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# **The impact of capital structure on Nordic IPO First-Day returns and Equity risk**

An empirical analysis of Nordic IPOs from 2014 to 2022

School of Accounting and Finance  
Master's thesis in Finance  
Master's Degree Program in Finance

Vaasa 2025

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**ABSTRACT:**

The objective of this thesis is to examine the relationship between capital structure, equity risk, and first-day stock returns of initial public offerings (IPOs) in the Nordic stock markets. The objective is to find which firm-specific variables influence IPO first-day returns. According to previous literature, IPO offer prices are often set too low, leading to higher returns on the first-day of trading.

The empirical data of this thesis shows that, during the period 2014–2022, first-day stock returns for companies going public in Denmark, Finland, and Sweden ranged from 1.20% to 15.01%, indicating that Nordic IPOs experience underpricing as other countries globally. The thesis focuses on IPOs in Denmark, Finland, and Sweden between 2014 and 2022 including total of 201 IPOs. The thesis uses OLS-regression analysis to investigate the relationship between first-day returns, equity risk, and financial ratios, such as book and market net gearing ratios. The regression results show that there is a negative statistically insignificant relationship between equity risk and capital structure. Conversely, previous literature finds a negative statistically significant relationship between equity risk and capital structure. Furthermore, the findings suggest that firms with higher firm-specific equity risk tend to experience more significant underpricing, resulting in higher first-day returns.

The OLS regression analysis also reveals that higher firm-specific equity risk is associated with greater underpricing, which leads to high first-day returns for riskier firms. The result of the study finds that IPO underpricing can be partially explained by firm-specific financial variables such as book net gearing ratio, market net gearing ratio, and equity risk. Interestingly, previous IPO literature have found that IPO first-day returns are explained by information asymmetry such as, agency problems, winner's curse, and investor sentiment. Moreover, the findings suggest that firm-specific variables may play a role in explaining IPO first-day returns.

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**KEYWORDS:** Initial public offering, capital structure, first-day returns, underpricing, Nordic stock markets, equity risk, corporate finance

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**VAASAN YLIOPISTO****School of Accounting and Finance**

<b>Tekijä:</b>	Akseli Syrjä		
<b>Tutkielman nimi:</b>	The impact of capital structure on Nordic IPO First-Day returns and Equity risk: An empirical analysis of Nordic IPOs from 2014 to 2022		
<b>Tutkinto:</b>	Kauppätieteiden maisteri		
<b>Oppiaine:</b>	Rahoituksen koulutusohjelma		
<b>Työn ohjaaja:</b>	Janne Äijö		
<b>Valmistumisvuosi:</b>	2025	<b>Sivumäärä:</b>	80

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**ABSTRAKTI:**

Opinnäytetyön tavoitteena on tutkia pääomarakenteen ja yrityskohtaisen osakeriskin vaikutusta sekä niiden välistä yhteyttä ensimmäisen listautumispäivän osaketuottoihin Pohjoismaisilla osakemarkkinoilla. Tarkoituksena on tunnistaa, mitkä yrityskohtaiset muuttujat vaikuttavat ensimmäisen listautumispäivän tuottoihin. Aiemman lähdekirjallisuuden perusteella, yhtiöiden listautumishinta on liian alhainen, mikä johtaa poikkeuksellisen korkeisiin ensimmäisen päivän tuottoihin. Opinnäytetyön tutkimusaineisto osoittaa, että Tanskassa, Suomessa ja Ruotsissa listautuvien yhtiöiden ensimmäisen päivän osaketuotto aikavälillä 2014–2022 vaihtelee 1.20 % - 15.01% välillä, mikä osoittaa, että listautuvat pohjoismaiset yhtiöt kohtaavat alihinnoittelua samassa suhteessa kuin muualla maailmassa.

Opinnäytetyössä tutkitaan Tanskan, Suomen ja Ruotsin pörssilistautumisia vuosilta 2014–2022 ja tutkimusaineisto sisältää yhteensä 201 pörssilistautumista. Opinnäytetyö hyödyntää tutkimuksessa OLS-regressioanalyysiä, jonka avulla voidaan selvittää ensimmäisen listautumispäivän tuoton ja yrityskohtaisen riskin sekä taloudellisten tunnuslukujen välinen suhde. Regressioanalyysin avulla selviää, että yrityskohtainen riski ja yhtiön pääomarakenne ovat negatiivisessa tilastollisesti epämerkittävässä suhteessa. Negatiivinen suhde tukee aiempaa kirjallisuutta, mutta lähdekirjallisuudessa havaittiin negatiivinen tilastollisesti merkitsevä suhde. Lisäksi tutkimuksessa selviää, että listautuvat yhtiöt, joilla on korkeampi yrityskohtainen riski, kohtaavat suurempaa alihinnoittelua listautuessaan ja etenkin listautuvan yhtiön ensimmäisen päivän osaketuotto on keskiarvotuottoa suurempaa.

OLS-regressioanalyysin avulla havaitaan lisäksi, että korkeampi yrityskohtainen osakeriski on yhteydessä korkeampaan alihinnoitteluun ja sen vuoksi korkea riskisempien yhtiöiden ensimmäisen päivän tuotot ovat poikkeuksellisen korkeita. Tutkimuksen avulla voidaan osoittaa, että listautuvan yhtiön alihinnoittelua voidaan selittää yrityskohtaisilla muuttujilla, kuten yrityskohtaisella osakeriskillä. Lisäksi tutkimus osoittaa, etteivät listautuvien yhtiöiden ensimmäisen päivän tuotot ole selitettävissä pelkästään informaatioepäsymmetriaan liittyvillä tekijöillä, vaan taloudelliset tunnusluvut selittävät myös tuottoja. Aiempien tutkimuksien mukaan informaatioepäsymmetrialla tarkoitetaan päämies - agenttiongelmia sekä sijoittajaluottamusta listautuvaa yhtiötä kohtaan.

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**AVAINSANAT:** Listautumisanti, pääomarakenne, ensimmäisen päivän tuotto, alihinnoittelu, Pohjoismaiset pääomamarkkinat, osakeriski, yritysrahoitus

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## 1 Introduction

Firms aim to maximize shareholders' value by undertaking positive net present value (NPV) investments to grow their businesses. In general, firms have two ways to fund new investments through internal financing and external financing (Acharya et al., 2013). If the company cannot make new investments using internal financing methods, it can raise external capital through an initial public offering (IPO). The IPO is the most commonly used financing method, and it is often considered as the most important event in the life of a corporation (Alti, 2006). When a firm goes public through an IPO, it issues new shares generating capital inflows that are needed for business operations, investments, and innovations. Additionally, after the IPO, firms gain better access to raise funds through the stock markets, and the costs of bank debt are typically lower for public companies (Pagano et al., 1998). Furthermore, a firm's shares receive a market-based valuation which makes them more attractive to investors and the IPO increases the firm's liquidity (Kim & Weisbach, 2008).

An initial public offering is a financing decision that directly affects a corporation's capital structure by increasing the firm's equity and cash balance. Additionally, capital structure ratios provide important information to investors when valuing a firm's stock. In general, firms with higher leverage ratios are perceived as riskier leading investors demand higher returns. As a result, underwriters apply discounts to make IPOs more attractive to investors resulting in underpricing (Roosenboom, 2012; Friewald et al., 2022).

According to previous findings, initial public offerings are, on average, underpriced globally (Chambers & Dimson, 2009; Zhang et al., 2023; Zhang & Neupane, 2024). Underpricing has been widely studied by focusing on asymmetric information explanations and macroeconomic conditions (Rock, 1986; Welch, 1992; Baker & Wurgler, 2002; Stambaugh et al., 2012). IPO valuations tend to fluctuate, and initial public offering are often underpriced, which has been widely regarded as a market anomaly. The underpricing is often described as leaving money on the table (Alti, 2006; Chang et al., 2017). Based on earlier findings, underpricing and first-day returns are strongly

associated with market conditions and asymmetric information issues. Typically, IPO activity increases when equity valuations are high in the markets.

An alternative perspective for studying IPO underpricing and first-day returns is to examine firm-specific variables that helps explain the underpricing phenomenon. Firms have different financial leverage ratios, which can influence their stock valuations. Typically, firms with higher financial leverage ratios are perceived as riskier, which increases the expected return demanded by investors (Friewald et al., 2022). According to the study by Aissia and Hellara (2019), firm-specific variables significantly affect IPO first-day returns. In particular, firms with higher equity risk or higher financial leverage have higher IPO first-day returns.

## **1.1 Background and motivation**

The initial public offering is often considered as the most important financing event in a company's life, and therefore, it is crucial to study which firm-specific financial variables influence IPO valuations by investors (Alti, 2006; Aissia & Hellara, 2019). Typically, IPOs provide high first-day returns, which means that the issuer does not get the full potential of the issuance resulting in underpricing (Ljungqvist & Wilhelm, 2003). According to previous studies from the U.S. markets (Ritter & Welch, 2002; Chambers & Dimson, 2009; Zhang & Neupane, 2024), IPOs have been underpriced on average since the 1960s. The underpricing of IPOs is well documented in the U.S. markets and therefore it is crucial to study the underpricing phenomenon in the Nordic markets, such as Finland, Sweden, and Denmark. Interestingly, initial public offerings have also been underpriced on average in the Nordic countries (Hahl et al., 2014; Zhang & Neupane, 2024).

The underpricing of IPOs is widely recognized, and it is one of the most studied phenomena in the IPO markets (Brau & Fawcett, 2006). Interestingly, previous studies have indicated that the underpricing of IPOs is caused by information asymmetry between issuers and investors (Baron, 1982; Rock, 1986; Welch, 1989; Li et al., 2019). In contrast to the previous studies, this thesis studies the first-day returns of IPOs by

focusing on firm-specific variables which provide an alternative perspective to examine the underpricing. The study by Aissia and Hellara (2019) finds that firm-specific variables, such as equity risk ratios and leverage ratios, are correlated with first-day returns in the French IPO markets, and therefore, it is crucial to study how corporations' capital structures and equity risk affects IPO first-day returns in the Nordic markets.

The capital structure reveals important information about corporations' financial performance and, therefore, investors consider firms' leverage ratios when making valuations. Furthermore, leverage ratios are correlated with equity risk premiums demanded by investors (Friewald et al., 2022). Typically, issuing firms have shorter operating history, which make it more difficult to analyze their valuation properly. Therefore, IPO stock returns fluctuate more compared to mature public firms. In addition, higher fluctuation is associated with underpricing (Kim & Ritter, 1999). Additionally, Lowry et al. (2010) found that greater volatility of IPO returns is associated with greater pricing errors and underpricing.

## **1.2 Hypotheses**

The thesis examines relationships between capital structure, equity risk, and Nordic IPO first-day returns. By examining three different empirical hypotheses, this thesis investigates the relationship between firm-specific variables and first-day returns. Principally, it is crucial to examine how firms' capital structures and equity risk are associated with first-day returns because first-day returns are typically associated with asymmetric information (Baron, 1982; Rock, 1986; Welch, 1989; Chen, 2023). Furthermore, equity returns are associated with firm-specific variables such as gearing ratios and equity risk measures. According to the study by Friewald et al. (2022), investors demand higher risk premiums from firms with higher debt ratios. Their finding suggests that firms with higher leverage ratios are perceived as riskier in the markets. Therefore, the first hypothesis is stated as:

H1: "Nordic IPO firms' leverage and equity risk have a positive relationship"

Aissia and Hellara (2019) argued that the IPO first-day returns are not only caused by asymmetric information in the stock markets, and therefore, it is important to examine the relationship between capital structure, equity risk, and first-day returns. Interestingly, Beaulieu and Mrissa Bouden (2020) find that IPOs face higher idiosyncratic risk fluctuation in the early aftermarket which affects IPO first-day returns. Their finding suggests that higher equity risk affects IPO returns and therefore, the second hypothesis is stated as:

H2: “Nordic IPOs with higher equity risk are more likely to exhibit higher underpricing on the first trading day”

The thesis examines the relationship between leverage and equity risk of Nordic IPOs, which offers important information about IPO firms’ capital structure dynamics. The study by Aissia and Hellara (2019) finds that the interactions between equity risk measures and leverage ratios are strongly and negatively associated with first-day returns. The finding suggests that the higher interaction between equity risk and leverage is associated with lower first-day returns because investors discount valuations of firms with high leverage and equity risk. Based on the study by Aissia and Hellara (2019), this thesis also examines the interaction between equity risk and leverage and the third hypothesis is stated as:

H3: “Nordic IPO first-day returns are negatively associated with the interaction between equity risk and leverage”

### **1.3 Contribution**

According to prior relevant literature, initial public offerings are underpriced on average internationally (Ritter & Welch, 2002; Chambers & Dimson, 2009; Zhang & Neupane, 2024). Additionally, prior studies have documented that IPOs are underpriced on average in Nordic countries including Denmark, Finland, and Sweden (Westerholm, 2006; Zhang & Neupane, 2024). Interestingly, Hahl et al. (2014) document differences in

underpricing between value and growth stocks in Finnish stock markets. Furthermore, according to the study, firms with higher book-to-market ratios are more underpriced compared to lower book-to-market firms.

According to prior finance literature, first-day returns are mostly caused by explanations related to asymmetric information (Rock, 1986; Welch, 1986; Chen, 2023). Aissia and Hellara (2019) argue that first-day returns are associated with leverage ratios and firm-specific variables, such as firm's profitability, asset tangibility, and size. Compared to the study by Hahl et al. (2014), the study by Aissia and Hellara (2019) examines more financial variables and firm-specific variables that are associated with first-day returns.

This thesis aims to contribute updated findings and explanations of first-day IPO returns in the Nordic IPO markets from 2014 to 2022. Previous studies related to IPO first-day returns have focused more on information asymmetric explanations (Rock, 1986; Welch, 1986; Chen, 2023). Additionally, studies from Nordic markets have documented IPO underpricing on average without focusing on corporations' capital structures or firm-specific variables (Keloharju, 1993; Westerholm, 2006; Hahl et al., 2014; Zhang & Neupane, 2024). The thesis will fill the research gap in the Nordic markets, like the study by Aissia and Hellara (2019) in French markets. Moreover, the study offers an updated data period of first-day returns from 2014 to 2022. The thesis updates prior findings by offering an alternative perspective of variables that are associated with IPO first-day returns, and how these variables affect the pricing of IPOs.

#### **1.4 Structure of the thesis**

The structure of the thesis is as follows. The second chapter presents fundamentals related to capital structure literature and core capital structure theories based on prior relevant literature. The third chapter offers fundamentals of initial public offerings, including IPO process, benefits of going public, valuation methods, and first-day returns and long-term performance. Additionally, the third chapter includes core theories related to IPO underpricing. The fourth chapter introduces the data and collecting

methods that are used in the thesis. The fifth chapter presents the methodology that is used in the empirical analysis. The sixth chapter offers findings from the empirical analysis and analysis of these findings based on prior relevant literature. Lastly, the chapter seven presents the conclusions of the thesis and discussions for future research related to first-day returns and capital structure ratios.

## **2 Capital structure**

The following chapter includes more in-depth capital structure literature analysis and review of core capital structure theories. In addition, the chapter provides the fundamental basics of firms' capital structure choices. The chapter is organized as overview of capital structure and leverage, and core capital structure theories such as, Modigliani-Miller theory, trade-off theory, asymmetric theory, and pecking order theory.

### **2.1 Definition of capital structure**

Capital structure is an important financial ratio for investors because it indicates how well a company manages to operate and create value for its shareholders. Particularly, changes in capital structure provide information for the investors (Myers, 1984). Capital structure is based on choice between internal and external financing. Internal financing and external financing each have their own risks and, therefore, firms usually use both financing methods. In principle, firms need to manage their liquidity needs for short-term and long-term. Firms can use, for example proceeds from debt issuances or operating cash-flows (Acharya et al., 2013). The decisions are also correlated to firms' growth opportunities. According to the study by Alti (2006), firms with higher growth opportunities tend to use more equity financing. Furthermore, firms with higher growth opportunities, tend to be more profitable during a longer period and according to the study by Chen et al. (2019), firms' profitability and financial leverage are correlated negatively align with the trade-off theory.

The choice between internal and external financing also affects firms' stock prices after the choice is announced (Myers, 1984). According to the study by Jensen (1986), the most leverage increasing transactions like, exchanges of debt to preferred stocks or stock repurchases, increase the firm's stock price. In contrast, according to the study by Jensen (1986), the most leverage reducing events like exchange of common stock to debt, tends to correlate negatively to stock prices. Kraus and Litzenberger (1973) noted that firms' market values are not correlated with its capital structure in complete and perfect capital

markets. The study also finds that firms face taxation and penalties in the event of bankruptcy which are market imperfections and there is not existence of complete and perfect capital markets. These imperfections are correlated positively between firms' leverage and market value.

Typically, capital structure theories have focused more on the tax advantages of debt and agency costs of debts (Modigliani & Miller, 1958; Myers, 1984; Jensen & Meckling, 1976). In contrast to earlier studies of capital structure, the study by Harris and Raviv (1990) argued that debt allows investors monitor the firm's management. According to the study, investors can obtain information related to business strategy and the quality of the firm's management by observing the amount of debt and debt payments.

### **2.1.1 Financial leverage**

Fundamentally, leverage describes the ratio of the firm's equity and debt. Lemmon et al. (2008) studied leverage ratios from 1965 to 2003. According to the study's descriptive statistics, firms with low or high leverage ratios are more likely to move more moderate ratios of leverage. Also, firms with low or high leverage ratios are more likely to maintain same leverage ratio over 20 years. According to the descriptive statistics, the adjusted R-square from a regression of leverage using firm fixed effects is 60%. This finding proves that the variation of leverage of firms is not explained by earlier determinants and the leverage of firms is time invariant. Additionally, Lemmon et al. (2008) find that the adjusted R-square range from 18% to 29% in traditional leverage regressions. Graham et al. (2015) studied leverage ratios over the last century in the U.S. markets. Their study supports the finding by Lemmon et al. (2008) that firms' leverage ratios are quite stable over time. Typically, more levered firms have same characteristics in their capital structure which are greater tax shields of debts and lower costs in the event of financial distress (Faulkender & Petersen, 2006).

Leverage is an important factor for investors and, therefore, firms' capital structure changes correlate with stock prices (Jensen, 1986). Cai and Zhang (2011) collected data

sample from the U.S. markets from 1975 to 2002 which included leverage changes in quarterly. They find that on average companies that increased their leverage more during the previous quarter, got lower abnormal returns and the change correlates negatively with stock prices. Myers (1977) published debt overhang theory which states that an increase in leverage may reduce firms' willingness to invest in positive net present value projects. According to the theory by Myers (1977), an increase in corporation's leverage ratio may lead to a reduction in a corporation's value as a result of forgoing positive NPV projects.

Faulkender and Petersen (2006) studied how the source of capital affects a firm's capital structure by comparing firms that have access to the public debt markets to those who do not have access to the public debt markets. The access to the public debt markets is defined as having a debt rating. According to the study's summary statistics, firms that use debt from the public markets have 10.5% higher debt ratio compared to firms that do not have debt rating. The statistics also proves that debt rated firms' book values and market values are 300% larger than firms without debt ratings. They also find that firms' assets differ between the debt rated and not debt rated firms. Typically, more levered firms with debt ratings have more tangible assets and they invest less on research and development (R&D). In addition, debt rated firms have lower market-to-book ratios.

Debt financing includes tax benefits which may increase firms' willingness to use external financing over internal financing. The tax benefits are related to corporations' allowance to deduct debt's interest expenses which lowers corporations' marginal tax rate (Graham, 2000). Mackiemason (1990) studied the effect of tax shields on corporations financing decisions. According to the study, the tax benefit strongly affects corporations' financing decisions. Firms with higher leverage ratio, have higher interest rate expenses which creates the tax shield by decreasing taxable income. The tax benefit requires that the firm has the marginal tax rate and, therefore, the tax shield does not work properly for nonprofitable firms. Karpavičius (2017) studied how interest rate levels affect corporates' capital structure decisions. The study's data sample was gathered from

CRSP, and it covered the period 1975 to 2014. The study finds that firms do not adjust their capital structure decisions based on interest rate levels.

## **2.2 Modigliani-Miller theorem**

Modigliani and Miller (1958) argued that the firm's leverage is uncorrelated with the firm's market value. The cost of capital is important factor related to corporate finance and return on investments. In finance literature, this has been called as the cost of capital problem. One reason for this problem is that the economists have assumed that bonds give sure streams and yielding known returns. This assumption indicates that the rate of interest on bonds is the same as the cost of capital to the owners of a firm. In addition, rationally acting firms make investments where the market interest rate is equal to yield on real assets.

According to Modigliani and Miller (1958), this assumption can be derived for two criteria of behavior related on decision-making. The first one is maximization of profits and the second one is the maximization of market value. The first criterion assumes that real or physical assets are worth to acquire if it increases firm's net profits. According to first criteria, the net profits does not increase if the expected rate of return of the asset will not exceed the rate of market interest. The second criteria permit a firm to acquire assets which increases firm's market value more than the cost of acquisition. In particular, the second criteria suggest that the asset is worth acquiring if it increases owners' equity. Interestingly, both criteria assume that the cost of capital is equal to the rate of interest on bond, even firm's funds are acquired through equity issues or debt instruments. As a conclusion from these criteria, the asset adds value only if the market interest rate is lower than the yield of the asset.

Some economists have added an uncertainty factor which is subtracted from the expected yield. After the model included uncertainty factor, profit maximization criteria lost its definition, and it has become a random variable. In addition, decisions which attempt to affect the firm's value will affect other outcomes and therefore the choice to

use debt over equity will increase return on equity only at the cost of increased risk. If a firm decides to use alternative financing decisions, it is called “utility function” for the equity owners. The utility function affects yield against other outcomes of the firm. The first criterion of maximization of profits are therefore changed from certainty model to utility maximization. The utility maximization model gives more insights than the profit maximization model because it notices other financing outcomes (Modigliani & Miller, 1958).

The study by Modigliani and Miller (1958), asserted that the firm’s capital structure is independent of its capital structure by creating two propositions. These models assume that firms are classified into specific classes where shares are perfect substitutes for each other. The model includes the following variables:  $V_i$  represents the total value of the firm,  $S_i$  is the market value of firm’s common shares,  $D_i$  is the market value of firm’s debts,  $\bar{x}_i / V_i$  represents the ratio of expected returns and  $P_k$  is the price of share in a same class. The following equations (1) and (2) proves that a firm’s value is independent of its capital structure and if these equations do not hold, there will be arbitrage opportunities.

$$V_i = (S_i + D_i) = \frac{\bar{x}_i}{p_k}, \text{ for any firm } i, \text{ in class } k \quad (1)$$

$$\frac{\bar{x}_i}{(S_i + D_i)} = \frac{\bar{x}_i}{V_i} = p_k, \text{ for any firm } j, \text{ in class } k \quad (2)$$

The following equations have limitations and, therefore, Modigliani and Miller (1958) created extensions for these models by including three different aspects. (1) profit taxes deducted by deductible interest payments, (2) recognition of different interest rate levels and bonds, (3) market imperfections that limits arbitrage opportunities.

### 2.3 Trade-off theory

The main idea of the trade-off theory is to find corporations' optimal firm-specific leverage ratio that consider the costs of debt. In particular, the model explains the tradeoff between the benefits and costs of borrowing (Ogden & Wu, 2013). DeAngelo (2022) argued that the management of the firm does not have relevant knowledge to achieve an optimal leverage ratio and, therefore, firms prioritize ensuring consistent access to financing rather than achieving an optimal leverage ratio. According to the study by Botta et al. (2022), firms acquire external funds from financial markets when it is needed for new investments aligned with the trade-off theory. Conversely, if external funds are not needed, firms do not try to access financial markets.

Kraus and Litzenberger (1973) developed an early version of the trade-off theory that included benefits of tax-exempt interests versus the present value of bankruptcy costs. The study was created as an extension of the Modigliani and Miller theorem (1958), which did not include tax benefits of debts' interests. According to the study by Kraus and Litzenberger (1973), the market value of an unlevered firm is equal to a levered firm's market value. The market value of the unlevered firm is defined in equation (3) as:

$$V(0) = \sum_{j=1}^n (1 - T_j)X_j P_j \quad (3)$$

where, the corporate tax rate is multiplied by the market value of firm's debts which is deducted by the tax rate multiplied the present value of bankruptcy costs.

The early version of the trade-off theory has been extended by considering benefits and costs. Jensen (1986) finds that agency costs of free cash flows can be reduced by using debt. According to his study, free cash flow may increase dividend payouts and stock repurchases. Free cash flow could be invested in positive net present value projects that will increase the firm's market value. The firm may also later reduce its dividend payout ratio, but it correlates negatively with firm's value. Principally, the trade-off model is

based on market-to-book ratio, which implies investment opportunities. According to the trade-off model, fluctuations in the market-to-book ratio have a persistent effect on firms' capital structure (Baker & Wurgler, 2002).

### **2.3.1 Statistic trade-off**

According to the study by Myers (1984), the statistic trade-off theory predicts that the firm sets a target debt-to-value ratio. Myers (1984) studied statistic trade-off hypothesis by adding three variables to explain the main idea of the statistic trade-off model. The observed variables were costs of adjustment, debt and taxes, and costs of financial distress. In addition, the study divided the observed firms with the same optimal debt-to-value ratio into subsamples.

The statistic trade-off theory is a widely researched concept in corporate finance. It is typically tested through empirical analyses, often involving cross-sectional regressions of leverage against various factors. The most common variables include profitability, market-to-book ratio, asset tangibility, firm size, and median industry leverage (Ogden & Wu, 2013).

According to the theory by Myers (1984), if there are not any costs of adjustments, then the statistic tradeoff model holds, and firms' debt-to-value ratios should reflect firms' optimal ratio. In reality, this hypothesis does not hold because there are costs and lags to reach the optimal ratio. Typically, firms also face different events that move them away from the optimal ratio. These events cause variations between the firms in the same subsample. If the costs of adjustments are small and firms in the subsample are close to the optimal ratio, then the variations of debt ratios should be explained by an idiosyncratic risk factor.

The tax benefits of debts are harder to observe in the statistic trade-off hypothesis because, typically, firms have different effective marginal tax rates. Myers (1984) finds that the tax benefits should be calculated by observing the difference between the

presented hypotheses, which were (1) the tax advantage of borrowing to firms facing the full statutory tax rate and (2) the tax advantage of lending to firms with large tax carryforwards. As a conclusion, firms should act with respect to the hypothesis, so the statistic trade-off model holds.

## **2.4 Agency theory**

Agency theory was first introduced in research by Jensen and Meckling (1976). They added management behavior and corporate governance to explain firms' capital structure decisions. The theory was developed to provide a deeper understanding to corporations' capital structure choices by noting an agency relationship. The agency relationship is a contract that gives other person, agent, rights to serve on behalf of another person, known principal. The agency theory by Jensen and Meckling (1976) differs from previous literature because they focus on the normative aspects of the agency relationship. According to the theory, normative aspect focuses more on the structure of the contracts between the agent and the principal. The structure of the contract includes agreement of incentives to provide that the agent makes choices that maximize the principal's welfare.

The relationship between the agent and the principal is crucial because agent's interests may differ from principal's interests. The difference of decisions between the agent and the principal may arise because they may both be utility maximizers. Usually, the agent has more information about company's financials, so the agent can make decisions that do not serve the principal. In addition, the principal can set incentives for the agent which permits that the agent acts in the best interests of the principal. These incentives cause agency costs. The agency costs can be divided into three parts that are the monitoring expenditures by the principal, the bonding expenditures by the agent and the residual loss (Meckling, 1976).

## 2.5 Pecking order theory

The pecking order theory was invented as a competitor for the static trade-off model. The first model of pecking order was introduced by Donaldson (1961). According to his study of large corporations, managers prefer internal financing over external financing even if the external financing could be more efficient option to handle financial deficits. The theory states that managers prefer not to change dividend payout policy except during significant financial distress. According to the study by Myers (1984), the pecking order theory is visible in firms' capital structure decisions and firms tend to prefer equity issuing even if they could issue investment-grade debts.

The pecking order theory (POT) relies on the hypothesis that firms tend to avoid external risks by issuing safer securities than risky ones. If the external financing is needed, firms prefer to issue the safest option of securities at first. Typically, the debt is a safer option than convertible bonds. In addition, according to the POT, firms set their target dividend payout ratios which can be referred to as "sticky". The payout ratios can be adjusted toward profitable investment opportunities. Firms can also adjust their payout ratios by building financial slack when the investment opportunities are not preferable. The financial slack allows firms to save the cash as marketable securities. The financial slack is also possible to build by issuing equity when managers' and owners' information is symmetric (Myers, 1984; Myers & Majluf, 1984).

The pecking order theory prefers internal financing because it does not include costs as much as debt. This is because managers have more information than others. The costs associated with external financing includes fixed costs and other costs that can be measured ex ante. If managers do not choose to use external financing, they may forgo positive net present value projects which correlates with firms' value. The problem with forgoing the positive NPV projects is asymmetric information between managers and other parties (Myers, 1984; Myers & Majluf, 1984).

The pecking order theory is based on financing behavior, and it is influenced by the costs associated with adverse selections (Myers, 1984). Typically, the pecking order theory works best among firms that face problems associated with adverse selection. Frank and Goyal (2003) studied the pecking order theory for the U.S. stocks from 1971 to 1998. The study finds that, typically, small high-growth firms are classified as firms with adverse selection problems. Contrary to this finding, the pecking order theory does not work for small high-growth firms due to their financing behavior. The study also finds that firms cannot rely only on internal financing to cover investment expenses on average and, therefore, firms use external financing extensively. Botta et al. (2022) finds similar findings align with the study by Frank and Goyal (2003) by testing capital structure hypotheses for publicly traded stocks covering 52 countries from 1996 to 2016. The study finds that firms act in accordance with the pecking order theory in short-run periods because firms prefer internal financing when macroeconomic conditions are preferable, but they use also external debt in short-run to cover investments expenses.

### **3 Initial public offering**

The following chapter includes the theoretical framework of initial public offerings (IPO) from the listing process to the valuations and returns. Firstly, section 3.1 provides fundamental information related to initial public offerings. Section 3.2 includes deeper analysis of benefits and advantages related on equity issuing. The third section 3.3 provides more deeper understanding of listing process including regulations and requirements. Section 3.4 includes fundamentals of IPO valuations and later sections discuss IPO returns over shorter and longer period. Additionally, section 3.6.1 focuses on Nordic IPO first-day returns.

#### **3.1 Fundamentals of initial public offerings**

Firms try to maximize their potential and shareholders' value. Therefore, they need to make financing decisions whether external or internal and, therefore, firms can go public and issue equity through stock markets, which is called an initial public offering. Firms are also motivated to go public because existing shareholders get wealthier by new shareholders and issuance increases the firm's liquidity (Kim & Weisbach, 2008).

When a firm get listed, it allows firm to get better access to financing opportunities. According to the study by Pagano et al. (1998), costs of bank debts are lower after the IPO. Especially, industries that needs lots of equity for investments are more likely to go public. Pagano et al. (1998) find that industries which needs capital for investments are more likely to go public. The argument was measured by using the market-to-book ratio which pointed that a one standard deviation increase in the book-to-market ratio increases the odds of an IPO by 25% for firms within the same industry. There are also differences by using cross-sectional analysis and, therefore, more profitable companies with higher growth opportunities are more likely to go public. In addition, the willingness to exercise IPO is also correlated with firm's size and, therefore, bigger companies are more likely to go public. Study by Kim and Weisbach (2008) find that equity issuances are mostly used for firms' investments which supports Pagano's et al. (1998) findings.

Kim and Weisbach (2008) study measured investments by using research and development (R&D) expense variable. They find that after the IPO, firms' R&D expenses increase by 18.50 cents per marginal dollar of raised equity.

Firms exercise IPOs with different motivations but typically, the biggest motivation is firms' financing needs. Dittmar and Thakor (2007) studied motivations why firms exercise IPOs relative to debt issuances and they developed a theory which predicts that firms' equity issues are impacted by manager-investor agreement. According to the theory, equity issuers have more investments need than debt issuers. Additionally, Bancel and Mittoo (2009) find that smaller firms exercise IPOs because they need additional funds for growth and larger firms consider that external monitoring to be one of the biggest motivations for IPO. Their study finds that motivations for IPO fluctuate between firms' size, ownership, and age.

### **3.2 Benefits of going public**

Going public offers firms' better access to raise funds for new projects and investments but it offers also other benefits related to their market shares. Chemmanur and He (2011), studied how IPOs affect firms' market share by comparing private firms to public firms within a same industry. According to their study, going public decision positively affects firm's market share, mostly because public firms are more visible, and they have better access to raise funds for new investments. Even private firms that have enough funds for investments, cannot compete against public firms within the same industry.

The motivation to go public is correlated with firm's productivity. Firms with higher productivity have more incentives to go public than firms with lower productivity because they need to raise funds to compete in the product markets. Higher productivity firms tend to go public even if it does not bring additional market shares. The study by Jong et al. (2012) finds that firms with higher profit margins are more likely to go public, supporting Altı's (2006) findings that firms with higher growth opportunities tend to use

more equity financing. The finding also proves that firms in more profitable industries have more incentives to go public.

Initial public offering also permits other benefits for firm. After the IPO, firm become more visible, and firm's brand becomes more popular. According to research by Demers and Lewellen (2003), firms' publicity increases abnormally when they announce initial public offering, and it causes underpricing. The publicity increases firms' attractiveness to employ skilled workers which enhance the productivity (Guo et al., 2024). In addition, after the IPO, firms get more attention by new investors and consumers which provides additional capital for new projects and investments.

Aghamolla and Thakor (2022) studied the motivation to go public when competitors go public. The study finds that if a competitor goes public within 12 months, it increases the odds by 40% that its peer firm will also go public. Initial public offering by competitor firm also offers additional information for other private firms within the same industry because they can observe how investors are attracted by a similar company. In addition, the additional information of competitor's offering may provide lower costs associated with others' IPO process. Interestingly, Henry (2023) finds that competitors' performance affects the amount of equity raised in the IPO, supporting Aghamolla's and Thakor's (2022) findings that a competitor's IPO provides additional information to other competitors. Additionally, Henry (2023) finds that an IPO within the same industry does not affect competitors' return on sales, sales growth or Tobin's q measured two years later.

### **3.3 Listing process**

The IPO process aims to transform a private company into a publicly traded entity by offering shares to the public for the first time. The IPO process is regulated, and firms need to fulfill the requirements of the process. The process varies between different countries and marketplaces. Therefore, the process is described how a company can issue equity to Nasdaq Nordic markets. At first, company must submit an application for

listing. Nasdaq has its own staff who reviews the application. After the review, the staff prepares comment letter, and the company handles these comments which may need some changes in company's listing organizations. When these changes are exercised, company gets approval for listing (Nasdaq, 2024).

The equity issuing company works together with an investment bank, which supervises and handles the initial public offering process. The role of investment bank is crucial in equity issuing process and the investment bank is typically called the underwriter. Typically, the investment bank has three important functions during the IPO process that are associated with IPO pricing. The functions are advising, distribution and underwriting (Baron, 1982). The underwriter is also the book manager during the initial public offering process. Firms are allowed to use multiple underwriters who assist the company during the IPO process.

The structure of multiple underwriters is called a syndicate. Typically, syndicates include co-managers and non-managing managers (Schultz & Corwin, 2005). Additionally, the syndicate may include lead-left investment bank whose responsibility is to underwrite the largest percentage of issued shares. Co-managers and non-managing managers are important participants during the process because they deliver the information between issuer and the book manager. According to the research by Shultz and Corwin (2005), the issuer is more likely to tell more positive information for the company's book manager. The co-managers may also find negative information of the issuer which they bring up to the book manager.

The syndicate composition affects the outcomes of IPOs because attending managers differ between activity during the IPO process. Dunbar and King (2023) studied how the syndicate structure affected the IPO outcomes in the U.S. stock markets from 2002 to 2020. The study finds that if the lead-left underwriter acts as a manager and controls the IPO process, it causes more positive first-day returns. Principally, higher first-day returns, and lead-left control are associated with larger IPOs. Conversely, first-day returns are

lower in smaller IPOs even if the lead-left underwriter controls the process. Interestingly, underwriters' incentives are associated with first-day returns because better compensated underwriters produce more information for investors. Espenlaub et al. (2024) find that better compensation decreases first-day returns because underwriters make wider research of the issuer which reduces underpricing.

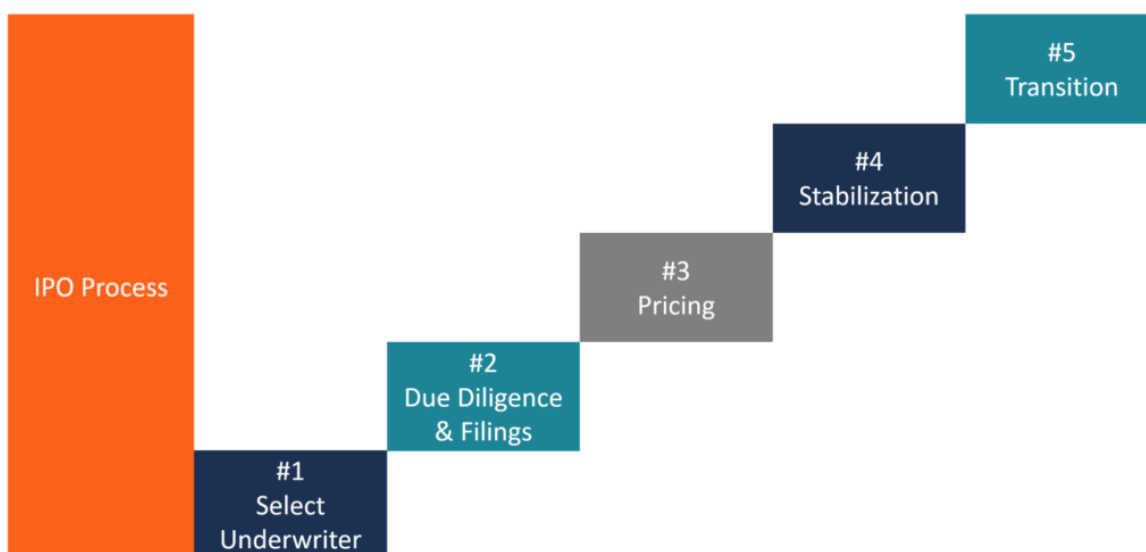
After the approval from the Nasdaq listing staff, the underwriter and the issuing firm decides the offer price per share and the amount of issued shares by agreeing the contract (Nasdaq, 2024). There are different patterns of contracts between the equity issuing company and the underwriter. Studies by Ritter (1987) and Raviv and Mandelker (1977) have researched different types of contracts and benefits of those. They have noted three different type of contracts which are the best effort contract, firm commitment contract and stand-by contract. Additionally, according to the study by Baron (1982), the issuer and investment bank can have contracts related to delegation. The choice of contract between the issuer and the investment bank is important factor related to IPO pricing. The issuer must design a contract that will serve issuer's needs related to the offering price and the distribution (Baron, 1982).

Raviv and Mandelker (1977) described that the best effort contract provides that the underwriter's main responsibility is to ensure that the issued equity is offered for new investors by their maximum effort. In addition, the company carries the risks because the underwriter does not provide to raise any fixed number of shares. According to research by Ritter (1987), the underwriter agrees the price and the maximum and minimum number of shares that must be sold. The underwriter sets up a bank account, called escrow, where interested investors can deposit their money. There are settled requirements for escrow account which provides that deposited money, which is not used for shares within 90 days, are refunded and the equity issuing firm does not receive deposited money.

The second contract option is firm commitment contract. It provides that the underwriter bears the risks, and it is therefore a safer option for equity issuing company. The underwriter purchases equity that will be issued and the issuing company receives their money back. This contract transfers risks to the underwriter because the underwriter cannot get the money back that they have used to purchase the issuer's equity (Raviv & Mandelker, 1977). According to the study by Brau and Fawcett (2006), corporate chief financial officers (CFOs) consider the firm commitment contract to be the most important agreement between the issuer and the underwriter. The third option is a stand-by contract. According to the research by Raviv and Mandelker (1977), the stand-by contract provides that the underwriter purchases all shares of the issuing company.

The investment bank and the issuer can have a contract related to delegation during the IPO process. The options for these contracts are a pure distribution and a direct sale. According to the study by Baron (1982), by using the pure distribution contract, the issuer makes the price offering of issued shares and the investment bank distributes them only. In direct sale contract, the issuer determines the offering price and offers issued shares directly to the markets without using an underwriter for the distribution.

The IPO process is not cheap to exercise for firms and the process causes expenses for the issuer. The contracts affect largely costs during the process and, therefore, the type of the contract must be reviewed carefully by the equity issuing company. The IPO process also includes other expenses, such as underwriter commissions, auditing expenses and other costs including legal and consulting costs (Ritter, 1987).



**Figure 1.** Listing process (Corporate Finance Institute, 2024)

### 3.3.1 Listing requirements

Firms face different regulations before they go public through initial public offerings. There are different requirements related to firms' size, age, revenue, equity, and accounting varying around the world. The study is focused on Nasdaq Nordic Markets, and therefore the observed requirements are by Nasdaq. According to Nasdaq Initial Listing Guide (2024), companies must fulfill all criteria related on financial liquidity requirements. Financial and liquidity requirements verify that the IPO company has enough resources to complete the IPO process.

Publicly traded European firms must follow International Financial Reporting Standards (IFRS) on their accounting by European Commission. The standards are created to harmonize accounting principles across European countries. Furthermore, the research by Jamaani et al. (2024) finds that IFRS accounting standards are required because they will decrease information asymmetry and investors' uncertainty. Additionally, the study finds that IFRS implementation results in lower IPO underpricing due to similarities with the accounting standards. Also, the study by Byard et al. (2021) finds that IFRS implementation has reduced underpricing between European countries. Interestingly, Duong et al. (2021) finds that IPO underpricing is lower in countries where requirements

are stricter. The study compares IPO first-day returns to Market Manipulation Index. The study finds that IPO first-day returns are negatively correlated with the index's returns which indicates that stricter requirements result in lower IPO underpricing.

### **3.4 Initial public offering valuations**

Typically, IPO firms are younger which makes harder to make correct valuations compared to older firms. Additionally, younger firms do not have a long operating history which causes a lack of earlier accounting data (Kim & Ritter, 1999). The valuing process has both an up-side and down-side effects because if the IPO stocks are valued too low, then the issuer does not get the full advantage of its capital raise. On the other hand, if the price is too high, investors are not willing to purchase the offered stocks (Ibbotson et al., 1994).

The previous accounting and finance literature suggest use peer comparable analyses and earlier accounting numbers to value IPOs. Principally, underwriters define a price range using benchmarks that are collected from accounting numbers and peer companies' price multiples (Chang et al., 2017). According to the study by Kim and Ritter (1999), historical accounting numbers do not give a precise value for IPOs which causes underpricing and overpricing. Hanley and Hoberg (2010) find that the levels of underpricing and overpricing decline due to greater informative content given to investors. Additionally, the study by Chen et al. (2020) finds that higher media coverage decreases the level of underpricing by 5%.

Typically, the discounted cash flow (DCF) analysis is widely used valuation model but without other models, the DCF valuations are empirically imprecise. Kim and Ritter (1999) find that the valuing process should include multiple valuation models such as price-to-earnings ratio, peer company analysis, price-to-sales, and market-to-book ratios. In addition, price-earnings (P/E) ratios measured by using comparable firms improves accuracy of IPOs' valuation.

The study by Kim and Ritter (1999) investigated the accuracy of valuation models by using earlier presented multiples, which are price-to-earnings ratio, peer company analysis, price-to-sales, and market-to-book ratios. The multiples are used to measure the enterprise value (EV), which is defined in equation (4).

$$EV = \text{Market Value of Equity} + \text{The Book Value of Debt} - \text{Cash} \quad (4)$$

The study by Kim and Ritter (1999) finds that the presented ratios give more accurate valuations than the relying only on historical accounting numbers without calculating ratios. In addition, the ratios are adjusted by comparing growth rates and profitability between the issuer and the comparable firm.

In contrast to the study by Kim and Ritter (1999), Purnanandam and Swaminathan (2004) investigated IPO valuations referred to as “fair value” by using different multiples with industry grouping. The industry grouping selection is based on Fama and French (1997) study, where companies are divided into 48 different classes. The study compared the fair value (V) to the offer price (P) by using multiples such as price-to-sales, P/E, and price-to-EBITDA (earnings before interest, taxes, depreciation, and amortization). The study finds that IPOs are typically overvalued at P, compared to peer firms. The study find that IPOs were overvalued from 14 % to 50 % in the U.S. markets. Additionally, the findings suggest that prices tend to move toward fair value in a long-run period. Interestingly, the study also shows that the most overvalued IPOs have the highest first-day returns.

According to the study by Roosenboom (2012), underwriters make valuations by using discount models such as dividend discount model (DDM) and discounted cash flow (DCF) model. The study suggests that neither of the models is accurate alone, which is why multiple valuation methods are needed in the valuation process. Additionally, the underwriter discounts the fair value to attract the investors. The level of discount is

typically based on the issuer's reputation and, therefore, more visible firms do not offer high first-day returns on average.

### 3.5 IPO underpricing

The reason why initial public offerings turn out to be successful or they fail is studied by using multiple different theories. More often initial public offerings turn out to be underpriced after the first trading day. The problem of IPO underpricing is usually referred to as, leaving money on the table (Ljungqvist & Wilhelm, 2003). The hypothesis of "leaving money on the table" is defined as the first-day price gain multiplied by the number of shares sold, as expressed in equations (5) and (6) (Loughran & Ritter, 2002).

$$\begin{aligned} & \textit{Money left on the table} && (5) \\ & = (\textit{Closing price} \\ & \quad - \textit{Initial Offer Price}) \times \textit{Number of shares sold} \end{aligned}$$

$$\textit{Underpricing} = \left( \frac{\textit{Closing price} - \textit{Initial Offer Price}}{\textit{Initial Offer Price}} \right) \times 100 \quad (6)$$

Stoll and Curley (1970) find that the prices of issued equity by small firms increased abnormally after the offering date. They compared the rate of return of issued equity to S&P 500 index. They find that the average 6-month return was 42.4% higher by investing in new issues at the offering price than by investing in portfolio of large cap S&P 500 stocks.

Chambers and Dimson (2009) studied IPO underpricing from 1917 to 2007. They divided the period into three parts that were 1917 to 1945, post-WWII 1946 to 1986 and post-Big Bang 1986 to 2007. They find that underpricing of initial public offerings was 3.8% from 1917 to 1945. During the post-WWII, underpricing averaged 9.15%. During the third period, IPOs were underpriced with an average of 19%. Usually, the initial public offerings are studied by using U.S. markets. Ritter and Welch (2002) find that the issued

shares were traded, on average, 18.8% higher than the companies' set prices in the U.S. markets from 1980 to 2001. Additionally, after three years, these shares underperformed compared to the CRSP value-weighted market index by 23.4%. According to the Ritter's IPO database (2024), the U.S. companies left money on the table total of 87.65 billion dollars from 2014 to 2022.

### **3.5.1 Asymmetric information**

The issuer uses the underwriter's services for advising, underwriting and distribution. Baron (1982) studied how the information between the issuer and the underwriter affects IPO pricing. According to Baron's (1982) study, issuer's increasing needs for the distribution effort by the underwriter is correlated with the issuer's uncertainty.

Earlier presented contract options between the issuer and the underwriter are studied by Baron (1982), who created mathematical models to explain which contract will give the best effort for the issuer depending on the issuer's situation. According to the models, the firm commitment contract is an optimal choice if the issuer and the underwriter are equally informed about the capital markets. In this situation, the issuer needs only underwriter's distribution services. If the issuer has less information than the underwriter and they agree a pure distribution contract, the underwriter may not give the best effort for distribution which causes underpricing. In principle, according to Baron's model, issuers can secure issuing process by making contracts that include incentives based on offering prices.

Asymmetric information is also associated with IPO's location because local investors are typically more informed about local initial public offerings. Additionally, investors are more attracted by firms whose headquarters are in the same location as the investors (Korniotis & Kumar, 2013). According to the study by Baschieri et al. (2021), underwriters typically underestimate IPOs where local investors express abnormal interest to participate in the IPO. Therefore, IPOs with active local investors tend to be more underpriced due to higher demand than was expected.

### 3.5.2 Winner's curse

Typically, new issues are underpriced, and it's commonly known as an anomaly. Rock (1986) created a theory which aims to explain the underpricing phenomenon of new issues. The model argues that the investment bank, called an underwriter, and the issuer do not have superior information compared to all other market participants. The informed investors may not obtain new issues which they find to be overpriced. When the informed investors do not participate in new IPO orders, the uninformed investors usually win the bids. Therefore, the underpricing is necessary for the uninformed investors by the underwriter. If new issues are not underpriced, generally, the uninformed investors could retreat from the new issue markets. Conversely, informed investors win bids of underpriced IPOs.

Keloharju (1993) studied the winner's curse hypothesis in the Finnish stock markets from 1984 to 1989. According to the study, the winner's curse was present in the Finnish stock markets because uninformed investors obtained small allocations of IPOs with positive initial returns, and larger allocations of IPOs with negative initial returns. The study finds that noting unadjusted bias for the allocation, the average initial excess returns were 8.7% and allocation-weighted returns ranged from -5.3% to 5.1%. Principally, investors who place smaller orders got bigger proportional allocations than investor with smaller orders. Interestingly, the study finds that larger orders are associated with more negative allocation-weighted returns, whereas smaller orders are correlated with more positive allocation-weighted returns. The findings suggest that smaller orders offer greater positive returns and, conversely, larger orders generate negative returns.

The winner's curse has faced some limitations that cannot be explained by this theory. According to the winner's curse theory, investors are not aware of the early investors and, therefore, uninformed investors assume that their success depends on luck. Interestingly, Welch (1992) argued that all investors should be aware of earlier investors because even uninformed investors are able to obtain information about the underwriter and how the underwriter has managed to sell the issue.

### **3.5.3 Signalling model**

Welch (1989) created a signalling model to explain the IPO underpricing phenomenon better than the winner's curse theory by Rock (1986). The model was based on assumptions that firms act rationally with all the information of the perfect capital markets. The study divided firms into low-quality firms and high-quality firms. The low-quality firms' owners must pay imitation costs to turn out to be high-quality firm so the capital markets may find low-quality firms' true quality after the IPO but before the seasoned offering (SO). The imitation costs may allow higher issue price for the firms but, on the other hand, the low-quality firms may forgo NPV positive investments by paying imitation costs to get higher issue price. The high-quality firms appear to be underpriced because of asymmetric information between the owners and the investors.

The study by Welch (1989) finds that the underpriced high-quality firms offer higher returns to investors after the IPO. In addition, underpriced firms are compensated by seasoned offerings because after the IPO, the markets have found the true quality of the firms. The explanation for the higher returns of SOs is explained by asymmetric information during the IPO. Francis et al. (2010) studied Welch's signalling hypothesis by observing foreign IPOs in the U.S. markets. The study divided firms into two sub-categories which are foreign firms and domestic firms. The separations were made because foreign firms face typically stronger information biases than the domestic firms. The study finds that the foreign firms that experience stronger underpricing are more likely to raise funds through seasoned offerings. In addition, more underpriced firms tend to raise more equity through SOs than less underpriced firms.

### **3.5.4 Market incompleteness hypothesis**

Firms that exercise an initial public offering participates into two markets that are primary markets and secondary markets. At the primary market, firms offer shares directly for the new investors without any separate marketplace. Typically, firms in primary markets have little operating history. In the secondary markets, firms' shares are

traded publicly at the stock markets between investors. Mauer and Senbet (1992) studied how the secondary markets affect the IPO pricing. According to the study, the price differential between initial price and secondary market price is mostly caused by risk premium demanded by investors. Additionally, the price differential is associated with investor accessibility to IPO primary markets. The study finds that underpricing is significantly lower when investors have higher access level to primary markets.

### **3.5.5 Bandwagon hypothesis**

Initial public offerings are typically distributed by an underwriter. Additionally, the underwriter sets the IPO offer price. Firms have typically earlier investors who have more information about the issuing company than individual market participants. Due to the extra information about the issuing firm, earlier investors have significant impact on the success of the IPO because market participants can interpret their sale actions. Typically, market participants follow earlier investors' behavior and, therefore, earlier investors' sale actions significantly affect new investors' market behavior (Welch, 1992). The earlier investors can impact on others' behavior by spreading warn signals to others which turns the IPO unsuccessfully. Conversely, they can create unlimited demand by believing in the IPO success. Welch (1992) defined these market actions as the "cascade" effect.

Welch (1992) developed a model, which was an extension to the Rock's (1986) winner's curse. According to the winner's curse hypothesis by Rock (1986), investors are not aware of earlier investors. Conversely, according to Welch's (1992) model, investors are aware about earlier investors, and they reflect their behavior to early investors' behavior.

### **3.5.6 Investor sentiment**

Investor sentiment is one of the explanations for the IPO underpricing. In principle, sentiment-driven investors cause prices to depart from the fundamental values (Stambaugh et al., 2012). Cornelli et al. (2006) studied how the investor sentiment affects IPO pre-pricing in the grey markets. The grey market was defined in the study as

follows “the when-issued market that precedes European IPOs”. The study used the grey markets because it provides information, how small investors value the issuing company before the actual IPO and shows how the underwriter considers small investors’ valuations in their book building. The study divided investors’ behavior in the grey markets to two categories which are rational or irrational. Based on these assumptions, if the investors behave rationally then the issuing price should be the same in the grey markets as the first-day aftermarket price. If the investors behave irrationally, the fundamental price differs from the first-day aftermarket price. The irrational behavior can be related to overoptimism which mean that the small investors are willing to pay more than the fundamental value is. Conversely, pessimistic behavior means that the small investors are priced out. These presented assumptions create an opportunity to observe the IPO underpricing phenomenon from information asymmetry perspective. Cornelli et al. (2006) finds that IPOs, that are highly valued by optimistic small investors in the grey markets, have on average 40.5% higher aftermarket prices than the pessimistically valued IPOs.

The investor sentiment has a powerful effect on IPO pricing and, typically, more optimistic analysts depart the value from the intrinsic value. Qian et al. (2024) find that analysts cause hype around offerings which biases the valuation and causes higher first-day trading price. Investors are more attracted to hyped IPOs which increases first-day returns. Additionally, Wu and Bu (2024) noted that more visible IPOs attract sentiment-driven investors which biases IPOs’ valuations. According to their study, more public IPOs increases investors’ optimism towards offerings and, therefore, the first day trading prices are higher and turns IPOs to be underpriced.

### **3.6 First-day returns**

Initial public offerings’ first-day return is known as an anomaly in the stock markets. The first-day returns tend to grow significantly after the issue but in long term returns are poor. According to the study by Ibbotson et al. (1994), first-day returns from 1960 to 1990 averaged from 10% to 15%. Ritter (2024) reports that the mean first-day return in

the U.S. markets is 18.9% and the mean first-day return was 7% from 1980 to 2023. During the same period Ritter (2024) reports that the aggregate amount left on the table was a total of 233.32 billion dollars.

Purnanandam and Swaminathan (2004) studied IPO pricing by using accounting measures. The study sample consisted total of 2000 IPOs from 1980 to 1997. According to the research, IPOs are overvalued systematically relative to peer firms. The study stated that overvalued issued stocks provided from 5% to 7% higher first-day returns on average relative to undervalued IPOs. In addition, overvalued IPOs provided from 20% to 30% lower long-run risk-adjusted returns.

The level of IPOs' first-day returns has varied between different market conditions. In 1996, before Dot-com bubble, first-day returns averaged 17% and the median was 10%. During the Dot-com bubble in 1999, first-day returns peaked, and returns averaged on 73% and the median was 40%. In 2000, the first-day return declined to 58% and the median was 30% (Ljungqvist & Wilhelm, 2003).

### **3.6.1 First-day returns in Nordic region**

Previous studies have shown that Nordic IPOs tend to offer high first-day returns consistent with findings from the U.S. IPO markets. The data sample of this thesis is collected from Nasdaq Nordic and, therefore, it is crucial to observe earlier findings of IPO performance in the Nordic markets. Westerholm (2006) reports that Nordic IPOs were underpriced from 1991 to 2002. Specifically, the average first-day return of Swedish IPOs was 15.9% with the median of 5.7%. The average first-day return of Finnish IPOs was 21.9% with the median of 2.6%. Lastly, the average first-day return of Danish IPOs was 8.5% with the median of 2.5%. The findings are consistent with the study by Hahl et al. (2014) who found that the average first-day return was 15.6% in Finland between 1994 and 2006. Interestingly, Hahl et al. (2014) reported lower average first-day returns compared to Westerholm (2006). The difference between these studies is mainly due to different time period and macroeconomic conditions.

Zhang and Neupane (2024) measured IPO underpricing during the period 2015-2021. The study divides the timeframe into a non-COVID period and a COVID period. During the non-COVID period, there was a total of 154 IPOs in Denmark, Finland, and Sweden. The study reports that the average underpricing during the non-COVID period was on average 4% in Finland, 8.6% in Denmark, and in Sweden 12.7%. During the COVID period there was total of 94 IPOs suggesting that IPO activity decreased significantly due to non-stable macroeconomic conditions. Interestingly, they report that the average first-day was 29.2% in Finland, 33.1% in Denmark and 22.7% in Sweden. According to the findings, IPO first-day returns are higher during non-stable macroeconomic conditions. Particularly, IPOs are offered with higher discount during non-stable period to attract investors.

### **3.7 Long-run performance**

IPOs long-run performance can be viewed as an IPO anomaly because in long-run period IPOs tend to be overpriced. Ritter (1991) studied the U.S. stock market's IPOs' long-run performance, and he finds that IPOs from 1975 to 1984 were overpriced. In addition, after 3 years listed firms underperformed relative to other firms within the same industry and size. According to Ritter's database of IPOs, from 1980 to 2022 in the U.S. stock markets there was a total of 9127 initial public offerings whose market-adjusted 3-year holding period return was total of -19.5%. The database's data of long-run performance supports Ritter's (1991) hypothesis that in long-run, IPOs tend to underperform relative to the market index. According to the study by Lin et al. (2021), market conditions explain IPOs' long run performance. Principally, IPOs which are issued during hot markets, tend to underperform during long-run. Additionally, Hahl et al. (2014) find that market-adjusted return after three years of issuance is -30 % in Finnish stock markets.

Based on earlier findings of IPOs' long-run underperformance, economists have tried to find explanations for this anomaly. Chen and Zheng (2021) studied how IPOs long-run performance correlate with idiosyncratic risk by examining idiosyncratic volatility in the

U.S. stock markets. The study divided IPO stocks into different levels based on their level of idiosyncratic volatility and they compared them to non-IPO stocks. They find that the idiosyncratic volatility is typically higher with IPO stocks than non-IPO stocks. In addition, the most volatile IPO stocks tend to underperform in a long-run. Xinmin et al. (2024) studied idiosyncratic volatility in China's stock markets from 2007 to 2018. They find that the idiosyncratic volatility significantly affects the stock performance which supports Chen's and Zheng's hypothesis that the higher idiosyncratic volatility causes IPOs long-run underperformance. Additionally, the study by Beaulieu and Mrisa Bouden (2020) finds that idiosyncratic risk is significantly related to IPOs long run performance and IPOs face higher idiosyncratic fluctuation in the aftermarkets.

### **3.8 Market timing**

The decision to exercise initial public offering means direct changes in a company's capital structure. Typically, firms' issuing decision is correlated to macroeconomic factors because firms tend to issue equity merely when the cost of equity is lower (Alti, 2006). Price fluctuations are correlated to macroeconomic conditions and therefore, firms try to issue equity when market value is high relative to book value and the situation is referred to as "hot markets". Conversely, when market value is low relative to book value, markets can be called as "cold markets". Additionally, companies try to maximize their financial benefits by timing their equity issuance. The equity market timing is crucial for firms because they can issue shares with higher prices and, conversely, repurchase shares at lower prices (Baker & Wurgler, 2002).

Baker and Wurgler (2002) studied issuers' market timing and the study noted that firms' current capital structures are correlated positively with historical market values. According to the study, after the initial public offering, corporations' book leverage drops sharply and increases over the next 10 years. During the same period, firms' market value leverage increases more than the book leverage. The study's descriptive statistics also shows that after the IPO, net debt issues rise significantly. In addition, net equity issues decrease slightly following the year of IPO.

The market timing is defined in corporate finance as follows, firms issue shares at high prices and repurchase them at low prices (Baker & Wurgler, 2002). Baker and Wurgler (2002) studied how equity market timing affects capital structure in short-run and long-run. The study finds that IPO firms with low leverage tend to raise more funds when their market valuations were high relative to high levered firms that tend to raise funds when their market valuations are low. The market valuation is measured by using the market-to-book ratio. The study's regression including leverage and the market-to-book ratio, shows negative correlation between leverage and historical market valuations. Interestingly, Kim and Weisbach (2008) find that the raised equity from IPO is typically held as cash when the firm have a higher market-to-book ratio and firms with lower valuations are more likely to spend more on investments than firms with higher valuations.

Pástor and Veronesi (2005) developed a model of optimal IPO timing which includes market condition variables, namely expected market return, expected aggregate profitability and prior uncertainty which is calculated by using post-IPO average profitability deducted by market profitability. According to the study, market conditions are the most important features related to IPO activity. During the period when market conditions are not attractive, stock prices tend to decrease which correlates as decreasing level to IPO activity. The model assumes also that IPO activity should increase when older firms' valuations and return volatilities differ from IPO valuations.

Conversely to earlier studies, Chemmanur and He (2011) studied how IPO timing affects capital structure variables. They defined IPO waves in two stages which were an earlier stage and a later stage. The earlier wave was defined as "the first 25% of firms going public in the wave". The later stage was defined as "the last 25% of firms going public in the wave". The most significant change is in the return-on-assets variable (ROA). According to their study, firms that went public on the earlier stage of IPO wave, got 2.3% higher ROA compared to firms in the later stage of the IPO wave. Chemmanur and He

(2011) noted also other financial variables that varied between the IPO wave and off the wave. They find that firms that go public during the IPO wave have on average more cash and equivalents in their balance sheet after the IPO than firms that go public off the IPO wave. The study also finds that on earlier stage of the IPO wave, firms have smaller increase in cash and equivalents balances than firms that go public in the later IPO stage.

Interestingly, Pástor et al. (2009) estimate how IPO affect firm's profitability by estimating changes in the return-on-equity (ROE) variable. The study finds that the ROE drops significantly after the IPO. On average the quarterly drop is 2.7% after one year and rises to 4.2% after three years. The post-IPO drop measured by ROE is sharper for firms that have more volatile profitability and firms whose profitability is more uncertain.

## 4 Data

The following chapter presents the process of collecting the used data sample in the final research methodology. The chapter introduces the criteria for selecting the data sample, variable definitions, and descriptive statistics of the sample. Additionally, the chapter includes more insights about findings from the used data sample.

### 4.1 Data collecting

The data in this thesis is gathered by using three different databases which are Refinitiv Eikon database (LSEG), Orbis, and Yahoo Finance. The LSEG database provides daily prices of the benchmark index which are used in estimated beta calculations. The study uses MSCI Nordic as its benchmark because it includes IPO firms from Finland, Denmark, and Sweden. The MSCI Nordic index offers the most current view of the Nordic countries' stock performance. Additionally, the index does not include Norway and, therefore, the thesis do not investigate Norwegian IPOs. Also, there have been excluded IPOs from Iceland because from 2014 to 2022 there were not enough IPOs to investigate.

The accounting data is collected from Orbis database and the daily stock prices are from Yahoo Finance. Orbis provides accounting data of sample's firms prior to the IPO. The accounting data is based on balance sheets and income statements. Additionally, Yahoo Finance provides first-day aftermarket prices. The offering prices are collected from firm-specific IPO prospectuses. The data sample includes Sweden and Denmark and, therefore, Swedish kronor and Danish kroner are converted in euros. Additionally, the accounting data is converted in euros in the Orbis data base, and the rest of the data is converted in euros manually by using daily currency prices. Totally, the sample includes 201 Danish, Finnish, and Swedish IPOs from 2014 to 2022. The thesis analyses IPOs from Nordic countries because the countries have similarities in their economics, and Finland alone does not provide enough data for the thesis. Additionally, Sweden dominates Denmark and Finland by the number of IPOs during the analyzed period.

## **4.2 Data limitations**

The data sample includes IPOs that provided all relevant information for the calculations. Therefore, there have excluded IPOs that did not provide all needed financial data. There have excluded delisted companies and special purpose acquisition companies (SPACs). Typically, listed firms are quite new and they do not have long operating history which causes a lack of earlier accounting numbers (Kim & Ritter, 1999). The data sample does not include firms whose accounting data prior to the IPO were not available to analyze for the research. Additionally, the data sample does not include companies who have faced bankruptcy.

### **4.2.1 Comparison to reference study**

The data sample and the methodology in this thesis is based on the study by Aissia and Hellara (2019). Their study also measures the relationship between IPO first-day returns and variables namely firm age, proceeds, price revision, top-tier underwriter, share overhang, and prior market 15-day return. The thesis does not use these variables to measure the relationship between IPO first-day returns and financial variables because there are not all the needed data available for proceeds, price revision, and top-tier underwriter.

## **4.3 IPO data sample**

The IPO data sample is summarized in Table 1 which includes IPOs from Denmark, Finland, and Sweden from 2014 to 2022. Table 1 shows that Sweden has dominated Denmark and Finland in the numbers of IPOs per year. Interestingly, the number of IPOs has fluctuated during the sample years by being lowest in 2014 and 2019, and highest in 2021. According to Ernst and Young (2021) IPO report, in 2021 IPO markets peaked globally and firms went public the most in the past 20 years. In the European IPO markets, the number of listed companies was highest since 2007 because IPO markets were supported by lower volatility levels.

According to Table 1, Sweden dominates the IPO markets between Nordic countries, which supports the finding by Westerholm (2006) who find that Swedish companies exercise more IPOs than Finland and Denmark. Additionally, Zhang and Neupane (2024) find that Sweden had totally more IPOs than Finland and Denmark from 2015 to 2021.

Table 1 shows that macroeconomic conditions affect directly to the IPO activity. According to earlier studies, IPO activity decreases during non-stable macroeconomic conditions when equity returns tend to be lower. Conversely, during better macroeconomic conditions, IPO activity increases and valuations are higher in the markets (Ritter, 1984; Altı, 2006). The data sample includes two different time periods which are 2014-2019 and 2020-2022. From 2014 to 2019, Finland, Denmark, and Sweden had a stable macroeconomic period and there were not any specific market shocks during that period. Therefore, IPO activity was stable and first-day returns were lower compared to the period from 2020 to 2022. According to PWC (2019) IPO report, European IPO activity was stable and from 2015 to 2019 there were not any peaks in the IPO markets.

Years 2020-2022 includes two market shocks which are COVID-19 and Russia's invasion of Ukraine. The IPO activity reflects directly how firms behave during different macroeconomic situations. In 2021, markets were raising, and IPO activity increased. When Russian attacked to Ukraine in February 2022, markets declined due to uncertainty and raising inflation which reflected to IPO markets. Additionally, interest rate levels increased which weakened equity prices. According to Ernst & Young (2022) IPO report, European IPO activity decreased total of 53% compared to year 2021. Additionally, during 2022 the market volatility was higher which increases uncertainty in the markets and, therefore, IPO activity decreased significantly.

**Table 1.** IPOs per year and country

<i>Year</i>	<i>Denmark</i>	<i>Finland</i>	<i>Sweden</i>	<i>Total IPOs</i>
2014	1	2	10	13
2015	1	4	14	19
2016	2	3	10	15
2017	1	3	22	26
2018	2	6	10	18
2019	0	3	10	13
2020	1	1	14	16
2021	1	14	45	60
2022	0	3	18	21
<b>Total IPOs</b>	<b>9</b>	<b>39</b>	<b>153</b>	<b>201</b>

Table 2 shows IPOs per year across different industries. The IPOs are sorted into different industry categories according to Fama and French 48-industry classification. The classification table also includes a category called “other industries”, which includes firms from construction, real estate, agriculture, and utilities sectors. Additionally, Aissia and Hellara (2019) also used a category called “other industries” which includes IPOs from construction and food industries.

According to Table 2, the categories called Others, Machinery, Wholesale, and Business services represents the highest classes in the used data sample. Table 2 shows that French IPO and Nordic IPO markets have similarities but there also were differences between countries. According to the study by Aissia and Hellara (2019), there were only six Business service IPOs in French IPO markets. Conversely to the Nordic IPOs, there were total of 34 Business service IPOs. Interestingly, Wholesale and Other industries are among the highest categories in both markets. Additionally, Aissia and Hellara (2019) do not report Machinery class in their study while Machinery represents the second highest class in the Nordic markets.

**Table 2.** IPO Industry classification

<i>Industry</i>	<i>Number of IPOs per Industry</i>	<i>Percentage</i>
<i>Other industries</i>	50	0,249
<i>Chemical industries</i>	16	0,080
<i>Wholesale</i>	39	0,194
<i>Computers</i>	7	0,035
<i>Communication</i>	3	0,015
<i>Business services</i>	34	0,169
<i>Machinery</i>	41	0,204
<i>Healthcare</i>	11	0,055
<b><i>Total IPOs</i></b>	<b>201</b>	

Table 3 presents the average first-day returns per year of the data sample. The summary shows, how returns are fluctuated during the period by being the lowest in 2014 and the highest in 2021. The first-day return per stock is calculated in equation (7) (Chen et al., 2022; Duong et al., 2022).

$$\text{First day return} = \left( \frac{\text{Closing price} - \text{Initial Offer Price}}{\text{Initial Offer Price}} \right) \times 100 \quad (7)$$

**Table 3.** Average first-day returns per year

<i>Year</i>	<i>Average First-day return</i>
2014	1,20 %
2015	4,32 %
2016	5,79 %
2017	5,23 %
2018	6,20 %
2019	8,98 %
2020	10,46 %
2021	15,01 %
2022	10,07 %

According to Table 3, the average first-day returns were lowest in 2014 and highest in 2021. The average first-day returns were 1.20% during 2014 and 15.01% during 2021.

The findings are aligned with Zhang and Neupane (2024), who reports that IPOs were highly underpriced during 2021, with an average of 63.7% globally. Additionally, Zhang and Neupane (2024) find that the average first-day returns were 29.2% in Finland, 33.1% in Denmark, and 22.7% in Sweden during 2021. Interestingly, they report higher average first-day returns but their findings are still aligned with the thesis by showing the highest first-day returns in 2021.

Additionally, Zhang and Neupane (2024) reports that the average first-day returns from 2015 to 2020 were 4% in Finland, 8.6% in Denmark, and 12.7% in Sweden. The results are consistent with Table 3 by showing that the first-day returns were relatively lower before COVID-19 period in the Nordic markets.

Table 3 shows that IPOs are underpriced on average depending on different market situations. Overall, the first-day returns increased from 2014 until the end of 2021. This period includes stable and non-stable market conditions caused by COVID-19. The findings are aligned with earlier studies by showing that IPO returns fluctuate due to macroeconomic conditions (Aissia & Hellara, 2019; Zhang & Neupane, 2024).

## 5 Methodology

The following chapter defines the used methodology in the thesis. The methodology is based on study by Aissia and Hellara (2019), which measures the relationship between IPO first-day returns, leverage, equity risk and firm-specific variables in French markets. The methodology chapter starts by first defining the control variables which are Size, Asset tangibility, Firm's profitability, and Tobin's Q. Additionally, there are calculated IPO firms' equity risk and corporate leverage ratios. In later part of this chapter, there are included correlations between equity risk, corporate leverage, and control variables. The chapter also represents the OLS-regression models including interaction terms.

### 5.1 Control variables

The study uses control variables which are calculated from IPO firms' accounting data. The thesis uses these control variables because they are known to directly affect firms' capital structure (Aissia & Hellara, 2019). The control variables are defined in following equations:

$$Size = \ln(\text{market capitalization of equity}) \quad (8)$$

$$Asset\ Tangibility = \frac{Net\ Property\ Plant\ and\ Equipment}{Total\ Assets} \quad (9)$$

$$Firm's\ Profitability = \frac{Operating\ Income\ before\ D\&A}{Total\ Assets} \quad (10)$$

$$Tobin's\ Q = \frac{(\text{Market Capitalization of Equity} + Long - term\ debt)}{Total\ Assets} \quad (11)$$

where, Size is a natural logarithm of the firm's market capitalization of equity. Asset tangibility is calculated by dividing net property, plant, and equipment by total assets. Profitability is measured by dividing operating income before depreciation and amortization by total assets. Tobin's Q is calculated as the firm's market capitalization of equity minus long-term debt divided by total assets. Additionally, there are included time and industry indicators as dummy variables in the regressions. The time indicator dummy variable is measured by dividing the period for two time periods which are from 2014 to 2019 and 2020 to 2022. The industry indicator dummy variable is defined by using Fama and French 48-industry classification.

## 5.2 Leverage ratios

This thesis uses two different measures of leverage which are book net gearing ratio as defined in equation (13), and market net gearing ratio as in equation (15). The market equity is calculated by multiplying the number of outstanding shares by the IPO firm's stock price at the end of first aftermarket month, as shown in equation (12).

$$\text{Market Equity} = \text{Outstanding shares} \times \text{IPO firm's stock price at the end of first aftermarket month} \quad (12)$$

$$\text{Book net gearing ratio} = \frac{(\text{Longterm debt} - \text{Cash \& Equivalents})}{\text{Book equity}} \quad (13)$$

$$\text{Market net gearing ratio} = \frac{(\text{Longterm debt} - \text{Cash \& Equivalents})}{\text{Market equity}} \quad (14)$$

### 5.3 Equity risk ratios

The equity risks are measured by using idiosyncratic volatility and estimated beta respectively to Aissia and Hellara (2019) study. At first, the idiosyncratic volatility measured by using Boyer et al. (2010) study, where the idiosyncratic volatility is defined as:

$$iv_{i,t} = \left( \frac{1}{N(t)} \sum_{d \in S(t)} \varepsilon_{i,d}^2 \right)^{\frac{1}{2}} \quad (15)$$

The idiosyncratic volatility presents firm  $i$  at time  $t$ . Let  $S(t)$  represent the collection of trading days from the first-day of aftermarket to the end of first month.  $N(t)$  denote the total number of days within this data sample,  $\varepsilon_{i,d}$  indicate the residual of the firm  $i$  on day  $d$ , obtained from regressing daily excess returns on the Fama and French (1993) three-factor model across  $S(t)$ . The Fama and French (1993) three factor model is defined as:

$$R_{i,d} = \alpha_i + \beta_{i,1}R_{m,d} + \beta_{i,2}SMB_d + \beta_{i,3}HML_d + \varepsilon_{i,d} \quad (16)$$

where,  $SMB$  is daily excess returns of small-cap company portfolio deducted by large-cap company portfolio.  $HML$  presents excess returns of portfolio with high book-to-price ratio deducted by portfolio with low book-to-price ratio. The Fama and French (1993) three factor model is calculated by using European factors as proxies for the Nordic markets and the data is obtained from Kenneth R. French data library. The European factors are converted into euros using daily closing exchange rates in the period. The idiosyncratic volatility is crucial to measure in this thesis because firms with higher idiosyncratic volatility are reported to have low average returns (Ang et al., 2006).

The estimated beta is calculated by using post IPO price data over the first month relative to CAPM market model. The equation is defined as:

$$R_{i,d} = \alpha_i + \beta_i R_{m,d} + \varepsilon_{i,d} \quad (17)$$

where  $R_{i,d}$  shows the daily excess return of the IPO firm  $i$ . In addition,  $R_{m,d}$  presents the daily excess return of the market and  $d$  presents days from the first-day aftermarket to the end of first month. In addition,  $d$  varies between IPOs.

**Table 4.** Descriptive statistics for the IPO data

<b>Variables</b>	<b>Mean</b>	<b>Std. Dev</b>	<b>Median</b>
<i>Book net gearing ratio</i>	0,519	2,165	0,051
<i>Market net gearing ratio</i>	0,130	0,405	0,005
<i>Estimated beta</i>	0,668	1,530	0,520
<i>Idiosyncratic volatility</i>	0,194	0,141	0,160
<i>Size</i>	7,356	1,105	7,231
<i>Asset tangibility</i>	0,078	0,109	0,031
<i>Firm's profitability</i>	0,057	0,211	0,065
<i>Tobin's Q</i>	0,322	0,764	0,161
<i>First-day return</i>	0,091	0,313	0,059

Table 4 presents descriptive statistics of the collected data sample including mean, standard deviation, and median of the used financial variables from 2014 to 2022. The mean of book net gearing ratio is, respectively 0.519 with a standard deviation of 2.165. The finding shows that the mean and the standard deviation of book net gearing ratio is higher with Nordic IPOs relative to French IPO markets. Aissia and Hellara (2019) report that the average of book net gearing ratio is 0.254 with standard deviation of 1.569. Interestingly, the market net gearing ratio is significantly lower averaging 0.130 relative to book net gearing ratio which displays that the market equity of IPOs is significantly higher relative to book equity.

The descriptive statistics also provide average values for idiosyncratic risk which is measured using estimated beta and idiosyncratic volatility. The mean estimated beta is 0.668 and the mean idiosyncratic volatility is 0.194. The findings provide that Nordic IPOs have lower average idiosyncratic risk values compared to the findings of Aissia and Hellara (2019), who report the mean estimated beta of 0.921 and the mean idiosyncratic volatility of 0.331. The difference between findings is due to differences between time periods. This thesis includes longer economically stable period compared to Aissia and Hellara (2019). Due to more stable economic period, equity risk is lower in Nordic IPO markets.

The descriptive statistics also show that the asset tangibility is lower in Nordic IPO firms than in French IPOs. Additionally, the profitability ratio is at a similar level by being 0.057 in Nordic IPOs and 0.056 in French IPOs. The standard deviation of profitability is significantly lower in Nordic IPOs by being 0.211 compared to French IPOs which is 1.454. The mean Tobin's Q in Nordic IPOs is 0.322 and 1.980 in French IPOs. The finding suggest that French IPO firms have higher market value relative to book value. Additionally, markets anticipate lower returns for Nordic IPOs than French IPOs.

### 5.3.1 Equity risk and leverage regression

The thesis uses following regression (18) which measures the relationship between IPO firms' leverage and equity risk. The following regression (18) is based on study by Aissia and Hellara (2019), which is defined as:

$$L_{i,t} = \alpha + \beta_1 R_{i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t} \quad (18)$$

The regression's variables are defined as follows:  $L_i$ , represents a leverage measure that includes both book and market net gearing ratios which are calculated in the first month after the IPO.  $R_i$ , represents equity risk which are calculated by measuring idiosyncratic volatility and estimated beta.  $X_i$ , represents control variables that are used in prior

corporate leverage studies (Erel et al., 2012; Leary & Roberts, 2014), measured as Tobin's q, firm's size, firm's profitability, and asset tangibility.

**Table 5.** Correlations between variables in the data sample

<i>Variable</i>	<i>VIF</i>	<i>Estimated Beta</i>	<i>Id. Vol.</i>	<i>Book</i>	<i>Market</i>	<i>Size</i>	<i>Asset Tang</i>	<i>Firm's prof</i>	<i>Tobin's Q</i>
Estimated Beta	1,063	1	0,197**	-0,114	-0,054	-0,058	0,025	0,073	-0,024
Id. Vol.	1,117	-	1	-0,087	-0,185*	-0,204**	-0,011	-0,149	-0,142
Book	1,212	-	-	1	0,219**	0,194*	0,066	0,11	0,311***
Market	1,161	-	-	-	1	0,297***	0,139	0,094	0,139
Size	1,186	-	-	-	-	1	0,168*	0,243**	0,148
Asset Tang	1,044	-	-	-	-	-	1	0,128	0,052
Firm's prof	1,078	-	-	-	-	-	-	1	0,08
Tobin's Q	1,134	-	-	-	-	-	-	-	1

Statistical significance: \*\*\* < 0,01, \*\* < 0,05, \* < 0,10

Estimated beta shows a positive correlation with idiosyncratic volatility at the 5% level. Conversely, idiosyncratic volatility is negatively correlated with market net gearing ratio and size. According to table 5, book net gearing ratio is positively correlated at statistical significance levels of 1%, 5%, and 10% with market net gearing ratio, size, and Tobin's q. Additionally, market net gearing ratio is positively correlated with to size at the 1% level. Even p-values shows strong significant correlation among these variables, presented values are not close to 1 or -1 and, therefore, there are no signals of multicollinearity.

Table 5 also shows Variance Inflation Factor (VIF) and the results indicates that the data final data sample does not have concern for multicollinearity among the independent variables. According to table 5, all VIF values are well below 5 by varying between 1.063 – 1.212. The finding indicates no signals of multicollinearity in the data sample.

Table 5 shows that both book net gearing ratio and market net gearing ratios have a negative correlation with estimated beta and idiosyncratic volatility. The findings are

aligned with the study by Aissia (2017), who reports that leverage is inversely related to the equity risk.

Table 5 shows that equity risk measures are negatively correlated to size. Interestingly, according to earlier findings, bigger firms are less risky and conversely, smaller firms are associated with higher equity risk (Aissia & Hellara, 2019; Zikri et al., 2024). According to table 5, asset tangibility shows positive correlation between estimated beta and small negative correlation between idiosyncratic volatility. According to the study by Aissia and Hellara (2019), correlations between asset tangibility, estimated beta, and idiosyncratic volatility are respectively, -0.25 and -0.33, which shows that there is significant difference between French and Nordic IPOs.

Table 5 shows that the idiosyncratic volatility is negatively correlated to firm's profitability. Additionally, the finding shows that firms with higher volatility are less profitable. Nevertheless, the correlation is quite small and, therefore, there are also needed to observe other variables. Interestingly, the estimated beta is slightly positively correlated with firm's profitability, but it is not statistically significant.

The correlation shows that equity risk measures and Tobin's Q are negatively correlated. Interestingly, the correlation between estimated beta and Tobin's Q is smaller than between idiosyncratic volatility. Additionally, Aissia and Hellara (2019) find strong positive correlation between equity risk and Tobin's Q.

### 5.3.2 Multifactor regression model

The regression measures IPO first-day returns between equity risk, leverage ratios, and control variables. The regression is defined by Aissia and Hellara (2019):

$$FDR_{i,t} = \alpha + \beta_1 L_{i,t} R_{i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t} \quad (19)$$

where  $FDR_i$  presents the first-day returns,  $L_i$  and are leverage ratios,  $R_i$  are measures of estimated beta and idiosyncratic volatility, and  $X_i$ , presents the control variables. The regression model reveals that IPO first-day returns are also based on equity risk and leverage ratios and, therefore, IPO underpricing is not explained by asymmetric information between the issuer and investors.

## 6 Results

This chapter includes results based on the thesis methodology and deeper analysis of the results. The relationship between leverage ratios and firm-specific variables are presented in section 6.1. The relationship between IPO first-day returns and firm-specific variables are presented in section 6.2 and the relationship between IPO first-day returns and interaction terms of equity risk and leverage are presented in section 6.3.

Within each section, variables are calculated by using the total period from 2014 to 2022. Furthermore, the results are interpreted based on R-squared values, the estimated coefficients of the main variables, and t-statistics. The statistical significance is based on two-tailed test using p-value associated with the statistical significance levels of 0.01, 0.05, and 0.10 respectively. The regression results are reflected to prior relevant literature focusing mainly to the main reference study by Aissia and Hellara (2019). Additionally, the results are interpreted by focusing on the three main hypothesis in this thesis.

### 6.1 Regression result of firms' leverage ratios

The left side of Table 6 shows the results of the IPO leverage regression described in equation (18). Firstly, the regression measures the relationship between IPO firms' book net gearing ratio and equity risk. The equity risk variables, namely estimated beta, and idiosyncratic volatility are not statistically significant because the t-statistic of the estimated beta is -0.967 and for idiosyncratic risk -0.397. Further, both equity risk variables have a negative impact on leverage with a coefficient of -0.097 for estimated beta and with a coefficient of -0.433 for idiosyncratic volatility. Aissia and Hellara (2019) also find that equity risk has a negative impact on IPO firms' leverage. Additionally, they find that both equity risk variables are statistically significant. The finding from Table 6 do not support the first hypothesis because both equity risks have a negative statistically insignificant relationship between book net gearing ratio and market net gearing ratio. Interestingly, both leverage measures have negative coefficients which suggest that

firms with higher leverage have lower equity risk. Further, the study by Aissia and Hellara (2019) report a negative relationship between book net gearing ratio and market net gearing ratio.

**Table 6.** Regression results of IPO firms' leverage ratios

	Book net gearing ratio Coefficient (t-statistic)	Market net gearing ratio Coefficient (t-statistic)
Intercept	-1,881 (-1,710)	-0,565 (-2,768)
<i>Equity risk measures</i>		
Estimated beta	-0,097 (-0,967)	-0,011 (-0,575)
Idiosyncratic volatility	-0,433 (-0,397)	-0,068 (-0,338)
<i>Control variables</i>		
Size	0,230 (1,590)	0,074** (2,769)
Tobin's Q	0,785*** (3,977)	0,029 (0,799)
Asset tangibility	0,032 (0,780)	-0,095 (-0,361)
Firm's profitability	-0,597 (-0,799)	-0,059 (-0,424)
Industry indicator	0,357 (0,643)	0,100 (0,999)
Time period indicator	0,443 (1,463)	0,073 (1,302)
R <sup>2</sup>	0,159	0,170
P-value	0,0026***	0,0012***

Statistical significance levels: \*\*\*p < 0,01, \*\*p < 0,05, \*p < 0,10

According to Table 6, Tobin's Q is positively related to book leverage, and it is statistically significant at the 1% level, with a coefficient of 0.785 and a t-statistic of 3.977. The finding shows that firms with higher growth opportunities tend to use more leverage, which is aligned with prior literature (Alti, 2006). Also, Aissia and Hellara (2019) find a

positive statistically significant relationship between book leverage and Tobin's Q, with a coefficient of 0.20 and a t-statistic of 6.24.

Table 6 shows that the book net gearing regression has an R-squared of 0.159 which is relatively lower than Aissia and Hellara (2019) who report an R-squared of 0.20. Further, the regression model in this thesis is statistically significant, with a p-value of 0.0026, indicating a strong statistical significance at the 1% level.

The right side of Table 6 shows the regression results of the market net gearing ratio defined in equation (18). First, the regression shows that both equity risk measures namely estimated beta, and idiosyncratic volatility, have a negative coefficient. The coefficient of the estimated beta is -0.011 and the coefficient of the idiosyncratic volatility is -0.068. Additionally, the t-statistic of the estimated beta is -0.575, which is statistically insignificant. The t-statistic of idiosyncratic volatility is -0.338 which is also statistically insignificant. These findings from Table 6 do not support the first hypothesis because both equity risk measures have a negative statistically insignificant relationship with the market net gearing ratio. Still, the findings are close to the the study by Aissia and Hellara (2019), who report a negative relationship between the market net gearing ratio and equity risk. Additionally, they report that both equity risk measures have a statistically significant relationship between market net gearing ratio. The findings suggest that firms with higher equity risk are more likely to decrease their market leverage. Still, the effect is not significant in Nordic IPO firms. Interestingly, Aissia (2017) finds that equity risk is inversely related to leverage measure in French firms.

The first control variable in the leverage regression is size. According to Table 6, size has a positive statistically significant relationship with market net gearing ratio with a coefficient of 0.074 and a t-statistic of 2.769. Interestingly, Aissia and Hellara (2019) report negative statistically significant relationship between size and market net gearing ratio suggesting that bigger Nordic firms use more financial leverage than French firms.

Interestingly, asset tangibility shows a weak negative relationship with market net gearing ratio, while the relationship is positive with the book net gearing ratio. The t-statistic of asset tangibility is -0.361 which is statistically insignificant. In contrast, Aissia and Hellara (2019) report a negative statistically insignificant relationship between asset tangibility and market net gearing ratio. The firm profitability variable has a negative relationship. The finding is similar with the book net gearing ratio suggesting that more profitable firms tend to have lower financial leverage. The results support the finding by Chen et al. (2019), who report that firm's profitability and financial leverage are negatively correlated aligned with the trade-off theory. Additionally, Aissia and Hellara (2019) also report a negative relationship with firm's profitability and gearing.

The industry indicator shows a positive but statistically insignificant relationship with the market net gearing ratio, with a coefficient of 0.100 and a t-statistic of 0.999. The finding is close to the study by Aissia and Hellara (2019) who reports positive relationship between the industry indicator and the market net gearing ratio. Additionally, they find statistically significant relationship between industry indicator and market net gearing ratio. The time period indicator also shows a positive but statistically insignificant relationship with the market net gearing ratio.

The R-squared of the market net gearing ratio is 0.170 which is slightly higher than the R-squared of the book net gearing ratio. Aissia and Hellara (2019) report that the R-squared is 0.46 in their model which is higher compared to the Nordic IPO data sample. Further, the p-value is 0.0012 indicating a strong statistical significance at the 1% level.

As a conclusion, the findings from leverage regression in Table 6 does not support the first hypothesis, showing that the leverage measures have a negative statistically insignificant relationship between the equity risk. Table 6 shows that Tobin's Q has a positive statistically significant relationship with book net gearing ratio at the 1% level. Additionally, firms' size has a positive statistically significant relationship with to the market net gearing ratio at the 5% level. Interestingly, both regressions have lower R-

squared values compared to the study by Aissia and Hellara (2019). Additionally, both regression models are statistically significant at the 1% level, suggesting that both regression models explain the relation between leverage, equity risk, and firm-specific variables.

## **6.2 Regression results of IPO first-day returns**

Table 7 provides regression results explaining IPO first-day returns and financial variables, and the regression model is defined in equation (19). The first variables are equity risks, namely estimated beta, and idiosyncratic volatility. The estimated beta has a coefficient of 0.033, a t-statistic of 2.253, and a p-value of 0.025, indicating statistical significance at the 5% level. Additionally, the idiosyncratic volatility has a coefficient of 0.266, a t-statistic of 1.700, and a p-value of 0.091, indicating statistical significance at the 10% level. The findings also support the second hypothesis because the regression results suggest that Nordic IPOs with higher equity risk are more likely to exhibit higher underpricing. Additionally, Aissia and Hellara (2019) also find that higher equity risk is associated with higher IPO underpricing.

Table 7 also includes leverage measures namely, book net gearing ratio and market net gearing ratio. The book net gearing ratio shows a coefficient of 0.002, a t-statistic of 0.230, and a p-value of 0.818, indicating not statistical significance between IPO first-day returns. The market net gearing ratio shows a coefficient of 0.051, a t-statistic of 0.892, and a p-value of 0.373. The results are aligned with Aissia and Hellara (2019) study, indicating that firms with a higher leverage ratio are associated with lower first-day returns.

**Table 7.** Regression results of IPO first-day returns

	First-day return		
	Coefficient	t-statistic	P-value
Intercept	-0,117	-0,723	0,471
<i>Equity risk measures</i>			
Estimated beta	0,033**	2,253	0,025
Idiosyncratic volatility	0,266*	1,700	0,091
<i>Leverage measures</i>			
Book net gearing ratio	0,002	0,230	0,818
Market net gearing ratio	0,051	0,892	0,373
<i>Control variables</i>			
Size	0,030	1,391	0,166
Tobin's Q	-0,002	-0,053	0,958
Asset tangibility	-0,162	-0,791	0,430
Firm's profitability	0,241**	2,241	0,030
Time period indicator	-0,109**	-2,492	0,014
R <sup>2</sup>	0,108		
P-value	0,0017***		

Statistical significance levels: \*\*\*p < 0,01, \*\*p < 0,05, \*p < 0,10

The control variables in Table 7 are namely, Size, Tobin's Q, Asset tangibility, Firm's profitability, and Time period indicator. The Size variable shows not statistical significance with a coefficient of 0.030, a t-statistic of 1.391, and a p-value of 0.166. Tobin's Q is not statistically significant in this regression with a coefficient of -0.002, a t-statistic of -0.053, and a p-value of 0.958. The firm's profitability shows a statistical significance at the 5 % level with a coefficient of 0.241, a t-statistic of 2.241 and, a p-value of 0.030. The result indicates that more profitable firms are associated with a higher first-day underpricing. Also, the Time period indicator shows a statistical significance at the 5% level with a coefficient of -0.109, a t-statistic of -2.492, and a p-value of 0.014. The findings are aligned with Aissia and Hellara (2019) who report that the first-day returns are related to the macroeconomic conditions.

Table 7 also shows R-squared of 0.108 which indicates that the presented variables explain weakly the IPO first-day returns. Also, the p-value of the regression model is 0.0017 showing a strong statistical significance at the 1% level. As a conclusion, the regression model shows that a higher equity risk is strongly related to the IPO first-day return which supports the second hypothesis in this thesis. Additionally, IPO first-day returns are positively related to profitability and macroeconomic conditions.

As a conclusion, table 7 reveals that the IPO first-day returns have positive statistically significant relationship between equity risk measures. The finding also supports the second hypothesis, and it is aligned with the study by Aissia and Hellara (2019). Additionally, leverage measures have not statistically significant relationship between IPO first-day returns. Interestingly, firm profitability and time period indicator have statistically significant relationship at the 5% level. The findings suggest that investors demand higher returns for riskier IPOs.

### **6.3 Regression results of IPO first-day returns with interaction terms**

Table 8 shows regression results of IPO first-day returns with interaction terms. Table 8 consists pooled regressions including interaction terms of leverage and equity. Additionally, Table 8 includes control variables namely, Size, Tobin's Q, Asset tangibility, Firm's profitability, Industry indicator, and Time period indicator.

Table 8 shows interaction terms between leverage and equity risk indicating negative relationship. Firstly, interaction term between estimated beta and book net gearing has a coefficient of -0.006 and a t-statistic of -0.863. The second interaction term is between estimated beta and market net gearing with a coefficient of -0.006 and a t-statistic of -0.039. Interestingly, both interaction terms including estimated beta are statistically insignificant with a same coefficient. The finding between estimated beta and gearing

ratio is similar as in the study by Aissia and Hellara (2019) but they find a negative statistically significant relation between these interaction terms.

Table 8 also shows interaction terms between idiosyncratic volatility and book net gearing ratio with a coefficient of -0.042 and a t-statistic of -0.653. Further, there is interaction terms between idiosyncratic volatility and market net gearing ratio with a coefficient of -0.014 and a t-statistic of -0.353. The results also show statistically insignificant relationship. Compared to the study by Aissia and Hellara (2019), this thesis does not find a negative statistically significant relationship between idiosyncratic volatility and gearing ratios.

Overall, the findings from Table 8 do not support the third hypothesis in this thesis because the relationships between first-day returns and interactions are negative statistically insignificant. Additionally, the negative coefficients suggest that Nordic IPO first-day returns are negatively associated between equity risk and corporate leverage while having not statistical significance level. Interestingly, Aissia and Hellara (2019) find a negative statistically significant relationship between French IPO first-day returns and interaction terms between equity risk and leverage.

Table 8 shows also control variables and the relationship between IPO first-day returns. Interestingly, none of the control variable are not statistically significant. The industry indicator and time indicator show a negative relation with all interactions between IPO first-day returns. Interestingly, Aissia and Hellara (2019) report positive relationship between industry indicator, time indicator and IPO first-day returns

Table 8 reports R-squared values of each regression. Interestingly, all regressions have similar R-squared values ranging from 0.137 to 0.140. The finding shows that each regression including interaction terms have an equal explanatory power. Interestingly, Aissia and Hellara (2019) report R-squared for same interaction terms ranging from 0.17 to 0.42, indicating higher explanatory power of their sample. Additionally, each regressions including interaction term are statistically significant at the 5% level.

**Table 8.** Regression results of IPO first-day returns and interaction terms

	First-day return Coefficient (t-statistic)	First-day return Coefficient (t-statistic)	First-day return Coefficient (t-statistic)	First-day return Coefficient (t-statistic)
<i>Equity risk * Leverage ratios</i>				
Estimated beta * book net gearing ratio	-0,006 (-0,863)			
Estimated beta * market net gearing ratio		-0,006 (-0,039)		
Idiosyncratic volatility * book net gearing ratio			-0,042 (-0,653)	
Idiosyncratic volatility * market net gearing ratio				-0,014 (-0,353)
<i>Control variables</i>				
Size	0,028 (-1,342)	0,027 (-1,278)	0,029 (-1,382)	0,027 (-1,242)
Tobin's Q	-0,005 (-0,158)	-0,006 (-0,202)	-0,002 (-0,073)	-0,005 (-0,186)
Asset tangibility	-0,153 (-0,737)	-0,192 (-0,917)	-0,159 (-0,767)	-0,170 (-0,818)
Firm's profitability	0,235 (-2,169)	0,234 (-2,153)	0,228 (-2,092)	0,237 (-2,175)
Industry indicator	-0,052 (-0,536)	-0,053 (-0,561)	-0,049 (-0,510)	-0,053 (-0,554)
Time period indicator	-0,116 (-2,646)	-0,115 (-2,615)	-0,112 (-2,523)	-0,117 (-2,645)
R <sup>2</sup>	0,140	0,140	0,138	0,137
P-value	0,0067**	0,0067**	0,0075**	0,0083**

Statistical significance levels: \*\*\*p < 0,01, \*\*p < 0,05, \*p < 0,10

As a conclusion, the findings from Table 8 do not support the third hypothesis in this thesis because the findings are negatively statistically insignificant. Additionally, the study by Aissia and Hellara (2019) finds negative statistically significant relationship between interaction terms and control variables. According to Table 8, the interaction terms between equity risk and leverage shows a weak negative relationship with IPO

first-day returns. Additionally, none of the control variables are statistically significant but the overall regression model shows statistical significance at the 5% level. In contrast, Aissia and Hellara (2019) find statistically significant control variables in their model, but their model included different control variables than in Table 8. The difference between variables is due to a lack of needed data and, therefore, there have not used variables such as proceeds, share overhang, and price revision.

## 7 Conclusion and future research

The thesis investigates the relationship between firm leverage, financial variables, equity risk, time, and Nordic IPO first-day returns. The purpose of this thesis is to investigate IPO first-day returns from alternative perspective because, typically, first-day returns are associated with asymmetric information. The underpricing of initial public offerings is well recognized anomaly in the stock markets and, therefore, it is crucial to deepen the understanding for why IPOs offer high first-day returns and issuers tend to leave money on the table. A deeper understanding of the IPO underpricing enhances issuers' knowledge about when the firm could face lower underpricing and get the full potential of the equity issuing.

Initial public offering is an important financial decision for a firm because issuing equity means that firm gets external funds, and it gets better access to borrow money with lower costs. Going public means that firm sells its equity to the public markets and receives money back from investors. Typically, equity issuing is needed for financial reasons but going public also offers other benefits such as, visibility which typically increases firm's market share (Pagano et al., 1998; Dittmar & Thakor, 2007).

The thesis investigates first-day returns of Nordic initial public offerings including Denmark, Finland, and Sweden from 2014 to 2022. The final data sample consists total of 201 Nordic initial public offerings. The methodology in the thesis is based on Aissia and Hellara (2019) study and the thesis uses OLS-regression models including interaction terms to measure the relationship between first-day returns, leverage and equity risk.

Firstly, the thesis finds that IPO underpricing is a persistent phenomenon in Nordic region because the first-day returns varied between 1.20 % and 15.01 % during 2014-2022. The findings are aligned with earlier studies who have find underpricing in the Nordic countries (Westerholm, 2006; Hahl et al., 2014; Zhang and Neupane, 2024). The thesis finds that the level of underpricing varies between different years due to macroeconomic conditions. Interestingly, the thesis finds that Nordic IPOs were

underpriced at the highest in year 2021. According to Ernst and Young (2021) IPO report, in a year 2021 European firms went public more than in earlier years since 2007.

The thesis finds that Nordic IPOs' both book and market leverage measures have a negative statistically insignificant relationship between equity risk. Additionally, the study by Aissia and Hellara (2019) also find a negative but statistically significant relationship between leverage and equity risk from French IPO markets. The findings from this thesis does not support the first hypothesis due to a lack of statistical significance.

The thesis finds a positive statistically significant relationship between equity risk and IPO first-day returns. The finding supports the second hypothesis and the study by Aissia and Hellara (2019), who also reports positive statistically significant relationship between equity risk and IPO first-day returns. The finding suggests that investors demand higher compensation for riskier IPOs aligned with prior literature (Friewald et al., 2022).

The thesis finds that IPO first-day returns have a negative statistically insignificant relationship between interaction terms of leverage and equity risk. Interestingly, without using interaction terms, both leverage measures and equity risk measures have a positive relationship between the IPO first-day returns. The findings with interaction terms does not support the third hypothesis due to a lack of statistical significance. Interestingly, the negative relationship is aligned with the study by Aissia and Hellara (2019) who reports that IPO first-day returns have a negative but statistically significant relationship with the interaction terms of leverage and equity risk.

As a conclusion, the thesis finds that IPO returns are caused by multiple variables and, especially, firm-specific variables may affect the first-day returns. This thesis offers an alternative perspective to observe IPO pricing and first-day returns because typically IPO literature have focused more on issues related to asymmetric information.

## 7.1 Practical implications

The thesis offers an alternative perspective to analyse and understand the IPO underpricing phenomenon in the markets. According to previous findings, IPOs have been underpriced globally and, therefore, it is crucial to understand the variables that will cause the underpricing (Chambers & Dimson, 2009; Zhang & Neupane, 2024). In general, high first-day returns indicate that the issuer does not get the full potential and leaves “money on the table” (Loughran & Ritter, 2002). Specifically, this thesis provides important information for issuers, underwriters, and investors.

Firstly, the issuer can recognize that the firm’s equity risk and higher leverage levels cause higher first-day returns which means that the issuer will not receive all available funds. Typically, less attractive IPOs are offered with greater discounts and this thesis finds that firms with higher leverage ratios or higher equity risk are offered with greater discounts indicating higher first-day returns for the investors (Roosenboom, 2012). Conversely, greater discounts decrease the amount of available funds from issuance. Particularly, this thesis gives important insights for the issuers who are looking to go public. The findings help with the timing of an IPO because, firms that have a high leverage can make capital structure decisions that will decrease leverage ratio which decreases first-day returns and the issuer can benefit more of the IPO. Moreover, the thesis finds that first-day returns are lower during stable macroeconomic period which supports previous literature (Aissia & Hellara, 2019).

The thesis also provides important insights for the investment bankers, underwriters, who manage the IPO process and set the offer price for investors. Typically, the underwriters use different valuation methods and multiples such as the dividend discount model and the discounted cash flow model. This thesis deepens understand that issuer’s leverage ratio and equity risk affect first-day returns and by adding these factors to the pricing process, the underwriter can set the offer price to the accurate level for the investors. Incorporating firm-specific variables into pricing process helps to reduce the excess underpricing which also benefits the issuer.

The findings from this thesis are important for investors such as individual investors and institutional investors who are looking to invest in Nordic IPOs. This thesis finds that investors can earn excess returns by investing in riskier IPOs. Moreover, higher leverage ratio indicates higher first-day returns. According to the findings from this thesis and previous literature, riskier IPOs tend to offer higher first-day returns (Aissia & Hellara, 2019) For instance, investors with higher risk tolerance who are looking short-term gains might invest in IPOs with higher equity risk and leverage ratios. Conversely, risk averse investors may avoid this kind of issuances due to the uncertainty. These insights can help investors identify types of IPOs that fits best with their investment plans and strategies.

## **7.2 Future research**

The aim of the thesis is to fill the research gap of Nordic IPOs regarding first-day returns. The thesis investigates IPOs from Denmark, Finland, and Sweden from 2014-2022 including a total of 201 IPOs. The underpricing of IPOs has existed in the markets since 1960s and therefore, this topic offers interesting and economically relevant study topics for future research. Understanding which financial and firm-specific variables affect the IPO underpricing increases a firm's and an underwriter's willingness to analyse issuer's situation deeply to reduce the level of underpricing by finding a correct level for the price offers.

This thesis offers interesting opportunities for future research related to Nordic IPO first-day returns. Firstly, the use of firm-specific variables, such as equity risk and leverage ratios, are typically not included in IPO first-day return studies and the thesis shows that firm-specific variables affect first-day returns. The thesis investigates Nordic IPOs from Denmark, Finland, and Sweden. Interestingly, Nordic IPO first-day returns are not studied widely and in future research there could be also added Norway into the data sample because it would increase the size of the data sample and offer better findings of IPO first-day returns. Additionally, Norway offers an interesting view to analyse IPO first-day returns due to the lack of earlier studies from Norway IPO markets.

Secondly, the thesis uses the OLS-regression model to measure the relationship between IPO first-day returns and firm-specific financial variables. In future research, there would also use an event study methodology to measure how equity risk and leverage affect to stock performance in the months following the IPO. The study by Ritter (1991) used the event study methodology to measure long-term performance of IPOs. The event study methodology would measure short-term IPO performance and capture market reactions more precisely. Therefore, by using event study methodology and OLS-regression, the future study could capture more precisely the relationship between IPO first-day returns and firm-specific variables.

Thirdly, the data period has two periods including stable macroeconomic time and period of COVID-19 and Russia's invasion of Ukraine. In future research, it would offer interesting view to measure the impact of Russia's invasion of Ukraine to IPO first-day returns, equity risk and leverage from 2022 to 2025. Interestingly, Zhang and Neupane (2024) used similar method to capture COVID-19 affect to IPO first-day returns globally. According to PWC (2022) IPO report, IPO activity decreased in 2022 due to raisin inflation, higher interest rate levels, and market uncertainty. Future research would offer interesting results about how Nordic IPO markets behaved after year 2022 because Russia was important market participant for Nordic companies before the invasion of Ukraine. Moreover, the future research would also measure how higher interest rate levels affect to IPO firms' leverage, equity risk, and first-day returns.

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