing. The reasoning includes that larger issues gain also larger institutional investors interest and thus might reduce the levels of uncertainty as numerous institutional investors join the IPO only in the case of reputable and sizeable companies. Also, the higher the number of the proceeds, the larger the investor base to be included for the road-shows and higher the marketing efforts both from the company and the underwriters to get the book covered which all have an effect on reducing the uncertainties.

c. **Ownership** – Empirical analysis on ownership has concentrated on analysing whether private equity or venture capital owned companies underpricing is different relative to for example management owned companies. This is sometimes also defined as whether the company has a financial sponsor or not. The background for assumption that ownership affects the IPO pricing is generally driven from different management skills of different investor types' motivation in an IPO. Michala (2016) finds that there isn't much that varies for IPOs owned by private equity compared to other ownerships.

d. **Underwriter reputation** – As investors have limited time and public information on the company about to come public, then when making their investment decisions it can be assumed that investors also assess the underwriter's reputation when subscribing to an IPO. Thus, it might be expected that higher quality underwriter driven IPOs have also lower levels of underpricing (Booth, Smith, 1986). This assumption was also tested by Michaely and Shaw (1994) with a dataset of 947 IPOs and the analysis proved that "... IPOs underwritten by reputable investment banks experience significantly less underpricing and perform significantly better in the long run."

e. **Media sentiment** – As media plays an important role for investor awareness then there exists logical expectations that the tone of the articles will drive both the demand for the new public company as well as might have an impact on the first-day returns of an IPO. This is tested by Bajo and Raimondo (2017) based on a number of U.S. IPOs and newspaper articles. The analysis finds that the effect is in fact there and positive tones mean higher underpricing or to put it positively for investors, increase the first-day returns and is the highest for articles by reputable newspapers issued close to IPO date. This drives again an important workstream for underwriters in IPOs to be rather over prepared in public relations than underprepared ahead of the IPO.

f. **Industry** – Often researched factor has been the impact of technology sector for IPOs and underpricing. Beck (2017) analysis that is based on U.S. IPOs in 2015 does not find proof of technology sector IPOs having different level of underpricing on average compared to other sectors. Industry effect has also been analysed in research about the dot-com bubble by Ljungqvist and Wilhelm (2003) and Kayne and Laux (2005) but rather valuation and IPO pricing practices were to blame, not the technology sector itself. Although the technology sector has usually had the highest attention in the industry-specific IPO underpricing factor analysis, then other industries specifics could be interesting to analyse as well.

g. **Hot and cold markets** – The underpricing of IPOs listed in hot periods is expected to be higher than the one of IPOs listed in cold periods (Ritter, 1984; Helwege, Liang, 2002). Hot markets are generally defined as periods when many IPOs happen for an industry where high levels of innovation have occurred. Other definitions and respective research suggest that hot markets are more related to investor optimism periods as IPO markets cycle with higher frequency than technological innovations (Helwege, Liang, 2002). High IPO activity and respective higher than average underpricing might also be related due to underwriters encouraging more firms to take on the IPO route at times when public valuations are higher than expected and on the other side propose issuers to wait when markets are not as optimistic (Ritter, Welch 2002).

h. **Market condition** –This is represented by the volatility or standard deviation of daily returns of the stock exchange index ahead of the day of listing. If the index volatility is high, then it indicates high uncertainty and reflects pessimism about IPOs (Dell'Acqua *et al*. 2015). This is often also a reason why IPOs can be postponed to take place when the market conditions have stabilized.

As can be seen from the previous non-exhaustive list, there exist numerous analyses where various factors that might have impact on IPO underpricing are tested empirically. Since the dataset used for empirical testing differs, then there isn't available any common conclusions about which of the factors have the highest impact. Butler *et al.* (2014) study 48 variables that have been used in previous research and find that only 15 of these are robust and significant across the whole selected sample period from 1981 to 2007. These 15 variables include for example firm sales, offer price revision, prior 30 day industry return. Interesting results from the analysis include also the finding that the IPO underpricing occurred in the IPOs in the last 30 days had influence on the level of underpricing of the next IPO.

1.3. IPO pricing

When elaborating on the IPO pricing process, it is important to distinguish between valuation process and pricing process. While the underwriters and the company do an extensive work during the months leading to the IPO when analysing the fair value of the company, then the pricing of the IPO will depend also on the market feedback generally collected via investor meetings or road shows. Overview of the IPO pricing process is briefly introduced with the following Figure 3:
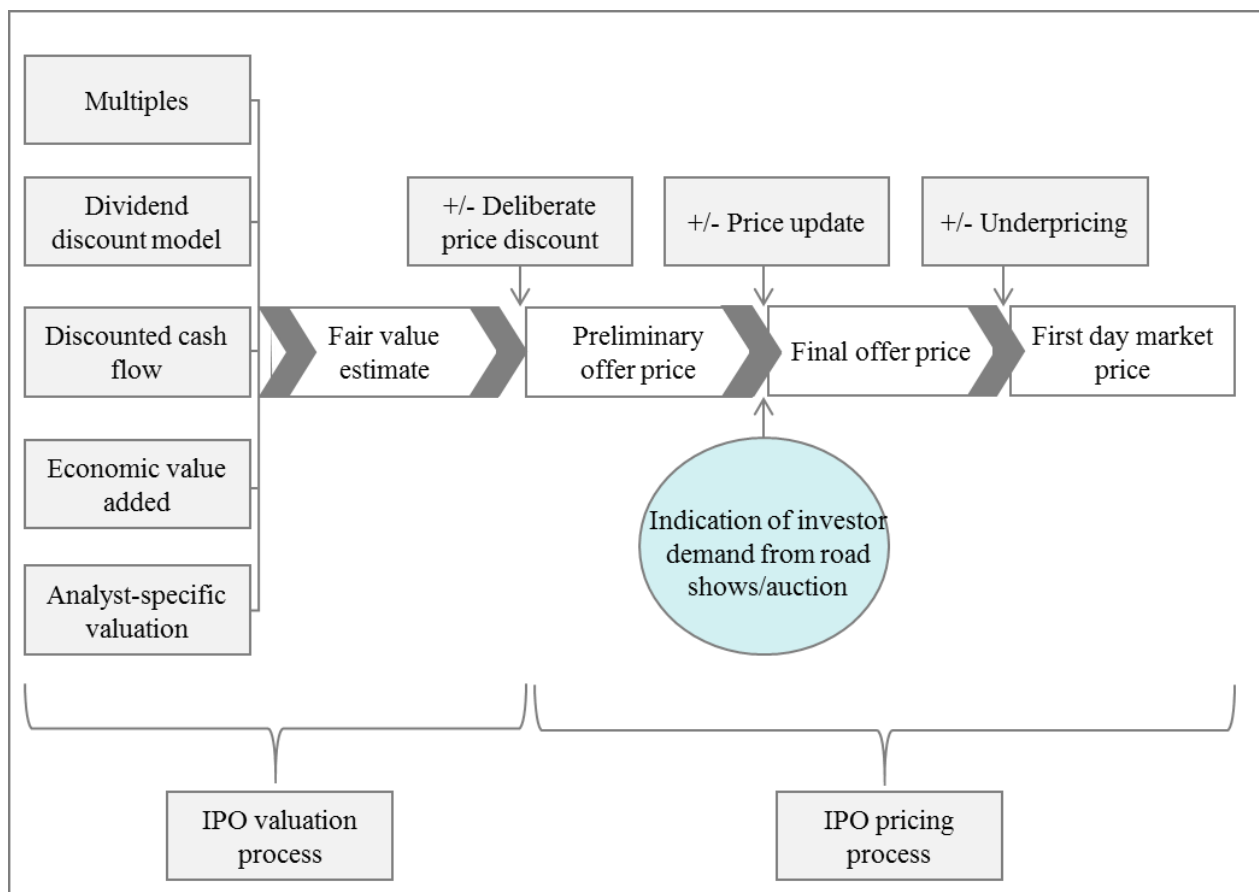
Figure 3. IPO valuation and pricing process
Source: Roosenboom (2012, 1656)

In addition to information symmetry related IPO underpricing theories introduced in the previous subchapter, then Roosenboom (2012) finds in his research based on French IPOs that underwriters deliberately discount the fair value estimate when setting the preliminary offer price. From previous works of Baron (1982) and Shiller (1990) the reasons for deliberate underpricing is said to cut on underwriters' marketing actions and strengthen the relationships with investors on the buy-side while also increasing investor demand for the IPO. Paleari *et al* (2014) find that due to underwriters' discretion in choosing comparable companies then comparable firms with higher market valuation levels have often been chosen to be presented in prospectuses compared to the post-IPO selection made by sell-side analysts or algorithms. This refers that underwriters deliberately exclude comparable companies that make an IPO feel overvalued. The conclusion about intentional underpricing is also summarized by Cassia *et al.* (2004) who find that negative feedback during preselling is taken into account in the final price setting more often than additional positive information.

Although, as introduced in the theoretical background that issuers might also target for some level of underpricing, the fact that issuers rarely complain about IPO discount is another interesting topic to investigate. The analysis about the reasons has been introduced in Loughran and Ritter (2002) analysis of prospect theory. "Prospect theory predicts that, in most situations occurring in the IPO market, issuers will sum the wealth loss from leaving money on the table with the larger wealth gain on the retained shares from the price jump, producing a net increase in wealth for pre-issue shareholders." (Loughan, Ritter 2002, 414)

While, as described, there exists uncertainty on the actual price setting process in an IPO, then the valuation process itself when setting the fair value of the company has also significant uncertainties included. The fair value is generally calculated using methods like discounted cash flows, multiples or dividend discount model or other (see Figure 3). These valuation methods incorporate all elements of subjectivity and thus can never predict precisely the expected market value that consists of many investors with different viewpoints regarding the outlook of the company and the relationship between risk and return. In his study of IPO valuation and pricing process, Roosenboom (2012) described that all of the methods used for valuation of the company suffer from a positive bias with respect to equilibrium market value and that underwriters tend to overestimate the market values ex-ante. The comparables multiple method was found to be the least biased in the same study. Thus, it is logical that both the IPO valuation and pricing process will not be able to eliminate the differences in IPO price and first-day market price even if there exists the will by both the issuer as well as the underwriters to set the market price exactly at market value level.

1.4. Analysts' price targets

Efficient market theory says that the market prices reflect the value most accurately if there are no visible obstacles. Nevertheless, rarely does the fair value estimate expressed as the target price in a professional equity analyst's research report equal the market price of the company's share, even different analysts have different target price estimates. At the same time, it should as the essence of the research to present the fair intrinsic value of the company analysed. This brings to question that as market price with different market obstacles (like liquidity, asymmetric information etc.) does not always reflect the true fair value of the company, then so doesn't the IPO discount specifically reflect the true discount to company's fair value but only to the market

value. While fair value is usually more constant as analysts publish updates about their view on the target price generally when something substantial has changed in the outlook of the market or the company, then the market value changes on a liquid stock market daily. In order to compare the IPO pricing to fair value, this thesis focuses on the difference of the IPO pricing and the analysts' initiation of coverage report target price. The **initiation of coverage report** is the first research report issued by market equity analysts after the IPO. It must be considered, that while the market price demonstrates price and thus value given for the share on the specific trading day, then analysts' price targets reflect in general the market price target in one year time. A rating on a stock is set after assessing the twelve months expected upside or downside of the stock derived from the analyst's fair value (target price) and in the light of the risk profile of the company (Kepler Cheuvreux). In order to compare the undepricing level and the levels of difference of analysts' price targets from IPO price, this limitation about the difference of time frame regarding the price must be taken into account.

After the IPO, there are restrictions for the company on how long the analysts related to the company or the underwriters have to wait before issuing research reports due to restrictions about releasing any non-factual information *i.e.* anything forward-looking or opinionated. This is called a quiet period or a blackout period. The **quiet period** generally lasts for 40 days after the stock begins trading. Its purpose is to ensure that all investors have access to the same information. The rules are different in different jurisdictions and it is also affected where the securities are offered (most importantly if in the United States or not). For offerings distributed in the United States, 40 calendar days is mandatory and the market rule is the same for European offerings. It can be seen in previous research that analyst initiations in the end of the quiet period were in majority "buy" or "strong buy", for example 87% of IPOs during 1996-2000 reviewed by Bradley *et al.* (2003). This is corroborated by Cliff and Denis (2004) where they find that even 95% of 839 recommendations for IPOs in 1993-2000 were "buy" or "strong buy".

One of the highlighted research topics with this is the potential conflict of interest of the research analysts affiliated with the underwriters of the IPO. Investment banks traditionally have had three main sources of income (Michaely, Womack 1999): 1) corporate financing, the issuance of securities, and merger advisory services; 2) brokerage services and 3) proprietary trading. These three income sources may create conflicts of interest within the bank and its clients. The reasoning for wondering about the **analysts' bias** is that the investment bank's analyst might be

biased towards giving a "buy" recommendation to present the success of the IPO. For example, this is analysed by Michaely and Womack (1999) and the conclusion based on the sample used in the analysis was that the long-run post-recommendation performance of the firms in the sample that are recommended by their underwriters is significantly worse than the performance of firms recommended by other brokerage houses and it was clear that "... it is not the difference in analysts' ability to value firms that drives our results, but a bias directly related to whether the recommender is the underwriter of the stock." To minimize the potential bias, regulations about analysts' involvement and communications with the underwriters have been introduced over time by both EU and U.S. regulators and lawmakers. An overview on the visible effects of higher regulation is explained for example by Catalano (2016) where he finds that also negative effects from not taking full advantage of underwriters' research power in pricing IPOs can be found. One interesting finding about the analysts' bias is introduced by Mola (2013) where he finds that analysts often downgrade a seasoned stock in the same sector before they initiate research coverage on an IPO and this can particularly be observed in case of lead underwriter's analyst. This effect diminished after 2002, where new regulations about research and underwriting conflict of interest were introduced.

The author of this thesis proposes that the analysts' bias might also be due to the positive expectations related in general with an IPO process as IPOs are usually considered when a company wants to attract money for growth or is in a stage when stabile dividends can be expected. As the underwriter(s) together with the company prepare extensively ahead of the IPO to sell a good equity story and find investors then everyone starting with the investors, general public and also the professional research analysts get excited more than with a seasoned public company with good investor relations.

The existing research on relationships of IPOs and analysts coverage is wide. For example a study (Rajan, Servaes 1997) covering data from IPOs from 1975 to 1987 finds that higher underpricing leads to increased analysts following and that IPO anomalies, including underpricing, might be driven by overoptimism. Another interesting article focuses on hypothesis that underpricing might be a way to pay for an all-star analyst coverage. This question is tested by Cliff and Denis (2004) where they find that underpricing is positively related to lead-underwriter having a highly reputable analyst included in the research staff.

Professional research is an important part of investment banks value offering and analysts' price targets developments are highly followed by investors. The recent changes in EU market rules regarding also investor protection, specifically Markets in Financial Instruments Directive II "MiFID II", have been towards separating the services with request that separate fees for research services need to be paid by investors in order to receive the analyses. This precaution was intended to make sure that the trading and research services conflict of interest would be minimized and research updates couldn't potentially be used to induce trading but also to distinguish the advisory services. The importance of analyst coverage can be viewed also in the light of risks related to an offer for shares as described in the prospectus – often the risk regarding the lack of continuous adequate analyst coverage is added in prospectus risk section. This all gives a good understanding why research analysts' role is important both in pre-IPO and on already public market post-IPO.

1.5. Analysts' price targets performance

The companies' performance is affected by numerous developments in the market and inside the companies and thus the price targets set by the analysts are inevitably not working out as crystal balls to predict the future precisely. Regardless of this, the long-term view the professional analysts present in their research is information that contributes to real investment decisions made by investors and thus have an important role in capital markets. The importance of analysts' price targets for investors' decisions is proved in studies analysing target price performance (Brav, Lehavy 2003; Asquith *et al.* 2005, Stickel 1995). The track record of the performance of the analysts' price targets compared to market price is thus followed by investors and explored in numerous research papers.

The target price accuracy is analysed by Kerl (2011) who analyses over a thousand analysts' reports and finds that target price accuracy is positively related to the detail level of the research report, company size and investment bank's reputation. The negative effect comes from stock-specific volatility and analyst-specific optimism. The optimism part is explained in 2005 analysis by Asquith *et al.* where the level of optimism affects the probability of achieving the target price. "Price targets that project a change of zero to ten percent and ten to twenty percent are achieved 74.4% and 59.6% of the time, respectively. In contrast, price targets that project a change in price of 70% or more are realized in less than 25% of the cases observed." (*Ibid.,*) The author of the

thesis finds interesting to investigate whether higher price targets have the same underachievement pattern existing in the case of Nordic IPOs.

The other side of the research has concentrated on the quality of the analysts and whether it is really right to calculate the performance of analysts' price targets just by looking at the end numbers of prices estimated and prices achieved as the forecast difficulty is different for various sectors, companies, markets etc. The factors affecting the accuracy of the forecasts is analysed by Clement (1999) and his conclusion is that positive relationship comes from the experience the analyst has which represents skills and employer size which describes the resources available to the analyst. On the negative side the number of firms and sectors followed would give an inverse relationship with target price accuracy levels as it represents the complexity of the task. The empirical analysis by Fontaine and Roger (2015) finds that when the forecasting difficulty has been taken into account, research analysts do not demonstrate difference in the ability to forecast future stock prices. The difficulty in the analysis is presented as stock return volatility and forecast horizon. Another example is from analysis by Bradshaw *et al.* (2013) where they find that target prices are met more often when there is positive momentum existing both in the market as well as with the company's share price. This leads again to the simple conclusion that no matter how well compiled is the research and valuation for the company, market and its volatility will affect the prices in ways unable to predict.

Finally, the accuracy and quality of analysts' price targets really matter to understand whether acting based on analysts' recommendations, also shortly after IPO, investors can achieve abnormal returns from their investments than without following these. For example, Ackert and Athanassakos (1997) analysed the relationship between uncertainties surrounding the firm and analysts' overoptimism. The mentioned research found that portfolio strategies based on uncertainty measure can generate abnormal returns. In the context of investing in IPOs it is thus useful to understand both on how the analysts' target prices might have an effect on the short-run as well as long-run returns.

2. METHODOLOGY AND DATA

In this chapter, the author presents analysis of underpricing for Nordic IPOs from 2015 through 2018. There exists number of research papers that concentrate on a specific Nordic country and the factors impacting the levels of underpricing. For example, Bruzgyte and Guliyeva (2016) analyse the Stockholm First North exchange, Torgersson *et al.* (2018) research also Swedish IPOs, Mylläri (2018) concentrates in her bachelor's thesis on Helsinki stock exchange and Falck (2013) on Norwegian IPOs. Nevertheless, there lacks previous analysis where the IPO underpricing and analysts' price targets have been investigated together. With the help of a regression model, hypotheses about the relationship between IPO underpricing and analysts' price targets and the performance of analysts' price targets will be analysed.

2.1. Methodology

2.1.1. Hypotheses

In the theoretical part of the thesis, the fact that analysts in general start covering the companies with a positive recommendation brings us to the first hypothesis of this thesis:

H1. Difference of analysts' price target to IPO price is positively impacted by the level of IPO underpricing.

As previous research suggests that analysts following and investor optimism is linked, then this is tested with the second hypothesis which assumes that after one year from analysts' price targets, the market price has not generally reached the target price level.

H2. After one year, the market price difference to the first target price set is highest to IPOs where analysts have estimated the highest level of upside compared to IPO price.

The second hypothesis will help to explore whether the IPOs where analysts see the highest price increases within one year compared to IPO price would also prove to miss the target the highest.

2.1.2. Model and description of variables

An **Ordinary Least Squares (OLS) regression model** is used to test the relationship between IPO price and analyst target price. The OLS regression model is applied for majority of the previously referenced empirical analyses. As the primary interest of the thesis is to analyse target price compared to IPO price levels, then the predictor variables are tested compared to the difference of the first published analyst target price levels. Even though the target price itself inherently presents a price target after one year, the dynamics and degree of the difference compared to variables like IPO discount itself can be analysed. The one-year performance for analysts' price targets is analysed in the second stand-alone regression model.

The author applies a multivariate regression model to investigate the combined effect of the explanatory variables and determines which ones are significant to explain the dynamics of analysts' price targets. The author analyses multiple regression models using the stepwise procedure where variables are omitted to improve the consistency of the final model. The final model is tested for statistical problems. To ensure the statistical meaningfulness of the model the following tests will be performed on the final models: White's test for heteroscedasticity, Ramsey Regression Equation Specification Error Test (RESET) and test for normality of residual.

From the factors potentially having an effect on the level of IPO underpricing as explained in the theoretical part of the analysis, selected variables are included in this model focusing on analysing the analysts' target price differences. The explanatory variables include:
- **Size of the issue** – The size of the issue represents the amount of funds in million euros attracted for the issue of both primary and secondary shares. For the size of the issue, logs are taken due to many empirical researches applying logs to issue size to avoid heteroscedasticity.
- **Market sentiment** – Market sentiment is defined as volatility of the stock exchange index 100 days ahead of the day of listing. The Nasdaq OMX 40 for Nordics combined is used in this analysis.

Additionally, the IPO underpricing itself is used as a factor to analyse whether there exists a relationship with the IPO underpricing level and analysts' price target degree of difference from the IPO price.

Initially, the author of this thesis contemplated to also add the oversubscription level as an explanatory variable, but taken from lack of data and findings from Amihud *et al.* (2003) as described in the theoretical part of the thesis, this would not most probably add significant value to the findings.

Summary of the variables and dependents is listed in the following Table 1 and descriptive statistics is included in Table 2:

Table 1. Variables included in regression model

Variable	Name abbreviation	Model 1: Target price difference	Model 2: Performance
Analyst target price difference to IPO price	TargetDif	Dependent	Explanatory
IPO underpricing	Underpricing	Explanatory	Explanatory
1-year market price difference to target price, adjusted with index	TargetDif1yr	Not included	Dependent
Size of the issue	Log_issue	Explanatory	Explanatory
Market sentiment	MSent100	Explanatory	Explanatory
Market price change until day before target vs 1st day of trading open price, adjusted with index changes	MPChange_target	Explanatory	Explanatory

Source: Compiled by author

Table 2. Descriptive statistics of variables and expected relationship to target price difference

	Expected sign	Mean	Median	Standard deviation	Min	Max
TargetDif	−	28.7%	27.7%	0.170	-21.9%	95.3%
Underpricing	+	6.8%	4.2%	0.125	-34.2%	48.1%
TargetDif1yr	n/a	-6.6%	-9.4%	34.0%	-109.0%	122.0%
Log_issue	−	2.03	1.96	0.539	0.23	3.36
Size of the issue	−	218	91	349.480	2	2 302
MSent100	+	9.8%	9.2%	0.035	5.8%	16.1%
MPChange_target	+	1.1%	0.6%	0.119	-26.2%	42.0%

Source: (Bloomberg) author's calculations

Even though size of the issue is presented in the Table 2, the log of issue size is used in the regression model as explained previously. The inclusion in the table is for understanding the nominal variances of the variable. The expectation about the sign of each variable is constant in both models the input is used as explanatory variable.

To test whether there exist multicollinearity issues in the regression models to be analysed, a correlation matrix is included in Table 3. It can be seen from the table, that the variables are not strongly correlated between each other with highest correlation coefficient being 0.49 which is between the difference of target price from IPO price and market price change until the day before the analyst target price issue.

Table 3. Correlation matrix for variables

	TargetDif	Underpricing	TargetDif1yr	Log_Issue	MSent100	MPChange_target
TargetDif	1.000					
Underpricing	0.412	1.000				
TargetDif1yr	0.116	0.108	1.000			
Log_Issue	-0.317	-0.164	-0.205	1.000		
MSent100	0.047	0.064	0.218	0.179	1.000	
MPChange_target	0.494	-0.062	0.174	-0.048	0.090	1.000

Source: Author's calculations

The data is more thoroughly defined in the next section while the results of regression models are presented in the next chapter.

2.2. Data

The sample analysed in the thesis includes 90 IPOs in Denmark, Finland, Norway and Sweden from 2015 to 2018. Only **regulated market IPOs** have been included as alternative market IPOs might often have considerably lower liquidity when starting the trading. In addition, generally the regulated market IPOs get more attention by professional investors and follow stricter rules. This means that the underpricing can be only analysed when a trade or even good level of trading activity in the stock exchange happens which might be limited for alternative market stocks. For this reason, the Iceland IPOs have been excluded, as very few regulated market IPOs took place in Reykjavik stock exchange (for example only one regulated market IPO in 2018). The analysed Nordic IPO exchanges include Nasdaq in all four countries and Oslo Bors as an additional

exchange in Norway. The data regarding specific IPOs and issued shares is collected via Federation of European Securities Exchanges IPO database where data regarding the before mentioned stock exchanges regulated and alternative market IPOs is collected on yearly basis. For the Baltic IPOs, described in the next chapter, the same database is used. Even though 100 regulated market IPOs were found in the time period, the IPOs where the analysts' price targets or other relevant data was missing or that were issued externally to Nordic stock exchange, were excluded from the sample leaving the final number of the sample at 90 Nordic IPOs. The total number of IPOs included in the sample is presented on Figure 4.
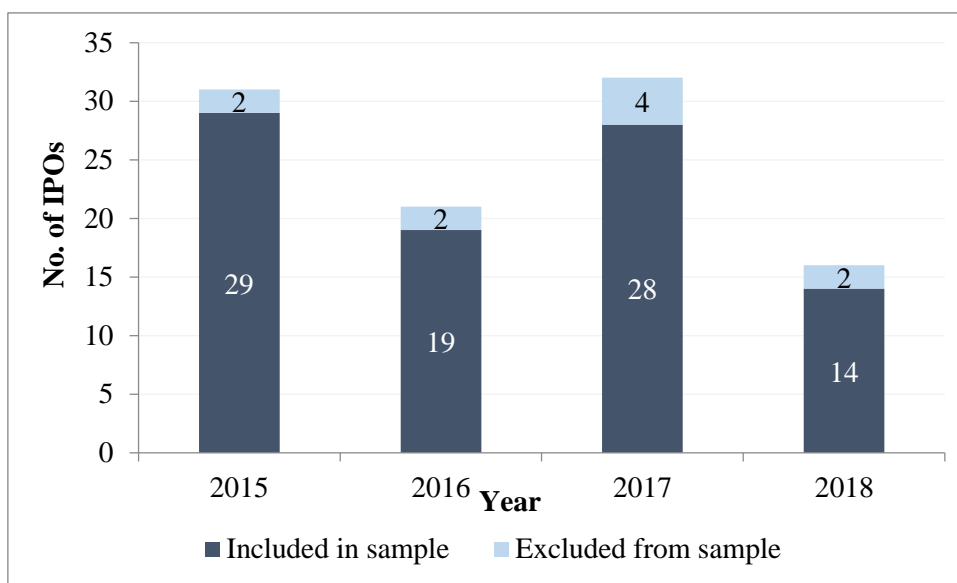

Figure 4. Number of IPOs on Nordic regulated market, 2015-2018.
Source: Federation of European Securities Exchanges, author's calculations

Data on the IPO price, market price, analysts' price targets and other variables used is collected via Bloomberg terminal. Even though Bloomberg database has provided for majority of the data, some missing data when not existing in Bloomberg has been searched item-by-item from companies' prospectuses or other public data.

In the current thesis, the IPO underpricing is measured using the opening price. Even though vast amount of empirical work has measured the difference rather with the closing price, then when taking into account that the opening price represents the first public transaction with the share, then the author has preferred to use the opening price for measuring the underpricing. "The opening market price is close to an unbiased indicator of the closing market price on the first day, so results are insensitive to whether the opening or closing market price is used. The vast

amount of empirical work has used the first closing price to measure the first-day return. This is also frequently called the initial return." (Ritter, Welch 2002, 1802). Majority of empirical analyses have used market adjusted first-day returns which means that the IPO underpricing is adjusted with market change generally reflected by the market index. The IPO underpricing is adjusted for market movements also in this thesis including Nasdaq OMX Nordic 40 as the market index. For avoidance of doubt, the calculation formula for this thesis is presented in the next equation:

$$IPO\ underpricing\ = \frac{Price_{OPEN} - Price_{IPO}}{Price_{IPO}} - \frac{OMX\ Nordic\ 40_1 - OMX\ Nordic\ 40_0}{OMX\ Nordic\ 40_0} \tag{1}$$

The analysts' price targets were identified as first analyst's target price published or analysts' consensus price issued after the IPO. The analysts' target prices are collected from Bloomberg respective data field. For the sample, this was generally just after the quiet period. From 90 IPOs in the sample, 63 had the analysts' price targets issued between 40-50 days post IPO. The analysts' price targets have not been adjusted with the market index. This is related to the difference of market and fair value terms, where analysts' present the fair value estimate that is more constant and less impacted by day-to-day market changes. The reasoning is also explained in the theoretical part of this thesis. Nevertheless, the market change impact on analysts' price targets is used as a variable in the regression model to see if there exists a relationship.

The Nordic IPOs in the period of 2015-2018 had IPO underpricing on average of 6.8%. With the median at 4.2% being lower than average, we can see from the distribution of the underpricing presented in Figure 5 that in addition to the general first-day returns faced by IPOs, some Nordic IPOs have also faced negative first-day returns. From the analysed sample, 15 from 90 which count for almost 17% had negative first-day returns. The highest negative return was faced by Eltel AB with 34% of discount in the first day of trading.
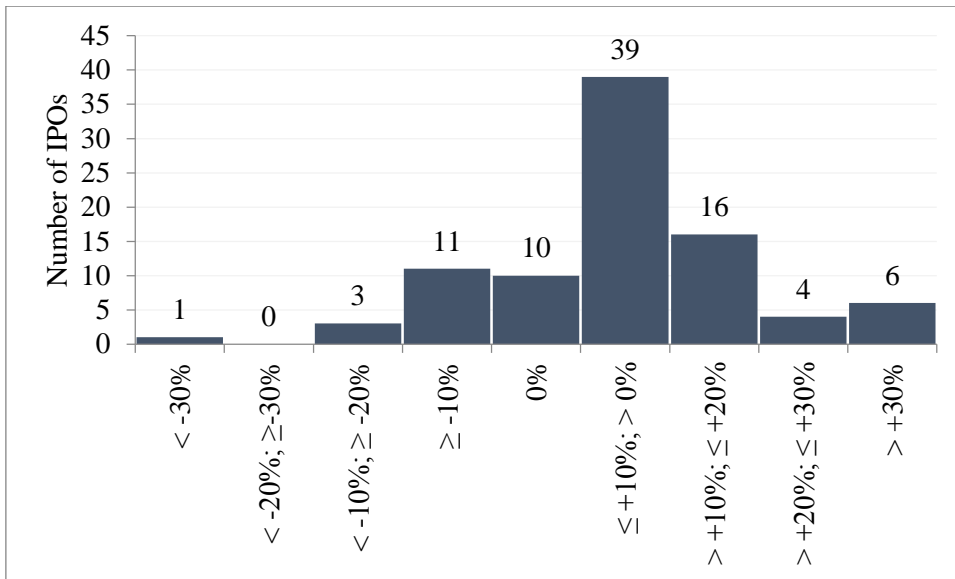
Figure 5. Distribution of IPO underpricing
Source: Bloomberg, author's calculations

As the interest of this thesis is the analysts' price targets, then the distribution of analysts' price targets compared to IPO price is included in following Figure 6. Even though, as said, the price target is the market price where the share could or should be in one-year time and it can not be explicitly compared to IPO price, then target prices higher than IPO price send a positive piece of information to investors about the prospects and potential fair value of the share. Saying this, it is based on more-or-less the same amount of information about the fair value as between the IPO and analyst coverage initiation is the quiet period as described in the previous chapter of the thesis with restrictions to issuing additional data. The analysts' price targets are skewed more towards a positive difference to IPO price and as described by previous researches by Bradley et al. (2003) and Cliff and Denis (2004), the analysts opinions issued after quiet period are largely positive. In current sample, 83 of 90 or 92% have more than +10% or upside from IPO price. For example 10% of upside over 12 months from target price would likely mean a "buy" recommendation as described in Kepler Cheuvreux analyses disclosure. When comparing the first target price with market price on the day before the analyst issued the target price, then for the current sample, 70 of 90 companies had a target price +10% or more which would translate to "buy" recommendation to 78% of companies.
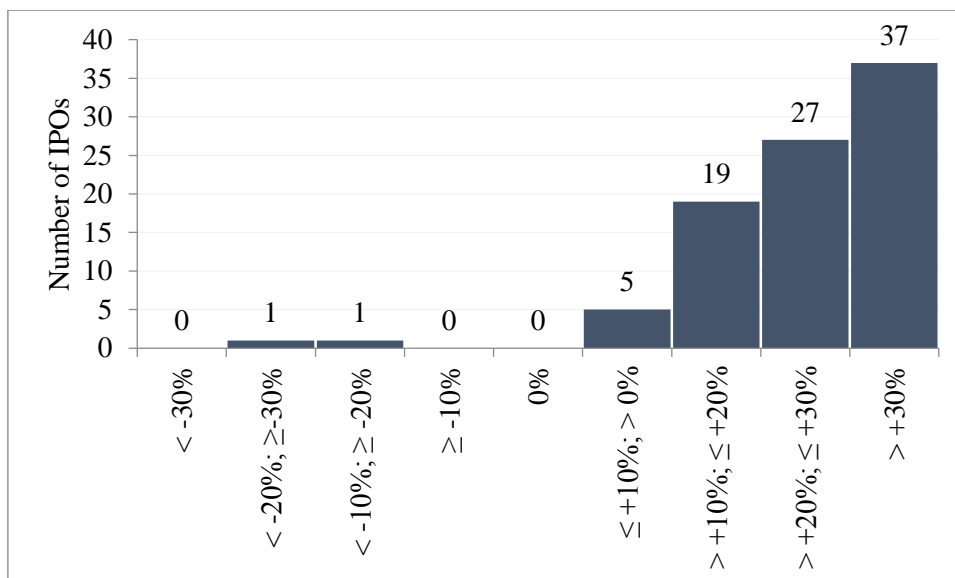
Figure 6. Distribution of difference of analysts' price targets compared to IPO price
Source: Bloomberg, author's calculations

Interesting is that from the IPOs having negative performance in the first day, only one had later a target price set by analyst that was lower than the IPO price. The other shares that faced negative underpricing received a target price higher than IPO price. The following Table 4 presents the averages of the sample with following Table 5 presenting the medians. It can be seen that across the Nordic countries the analysts' price targets were on average between 20-30% higher than IPO price in all Nordic countries and the mean is very similar to the medians in this sample. This is by coincidence very similar result found by Brav and Lehavy (2003) who found that, on average, target prices are on average 28% higher than current stock prices.

On the other hand, after one year from the first analyst's price target, on average the market price is lower than the target set a year ago. This goes together with previous analyses that have tried to prove that there might be elements of positive bias at least for analysts related to the underwriters. So it is not the analyst's ability to set correct market prices in general but rather related to specific stocks where the investment bank has also the role of underwriting (Michaely, Womack 1999). As approximately 16% of the sample includes IPOs that have been issued after the first months of 2018, then we can not compare the performance of target prices after one year for all IPOs and the limitation of latest available market price is used which means that due to data limitations the analysis can underestimate the analysts' ability to reach target prices. The market prices after a year from the initial price target are again adjusted with market index.

Looking at the sample on country-by-country basis and when comparing with previous data as presented in Figure 2 then the relative underpricing levels are similar with Norway having the lowest levels of IPO underpricing both on average and median and Sweden the highest. However, the Swedish IPOs underpricing levels seem considerably lower on average for the recent sample when comparing the period of 1995-2017 reflected in Figure 2 where it is around 21%. While the averages of IPO underpricing are slightly different across countries compared to overall Nordics average then the average target price difference to IPO price is rather homogeneous in the sample.

Table 4. Averages of the variables and sample of Nordic IPOs 2015-2018

Country	Number of IPOs	Averages			
		issued shares, EUR million	IPO Underpricing	Target price difference to IPO price	Market price difference to target price after a year
Denmark	9	647	8.8%	26.9%	-17.7%
Finland	16	187	5.0%	27.0%	-2.8%
Norway	18	162	2.2%	27.0%	-16.0%
Sweden	47	167	8.8%	30.4%	-2.1%
Nordics	**90**	**218**	**6.8%**	**28.7%**	**-6.6%**

Source: Bloomberg, author's calculations

Table 5. Median of the variables and sample of Nordic IPOs 2015-2018

Country	Number of IPOs	Median			
		issued shares, EUR million	IPO Underpricing	Target price difference to IPO price	Market price difference to target price after a year
Denmark	9	168	5.6%	22.5%	-16.5%
Finland	16	97	4.1%	25.4%	-5.7%
Norway	18	74	0.4%	25.8%	-16.8%
Sweden	47	85	5.8%	28.4%	-4.9%
Nordics	**90**	**91**	**4.2%**	**27.7%**	**-9.4%**

Source: Bloomberg, author's calculations

The country-by-country division in the tables in the previous tables were included to illustrate the IPOs in the Nordics in different countries. Further analysis concentrates on the Nordic IPOs as one sample and the overall descriptive statistics is presented previously in Table 2.

3. RESULTS OF ANALYSIS

The following chapter analyses the results of the regression models and compares the findings with Baltic IPOs for the same period. Compared to Nordic IPOs, the Baltic IPOs underpricing is analysed less. This is also most probably due to the fact that as there has been very limited number of IPOs in the Baltics, no significant analyses for can be conducted. The relevant analysis includes a study by Ivanauskas (2015) which analysed the Baltic IPOs from 2004 to 2014. In addition, the analysts' price targets in context of IPOs have not been analysed for Baltics as far as the author has come across. Thus, even though it might not add significant statistical value for the analyses, the gap for describing Baltic IPOs is covered with the descriptive chapter included in the current thesis.

3.1. Regression models

3.1.1. Model 1 – Target price difference to IPO price and impacting factors

In the following models the analysts' target price difference to IPO price is the dependent variable. The result of the stepwise regression model for Model 1 is presented in Table 6 and Table 7.

Table 6. Regression results with TargetDif as dependent variable, all variables included (confidence levels: green 1%***, orange >10%)

Step 1 of Model 1					
Explanatory variables	Coefficient	Std. Error	t-ratio	p-value	
const	0.380	0.060	6.345	<0.0001	***
Underpricing	0.548	0.107	5.114	<0.0001	***
Log_Issue	-0.072	0.025	-2.850	0.0055	***
MSent100	0.081	0.386	0.210	0.8341	
MPChange_target	0.726	0.112	6.479	<0.0001	***
F-value	20.436				***
R-squared	0.490				
Adjusted R-squared	0.466				

Source: Author's calculations

Table 7. Regression results with TargetDif as dependent variable, final model (confidence levels: green 1%***, orange >10%)

Final Model – Step 2 of Model 1					
Explanatory variables	Coefficient	Std. Error	t-ratio	p-value	
const	0.386	0.053	7.231	<0.0001	***
Underpricing	0.551	0.106	5.192	<0.0001	***
Log_Issue	-0.071	0.025	-2.882	0.005	***
MPChange_target	0.729	0.111	6.577	<0.0001	***
F-value	27.539				***
R-squared	0.490				
Adjusted R-squared	0.472				

Source: Author's calculations

As can be seen from Table 6, then market sentiment before the IPO has been excluded from the final model presented in Table 7 as not being proved significant. The signs of the coefficients were according to expectations.

The estimated final regression model is presented with the following equation:

$$TargetDif = 0.386 + 0.551 Underpricing - 0.071 \log_{issue} + 0.729 MPChange_{target} \quad (2)$$

The Model 1 is significant with R-square at 0.49. The diagnostic tests for heteroscedasticity, RESET test and test for normality of residuals confirmed the appropriateness of the model. The results of the tests are presented in Table 8.

Table 8. Diagnostic tests results for model 1.

Test	p-value
White's test for heteroscedasticity	0.057
RESET test for specification	0.079
Test for normality of residual	0.138

Source: Author's calculations

As the model is significant it helps in concluding the first hypothesis that the analysts' price targets are positively impacted by the level of IPO underpricing. This means that the higher the IPO underpricing, the higher the expectations on target price set by analysts.

3.1.2. Model 2 – Market price difference compared to target price after one year

The second model had market price difference compared to target price after one year as the dependent variable and factors affecting it included the same factors as Model 1 and in addition included the initial price difference of analysts' price targets to IPO price. The result of the regression analysis is included in Table 9.

Table 9. Regression results with TargetDif1yr as dependent variable, all variables included (confidence levels: green 1%***, yellow 5%**, pink 10%*, orange >10%).

Step 1 of Model 2					
Explanatory variables	Coefficient	Std. Error	t-ratio	p-value	
const	0.081	0.190	0.426	0.671	
TargetDif	-0.258	0.2833	-0.911	0.365	
Underpricing	0.313	0.320	0.977	0.332	
Log_Issue	-0.164	0.069	-2.371	0.020	**
MSent100	2.368	1.008	2.350	0.021	**
MPChange_target	0.603	0.358	1.686	0.096	*
F-value	2.746				**
R-squared	0.140				
Adjusted R-squared	0.089				

Source: Author's calculations

Table 10. Regression results with TargetDif1yr as dependent variable, final model (confidence levels: green 1%***, yellow 5%**, pink 10%*, orange >10%).

Final Model – Step N of Model 2					
Explanatory variables	Coefficient	Std. Error	t-ratio	p-value	
Log_Issue	-0.159	0.065	-2.447	0.016	**
MSent100	2.550	0.998	2.556	0.012	**
F-value	5.311				***
R-squared	0.109				
Adjusted R-squared	0.088				

Source: Author's calculations

The step-by-step regression reached a significant model only when leaving in the basic factors considered important in the difference of market price in one year and analysts' price targets. These are the issued shares (log of issue size) and market sentiment before the IPO. For keeping the analysis consolidated only the first and the final step were included in the Table 9 and Table 10. The signs of the coefficients were according to expectations. The estimated regression model is presented with the following equation:

$$TargetDif1yr = -0.159\log\_issue + 2.550MPSent100 \tag{3}$$

The final Model 2 is significant with R-square at 0.11. The diagnostic tests for heteroscedasticity, RESET test confirmed the appropriateness of the model whereas the test for normality of residuals did not. The results of the tests are presented in Table 11.

Table 11. Diagnostic tests results for model 2.

Test	p-value
White's test for heteroscedasticity	0.608
RESET test for specification	0.201
Test for normality of residual	0.000

Source: Author's calculations

To test whether it could be affected by "too new" IPOs meaning that there wasn't enough time for 2018 IPOs to achieve the targets, the regression was also performed for the sample neglecting 2018 IPOs. However, the regression did not give any contradicting results as previously described.

The second model for testing the second hypothesis about relationship between analysts' price targets difference to IPO price and level of achieving the target price in a year's time was not satisfactory explained with a regression model based on sample of Nordic IPOs.

3.2. Results of regression models

In the previous subchapter the first hypothesis that the analysts' price targets are positively impacted by the level of IPO underpricing was accepted with a regression model. This means that the higher the IPO underpricing, the greater the difference with first analyst price target set. This gives investors who follow the analysts' recommendations signals that the most underpriced IPOs will also receive the highest target prices compared to the IPO price and thus generally the strongest "buy" recommendations.

When comparing the factors that have been found to have an effect on the level of IPO underpricing, then in the model for analysing the analysts' price target difference to IPO price, the explanatory factors have similar direction of effect. As expected, the issue size had an inverse relationship. However, the market sentiment had not an effect in the case of this sample. The obvious explanatory factor that describes the share's market price change ahead of the target price is also providing logical direction and gravity of the effect as the analysts might certainly take into account also the information from the market in one way or another before releasing their target estimates. So when the market price changes significantly over the quiet period, it can be expected that the analyst price targets are affected in the same direction.

The second model concerning the potential relationship of analysts' target price and the performance of the issued shares should be investigated further since the current model based on Nordic IPOs did not manage to explain the relationship. As the performance of the IPOs that have an effect on the price in one year's time was not the main research problem in the thesis, this is not analysed further in the current thesis. On the other hand, as on average, the Nordic IPOs did not manage to achieve target prices, then this would definitely be an interesting topic to analyse further.

3.3. Baltic IPOs in 2015-2018

During the time period analysed in this thesis, three IPOs took place on Baltic regulated exchange. This means that with the extremely limited amount of IPOs, no statistically significant tests or generalizations can be made. One way to overcome the problem is to change the time-frame, but this will not help much as Baltic stock exchanges have not had higher number of IPOs also historically. In his analyse of IPO underpricing in OMX Baltic, Ivanauskas (2015) has identified 13 Baltic IPOs throughout 2004-2014. Thus, the author of this thesis does not find that widening the time frame for Baltic IPOs, would give many advantages and to keep the consistency with the core of the analysis concentrating on the Nordic IPOs, only IPOs from 2015 through 2018 are included in the brief overview presented in this subchapter regarding Baltic IPOs.

The data about Baltic IPOs was gathered with the same methodology as described in the Nordic IPOs section. The IPO of Eften Real Estate Fund III has not been included as the analysts have not so far started coverage on the mentioned company. Among the three IPOs, two companies were listed in Nasdaq Tallinn exchange and one in Lithuania Nasdaq Vilnius exchange. The same descriptive statistics as for the Nordic IPOs have been included in Table 12, but due to the minimal amount of IPOs existing, the single point estimates have been also included in the table.

The respective index of OMX Baltic has been included where adjustment with market index is expected as with the data of Nordic IPOs. As the target prices for two IPOs (Tallinna Sadam and Novaturas) were released less than a year ago, then in the same manner as for the case of Nordic IPOs, the latest available market price is used for the current analysis which might somewhat

underestimate analysts' ability to forecast one-year-target prices. Nevertheless, as market prices tend to be volatile, it could also mean difference to market values from both sides – negative and positive. As an illustrative example the price at the date of data collection (8.02.2019) the latest market price of AS Tallinna Sadam was 2.139 euros and more than two months later at 23.04.2019 it closed at 2.140 euros per share. This gives the difference to initial published target price which was at the level of 1.93 euros at +10.8%.

Table 12. Averages of the variables and sample of Baltic IPOs 2015-2018

Company	Number of IPOs	Averages			
		issued shares, EUR million	IPO Underpricing	Target price difference to IPO price	Market price difference to target price after a year/latest available
Novaturas	1	22	3.9%	48.6%	-40.7%
Tallinna Sadam	1	147	20.5%	13.5%	16.1%
LHV Group	1	14	4.3%	15.1%	11.5%
Baltics	**3**	**61**	**9.6%**	**25.7%**	**-4.4%**

Source: Bloomberg, author's calculations

As said, due to the limited amount of IPOs in the Baltics, the following generalizations must be taken more in illustrative form than statistically significant. On average, Baltic IPOs as a group faced slightly higher underpricing at 9.6% compared to the Nordic IPOs (6.8%). LHV Group and Novaturas faced lower underpricing than Nordic average whereas Tallinna Sadam had higher IPO underpricing for the same period landing at the higher end of the Nordic sample. At the same time, the target price difference to IPO price was on average lower for the limited sample of Baltic IPOs and lower also for both Tallinna Sadam and LHV group whereas considerably higher for Novaturas. The achieved market price in one year has been higher for Tallinna Sadam and LHV and negative for Novaturas. To compare, Nordic IPOs had on average negative performance in the time-frame compared to analysts' price targets.

The Model 1 that did not have any statistical issues and proved the first hypothesis is applied to the Baltic IPOs to see the comparison of actual versus modeled results. The results are presented in Figure 7.
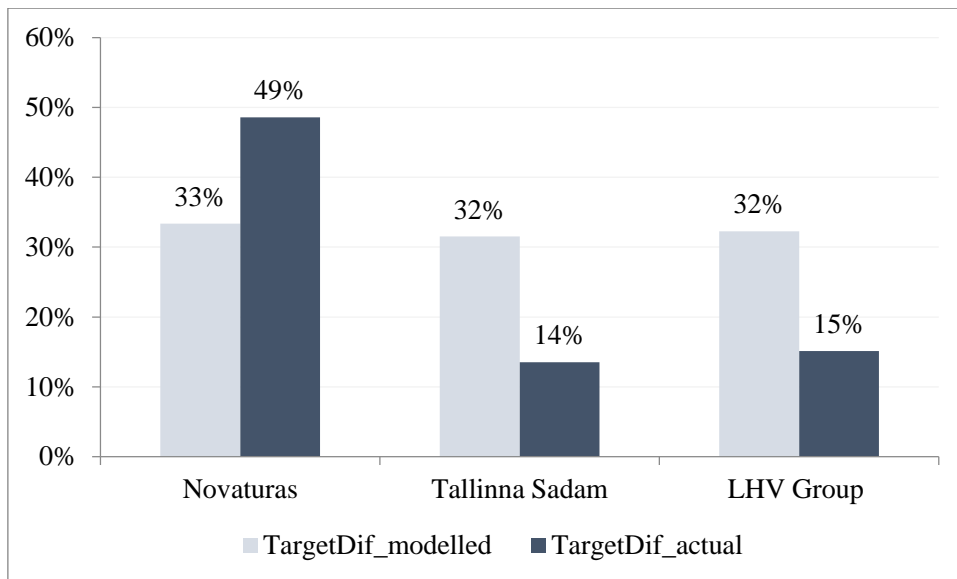
Figure 7. Analysts' target price difference to IPO price, modeled versus actual
Source: Author's calculations

The regression model based on Nordic IPOs does not fully explain Baltics analysts' target price difference compared to IPO underpricing. As explained with descriptive statistics, it seems that in the limited number of IPOs in the Baltics during the same time period, the analysts' target prices are set less optimistically compared to the Nordics and the positive outcome with this is generally the result of target prices being actually achieved.

CONCLUSION

The aim of the research was to analyse the analysts' target price relationship with IPO underpricing. While previous empirical analyses have proved that the IPO undepricing phenomenon is existent across markets, then there does not exists specific research on the relationship between IPO underpricing levels and analysts' target price levels published right after the IPOs. At the same time, previous empirical analyses have proved that analysts tend to give "buy" or "strong buy" recommendations in their first reports on the shares of the new public company. The positive recommendations might prove to be optimistic with the increase of the target resulting in decrease in the probability of achieving it in the time frame.

To analyse the analysts target price setting and the achievement of it in the context of IPO underpricing, two hypotheses were raised. The hypotheses were tested with two regression models. The first testing whether there exists a relationship between the level of IPO underpricing and the difference of analysts' target price to IPO price. The second hypothesis assumed that after one year, the market price difference to the first target price set is highest to IPOs where analysts have estimated the highest level of upside compared to IPO price. The second hypothesis was tested with a separate regression model. The regression models for testing the hypotheses included also variables for robustness check: the size of the issue and market sentiment.

The sample included in the empirical testing of the hypotheses was based on Nordic regulated market IPOs from 2015 until 2018. On average, the 90 Nordic IPOs included in the sample had market adjusted IPO underpricing of 6.8% and analysts' target price estimate 28.7% higher than the IPO price. Interesting is that from the IPOs having negative performance in the first day, only one had later a target price that was lower than the IPO price. The other shares that faced negative underpricing received a target price higher than IPO price. This contributes again to the starting point of the analysis that the market value and potential fair value as expressed by professional analysts' target price estimates might differ and on the other hand there might exist a positive bias in analysts' estimates.

The first hypothesis that the analysts' price targets are positively impacted by the level of IPO underpricing was accepted with a regression model. This means that based on sample of Nordic IPOs the higher the IPO underpricing, the greater the difference with first analyst price target set. This gives investors who follow the analysts' recommendations signals that the most underpriced IPOs will also receive the highest target prices compared to the IPO price and thus generally the strongest "buy" recommendations. This creates an interesting topic to analyse further – do the market prices react in short-term to the "strong buy" recommendations? In connection with this, opposite hypothesis could be raised based on previous analyses that say that the new public companies in majority always receive positive "buy" recommendations and thus there should not be any surprise or specific price impact shortly after analysts coverage initiation reports.

The analysts' target price difference to IPO price and the one-year performance of market prices relationship was not explained in this thesis, as the regression model describing the relationship for the sample of Nordic IPOs did not prove significant. As the descriptive statistics of the sample demonstrated that on average the target price after one year was not achieved, then the performance of analysts' estimates should be investigated further.

The final part of the thesis was the overview of the Baltic IPOs from the same time period of 2015-2018. As the sample from Baltic IPOs was limited with three IPOs on regulated market that had analysts' target prices, then no generalisations from the sample could be made. Nevertheless, as lengthening the time period would not have changed the fact of limited number of observations then an overview for the three IPOs in the Baltics was included as a descriptive overview.

As said, the price reaction for newly issued shares analysts' recommendations would be an interesting topic for further research. In addition to this, as new companies on the stock market are just another companies whose future can not be precisely predicted, then the analysis about the analysts' price targets in the Nordics and how they have performed in context of IPOs versus in the case of companies with history of being publicly listed could be another direction to test the potential positive bias of analysts. Is there positive bias in analysts' research and initiation report versus when the analysts update the price targets for already listed companies? Finally, as

the current thesis was based on Nordic IPOs, then the same hypotheses could be tested on a broader number of IPOs also including cross-country analyses.

KOKKUVÕTE

AVALIKE ESMAPAKKUMISTE HINNASTAMINE: PÕHJALA ESMAPAKKUMISTE NÄITEL 2015-2018

Maire Gustavson

Efektiivse turu teooria kohaselt näitab õiglast väärtust kõige täpsemalt turg. Seda aga juhul, kui puuduvad erinevad turutõkked. Samas, harva on aktsia õiglane väärtus, mida võib väljendada näiteks professionaalse analüütiku hinnasiht, võrdne aktsia turuhinnaga. See viib mõtteni, et kui arvestada turutõketega nagu likviidsus, asümmeetriline informatsioon jne., mistõttu aktsia turuhind ei pruugi alati kajastada aktsia õiglast väärtust, siis niisamuti ei näita avaliku esmapakkumise (IPO – *Initial Public Offering*) allahindlus, mis on esimese kauplemispäeva hinna ja IPO hinna vahe, allahindlust mitte õiglase väärtuse vaid ainult turuhinna suhtes.

Võrdlemaks IPOde hinnastamist õiglase väärtusega, keskendub antud magistritöö IPO hinna ning analüütikute esimese hinnasihi võrdlusele. Analüütikute esimene hinnasiht avaldatakse üldjuhul umbes 40 kalendripäeva pärast IPOt nn. vaikset perioodi. Kui aktsia turuhind muutub üldiselt igapäevaselt, siis analüütikute hinnasihid on stabiilsemad ning muutuvad vaid juhul, kui miskit olulist on muutunud turu või ettevõtte väljavaates. Käesoleva magistritöö täiendav eesmärk on testida, kas analüütikute hinnasihid on aasta pärast täitunud või mitte ning kas need on seotud ka esialgse hinnasihi erinevusega IPO hinnast.

IPO allahindluse põhjuseid ja selle suurust mõjutavaid faktoreid on uuritud laialdaselt. Teoreetilist tagapõhja uurivad analüüsid keskenduvad üldjuhul kas IPO hinnastamise või aktsiate jaotuse protsessis tulenevast asümmeetrilisest informatsioonist IPO allahindluse kujunemise selgitamisele. Empiiriliste analüüsidega on testitud erinevaid faktoreid, mis IPO allahindluse suurust võivad mõjutada, sealhulgas näiteks avaliku pakkumise suurust, omandistruktuuri või turgude olukorda.

Analüütikute esmased hinnasihid pärast IPOt on erinevatele varasematele analüüsidele tuginedes üldjuhul alati positiivsed, soovitades aktsiat osta. See viib kahe uurimissuunani, mida tihti empiiriliselt testitakse. Esiteks, kas ja miks analüütikud on IPOde puhul positiivselt kallutatud ning teiseks, kas seetõttu on ebatõenäoline, et hinnasiht täiel määral saavutatakse.

Käesolevas magistritöös tõstatati kaks hüpoteesi analüüsimaks analüütikute hinnasihte IPOde kontekstis. Hüpoteese testiti regressioonimudeliga tavalise vähimruutude meetodil. Esimene hüpotees aitas testida võimalikku seost IPO allahindluse ning analüütikute hinnasihi erinevusest IPO hinna suhtes. Teine hüpotees eeldas, et eksisteerib vastassuunaline suhe hinnasihi ning selle saavutamise vahel. Kahte hüpoteesi testiti kahe eraldiseisva regressioonimudeli abil. Regressioonmudelid sisaldasid selgitavate muutujatena sealhulgas IPO suurust ning turuolukorda kirjeldavaid tegureid.

Empiirilisse analüüsi kaasatud valim koosnes Põhjala reguleeritud turu IPOdest aastatel 2015-2018. Analüüsitud valimi, mis koosnes 90st IPOst, keskmiseks IPO allahindluseks kujunes 6,8% ning analüütikute hinnasiht oli IPO hinnast keskmiselt 28,7% kõrgem. Huvitava faktina võib välja tuua, et kuigi negatiivne tulemus esimese kauplemispäeva hinna ja IPO hinna võrdluses oli 15-l IPOl, siis madalam hinnasiht kui IPO hind, anti analüütikute poolt vaid ühele aktsiale. Samas, ka Põhjala IPOde puhul võis näha, et keskmiselt ei jõudnud aktsiahind aasta pärast analüütiku hinnasihti omistatud sihttasemeni.

Esimese hüpoteesi, mis eeldas, et analüütikute hinnasihid on seda suuremad, mida suurem on IPO allahindlus, sai regressioonanalüüsi tulemusel vastu võtta. See tähendab antud valimi põhjal tõlgendades, et mida suurem on IPO allahindlus, seda suurem on oodatav hinnasiht, mis pärast „vaikset perioodi" avaldatakse. See annab investoritele, kes analüütikute soovitusi jälgivad signaali, et kõige suurema allahindlusega IPOd saavad ilmselt ka tugeva ostusoovituse. See loob omakorda huvitava teesi edasiuurimiseks – kas turg reageerib tugevatele ostusoovitustele pärast IPOt?

Analüütikute hinnasihi erinevuse IPO hinna ning turuhinna vahel aasta pärast ei leitud käesolevas töös koostatud regressioonanalüüsis statistiliselt olulist seost. Kuigi nii teooria kui valimit kirjeldav statistika viitavad sellele, et mida kõrgem hinnasiht, siis seda madalam tõenäosus selle täitmiseks, siis Põhjala IPOdest koosnev valim ja vähimruutude meetod seda ei kinnitanud.

Viimases peatükis käesolevas magistritöös anti ülevaade ka Balti IPOde hinnastamisest samal perioodil 2015-2018. Kuna Baltikumis on mainitud perioodil toimunud vaid kolm reguleeritud turu IPOt, millele on sealhulgas antud professionaalse analüütiku poolt hinnasiht, siis üldistamist antud valim ei luba. Lugeja huvides oli kirjeldav ülevaade Balti IPOdest aga siiski lisatud, kuna eraldi analüüsi Balti riikide IPOdest ei ole ilmselt alust oodata ning seega katab see peatükk ilmselt ühe vähese allikana lünka, kus antud ajaperioodi Baltikumi IPOdest ülevaade hinnastamise kontekstis on antud.

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