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IPO UNDERPRICING IN THE HELSINKI STOCK EXCHANGE

- AN EMPIRICAL STUDY OF IPOs DURING 2013-2018

Bachelor's thesis

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ABSTRACT

This thesis presents the dynamic phenomenon of IPO underpricing by examining 38 initial public offerings that took place in the Helsinki Stock Exchange (HSE) between January 2013 and November 2018. Empirical findings of IPO underpricing is presented, supported by company specific reasoning and regression analyses. Three hypotheses are presented in respect to the regression analyses, therein the EBITDA multiple, the offering size and the percentage of primary shares issued. Additionally, prior art and prominent literature is conferred.

It was found that investors who chose to invest in IPOs during the sample period were "rewarded" by underpricing with a median of 2.97%. Factors that resulted a higher underpricing included the listing venue and the company's dominant industry. Hypotheses regarding the offering size, EBITDA multiple and the percentage of primary shares were testified true and so not having an effect on underpricing.

Keywords: Initial Public Offering, IPO, underpricing, initial return, Helsinki Stock Exchange, NASDAQ OMX Helsinki, NASDAQ OMX First North Finland, First North, bachelor's thesis

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INTRODUCTION

An initial public offering (IPO) is when a company, the issuing firm, offers to sell its shares for the public for the first time (Ritter, 1998). The phenomenon may be chosen to be a part of a company's natural lifecycle with an aim to raise equity capital for the company (Espinasse, 2011). Other reasons for choosing such route include the eased future financing, continuous and visible valuation, liquid stock and the flexible capital structure (FFSP, 2016).

Initial public offerings have been studied by various academics, where IPO underpricing has emerged to be one of the most prominent research topics. The anomality may be described as the positive first day returns from the offer price. Underpricing has been a globally debated topic. Prior art in the Helsinki Stock Exchange (HSE) have been focused either in the turn of the century or on either one of the listing venues in HSE. The aim of this study is to give a comprehensive outlook of recent underpricing in the specified stock exchange as a whole, and possible factors affecting the results.

While performing my core research paper on "Finnish Listing Venues and Their Selected Aftermarket Performance of Recent IPOs", I discovered the anomality of underpricing on its "full swing". This served as a motivation to further research the topic on this bachelor thesis. Additionally, my increased interest in corporate finance and recent employment in the equity capital markets were a further encouragement.

Research questions addressed in this thesis are in line with the presented aim. Questions "has underpricing occurred in the HSE during 2013-2018" and "what company specific factors have affected for certain initial returns" will be further studied. Firstly, my objective is to examine the phenomenon and calculate initial returns with the help of presented methods. Then underpricing will be examined with specific company features and yet evaluated in a regression model supported with designated hypotheses.

The structure of the thesis is sectioned into three dominant parts: The theoretical framework, the empirical framework and the conclusions. Firstly, relevant literature is discoursed alongside a presentation of prior art. This is followed by the quantitative section with the demonstration of

methods, the sample selection and research results. Finally, concluding remarks will be gathered in light of the two previously presented sections.

1. THEORETICAL FRAMEWORK

The following section will cover the theoretical framework of an IPO and the phenomenon of underpricing. Theories, prior art, regulated listing venues in Finland and an overview of a Finnish IPO process will be presented. The theoretical framework was conducted by gathering information from academic papers, articles and reliable online resources.

1.1. Initial Public Offering (IPO)

An initial public offering (IPO, "going public") is when a formerly private company makes the decision to sell its stock to the general investing public for the first time with an expectation of creating a liquid market. This is done in a regulated securities exchange such as the New York Stock Exchange (NYSE) or NASDAQ OMX Helsinki where the public may trade their shares (Nasdaq, 2018.1; Ritter, 1998).

Once the company has gone public and has its stock publicly traded, it allows a company to further raise capital with more favourable terms. This is due to transparency: A public listed company has the obligation to inform about its financial position and major changes in business on a regular basis. Private companies lack the associated liquidity. Additional benefits include the shareholders ability to exchange their shares in open-market transactions and the public attention the issuing company receives during the listing. Transparency may be perceived as a downside due to the continuous liability of information releases and their maintenance costs. The IPO process itself is filled with direct and indirect costs that affects a company's ability and decision on going public (Ritter, 1998).

1.2. IPO Underpricing

IPO underpricing is a frequent phenomenon, perhaps the most distinguished attribute of an IPO (Ritter, 1998). It is portrayed by significant escalation in the market price at the end of the first day of trading from the offer price (Loughran et al. 1994). Adams et al. (2008) describe IPO underpricing as "the difference between the price obtained by the shares at the close of the first trading day and the price of the offer". Figure 1 below further illustrates the phenomenon of

underpricing by presenting Silmäasema's share price development by the initial trading days. Day 1 is the closing price of the first official trading day and so forth.

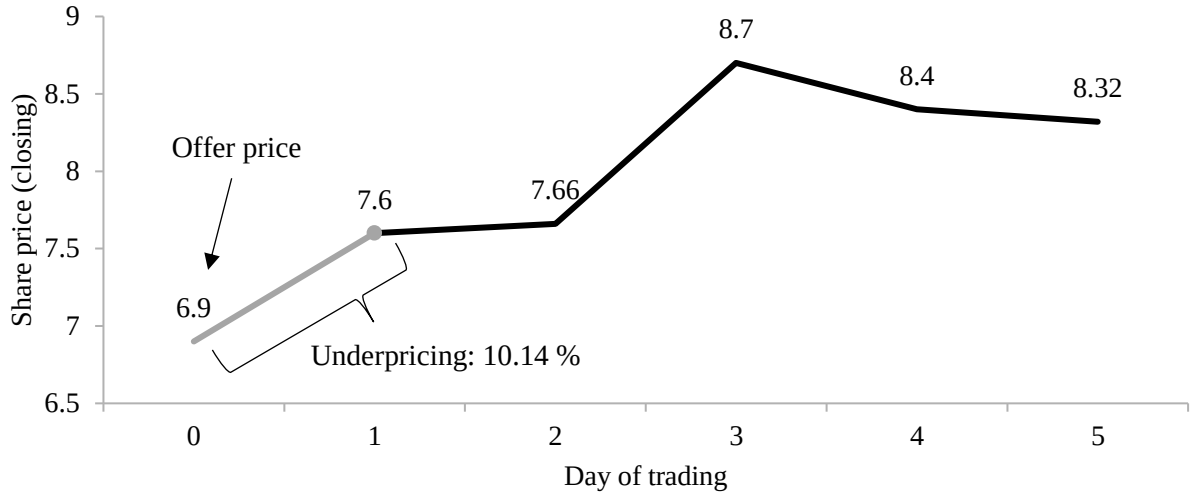

Figure 1. Underpricing visualised by share price development
Source: Factset (2018)

Ritter (2003) continues to explain the reasons of underpricing as an issue related to the topic of behavioural finance where investors and agents are not fully rational of their decisions. It is useful to think the IPO process as a game involving three players: the issuing firms, investment bankers and investors. The objectives and the weights of underpricing vary by player. In general, these reasons are not mutually exclusive, and their relative importance varies by country, contractual mechanisms and time (Ritter, 2003).

1.2.1. IPO underpricing literature review

IPO underpricing is one of the puzzling empirical regularities that has been documented by several economists throughout the years. The phenomenon received substantial attention since Stoll et al. (1970), Logue (1973) and Ibbotson (1975) documented systematic increases from the offer price to the closing price of the first trading day (Francis et al., 2010). Several theories have been developed with a focus on various aspects such as the relations between investors, issuers and the investment bankers taking the firms public (Ritter, 1998). In the following is conducted the most prominent ones.

Winners curse hypothesis

Rock (1989) introduced one of the most well-known theories of underpricing: The Winners Curse. The theory focuses in the asymmetric information between investors and the underwriter that is applicable with fixed price offers (Ritter, 2003). The theory states that in the market, investors are segregated into investors with informational disadvantage (uninformed) and to investors with perfect information (informed). Uninformed investors subscribe to every IPO due to the lack of information and resources, whereas informed investors only subscribe to buy new shares if the issue price is attractive (Rock, 1989).

When an IPO is appealing, both uninformed and informed investors subscribe for the IPO which causes an oversubscription, with unanswered demand in the market. This results in a higher first day closing price than the initial offering price (Rock, 1989). Several global studies have tested the hypothesis of the winner's curse with consistent evidence of its relevance (Ritter, 1998).

Levis (1990) continues to state that the Winners Curse is a further testimony on why it is difficult to earn excess returns on a good IPO. Uninformed investors may invest in IPOs that are priced over the fair value that causes negative returns for investors (Ritter et al., 2002). If the majority of IPOs would be overpriced, it would be unprofitable for uninformed investors to stay in the market, this would further lead to the withdrawal of uninformed investors. To prevent this, IPOs are consciously underpriced to keep both investors actively in the market (Ritter, 1998).

Thaler (1988) analyses the theory by bidding. Some bids on the IPO will be far above the true value and would so be overpaying on the asset, whereas some would be bidding below. Eventually, the bids that are too high win the auction and winners will overpay for the shares and so be "cursed".

Signalling theory

The signalling theory was introduced by Allen et al. (1988) with evidence that underpricing of new issues occurs at certain times in particular industries. A company may imply their quality through the pricing of an IPO. High quality firms can ensure the capital losses of underpricing, that leave investors pleased. The costs of implementing underpricing are redeemed in a secondary

equity offering (SEO). Lower quality firms are not able to patch up the lost capital of underpricing, and so leaving investors unpleased.

The theory further assumes that a firm doing an IPO is better informed about its future possibilities than anyone else. In this light, a company underpricing its IPO is signalling to the investors about its favourable prospects and ability to face the financial losses of underpricing (Allen et al., 1988).

Welch (1989) carried the theory forward by presenting that low-quality firms must invest in imitation expenses to appear to be high-quality firms. With some probability this imitation could be discovered on the detriment of smaller firms. They were incapable to carry the cost of reproducing qualities of high quality firms. Welch (1989) further testified his theory by presenting that several firms raised substantial amounts of additional equity capital in the immediate years after an IPO.

The SEO hypothesis has been further testified with evidence from less transparent emerging markets where information asymmetry is likely to be high and where the communicated information through signalling may be valuable. The study consisted of a sample of 153 Polish IPOs from 2005-2009. Companies that significantly underpriced their IPOs were more likely to make a secondary offering faster and larger than the IPO within three years (Cornanic, 2015)

The partial adjustment theory (Market feedback theory)

The partial adjustment theory is based on information asymmetry addressed in the Winners Curse hypothesis. Ritter (1998) introduced the theory in 1988, more commonly known as the market feedback theory. The theory may be implied in an IPO where book building is used (Ritter, 1998).

Investment bankers may underprice the IPO to persuade regular investors to reveal their information of the company. This is done during the time of pre-selling, to evaluate whether the price in the working prospectus is accurate. The “information reveal” from the investors is further compensated in the final pricing range as an underpricing of the IPO (Ritter, 1998).

In Ritter’s (1998) theory, IPOs that revise their offer price upwards will be more underpriced as the investment bankers have got an assurance that the shares would sell anyway. On the other hand, if the offer price would be revised downwards it would signal to the market that with the

initial price range the IPO would have not been that successful and would have resulted in less underpricing. This pattern is visualized in the table 1 below. On the light of the study, IPOs that revised their offer price upwards will eventually be more underpriced than those that revise their offer price downwards (Ritter, 1998).

Table 1. Offer price relative to the final price range

		Initial offer price relative to the final price range		
	All	OP revised down	OP unchanged	OP revised up
Average initial return	13.99 %	3.54 %	11.99 %	30.22 %
Number of IPOs	2,861	708	1511	642

Source: Ritter (1998) (modifications with presentation made)

Note: IPOs in 1990-96 with proceeds = USD 5m, excluding units and ADRs

1.2.2. IPO Underpricing as a Global Phenomenon

The first empirical evidence of IPO underpricing dates back to 1963 to a study performed by the U.S. Securities and Exchange Commission (Bachmann, 2004). Since then, numerous studies have examined that during an IPO, shares have been sold in a considerably lower offer price compared to the immediate aftermarket.

Underpricing of Finnish IPOs has been examined in studies by Westerholm (2006) and Hahl et al. (2014). Westerholm's (2006) findings included an average level of underpricing of 21.9% with a sample of 63 IPOs listed during 1991-2002. Hahl et al. (2014), in the other hand, examined 67 IPOs listed during 1994-2002, with a conclusion of an underpricing of 15.6% on the first day returns. Lastly, Keloharju studied the underpricing of 168 IPOs listed during 1971-2013 with a result of a underpricing of 16.9%, visible in table 2 (Loughran, 2015).

Aside from Finland, underpricing has been a puzzling global phenomenon studied by several academics. Table 2 below presents findings of underpricing in 52 countries. Every single country presented with the selected time frame and sample size has experienced underpricing. Saudi Arabia, Jordan and China has had the highest average initial returns with a range of 118.4-239.8%, whereas Argentina, Austria and Russia have had the lowest initial first day returns with the range of 3.3-6.4%. As a vague conclusion one may spot that the effect of underpricing is not attributable

for a single country, but second and third world countries has had higher first day returns than developed countries.

Table 2. Average initial return by country

Country	Sample size	Time Period	Avg. Initial Return	Country	Sample size	Time Period	Avg. Initial Return
Argentina	26	1991-2013	4.2 %	Malaysia	474	1980-2013	56.2 %
Australia	1,562	1976-2011	21.8 %	Mauritius	40	1989-2005	15.2 %
Austria	103	1971-2013	6.4 %	Mexico	123	1987-2012	11.6 %
Belgium	114	1984-2006	13.5 %	Morocco	33	2000-2011	33.3 %
Brazil	275	1979-2011	33.1 %	Netherlands	181	1982-2006	10.2 %
Bulgaria	9	2004-2007	36.5 %	New Zealand	242	1979-2013	18.6 %
Canada	720	1971-2013	6.5 %	Nigeria	122	1989-2013	13.1 %
Chile	81	1982-2013	7.4 %	Norway	209	1984-2013	8.1 %
China	2,512	1990-2013	118.4 %	Pakistan	80	2000-2013	22.1 %
Cyprus	73	1997-2012	20.3 %	Philippines	155	1987-2013	18.1 %
Denmark	164	1984-2011	7.4 %	Poland	309	1991-2014	12.7 %
Egypt	62	1990-2010	10.4 %	Portugal	32	1992-2013	11.9 %
Finland	168	1971-2013	16.9 %	Russia	64	1999-2013	3.3 %
France	697	1983-2010	10.5 %	Saudi Arabia	80	2003-2011	239.8 %
Germany	736	1978-2011	24.2 %	Singapore	609	1973-2013	25.8 %
Greece	373	1976-2013	50.8 %	South Africa	316	1980-2013	17.4 %
Hong Kong	1,486	1980-2013	15.8 %	Spain	143	1986-2013	10.3 %
India	2,964	1990-2011	88.5 %	Sri Lanka	105	1987-2008	33.5 %
Indonesia	464	1990-2014	24.9 %	Sweden	374	1980-2011	27.2 %
Iran	279	1991-2004	22.4 %	Switzerland	164	1983-2013	27.3 %
Ireland	38	1991-2013	21.6 %	Taiwan	1,620	1980-2013	38.1 %
Israel	348	1990-2006	13.8 %	Thailand	500	1987-2012	35.1 %
Italy	312	1985-2013	15.2 %	Tunisia	32	2001-2013	24.3 %
Japan	3,236	1970-2013	41.7 %	Turkey	399	1990-2013	9.7 %
Jordan	53	1999-2008	149.0 %	UK	4,932	1959-2012	16.0 %
Korea	1,758	1980-2014	58.8 %	USA	12,702	1960-2014	16.9 %

Source: Loughran et al. (2015)

Loughran et al. (2015) conclude that the presented differences between IPO underpricing is no coincidence. They found supporting empirical evidence and hypothesized that the differences with

underpricing among countries was due to different regulations and contractual mechanisms alongside company specific characteristics.

Banerjee et al. (2010) continue to support the previously cited with conclusions of country-level characteristics affecting the underpricing of IPOs. The group evaluated more than 8,700 IPOs in 36 countries between 2000 and 2006. Results included that IPO underpricing was higher in countries with higher levels of information asymmetry, lower home-country bias among investors and less effective contract enforcement mechanisms.

1.3. Helsinki Stock Exchange

Helsinki Stock Exchange is the only regulated stock exchange in Finland and is divided into two market segments: the main market (NASDAQ OMX Helsinki) and the alternative stock exchange for smaller companies (NASDAQ OMX First North Finland). With an overall trading volume of 114,200 HSE is lacking behind from the other Nordics: Sweden has a notably higher trading volume whereas Denmark's volume is more modest, 225,400 and 126,800 respectively (Nasdaq Inc, 2018). The trading volume presents the number of shares exchanged on a daily scale (NASDAQ, 2018)

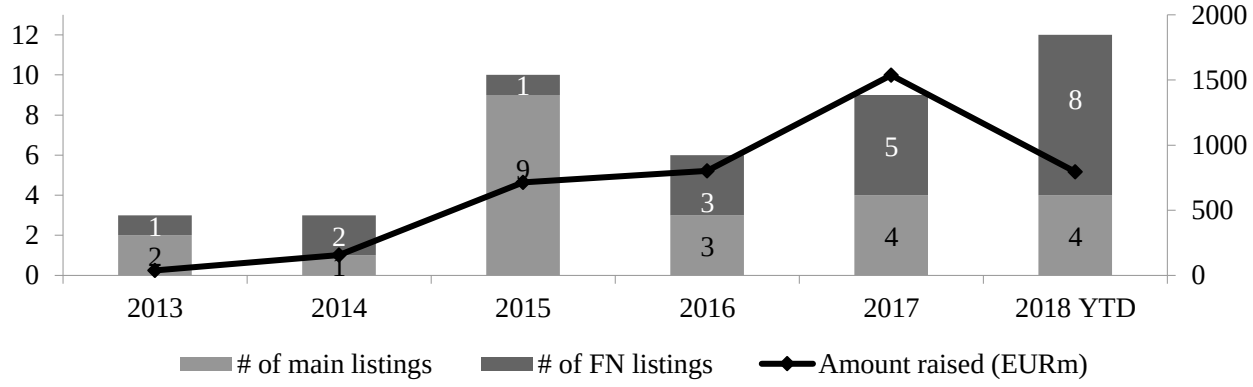

Figure 2. Recent Finnish IPOs and amount raised
Source: Mergermarket
Note: (1) November 2018

The two regulated listing venues in Finland differ by several company specific characteristics. The main market is more liquid and has notably larger companies' stocks listed with a wider analyst coverage. First North in the other hand has a lower trading volume and backed up with a stong

track of growth companies. Furthermore, the two marketplaces differ by market value, number of companies listed and admission requirements. These factors are represented in more detail in the following chapters.

The past 4 years has been characterised with essentially record-breaking number of listings in the equity capital markets. Figure 2 visualises this activity. During the sample period (January 2013 – November 2018) 43 companies listed to the HSE of which 23 were listings to the main list. This year alone, 12 companies have listed representing roughly a third of the sample size. Figure 2 further emphasizes 2017 being the strongest year in regards of the amount raised (sum of all offer sizes of a specific year). Several landmark IPOs went public that year including the largest IPO to date Terveystalo (EUR 830m) and Rovio (EUR 440m) (Mylläri, 2018).

NASDAQ OMX Helsinki

Since first opening its doors to the public in 1912, Helsinki Stock Exchange has played an important societal role for different sized and matured companies to help acquire equity-based funding for growth (Nasdaq OMX, 2014). The exchange located in the Finnish capital joined NASDAQ, an American technology exchange, in 2007 alongside a Nordic and Baltic based OMX in 2013 (FFSP, 2018). Today NASDAQ OMX Helsinki has 132 companies listed with a total market value of EUR 223 billion in 2017 (Nasdaq, 2018; FFSP, 2018.1).

NASDAQ OMX First North Finland

NASDAQ OMX First North was launched in 2006 in Denmark, due to the lack of a early stage marketplace for companies to step into the financial markets. From Copenhagen the exchange found its way to Helsinki in 2007 (Nasdaq First North, 2018). First listing did not happen until 2012 when Siili Solutions listed it shares to the alternative stock exchange (FFSP, 2018.2). Many early stage companies choose the First North exchange as their primary listing venue due to the lighter requirements and requirements (Nasdaq First North, 2018). Today NASDAQ OMX First North Finland has 29 companies listed with a total market value of EUR 1.3 billion (Kauppalehti, 2018).

The First North marketplace is referred as a "first step" for smaller and developing growth companies. As companies have reached a certain stage of maturity, they may proceed with a secondary listing to the main market where requirements for factors such as corporate governance, financial reporting and accounting methodologies vary (Mylläri, 2018). Companies who have chosen such route include Taaleri and Siili Solutions (Talouselämä, 2017).

It is important to emphasize that a listing process to the alternate stock exchange is without exception expensive and time consuming. A secondary listing from one venue to another does not drastically differ from this. On this note an IPO is only possible to execute by a company who has the adequate solvency and has a solid track of operating years (Ritter, 1998).

1.3.1. IPO Process

An IPO process is a lengthy and expensive milestone that may take from one to 18 months of time. The process has abnormalities by listing venue but may be roughly outlined as presented in the figure 3. below.

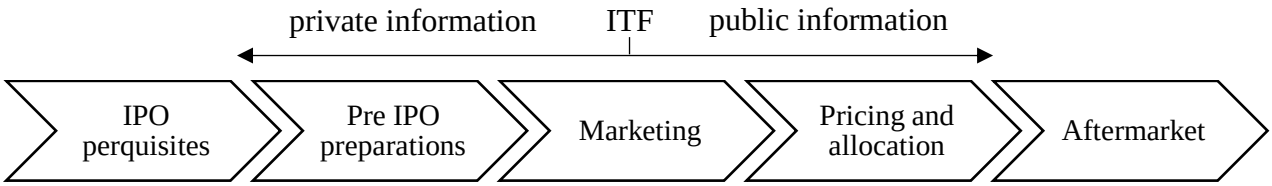

Figure 3. Indicative IPO process timeline
Source: FFSP (2016; FSA, 2018

IPO perquisites include preparations that may be implemented before any advisors are chosen. Both regulated listing venues in Helsinki Stock Exchange (HSE) have general listing requirements that must be fulfilled if an IPO is executed. The main list has higher disciplinary regarding the requirements. The major differences include the implementation of IFRS accounting methodology, that differs from the generally accepted Finnish Accounting Standards (FAS) in Finland. Additionally, the minimum market value of a listing company must be EUR 1 million, whereas First North does not require one (FFSP, 2016).

As IPO perquisites have commenced the company may implement a "beauty contest" in which several investment banks compete to be chosen as the financial advisor. An investment bank carries key roles that include the coordination of the project and initially getting the company's

stock sold (RSM, 2018). Other advisors include the legal counsel and PR agency. During the pre IPO preparations, due diligence is implemented to ensure that the IPO preparations have been implemented in the right manner. Additionally, meetings will be made with the Finnish FSA, Euroclear Finland and the stock exchange (FFSP, 2016; FSA, 2018).

Marketing is a fundamental component of an IPO process as it enables the creation of demand and the possibility to test the demand. The process lasts from the strictly private early look meetings with investors, that take place in the very start of the process, to visible public marketing (FFSP, 2016). During the marketing period the company decides either to "go or no go" with their intention to float (ITF). When a company decides to go ahead with the public ITF announcement it is confident that it will proceed with the offering of shares (Syndicate Room, 2018). Before this period, all information has been private and under a non-disclosure agreement.

The marketing period continues with the publication of the prospectus and the offering period. A prospectus is a document provided for investors with adequate information to allow an informed assessment of the securities and the issuer (FSA, 2018). After the marketing period comes the pricing and allocation where both are crucial for the success of the IPO. More attention has been drawn to the allocation and the aftermarket performance of shares (Ritter, 1998). Ritter (1998) describes that one of the reasons to this is the increased public attention on perceived unfairness in how the shares are allocated between institutional investors and the public. IPO pricing is generally exposed to an IPO discount as compared to public peers a new issue is perceived as a riskier investment (SOW, 2018).

In most cases the transaction is proceeded without any complications but as Espinasse (2011) describes, IPOs tend to be more successful during periods of healthy and liquid capital markets. After a successful listing, the aftermarket procedures begin. This includes the commence of public trading and closing of the transaction (FFSP, 2016). For a company who has just executed an IPO the responsibilities have only begun.

2. EMPIRICAL FRAMEWORK

In this section, the chosen methodology will be presented. The empirical framework was conducted by gathering information from various databases, academic papers and other reliable sources. Several statistical tools and methods will be used, alongside appropriate calculation methods. These will be further implemented to answer the research questions supported by quantitative data to evaluate if underpricing has occurred in the HSE during 2013 - November 2018. Yet, possible factors influencing higher returns were studied. The data will be evaluated and narrowed down by sample selection criteria, presented in 2.4. to minimize biased results. Several regression analyses were yet used to evaluate potential factors influencing the end results.

Research Approach

The study will be implemented in the light of positivism. Resources used will lead to credible data that will further help to generate a research strategy and develop hypotheses to support the study. The presented hypotheses will be yet confirmed or rejected leading to a further development of theory which may be tested in further research. All in all, the emphasis will be based on quantifiable observations that lead to a statistical analysis (Saunders et al., 2009).

2.1. IPO Underpricing Methodology

To measure underpricing, on other words initial return, it is necessary to specify the appropriate calculation methods. In this study, calculations were executed by simple cumulative return basis between the offer price and the closing price of the first day of trading, in the designated stock exchange. The quantitative representation in equation (1) as follows:

$$\boldsymbol{UP} = \frac{(\boldsymbol{PFT_i} - \boldsymbol{OP_i})}{\boldsymbol{OP_i}} \qquad (1)$$

where UP = underpricing; PFT = closing price on the first reported trading of the IPO stock *i;* OP = offer price of the IPO stock *I.*

Espinasse (2011) represents the same as a verbal equation (1) as follows:

$$\boldsymbol{Underpricing} = \frac{\boldsymbol{Closing\ price - Offer\ price}}{\boldsymbol{Offer\ price}} \quad (1)$$

Underpricing was further analysed by three allocations: Listing venue, industry and the share of primary shares issued. When analysing these factors, a t-test was performed to find if the results significantly differed from each (Dr. Elrod, 2018). The t-test was done in a two-tailed manner and as a two-sample unequal variance.

2.2. Linear Regression Analysis

A regression analysis is one of the most widely used techniques for analysing multifactor data. It is a statistical technique to express the relationship between a variable of interest (the response) and a set of related predictor variables (Montromery et al. 2012). In this thesis the variable of interest is the underpricing of evaluated stock and the predictor variables evaluated are the EBITDA (earnings before interest, taxes, depreciation and amortization) multiple, the offering size and the percentage of primary shares. These were chosen with the expectation to have a significant influence on the end result. The linear regression model is presented in the following equations (2) (3) and (4) as follows:

$$\boldsymbol{Y_u = \beta_0 + \beta_1 x_1 + \varepsilon} \quad (2)$$

$$\boldsymbol{Y_u = \beta_0 + \beta_2 x_2 + \varepsilon} \quad (3)$$

$$\boldsymbol{Y_u = \beta_0 + \beta_3 x_3 + \varepsilon} \quad (4)$$

where β_0 = represents the intercept; $\beta_1, \beta_2, \beta_3$ = represents the designated slope; x = the independent variable (predictor or regressor)); y = dependant variable (response variable); ε = error of the difference between the observed value and the straight line ($\beta_0 + \beta_x$) (Montgomery et al. 2012). In the thesis we assume a linear relationship with the level of underpricing (Y_u) and these sets of predictor variables, each analysed separately. These predictors include the EBITDA multiple (x_1), offering size during the IPO (x_2) and the share of primary share (x_3).

If the relationship between the two examined variables (Y and x) equal to zero, the slope of the regression line would likewise equal to zero. In other words, there would be no relationship between the two variables (Montgomery et al. 2012). Additionally, there is always a possibility for a spurious regression, where the regression will most likely indicate a non-existing relationship (FSB, 2018).

2.2.1. Research Hypothesis for Regression Analysis

A hypothesis can be a part of a sound conceptual argument containing logical arguments on why empirical relationships are expected to occur (Saunders et al., 2009). In this study the hypothesis is based on a null and alternate hypothesis and as a support for the linear regression analysis. Dean et al. (2014) describe the null hypothesis (H_o) being a statement about the population that will be assumed to be true unless it can be shown to be correct beyond reasonable doubt. The alternate hypothesis (H_a), on the other hand, is a claim about the population that is contradictory to H_o and what is conducted when rejected H_o. In the following is presented hypotheses in correlation to the three presented predictors in 2.3. Linear regression analysis.

The hypothesis for examining if the EBITDA multiple during an IPO has an impact on the occurrence of underpricing is formulated in the following hypotheses $H_{o,1}$ and $H_{a,1}$:

$H_{o,1}$: There is no correlation with the EBITDA multiple and the initial return of the IPO
$H_{a,1}$: There is a correlation with the EBITDA multiple and the initial return of the IPO

The following hypotheses $H_{o,2}$ and $H_{a,2}$ state if the offering size during the IPO had an impact on the occurrence of underpricing:

$H_{o,2}$: There is no correlation with the offering size and the initial return of the IPO
$H_{a,2}$: There is a correlation with the offering size and the initial return of the IPO

Lastly, the following hypotheses $H_{o,3}$ and $H_{a,3}$ state if there is a correlation with the proportion of primary shares issued during the IPO and the occurrence of underpricing:

$H_{o,3}$: There is no correlation with the proportion of primary shares issued and the IPO underpricing

$H_{a,3}$: There is a correlation with the proportion of primary shares issued and the IPO underpricing

2.3. Data Collection and Sampling

The sample in this study was composed of 43 IPOs that took place in the Helsinki Stock Exchange between January 2013 and November 2018 (1.1.2013-30.11.2018). Only primary listings were taken into consideration. In other words, secondary listing from First North, or other listing venue, to the main list were not observed. Actual data used in quantitative research is listed in Table 3 below with further eliminations as presented. It is important to acknowledge that as relevant data was not available for all IPOs the sample needed narrowing down to enable unbiased results and adoption in further analysis.

The data and company specific information was gathered as a primary source from the Mergermarket database. Mergermarket is a specialist news, research, analysis and data provider of the financial markets (Aquris, 2018). The daily share price data was collected as primary data from the FactSet database. FactSet is a financial data and software company that provides financial information and analytic software for investment professionals (FactSet, 2018.1). All presented data is modified from the original display from primary sources, unless stated otherwise.

Table 3. Sample selection criteria

	All
Total number of companies' commitment domestic IPOs in the raw sample	43
Less: Observation deleted because not enough data available	5
Final sample	38
Less: Observation deleted because EBITDA multiple not available	12
Sample for EBITDA regression analysis	26

Source: Mergermarket (2018)

2.4. Empirical Research Results

In this section, empirical findings are presented and executed from the stated sample data and research methodologies. The empirical results begin by evaluating underpricing. Several different allocations with results are used to find if specific factors resulted in a higher underpricing. These factors include the listing venue, industry and a backup of a financial sponsors. This is followed by the three linear regression model analyses previously presented in 2.3. To support the calculations and end-data, tables and graphs were created.

2.4.1. Underpricing

After conducting the primary data, 38 IPOs were identified to fulfil the sample selection criteria presented in 2.4. To repeat, it is important to highlight that IPOs to the main list are not only larger companies by market capitalization but additionally have a significantly higher offering size.

The following Table 4 presents findings of all sample IPOs. Market capitalization ranged from EUR 8.2 million (Rush Factory) to EUR 3,575 million (Terveystalo). The median market capitalization during the evaluated time period (January 2013 – November 2018) was EUR 78.1 million. The offering size over market capitalization ranged widely from 8% (FIT Biotech) to 80% (Kotipizza), with a total median of 27%. Presented in figure 4, one may conclude that an offering size in HSE was most likely to drop in the range of EUR 1-50m.

Table 4. Company specific information of sample data

List Date	Issuer	Offering size	Market Cap	Offering size as % of Market Cap	List Date	Issuer	Offering size	Market Cap	Offering size as % of Market Cap
30.11.18	Oma Savings Bank	32	207.1	15 %	30.11.16	DNA	547.1	1768.9	31 %
20.11.18	Viafin Service	10	25.4	40 %	10.11.16	Heeros	3.5	13.5	26 %
16.11.18	Rush Factory	1.5	8.2	16 %	29.4.16	Tokmanni	181.4	453.6	40 %
10.10.18	Fellow Finance	20	55	36 %	28.4.16	Lehto	69.4	288.2	24 %
19.6.18	VMP	30.2	69.5	43 %	11.12.15	Consti	43.4	82.6	53 %
15.6.18	Kojamo	483.4	2100.7	23 %	2.12.15	Evli Bank	14.2	157.4	9 %
24.4.18	Enersense	7	33.2	21 %	30.11.15	EAB	5	53.5	9 %
23.3.18	Altia	172.8	271	64 %	7.7.15	Kotipizza	25.5	31.8	80 %
22.3.18	Harvia	59	107.5	55 %	1.7.15	FIT Biotech	3.5	43.1	8 %
28.2.18	BBS	3.5	28	13 %	11.6.15	Talenom	15	50.1	30 %
8.12.17	Efecte	11.3	30.4	37 %	4.6.15	Pihlajalinna	80.1	230.2	35 %
16.11.17	Gofore	21.5	82.2	26 %	21.5.15	Robit	48	99.6	48 %
11.10.17	Terveystalo	826.2	3576.5	23 %	27.3.15	Asiakastieto	195	256.1	76 %
29.9.17	Rovio	436.8	896.1	49 %	16.3.15	Detection Tech.	19.7	74	27 %
9.6.17	Silmaasema	65.1	98.3	66 %	24.11.14	UB Capital	9.9	49.4	20 %
29.5.17	Remedy	13	68.1	19 %	14.11.14	Nexstim	7.7	45.3	17 %
12.5.17	Kamux	124.2	287.9	43 %	4.4.14	Verkkokauppa	63.8	197.6	32 %
4.4.17	Fondia	5	29.9	17 %	28.11.13	NoHo Partners	16.5	65.4	25 %
23.3.17	Next Games	34.6	143.4	24 %	25.4.13	Taaleri	15	65.2	23 %
Median (all)							23.5	78.1	27%

Source: Mergermarket database (2018)

Figure 4. below illustrates the distribution of the offering size during the evaluated sample period.

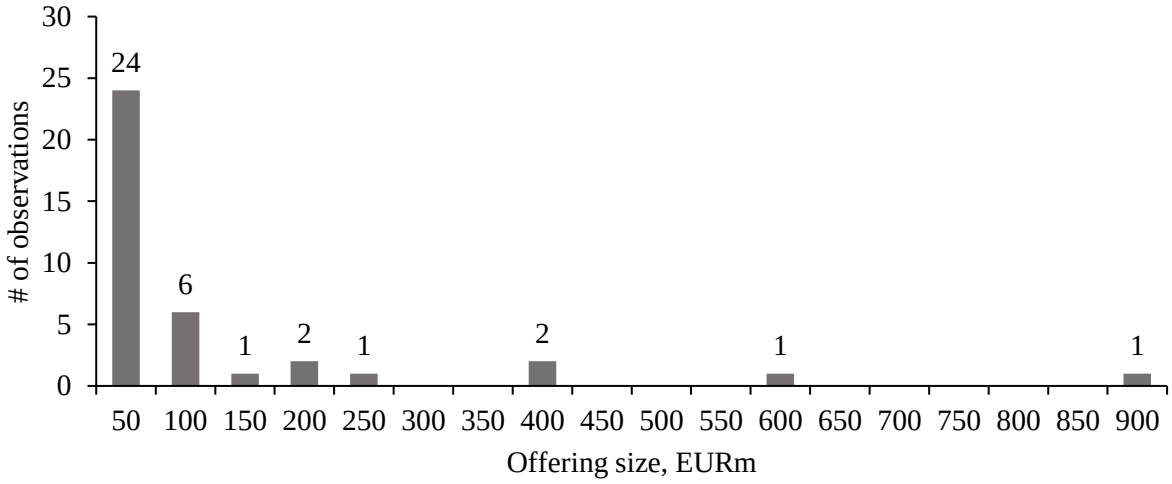

Figure 4. Distribution of the offering size
Source: Mergermarket

To determine the occurrence and scale of underpricing, equation (1) was used for all sample data. To repeat, it measures the initial one-day change in the share price of an IPO by calculating it with the offer price and closing price of the first trading day. The following table 5 summarizes the underpricing of the selected sample data in order of listing date.

Table 5. Underpricing by listed company

Oma Savings Bank	2.14 %	DNA	0.00 %
Viafin Service	-5.83 %	Heeros	-9.68 %
Rush Factory	0.00 %	Tokmanni	0.00 %
Fellow FInance	2.20 %	Lehto	15.69 %
VMP	4.40 %	Consti	3.16 %
Kojamo	0.60 %	Evli Bank	24.00 %
Enersense	-10.17 %	EAB	5.40 %
Altia	2.93 %	Kotipizza	3.80 %
Harvia	0.00 %	FIT Biotech	-33.33 %
BBS	-21.82 %	Talenom	-7.88 %
Efecte	-6.00 %	Pihlajalinna	8.60 %
Gofore	7.09 %	Robit	9.52 %
Terveystalo	2.46 %	Asiakastieto	3.32 %
Rovio	0.00 %	Detection Tech.	-2.50 %
Silmaasema	10.14 %	UB Capital	5.00 %
Remedy	18.41 %	Nexstim	-2.21 %
Kamux	5.00 %	Verkkokauppa	3.00 %
Fondia	28.50 %	Restamax	8.04 %
Next Games	20.25 %	Taaleri	5.10 %
Median (all)			2.97%

Source: Mergermarket database (2018)

The results from table 4 show that the median underpricing was 2.97%. From the 38 IPOs 29 experienced underpricing, whereas eight companies experienced negative results and five companies had unchanged results on the first day of trading. Fondia had the highest underpricing of 28.50%, where FIT Biotech had a negative result of 33.33%. The large negative results within FIT Biotech's one-day share price, may be due to the low offer price (EUR 1.56) where small changes may seem larger than they actually are.

Listing Venue

To further evaluate if specific factors resulted to higher initial returns, three viewpoints were conducted: listing venue, industry and a backup of a financial sponsors. Two of these viewpoints

were yet run by a t-test to find if the results significantly differed from each other. To start off, Table 5, presents the median amount of underpricing by the two listing venues.

Table 5. Underpricing by listing venue

Venue	# of observations	underpricing, %
Main list	22	3.05%
First North	16	2.20%
T-test	-	0.79

Source: Offer price, listing venue (Mergermarket); closing price of the first trading day (FactSet)

As a result, from table 5, both main list and First North IPOs experienced underpricing on a median 3.05% and 2.20%, respectively. The executed t-test proves that statistically the returns between First North and main list were not different.

Industry Allocation

Secondly, the companies were divided into 8 industry specific groups. The variables for different industries was based on Mergermarket's (2018) issuers dominant industry standards, that were further abbreviated for a more dynamic expression. Services is addressed as a comprehensive definition alongside IT. Services include legal-, consumer and others whereas financial services are examined separately due to the wider population. IT includes computer software, games and other IT. The table 6 presents the median level of underpricing per industry and the amount of observations that was included to each category.

Table 6. Median underpricing across industries

Industry	# of observations	Underpricing, %
Construction	2	9.42 %
Consumer	7	3.00 %
Financial services	6	5.05 %
Industrial	3	-2.50 %
IT	6	3.54 %
Medical	5	2.46 %
Services	6	1.66 %
Other	3	0.00 %

Source: Industry further developed from Mergermarket alongside offer price; closing price (FactSet)

Table 6 emphasizes that all industries presented apart from industrial, has been exposed to underpricing. The highest underpricing was among construction with 9.42%. It is notable as only two (Lehto and Consti) observations were in the selection, it does not enable a comparable result with industries with higher amount of observations and spread.

To further evaluate the industry specific initial returns an allocation with a stronger population is necessary. The following Table 7. illustrates the industry division between traditional and non-traditional industries. This division was done on a company basis. For example, financial services represent both traditional banking (Oma Savings Bank) and crowdfunding marketplace (Fellow Finance). Further nomination of division is represented in the appendices.

Table 7. Median underpricing between traditional and untraditional industries

Industry	# of observations	Underpricing, %
Traditional	19	2.57 %
Untraditional	19	0.00 %

Source: Company description and offer price (Mergermarket); closing price (FactSet)

As an interesting finding of table 7 above, the traditional industries would have experienced underpricing of 2.57% whereas untraditional industries did not experience neither under- or overpricing during the evaluated time period.

Sponsor Backup

Lastly, underpricing is evaluated in the light of a backup of a financial sponsor. Financial sponsors may be referred to private equity (PE) firms and/or investment funds. The basic elements of a private equity include the seek to acquire companies that they can grow and/or improve with a view towards an exit (Blomberg, 2008). Exit options broadly include M&A (Mergers and Acquisitions) or an IPO. Investment funds on the other hand, typically mean funds (that include equity, bond, hedge et al.) that are marketed openly and accept investments on a continuous basis (Bank of Finland, 2018). In this paper we are referring financial sponsors to the PE's or investment funds who are selling their shares of the listing company in the IPO as secondary shares either partially or fully. In contrast primary shares are newly issued shares; a company's shares specifically made available for sale (Cambridge, 2018). Table 8 presents the median underpricing among companies that were backed up by a financial sponsor and them that were not.

Table 8. Median underpricing evaluated by sponsor backup

Type	# of observations	underpricing, %
Financial sponsor	14	3.08%
No sponsor	24	2.57%
T-test	-	0.92

Source: Financial sponsor secondary data (Mergermarket)

The results of table 8 indicate that a financial sponsor would not have a significant effect on underpricing as the median differs only by 11 basis points. The t-test further proves, yet again, that the returns between First North and main list were not different statistically. To further develop these calculations, companies that only listed to the main list were taken into consideration. The results have a contrary result. Non-sponsored IPOs resulted a median underpricing of 4.17% whereas sponsored a median of 2.81%.

2.4.2. Linear Regression Model

The following section presents underpricing in light of the three main hypotheses presented in section 2.3.. These will be quantitatively tested in a regression model and proven to either be rejected or being true.

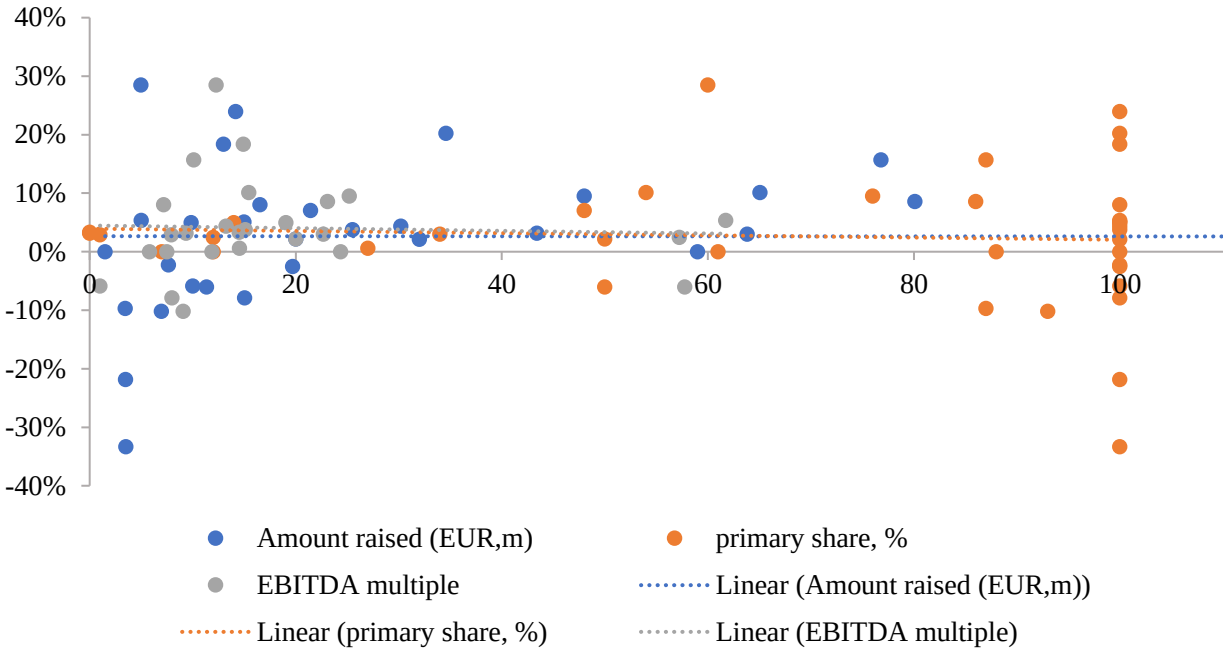

Figure 5. Linear regression analysis
Source: Numeral data (FactSet); company specific information (Mergermarket)
Note: Externalities on the x-axis was eliminated from the figure. Fully represented in the appendices.

EBITDA multiple

The aim of the first hypothesis is to test if the EBITDA multiple has a correlation with underpricing. The higher the multiple is, the more premium valued an IPO has been during valuation. The hypotheses presented in chapter 2.3.1. as follows:

$H_{o,1}$: There is no correlation with the EBITDA multiple and the initial return of the IPO
$H_{a,1}$: There is a correlation with the EBITDA multiple and the initial return of the IPO

To test the null hypotheses above, a correlation between the EBITDA multiple and underpricing was performed with a regression analysis presented in figure 5. 12 companies out of the final sample data did not have a multiple available so they were left out of the calculations as presented in table 3 sample selection criteria. Table 9 below presents the responsible coefficients.

Table 9. Coefficents, EBITDA multiple

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.04	0.03	1.75	0.09
EBITDA multiple	-0.00	0.00	-0.22	0.82

Source: data from FactSet

The variation among underpricing is explained by the EBITDA multiple with 0.2%. On other words the R square is 0,002. Table above presents the t-test, with a result of indifferent statistical returns as the p-value is above 0.05. The equation of the linear regression line for the EBITDA multiple may be rewritten as follows:

$$\boldsymbol{Y = -0.0002x + 0.0448}$$

The scatter plot illustrates that underpricing takes place in all ranges of the EBITDA valuation multiple. With a multiple within the range of 5-25, overpricing was substantially higher but harmonized by overpricing. The coefficient results and the p-value further testify $H_{o,1}$ may be assumed to be, as the EBITDA multiples correlation with underpricing is insignificant.

Offering Size

The second hypothesis aims to test if the offering size has a correlation with underpricing.

$H_{o,2}$: There is no correlation with the offering size and the initial return of the IPO

$H_{a,2}$: There is a correlation with the offering size and the initial return of the IPO

To yet test the stated hypothesis, a linear regression was conducted in figure 5. As the offering size varies drastically by listing venue, the analysis is presented separately in the appendix in figures A2.1 and A2.2. This further result that 0.3% of the main list variation in the underpricing is explained by the offering size, whereas First North IPOs had a remarkably higher variation of 6.5%. All in all, the combined variation was presented as a R square of 0.00004. The equation of the linear regression line for the offering size may be rewritten as with designated coefficients presented in table 10.

$$\boldsymbol{Y = 4E - 0.6x + 0.0265}$$

Table 10. Coefficents, offering size

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.03	0.02	1.27	0.21
Offering size	-4.01	0.00	-0.04	0.97

Source: data from FactSet

The scatter plots illustrate that both listing venues have a positive relationship. Figure A2.1 in the appendix illustrates higher initial returns on smaller main list offering sizes, whereas the relationship is weaker among the First North IPOs. The previous quantitative documentation in table 10 is a further testament that hypothesis $H_{o,1}$ is true, whereas hypothesis $H_{a,2}$ may be rejected.

Percentage of Newly Issued Shares (Primary Shares)

Lastly, the aim of the third hypothesis is to examine if the percentage of primary shares over the total amount of shares issued during an IPO has a correlation with underpricing. The hypotheses were formed in 2.3.1. as follows:

$H_{o,3}$: There is no correlation with the proportion of primary shares issued and the IPO underpricing

$H_{a,3}$: There is a correlation with the proportion of primary shares issued and the IPO underpricing

Figure 5 presents the analysis in the scatter plot. As the proportion among primary and secondary shares within an offering differs among the two listing venues, two separate regression figures were generated and are presented in the appendix. As First North IPOs are generally smaller with greater growth potential, shareowners of the company do not want to secede their shares. The figures A3.1 and A3.2 in the appendix yet are a further representation of this divergence. Table 11 below presents the joint coefficients and the rewritten equation.

$$\boldsymbol{Y = 0.0002x + 0.0393}$$

Table 11. Coefficients for the percentage of primary shares

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.04	0.04	0.99	0.33
Primary shares	-0.02	0.05	-0.37	0.71

Source: data from FactSet

The percentage of primary shares explain the changes in underpricing with 0.4% when examining the two marketplaces (R square 0.0039). The t-test again presents that the results did not differ statistically. There is no significant evidence confirming the percentage of primary shares issued influencing the level of underpricing, further proven incoefficient representation in table 11. Therefore, hypothesis $H_{o,3}$ is assumed to be true.

CONCLUSIONS

The final chapter will answer and discuss the research questions considering the empirical findings. The aim of the study was to discover if IPO underpricing occurred during the sample period in HSE and possible factors resulting in certain results. To support this finding, company specific factors affecting higher or lower returns were yet to be researched. Conclusions are presented in the same chronological manner as in section 2.5. Empirical Research Results.

IPO Underpricing

The empirical result of this study confirmed that IPOs conducted between 2013 and November 2018 in HSE experienced underpricing with a mean of 2.97%. This is substantially lower from previous studies conducted by Westerholm (2006), Hall et al. (2014) and Keloharju (Loughran et al., 2015). It is apparent that underpricing is largely dependent by timing, length of the period and the market sentiment.

Studies conducted by Westerholm (2006) and Hall et al. (2014) were done during the turn of the century when the dot-com bubble was on its peak. During this period, IPO initial returns reached astronomical levels, that could partially be explained by the pre-IPO ownership structure and insider selling behaviour (Ljungqvist, 2002). In this light, these studies are not fully comparable. Keloharju's (Loughran et al., 2015) findings on the other hand take place on a time period of 40 years. During this time the market has become more efficient and dynamic, alongside the availability of new online trading services.

Studies conducted in recent years are more in line with the underpricing findings of this study. Hesjedal (2007) conducted a study in the Norwegian equity market with a population of 41 IPOs between 2004 and 2006 with an average underpricing of 3%. Ivanauskas (2015) on the other hand studied that new issues floated in the Nasdaq OMX Baltic during 2004-2014, were underpriced on an average with 7.54%. The marginally larger initial return could be supported by the less efficient Baltic market.

Online services and resources have made it easier for investors to gain information of companies that are planning to list. This reduces the information asymmetry mentioned in theories presented by Rock (1989) and Ritter (1998) in section 1.2.1.. Marketing and its new versatile platforms have

influenced the efficient information exchange and diminished asymmetry that is named as key factors for underpricing.

As mentioned in chapter 1.3.1., IPOs are frequently priced with an IPO discount due to their characteristic of perceived riskier than their public peers. The discount is meant to perform as an incentive for investors to take part to the offering (SOW, 2018). On this note, underpricing could be plead to be resulted from the conscious decision of investment bankers.

Underpricing was further supported by several focus points. Firstly, underpricing was examined between three allocations: the listing venue, industry and the backup of a sponsor. NASDAQ OMX Helsinki (main list) experienced higher underpricing (3.05%) in comparison to First North (2.20%). When examining overpricing, four out of six companies presented in table 5 were First North companies. This indicated that First North companies were priced unsuccessfully. The higher underpricing of main list companies could be due to the expertise and conscious behaviour of investment bankers, to make the IPO more appealing to investors.

Similar conclusions could be made when examining the underpricing between traditional and untraditional industries. Traditional industries received higher underpricing (2.57%) over untraditional industries (0.00%). This may be drawn down to the comprehensive knowledge of the already familiar industries and so easier valuation and price benchmarking to peers. Next Games (underpricing of 20.25%) and BBS (overpricing of -21.82%) both were segmented to untraditional industries. Next Games was Finland's first publicly-traded game developer that lacked national peers to have a more realistic pricing (Reuters, 2017). Whereas the health technology company BBS naturally lacks significant listed peers due to the focus on a niche segment of bioactive bone-graft substitute implants (BBS, 2018).

Lastly the effect of a financial sponsor was examined. The results presented in table 8 did not differ significantly as the median underpricing varied only by 11 basis points. Therefore, no significant evidence confirms underpricing being affected by the presence of a financial sponsor. The results were expected to result in significant findings, as it was assumed that a financial advisor would have the motivation of higher returns once selling one's shares during an offering.

Linear Regression Model

When analysing IPO underpricing by the means of a linear regression model, three predictor variables were chosen: EBITDA multiple, offering size and the percentage of newly issued shares. Three hypotheses were presented in line with the predictors to further support the quantitative research. Campbell et al. (2007) present that underpricing would be significantly higher for over-valued IPOs. This is in contrary with the quantitative representation presented in table 9. One may conclude some inconsistency occurred with multiples around 15 (visible in figure 5) but is balanced out with overpricing. To conclude, there is no relationship between underpricing and the EBITDA and so hypothesis $H_{o,1}$ was assumed to be true.

The offering size conducted the lowest test results within the regression analysis. Higher initial returns were generated among smaller offering sizes. This is in line with the thoughts of Carter et al. (1998), as they state that larger IPOs are usually offered by well-known firms with better records of operating years behind. This is contributed to a reduced risk perceived by the potential investors. On this light, a larger offer price could be connected with a less risky pricing without the danger of a poorly priced IPO either concluding to extreme under-or overpricing. Figure 5 further supports these findings as offer sizes over EUR 22m did not encounter overpricing. The quantitative documentation further presents different results as there is proven to be no relationship with the offering size and underpricing. Therefore, Hypothesis $H_{o,2}$ was assumed to be true.

Lastly, the percentage of primary shares explaining the phenomenon of underpricing was presented with documentation that no influence occurred. No significant evidence raised from the quantitative justification, even though the analysis showed stronger results when analysing the offering size. It is important to consider when offering size was analysed separately by the two listing venues results yielded stronger results. The insignificancy is further supported by the figure 5, where may be perceived that no consequential differences between the percentage of primary shares is visible. Therefore, the hypothesis $H_{o,3}$ was assumed to be true.

Discussion

A weakness of this study included the limited final sample size of 38 IPOs. With a larger population results would have been more accurate and would have left less space for the of externalities. Furthermore, the sample period towards the end was exposed for a sentiment of

active listings alongside a positive economic outlook. With a longer sample period the circularity of the economy and the equity capital markets could have been better portrayed.

Even though Helsinki Stock Exchange is reaching IPO levels of the dot-com bubble, underpricing has notably decreased since then. One may debate that this is a “lesson learned”, but strong support is beheld by the more efficient market and marketing. IPOs in HSE are still modestly underpriced with a median of roughly three percent. Factors affecting a higher underpricing included listings to the main list, alongside a dominance of a traditional industry. None of the presented hypotheses were proven to have an affect on underpricing and so were further testified to being true.

APPENDICES

Table A1. Final sample data with company specific attributes

Company	UP	Listing venue	Industy	Traditional	Sponsor
Oma Savings Bank	2 %	NASDAQ OMX Helsinki	Financial services	1	0
Viafin Service	-6 %	NASDAQ OMX First North Finland	Industrial	1	0
Rush Factory	0 %	NASDAQ OMX First North Finland	Services	0	0
Fellow Finance	2 %	NASDAQ OMX First North Finland	Financial services	0	0
VMP	4 %	NASDAQ OMX First North Finland	Services	1	1
Kojamo	1 %	NASDAQ OMX Helsinki	Other	1	0
Enersense	-10 %	NASDAQ OMX First North Finland	Services	0	0
Altia	3 %	NASDAQ OMX Helsinki	Consumer	1	0
Harvia	0 %	NASDAQ OMX Helsinki	Consumer	1	1
BBS	-22 %	NASDAQ OMX First North Finland	Medical	0	0
Efecte	-6 %	NASDAQ OMX First North Finland	IT	0	0
Gofore	7 %	NASDAQ OMX First North Finland	IT	0	0
Terveystalo	2 %	NASDAQ OMX Helsinki	Medical	1	1
Rovio	0 %	NASDAQ OMX Helsinki	IT	0	1
Silmaasema	10 %	NASDAQ OMX Helsinki	Medical	1	1
Remedy	18 %	NASDAQ OMX First North Finland	IT	0	0
Kamux	5 %	NASDAQ OMX Helsinki	Consumer	1	1

Fondia	28 %	NASDAQ OMX First North Finland	Services	0	0
Next Games	20 %	NASDAQ OMX First North Finland	IT	0	0
DNA	0 %	NASDAQ OMX Helsinki	Other	1	0
Heeros	-10 %	NASDAQ OMX First North Finland	IT	0	0
Tokmanni	0 %	NASDAQ OMX Helsinki	Consumer	1	1
Lehto	16 %	NASDAQ OMX Helsinki	Construction	1	0
Consti	3 %	NASDAQ OMX Helsinki	Construction	1	1
Evli Bank	24 %	NASDAQ OMX Helsinki	Financial services	1	0
EAB	5 %	NASDAQ OMX Helsinki	Financial services	0	0
Kotipizza	4 %	NASDAQ OMX Helsinki	Consumer	1	1
FIT Biotech	-33 %	NASDAQ OMX Helsinki	Other	0	0
Talenom	-8 %	NASDAQ OMX First North Finland	Services	0	0
Pihlajalinna	9 %	NASDAQ OMX Helsinki	Medical	1	1
Robit	10 %	NASDAQ OMX Helsinki	Services	0	0
Asiakastieto	3 %	NASDAQ OMX Helsinki	Services	0	1
Detection Tech.	-3 %	NASDAQ OMX Helsinki	Industrial	0	1
UB Capital	-79 %	NASDAQ OMX First North Finland	Financial services	0	0
Nexstim	-2 %	NASDAQ OMX Helsinki	Medical	0	1
Verkkokauppa	-83 %	NASDAQ OMX First North Finland	Consumer	1	1
NoHo Partners	8 %	NASDAQ OMX Helsinki	Consumer	1	0
Taaleri	5 %	NASDAQ OMX First North Finland	Financial services	1	0

Source: Mergermarket and Factset

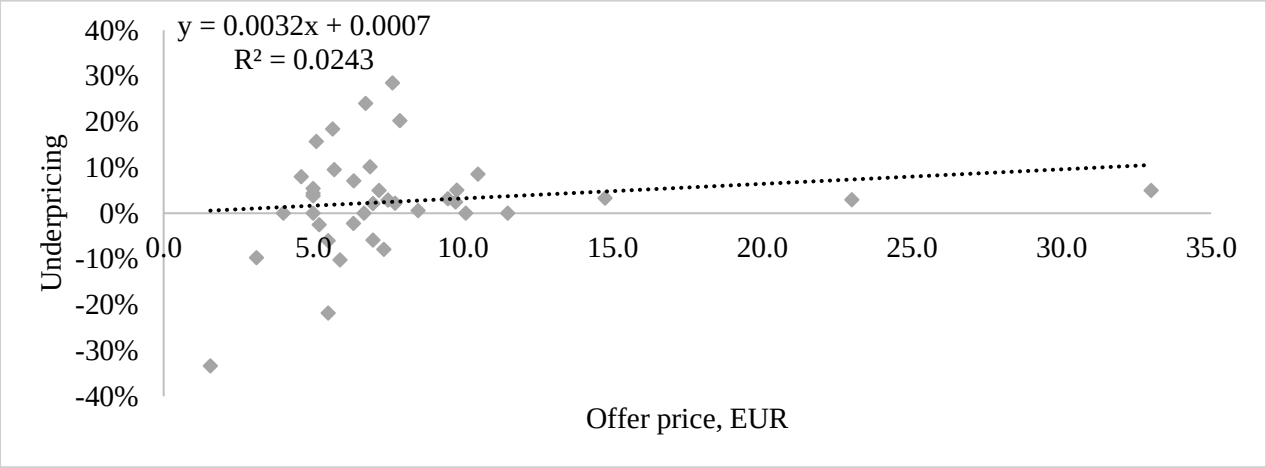

Figure A1. Scatter plot, offer price
Source: Mergermarket and Factset

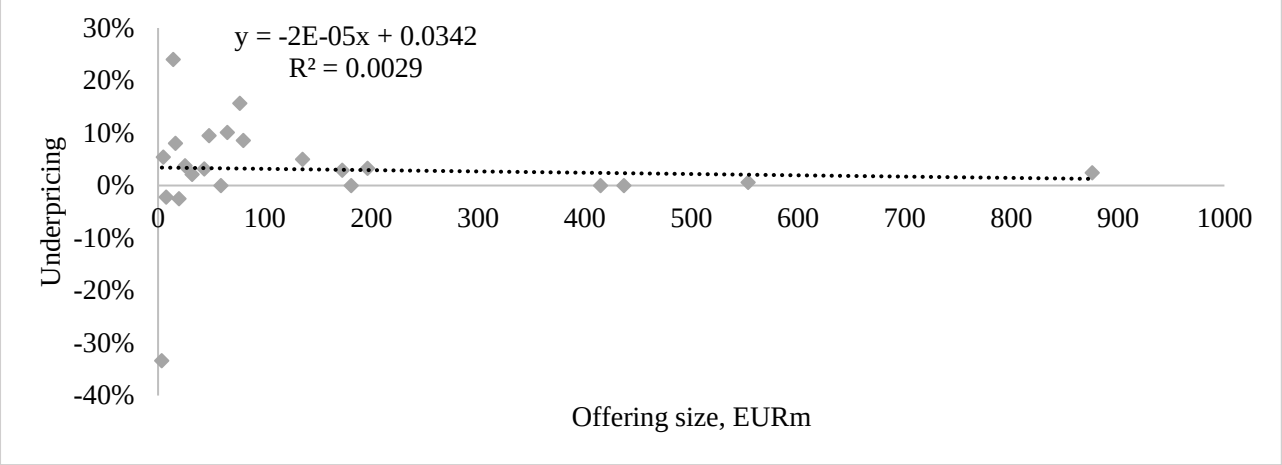

Figure A2.1. Main list scatter plot, amount raised
Source: Mergermarket and Factset

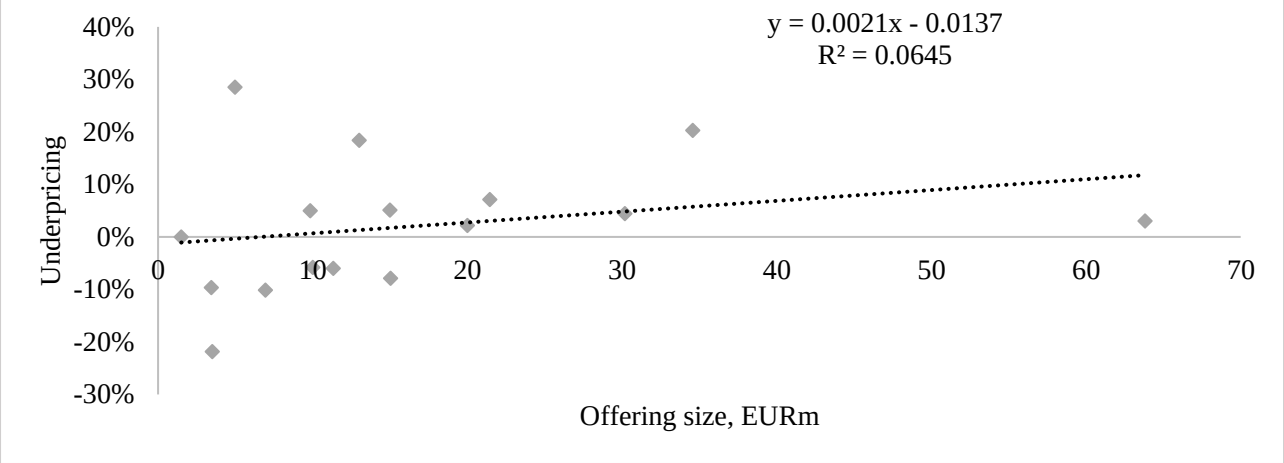

Figure A2.2. First North scatter plot, amount raised
Source: Mergermarket and Factset

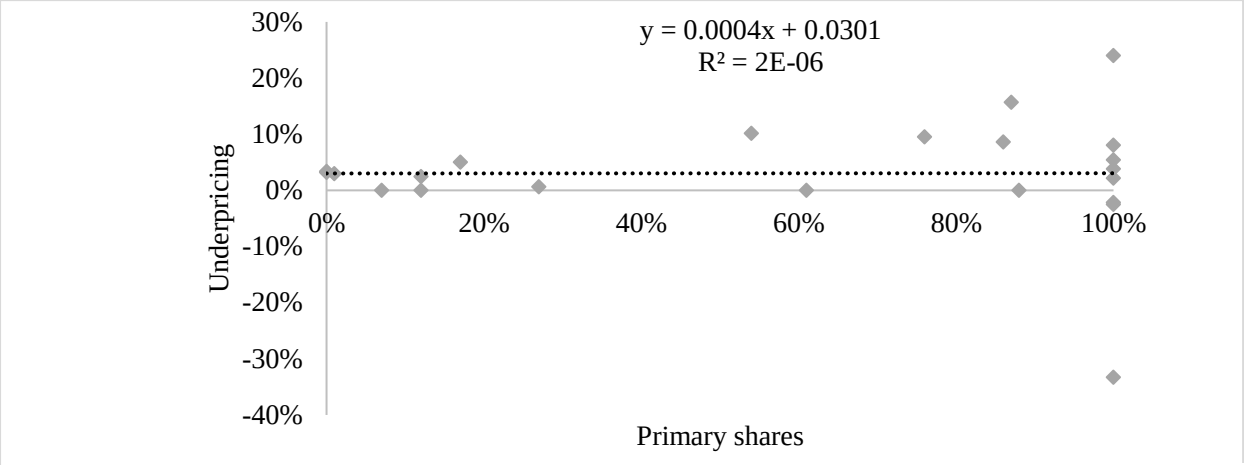

Figure A3.1. Main list scatter plot, primary shares
Source: Mergermarket and Factset

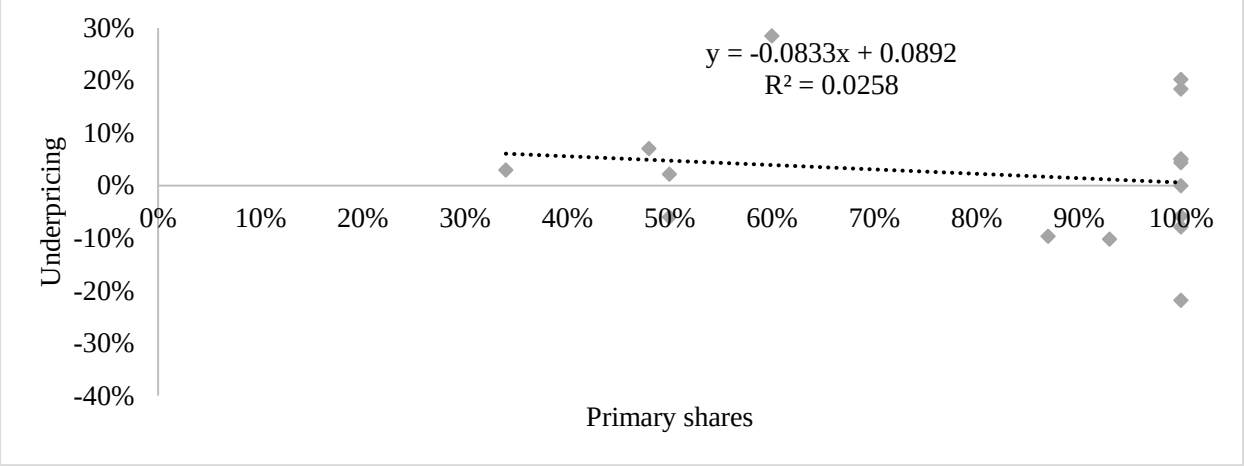

Figure A3.2. First North scatter plot, primary shares
Source: Mergermarket and Factset

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