INTERRELATION BETWEEN IPO RETURNS AND MARKET CYCLES: THE FINNISH EVIDENCE

ABSTRACT

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Interrelation between IPO returns and market cycles: the Finnish evidence

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Over the sample period from 1999 to 2019, the thesis examines both short- and long-term returns of Finnish companies that have entered into the stock market via initial public offering (IPO). The focus is on the interrelation between the return accumulation and IPO market cycles, defined as the number of IPOs per year. Earlier literature states that during hot IPO markets, the first-day return of just listed stocks are on average significantly higher than the comparable market return. Previous studies have also documented that long-term returns of IPO companies lag behind the stock market average. The thesis examines both of these IPO anomalies and also analyses whether they are interrelated.

The results show that during hot IPO markets, the average first-day return of IPO companies significantly exceeds the comparable market return. The average return of hot market IPOs is also significantly higher than the comparable market return during the three-year period following the first trading day. However, the median return for the similarly-defined three-year holding period is negative, implying that the majority of IPO companies underperform against the market return in the long term. Cold market IPOs underperform against the market in terms of both 3-year average and median returns. The first trading day's return is also indicative of the medium-term return, as underpriced hot market IPOs exceed the market return in the medium term.

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Tämän tutkielman tarkoituksena on analysoida vuosina 1999–2019 listautuneiden suomalaisyritysten osaketuottoja sekä lyhyellä että pitkällä aikavälillä huomioiden IPO-markkinasykli, joka määritellään listautumisantien vuosittaisten lukumäärien perusteella. Aiemman kirjallisuuden mukaan kuumassa listautumismarkkinassa IPO-yhtiöiden osakkeiden ensimmäisen kaupankäyntipäivän keskiarvotuotto ylittää tilastollisesti merkitsevästi vastaavan markkinatuoton. On myös todettu, että listautuneiden yhtiöiden osakkeet tuottavat pitkällä aikavälillä vähemmän kuin osakemarkkinat keskimäärin. Tämä tutkielma tarkastelee näitä molempia IPO-anomalioita analysoiden myös niiden keskinäistä riippuvuutta.

Tutkimuksen tulokset osoittavat, että kuumassa markkinassa listattujen osakkeiden ensimmäisen kaupankäyntipäivän tuotto ylittää tilastollisesti merkitsevästi vastaavan markkinatuoton. Myös listautumispäivää seuraavan 3-vuotisperiodin aikana tällaiset osakkeet ovat tuottaneet tilastollisesti merkitsevästi markkinaportfoliota enemmän. Niiden mediaanituotto on kuitenkin ollut samalla tavoin määritellyllä 3-vuotisperiodilla selvästi negatiivinen, joten enemmistö IPO-osakkeista on pitkällä aikavälillä alisuoriutunut suhteessa markkinatuottoon. Kylmässä markkinassa listautuneet yhtiöt ovat hävinneet markkinaportfoliolle sekä keskiarvo- että mediaanituottovertailussa. Ensimmäisen kaupankäyntipäivän tuotot ennakoivat myös suuntaa antavasti keskipitkän aikavälin tuottoja, sillä kuumassa IPO-markkinassa listatut alihinnoitellut osakkeet tuottavat osakemarkkinoita paremmin myös keskipitkällä aikavälillä.

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1. Introduction

The 2020s has been an extreme decade so far, mainly because of Covid-19, global economic recession, quantitative easing, inflation, and Russian invasion of Ukraine to name only a few. As the real economy and financial markets are not the same, financial markets represent the real economy. Thus, there has been serious volatility in the financial markets in twenty-twenties, as maximum fear of missing out usually reverses to maximum fear.

Investors sometimes fantasize about the "normal" times, when there are not any negative shocks in the markets, and the blue-sky scenarios come to life. As in real life, people tend to go back to the past when everything was normal, when pandemics did not restrict us or when there was no war in Europe. The misfortune is that as real life can never be described as normal, there is no time in the financial markets when there are no negative events. As Peter Lynch said in 1997, "there is always something to worry about".

Year 2021 was the record year for Finnish stock market, as 29 companies went public. It may be coincidence, but the record year happened right after the central banks had boosted the economies with excess liquidity. Previous studies have concluded that hot IPO markets, referred by the volume of initial public offerings, are related to the state of the economy. As the economy is in upturn, companies can utilize the excess liquidity by going public. Strong positive returns in 2020 may have agitated the IPO mania around the globe. This thesis studies, does it matter if companies go public during hot or cold market conditions, and what is the long-run performance for these companies. Multiple studies have shown that in the long term companies which have gone public have underperformed significantly against the market. When the long-term returns and IPO market cycles are studied together in the Finnish stock exchange, this thesis will yield some new results to investors.

1.1. Purpose and objective of the thesis

In this thesis, IPOs from 1999 to 2019 are included. This timespan excludes, for example, the most vivid IPO year in Finland, as 29 new companies went public. The Covid-19 pandemic, which has been very interesting in how it has driven the market to all-time highs, after a market crash followed by governments going on a spending spree, central banks implementing quantitative easing, and interest rates reaching all-time lows, is neither included in this sample period. To name a few, all of these factors have created a market, where opportunism blooms. History does not repeat itself, but it often rhymes.

1.2. Research questions and methodology

The object of this research is to examine the long-term returns of Finnish IPOs, and how they are affected by IPO cycles. Numerous studies have been conducted on how IPOs perform on the first trading day, but fewer have been conducted over longer time frames. According to the vast majority of literature, IPOs are underpriced in the short term but overpriced in the long term. While some individual investors prefer to seek for fast buck from the aftermarkets of potentially underpriced IPOs, most investors prefer to buy and hold equities.

There are numerous reasons why companies go public. Some of them include raising capital, obtaining funding from the markets, or having the option to use its own stock as a method of payment in the future. When company goes public, it becomes publicly traded and owned entity through initial public offering. Both the number of shares a corporation issue and the price per share are determined. The IPO is said to be underpriced if there is more demand for the shares at the issued price than there are shares issued, whereas the opposite is true if supply exceeds demand. Typically, during an economic boom, there is a lot of excess money in the market, and if the interest rates are low, majority of the excess money flows to equities. Thus, there is high opportunism in the markets, which the companies going public are attempting to take advantage of.

In the IPO markets, there are cycles that can be categorized as hot or cold. These cycles are frequently characterised by the quantity of their offerings. Another presumption is that during hot IPO markets, the IPOs are underpriced, meaning high first trading day returns to the investor. During hot IPO cycles there are also more individual investors, trying to utilize the underpricing of offerings. This is a component of behavioural finance since the behaviour of investors creates a self-feeding loop. If the assumptions regarding hot IPO markets are true, then in the cold IPO markets the offerings should be priced closer to the closing price of the first trading day.

The paper has three research hypotheses. The hypotheses are:

H_1: There is no difference in initial IPO returns during hot and cold markets

H_2: In the long term, IPO returns do not differ based on the market they went public

H_3: Initial IPO returns are not related to long-term returns

The first hypothesis is looking for answer, whether it matters, if the company goes public during a hot or cold IPO cycle. When companies go public during cold IPO cycle, there may be less enthusiasm towards the offering, which probably softens the spike of share price in the first trading day. There should also be higher returns on companies in the long term, when investing in IPOs during the cold markets. Based on the theories and previous studies, it can be expected that the returns during different market cycles are not the same. The first research question only focuses on the first day's initial returns of IPOs. Initial returns are significant for the future, long-term returns, as it sets the market value for the company after the listing, therefore also affecting the upcoming returns.

The second hypothesis is based on the results of previous studies. IPOs are compared monthly to their benchmark index, OMX Helsinki Cap Price Index (OMXHCAPPI) in the three-year span. The benchmark represents the Finnish stock exchange for diversifying investor, with a maximum weight of 10% for one company. As in the first hypothesis, this

hypothesis is also based on previous studies, which suggest that investors should not invest in companies gone public recently, as they have historically underperformed against the stock market.

The third hypothesis merges together the first and second hypotheses. It can be assumed, that if it matters whether companies go public during hot or cold years, it also does matter in the long term. According to the former studies, it is expected that the buy-and-hold strategy will underperform against the market and the IPOs are expected to be overpriced. When comparing the hot and cold IPO markets, better long-term returns are expected when the companies go public during the cold markets, as there would be less optimism during the IPO, and the companies may be of better quality. The companies gone public during the hot markets are expected to generate lower long-term returns, as there would be much enthusiasm towards investing during the listing, high volume of IPOs, and room for opportunism, which would drive companies with not so good fundamentals or even positive profits for cheap financing. In the short term, company being nonprofitable is not a disaster, but in the long term the returns for investors are abysmal if only holy spirit and coverless promises drive the investors' expected returns.

1.3. Structure of the thesis

This thesis is structured as follows. After the introduction, this thesis is divided into the theoretical background, data and methodology, results, and finally, conclusion sections. The study begins by introducing the theoretical background of factors relevant to the returns from IPO investing. The theoretical foundation contains in-depth explanations of why companies go public, why long-term returns of IPO companies typically lag behind the market, what are the known IPO anomalies, and what IPO cycles are.

The empirical aspect of the thesis is covered in data and methodology, results, and conclusions. The data and methodology section introduces the analysis method along with

description on data gathering. Conclusions provide a summary of the main findings, as well as suggestions for further research on the topic.

2. Theoretical background

This section discusses relevant academic literature on IPOs. It is important to first comprehend why companies wish to go public because this is likely the most significant choice they will make throughout their existence. The IPO procedure is then walked through. Third, I proceed to academic literature about initial public offerings' underpricing and the theories underlying the mispricing. Finally, the market cycles for IPOs and the reasons behind differences in IPO volumes are explored.

2.1. Why companies go public

Although a company may seek to go public for a variety of reasons, the main drivers are financial, liquidity, publicity, and risk diversification considerations. The advantages of being a public company are company specific, so it is important to consider other factors of going public as well. For example, publicly listed company has obligations to report to shareholders and authorities, which increases the transparency of the company to the public. (SEC, 2022)

An efficient capital market which provides a variety of options to meet financial needs, includes an efficient equity market. The largest equity issue the companies typically undertake is the initial public offering. The IPO offers various advantages to company's shareholders, including diversification, the opportunity for equity financing beyond the initial entrepreneur's limited wealth, enhanced share liquidity, more affordable access to the capital markets, and external oversight. Going public allows the initial owners to reap the benefits of their labour, which can be maximized through initial public offering. (Zingales 1995, 425-426)

Companies have the option to use equity financing to finance their operations thanks to the stock market. Comparatively speaking, equity financing for publicly traded companies is

much simpler than for private companies. Since it is simpler and less expensive for investors and corporations to connect, public companies have better liquidity via the stock market, which is reflected in a reduced cost of equity and capital. By going public the economic transparency increments the trustworthiness of a company, and along with more strict public reporting requirements the cost of debt may also decrease. (Pörssisäätiö 2016, 5-6.)

The listing can be implemented by the issue of stocks, sale of stocks or a combination of the two. If the company does not need to raise capital, the listing can be completed fully by sale of stock, allowing the initial shareholders to realize their investments by selling their shares to the public. The method of implementing the share issue affects the payable transfer tax. Trading of shares of a public company is excluded from transfer taxation. (Pörssisäätiö 2016, 14.)

Once a company has gone public, it may utilize its own shares to pay out bonuses to employees, such as through stock option grants. By stock-based compensations the company may be able to lure better personnel to its labour. When a company's shares are traded, they do so as a market value, which is the equilibrium of supply and demand. Along with the public valuation, the stock can be used as a mean of payment in corporate transactions. (Pörssisäätiö 2016, 5.)

Because their securities are traded on a regulated market, listed companies are subject to the disclosure obligation. The obligation for disclosure guarantees that all investors have simultaneous, equitable, and equal access to information so that they can assess the security in detail. The prospectus required by the Securities Markets Act, or the company description required by the Multilateral Trading Facility guidelines must either be published by the company during the listing phase. The most essential components of the prospectus are a description of the company operations, financial position, and future prospects. The information in the brochure must be presented in a manner that is consistent and simple to grasp. For the stakeholders in the company, periodic reporting and financial transparency of operations builds on reliability. The Securities Market Act is a crucial

component of a public company's transparency and obligates market participants to abide common rules to ensure efficient market functioning and sufficient investor protection. (Pörssisäätiö 2016, 6.)

Increased visibility raises awareness and conspicuousness of the publicly traded company, which may be advantageous for potential acquisitions and expansion opportunities in the future. Listing enables the company to effectively spread the word about its operations, values, and products internationally to various stakeholders, especially in consumer products. (Pörssisäätiö 2016, 5.) According to Leppiniemi & Lounasmeri (2021), the image benefit – which is best observed in labour markets because candidates have sought for positions at public companies more actively – may be the most significant benefit.

2.2. IPO Process

Generally, it takes six to twelve months to plan and carry out the procedure, though this can change depending on the market or how quickly the company can implement the International Financial Reporting Standard. Companies frequently list to their domestic market but there is also a possibility of listing to a foreign country. Companies may decide to list on foreign exchange for better liquidity, looser restrictions, or industry relevance. Several mining companies, such as Talvivaara Mining Company Plc, have been listed in London, as investors are more familiar with the sector on a single market. Compared to foreign markets, domestic market is inexpensive and a more familiar listing option, and the company can guarantee greater media exposure domestically. In addition, compared to foreign companies, Finnish enterprises are typically in the smaller section of companies, which could not get as much attention. (Pörssisäätiö 2016, 6.) The Finnish equities have two markets, Nasdaq Helsinki, and First North Helsinki. The criteria are more flexible in First North Helsinki than on the main list, which also expedites the procedure.

The market and a company's readiness to list determine the IPO process. In the first phase of the listing process, the company begins the preliminary planning for listing with the

advisor, who is often an investment bank. The financial and legal advisors, the IPO readiness assessor, and the issues agent are the most crucial advisors. The readiness of the company to become a public company is assessed during the preparatory phase, and its internal processes are brought up to the necessary standard. Company advisors carry out a comprehensive due diligence process that thoroughly and completely evaluates the business, assets, and financial performance of the company. Due diligence also examines the management's capabilities and power structure, as there should not be agency problems. (Pörssisäätiö 2016, 22.)

Preparing for the listing and making the IPO prospectus are done in the second phase. The most crucial document in the procedure is the IPO prospectus, which provides detailed information on the firm and its initial public offering. The Financial Supervisory Authority must approve the prospectus if the offering is more than eight million euros; otherwise, the stock exchange must approve it. The company will be valued by an investment bank that has been chosen as an advisor, and the results will be shared with the board of directors and executives to help them understand how much the company's value is. As stocks may be issued to institutional investors, retail investors, as well as to company's own employees, the structure of the transaction must also be planned. Only issued stocks increase a company's equity since stockholders who sell their shares profit personally. Employee share issues often come with a 10% discount, and they are an effective approach to involve staff in the company's future through ownership. The company's shares should have at least 10% free float. (Inderes Oyj 2022.)

The third phase of the IPO process sees the beginning of active marketing and the actual implementation of listing. Shares are issued in two stages, initially to institutional investors, and anchor investors, which commit to purchase issued shares. Anchor investors have crucial role in the listing, as they act as a reference investor, which can be utilized in marketing materials to increase the credibility of company. Marketing to retail investors is done by media and investor events, such as roadshows, where investors can meet the management of a company and ask questions. Investors will receive fewer shares than they have requested if an IPO is oversubscribed. As a result, the shares must be allocated so that

each investor receives shares, and they are treated equally. The company's journey as a public company will begin after the board has approved the allocation and shares have been registered to book-entry accounts. (Inderes Oyj 2022; Pörssisäätiö 2016, 26-27.)

2.3. Long-run underperformance of IPOs

The initial market adjusted returns, according to Jewartowski and Lizińska (2012, 59), are 13.95 percent, while the long-term performance is underwhelming, with a mean of -22.62 percent for a three-year buy-and-hold strategy. Although the initial returns in earlier Polish experiments were substantially more extreme, the long-term returns were not significantly different. Miller (2000, 4-5) and his hypothesis of a divergence of opinion is cited by Jewartowski's and Lizińska's research. According to the hypothesis, there is a high divergence of opinion, which increases the initial market price, but causes it to decline over time.

In a three-year period, IPOs in the UK from 1991 to 1995 underperformed by 17.81 percent, according to Khurshed et al. (1999, 3). Additionally, they discovered a significant negative correlation between first day returns and long-term performance. The divergence of opinion hypothesis also supports this. They also discover a positive correlation between long-term returns and the quality of the companies at the time of the IPO. According to authors, theoretical explanations why IPOs underperform, are scarce. Their findings suggest that long-term investors should be cautioned about making IPO investments.

According to Miller (1977, 1166), during the IPO, the most optimistic, marginal investors determine the share price. The divergence of expectations shrinks over time as information grows, which causes the stock price to be adjusted downward. As a result, the degree of disagreement among opinions has a negative relationship with long-term performance. During hot IPO markets, investors frequently overestimate the growth potential of companies. On the first trading days, investors overpay, but prices decline as more

information becomes available. Long-term returns decline along with a downturn in investor sentiment.

Benninga et al. (2004, 117) state, that companies go public in clusters during the hot IPO markets, because the economic circumstances positively affect the cash flows of the companies. Companies with high cash flows have a tendency to go public in waves, according to their model. There should therefore be more IPOs from companies from same industry. When a company goes public, it is typically amid a period of high cash flows and relatively high stock values. This explains why IPOs underperform in the long term, in line with Ritter (1991, 19).

Ibbotson (1975) has not rejected the hypothesis that the abnormal returns in the long term are zero because the founding of an IPO underperformance of 1 percent per month on average over a four-year period. This is driven by outperformance in the first year, followed by negative returns in the subsequent three years. According to Gao et al. (2013, 1690-1691), that the long-term performance results are sensitive to the examined time span. The number of particularly small IPOs in the US after the internet bubble burst, when IPO activity decreased, is evidence of this. Shiller (1990, 63) questions why companies deal with underwriters who substantially undervalue issues.

In the study of the Finnish stock market between 1984 and 1989, which covered 80 IPOs, Keloharju (1993, 266) concluded that the long-term cumulative market adjusted return was -26.4 percentage. Winner's curse was confirmed to exist. According to Keloharju (1993, 253), overconfidence led to a carnage since IPO investors were disillusioned after learning about the prospects of the company listed. Jakobsen and Sorensen (2001, 416) concluded from 76 Danish IPOs, that the stocks' underperformance against the market was -30.4 percent after five years, measured by volatility-adjusted returns. However, Brounen and Eichholz (2002, 111) discovered that over the course of three years, Swedish property IPOs outperformed the market by 18.89 percent, as in the same time British and French property IPOs had the traditional IPO price behaviour, underperforming against the market return.

2.4. IPO Anomalies

This section delves into the history and theories of IPO underpricing anomalies, as it has been tried to explain why the initial IPO returns for the offering price are sometimes rather high.

2.4.1. Underpricing

The IPO underpricing is a well-studied anomaly, and, in numerous studies, it has been proven that IPOs are underpriced. (Ibbotson 1975; Ritter and Welch 2002). Loughran et al. (1994, 167) investigated underpricing in multiple countries and discovered that significant underpricing existed in all of them. Keloharju (1993), concluded that IPOs are typically underpriced in Finland, between 1984 and 1989. To verify underpricing, the percentage difference between the offering price and some specific period's closing price is noted. The closing price of the first trading day is used in most studies. Alternative measure for underpricing is the amount of money left on the table. (Ljungqvist 2007, 381).

Anomalies in financial markets indicate that markets are inefficient or there is imperfection in asset pricing. Anomalies are deviations from theories that explain asset valuations, and they disrupt efficient market conditions. (Schwert 2002, 3.) Underpricing has been attempted to explain using various theories, which are classified under four headings: asymmetric information, institutional, control, and behavioural theories. (Ljungqvist 2007, 376.)

2.4.2. Efficient market hypothesis

The primary mission of financial markets is to allocate resources among productive investments. There are parties in the market, who have ideas for investments, but insufficient funding to carry them out. Financial markets allocate these resources as efficiently as possible between those who have surplus and deficit in asset holdings. When

markets are efficient, lenders profit from a return to their investments and borrowers can put their profitable investments into action. (Fama 1970, 383.)

According to Fama's (1970) Efficient Market Hypothesis, stocks always trade at their fair value, and all the information at the market reflects to the prices instantly. All the information is available to investors and purchase and sale orders for stocks determine the price such that it accurately reflects all the information. Market efficiency prevents excess profits from being gained and prevents individual investors from outperforming the market. The information efficiency is divided into three forms of efficiency: weak, semi-strong and strong efficiency markets. (Fama 1970, 383.)

All historical data, including trading volume and prior returns, is included in prices at weak form efficiency markets. According to Fama (1970), excess returns are impossible to achieve on weak form efficiency markets. On a semi-strong market, where investors also have access to all publicly available information, such as financial statements and dividend declarations, investors cannot have excess returns without inside information. On a strong efficient market, all information is already reflected in prices, thus individual investor cannot have excess returns even with inside information. (Fama 1970, 383.)

According to the Efficient Market Hypothesis, IPOs are priced correctly, hence underpricings should not occur. A number of anomalies on the capital markets have emerged that contradict from Fama's (1970) Efficient Market Hypothesis. IPOs have been proven to be underpriced in numerous researches which suggests that markets are not efficient.

2.4.3. Winner's curse

Rock (1986) presented a theory called winner's curse, which is based on asymmetric information. Investors are split into two groups: informed investors and uninformed investors, with informed investors possessing greater information. The informed party will

take part in the IPO if they are satisfied with a company's offering price. As a result, the company must underprice its IPO to attract interest and participation from knowledgeable investors. According to Rock's (1986) theory, uninformed investors bid indiscriminately for all IPOs because they are unable to distinguish between underpriced and overpriced offerings. Due to oversubscription in underpriced IPOs, investors only receive a part of the shares they subscribed for. As regards of overpriced IPOs, only uninformed investors subscribe in them. As a result, informed investors who participate only in the underpriced IPOs outperform uninformed investors who participate in all IPOs in terms of total return. Uninformed investors would not engage in initial public offerings at all if they were not, on average, underpriced, as they would have negative returns. In that case, the issue's shares would not be purchased, and the IPO would not realize. Thus, by underpricing IPOs, underwriters ensure that the issue is realized and that average profits are achieved by uninformed investors. (Rock 1986, 205-207.)

As uninformed participants have the entire allocation of overpriced stocks for them, yielding a negative initial return, informed investors bid for stocks that are priced attractively (Akerlof 1970, 488). Underpricing leaves money on the table, but it collectively benefits the companies going public, as it keeps investors participating in the future IPOs (Ljungqvist 2007, 385).

2.4.4. Signaling theory

According to the signaling theory of IPOs, high quality companies that go public are underpricing their issue on purpose to signal a message of high quality to gain investors' trust. High quality companies strategically wait until the listing market is favourable, according to Çolak and Günay's (2011, 577) argument. By underpricing IPOs, the companies communicate their superior quality to the markets, and they prepare the investors for good future dividend yields based on the cheap offering price. Bad quality companies are aware of their outlook and expected market cap, so they understand that they cannot survive without equity from the stock issue, and that they are unable to use underpricing as a mean to demonstrate their quality. (Allen & Faulhaber 1989, 304.)

By underpricing the issue, investors have a good taste in their mouth, and they are willing to pay more in future issues (Ibbotson 1975, 264). Jegadeesh et al. (1993) investigated the relationship between IPO returns and post-IPO returns in the United States between 1980 and 1986. Companies that consciously underprice their issues, have better likelihood issuing shares in the future, and they are often bigger on average. (Jegadeesh et al. 1993, 153-154.)

According to Welch (1989, 445), higher returns on subsequent issues balance the money left on the table in initial IPO. Thus, if companies are split into two groups, those which are underpriced and those which are overpriced, in the post-IPO offerings the underpriced group's companies have bigger equity issues. Ritter and Welch (2002, 1803) endorse the signaling theory and found that companies communicate their superior quality by underpricing IPOs.

2.4.5. Hot markets

Ibbotson and Jaffe (1975) observed that IPO volumes and returns go in cycles which are called hot and cold markets. The number of companies that go public has been increasing during hot markets, likewise the returns from IPOs. The opposite of hot markets is cold markets, when IPO activity is low and returns from IPOs are similarly low, or even negative. (Ibbotson & Jaffe 1975, 1041.) During cold markets there are less oversubscriptions of IPOs than during hot markets. Although, in both hot and cold markets, companies that go public maintain the same characteristics. (Helwege & Liang 2004, 543).

Ibbotson and Jaffe (1975, 1041) assert that it is profitable for investors to participate in IPOs during hot markets, because the initial returns are higher. According to their analysis, the first month's return is 16.83% excessive to the market return. Going public during hot markets leaves money on the table at first glance, because the company does not directly benefit from the first trading day's price spike, but the valuation of company may still be

above its fair value at the time of IPO. (Ibbotson & Jaffe 1975, 1041.) Helwege and Liang (2004, 543) observed that hot markets typically appear in the same industry at the same time, when they researched hot markets.

Ibbotson and Ritter (1995, 1012) assert that it is challenging to find a rational justification for hot markets, but investors are excited about the companies' prospects at the time. According to Ritter's (1984, 216) explanation, hot markets could be explained by the shift in risk composition. Since risky companies typically have higher initial returns on average, they enter into the stock market around the same time (Ritter 1984, 216). Positive feedback has also been used to explain how hot markets are formatted. If investors have previously received positive returns, they are more likely to participate also in future IPOs. If sufficient number of investors believe in this, they can earn positive returns. (Ibbotson & Ritter 1995, 1003.)

Lowry (2003, 36) explains cycles are born because of economy's strong phases and investor sentiment. When economy's circumstances are favourable and growth is greater than anticipated, companies have more demand for capital. Increase in demand of capital leads to companies applying for more financing. Investor optimism also affects volume of companies going public, as when investors are optimistic, they are more inclined to pay for stocks more than what the fair value is. On the other hand, when investors are pessimistic, they underestimate company valuations, which results in a low volume of IPOs. (Lowry 2003, 36.) Hot issue periods are overall seen as a consequence of technological and productivity shocks.

2.4.6. Investor sentiment

As in traditional financial theory all investors are rational, who diversify their portfolios optimally to maximize the returns with minimum risk, and stock prices reflect the expected discounted cash flows of company, there is a theory on IPO anomalies that is based on behavioural finance. As irrational or 'sentiment' investors' effects on IPOs have been

researched, the effect is particularly large as IPO companies are generally young, immature, and relatively opaque in terms of information, and therefore difficult to valuate. Sentiment investors have optimistic prospects for the IPO company, and the issuer wants to capture as much surplus of the investors' demand as possible, thus they try to maximize the excess valuation over the fundamental value of the stock. (Ljungqvist 2007, 414.) As Ritter (1991, 24) has concluded, long-term IPO returns are negative because stocks eventually revert to their fundamental value. The best course of action for the issuer would be to distribute shares for institutional investors for subsequent resale to sentiment investors, at prices the institutions maintain by restricting supply. As hot markets can end prematurely, IPO stocks can be risky to hold, and therefore institutional investors require the stock to be underpriced. The offer price, however, exceeds the fundamental value of the stock. (Ljungqvist 2007, 414.)

According to the investor sentiment anomaly, companies that go public during hot markets subsequently underperform, both in terms of offering price and first day's closing price. IPO companies tend to trade at greater valuations during hot markets. Ljungqvist et al. (2006, 1671) find that hot IPOs are passed from institutional investors to retail investors. The stock underperforms between six to twelve months after the IPO as net retail investor purchases decline and the high initial returns are reversed. Ritter (1991, 23) showed a negative link between underpricing and long-run performance, but Krigman et al. (1999, 1042-1043) discovered a positive correlation, thus there is some contradicting evidence as well.

2.4.7. Agency problems

When companies go public, the information asymmetry can cause conflicts of interest between stakeholders. These so-called agency problems might arise between old and new shareholders since the former have a vested interest in selling their shares at the highest price as possible while the latter are uncertain of the offering price. It is not reasonable for old shareholders to sell their stake below the fair value, but as new shareholders are

uncertain of the fair value, old shareholders are forced to underprice the offering, so new owners are willing to subscribe despite the uncertainty. (Knüpfer & Puttonen 2018, 38.)

According to Baron's (1982, 976) theory, information asymmetry can also exist between the underwriter and the corporation, which is known as the principal-agent problem. The company needs advisory services from investment bank, and the primary reason is that investment bank has more information about demand for IPOs and the state of capital markets. As the uncertainty of the company's value increases, the greater the asymmetry of information also grows. If an investment bank has the power to choose the offering price, it may decide to underprice the offering by taking advantage of its knowledge. They might be underpricing it to increase the likelihood that it will be quickly oversubscribed and save the investment bank's money. If the IPO is overpriced, and all stocks of the offering are not subscribed, the investment bank may be contracted to purchase the unsold stocks. Underpricing the offering could entice investors to invest, generating demand and winning over clients. (Baron & Holmström 1980, 1115-1117.)

When ownership and control are distorted, agency costs are incurred. They can occur between managers and owners. In a limited company, management should maximize the value of company's share. Managers of the company could have objectives that clash with maximizing share value. They could pursue maximizing the growth or size of company, which may not be the best option to maximize the value. Owners must oversee the executives if they have any doubts about whether they are acting in their best interests. Agency costs are the expenses related to supervision. (Ljungqvist 2007, 409.)

2.5. IPO Cycles

There are IPO market cycle theories that explain why IPO markets sometimes fluctuate between hot and cold. Some theories presuppose that in hot markets, the companies are of good quality, while others presuppose that they are of low quality. The characteristics of companies listed in hot or cold markets do not differ as much as the quantity of companies

that go public, according to research by Helwege and Liang (2004, 543) who studied IPOs from 1975 to 2000 over IPO cycles. In contrast to technological advancements or management opportunism, their findings imply that hot markets are a reflection of strong investor optimism.

Çolak and Günay (2011, 555) analyze the strategic tendencies of IPO companies. Their study shows that it would be valuable for companies to delay their decision to go public so that they would gather more information about the current economic conditions. An IPO during an economic slowdown is riskier and costlier. As companies wait for the right moment to go public, even a single economic actor cannot confirm a recession or an expansion until after it starts. As each individual market participator gather private information, it is easier to have information from the same part of the economy where it specializes. When one company goes public, either successfully or unsuccessfully, the outcome aggregates information held privately by the individuals. (Çolak & Günay 2011, 555.) As companies learn from pioneer companies' IPOs, their option to wait has paid off. Companies from the same industry therefore go public at the same period, as seen for example in the dot-com bubble.

Cycles in the IPO market were analyzed by Yung et al. (2008, 192-193). They contend that the upcoming wave of initial public offerings will contain businesses of substantially poorer quality due to positive exogenous shocks to the economy. The exogenous shock exacerbates the underpricings since there is an increasing knowledge asymmetry, which causes underpricings. They discovered that more businesses go public when the market outlook is favorable. This occurs because of rising capital productivity, which raises demand for capital and stimulates the IPO market. Positive correlation exists between volume and underpricing of companies going public. (Yung et al. 2008, 192-193)

Both IPO volume and average initial returns are substantially autocorrelated, according to Lowry and Schwert (2002, 1197-1199), and Çolak and Günay (2011, 577). However, they do not see any evidence that companies could achieve lower underpricing regardless of high versus low average initial returns. Over the 41-year span between 1960 and 2001, the

pattern of periods of low initial returns followed by high initial returns, followed by bursts of IPOs, has often occurred. If companies filed for offerings when initial returns are typically modest, they may raise more money. Lowry and Schwert (2002, 1173) state that there is weak evidence of negative relation between IPO volume and future initial returns. However, they found significant positive relation between high initial returns and future IPO volume. Therefore, it appears that companies prefer to go public during periods when the underpricings are high, rather than when they are low, and companies could raise more money. (Lowry & Schwert 2002, 1173.)

Cornelli et al. (2006, 1214) investigated whether post-IPO prices are driven by irrational behavior among retail investors who are influenced by investor sentiment. High grey market prices were discovered to be a reliable predictor of first day aftermarket pricing, which is also followed by a long-run price reversal. Negative long-term returns are anticipated because overly optimistic retail investors caused the first day trading price to surpass the stock's underlying value. A price reversal of this kind is not anticipated if market prices are low on a grey market because they are based on fundamentals. Retail investors can therefore influence aftermarket prices to increase but not to decline.

Cornelli et al. (2006, 1214) inferred that retail investors are irrational because they overestimate the importance of their information, while book-building investors exploit retail investors' irrationality. In the subsequent 12 months of trading, prices decline as overconfidence gives way to more reasonable expectations. Sophisticated investors can take advantage of the behavior of sentiment investors. (Cornelli et al. 2006, 1190)

According to Miller (1977, 1151), that the homothetic assumption of the capital asset pricing model assumes that every investor has an equal expected return from every security. He claims that because investors have different investment horizons, expectations of returns and probability distributions, the theory does not hold in practice. Therefore Miller (1977, 1154) concluded that optimistic investors drive the short-term price of financial securities in his theory about divergence of opinion. Investors are overly excited about the prospects of the IPO company during the hot market conditions. Demand is

strongly correlated with market conditions among individual investors. Retail investor demand significantly affects IPO initial returns, which has a negative correlation with long-term returns. The companies going public leave money on the table since the IPO shares are underpriced according to the initial trading day's reaction, but they are not concerned about it during the hot IPO markets because they are aware that the shares are overpriced during the offering because of investor sentiment. (Derrien 2005, 515-516.)

Further justification for companies' lack of displeasure about leaving money on the table is provided by Loughran and Ritter (2002, 414). Insiders of the IPO company who sold their shares also profit from the first price surge for the shares they retained. Many US companies listed during the dot-com bubble were determined by Purnanandam and Swaminathan (2004, 845-846) to be significantly overpriced in comparison to their peers. By the time, the excessively overpriced companies with strong initial returns had the worst long-term returns. They argue that excessively optimistic growth estimates that ultimately prove to be inaccurate are to blame for overvaluation. (Purnanandam & Swaminathan 2004, 845-846) Therefore, issuers are taking advantage of the window of opportunity, which is timed to coincide with the apex of market excitement. (Loughran et al. 1994, 167)

3. Data and Methodology

In this section the data of research, limitations and research methodology are introduced. The research has been implemented as quantitative research.

3.1. Data

In this thesis, the Finnish IPOs which issued shares to the public, starting from the year 1999 are considered, to capture the cycles in the Finnish IPO markets. This includes the bull market during the dot-com bubble, financial crisis, and the bull market of twenty-tens. The long-term return horizon is three years, and 2019 will be the final year, for which IPOs are considered. All IPOs from 2019 are not included in the research because only companies with at least three years of stock market experience are considered. For the same reason, the sample does not include any Finnish initial public offerings from 2021, which was the most active IPO year in Finland.

The information is derived primarily from Thomson Reuters Datastream and, secondarily from Nasdaq Nordiq website. The data will be processed in Microsoft Excel. If a company has been delisted, gone bankrupt, bought out, or for any other reason been listed less than three years, the last trading day is considered, and the company's returns are retained in the respected portfolio.

The OMX Helsinki Cap Price Index is used as a benchmark for comparing returns to the market. The OMX Helsinki Cap Price Index has a maximum weight of 10% for a single company, preventing outliers like Nokia Oyj, which in 2000 accounted for more than 70% of the market value of the Helsinki Main list, thereby dominating the index. Therefore, OMXHCAPPI more accurately represents the benchmark for a diversified market portfolio.

Figure 1. OMX Helsinki Cap PI 1999-2021

Figure 1 shows the price history of OMX Helsinki Cap PI from 1999 to 2021. As seen, the index has been below the highs of the financial crisis for the last time in 2020, meaning the index has been trading at the same level for the last 20 years.

3.2. Methodology

The long-term performance of Finnish IPOs is assessed using market adjusted buy-and-hold returns (MABHR). Three-year buy-and-hold returns are calculated, assuming that the stocks are held from the end of their first trading day until three years have passed from the listing. MABHR is preferred to detect long-run abnormal returns, as the other commonly used method cumulative adjusted returns (CARs) is biased, due to non-standard distribution of IPO returns, which leads to conceptually flawed test statistics.

Following Khurshed et al. (1999, 11-12), market adjusted abnormal returns (MAAR$_0$) are computed for each company, against the market index. The first trading day return for stock i is calculated as:

$$R_{i,1} = \left(\frac{P_{i,1}}{P_{i,IPO}}\right) - 1 \tag{1}$$

Where $P_{i,1}$ is the closing price of stock i at the end of the first trading day, $P_{i,IPO}$ is the offer price of the stock and $R_{i,1}$ is the return of first trading day. The formula calculates the actual change in value over one trading day. The return on the market index during the same period is:

$$R_{m,1} = \left(\frac{I_{m,1}}{I_{m,IPO}}\right) - 1 \tag{2}$$

Where $I_{m,1}$ is the market index value at the first closing day, $I_{m,IPO}$ is the market index value at the offer date, and $R_{m,1}$ is the comparable market return on the first trading day of a stock. With the third formula, for each IPO the market adjusted abnormal return on the first trading day is computed as:

$$MAAR_{i,0} = 100 \ x \ \left(\frac{1 + R_{i,1}}{1 + R_{m,1}}\right) - 1 \tag{3}$$

The initial trading day is excluded from this study's analysis of the long-term performance of IPOs to balance its effects and allow the market to determine the company's price. Formula 4 is used to determine the market adjusted buy-and-hold returns up to 3 years, starting from the closing price of the initial trading day. The long-term returns are calculated using the formula below:

$$MABHR_{i,t} = \left(\prod_{t=1}^{T=36} (1 + R_{i,t}) - 1 \right) - \left(\prod_{t=1}^{T=36} (1 + R_{m,t}) - 1 \right) \tag{4}$$

Where $R_{i,t}$ and $R_{m,t}$ are the end of the t month share price for the company i and the corresponding end of the month index respectively. The companies are also grouped into hot and cold groups, as it can be studied whether there is statistical significance, when the company goes public. The average adjusted return on a portfolio of n stocks for event month t is the equally weighted arithmetic average of the market adjusted returns:

$$AR_t = \frac{1}{n} \sum_{1}^{n} MABHR_{i,t} \tag{5}$$

When considering the first and third research hypotheses, two different groups are compared to each other, to determine whether there is statistically significant difference in average returns. The comparison is performed by Welch's t-test, which is the non-parametric equivalent of the two-sample t-test, which assumes the variances of groups are unequal. The Welch's t-test formula:

$$t = \frac{\overline{r_1} - \overline{r_2}}{\sqrt{\frac{Var_1}{N_1} + \frac{Var_2}{N_2}}} \tag{6}$$

Where r_1 is the mean of first sample, r_2 is the mean of second sample, Var_1 and Var_2 are the variances of the groups and N_1 and N_2 are the sample sizes.

3.3. Sample

The 94 Finnish IPOs that make up the research's sample are illustrated in Figure 2. The absence of IPOs on the Finnish Stock Exchange in 2001, 2003, and 2008 – 2011 is indicative of general market cycles and market crashes. The dot-com bubble burst in 2000 and the financial crisis struck in 2008. According to Çolak and Günay (2011), IPOs are riskier and more expensive during economic downturns, and investor sentiment is typically quite pessimistic and devoid of optimism.
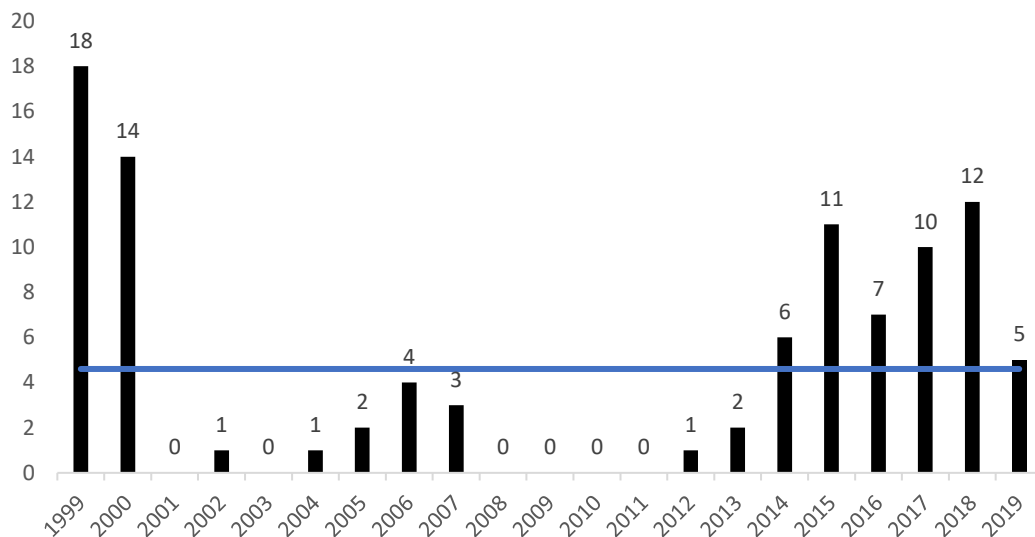

Figure 2. Distribution of IPOs by year

In 2019 there were five IPOs in Finnish stock exchange, but only two of them have been full three years public, therefore the other three IPOs are excluded from the study as they do not fulfil the research criteria. But given that the volume of IPOs in 2019 has exceeded the average volume, 4.6 IPOs, throughout the research period, 2019 has been designated as a hot year. The average IPOs per year is used as the threshold which defines the market cycle, due to relatively small size and overall low volume of initial public offerings in Finnish stock market.
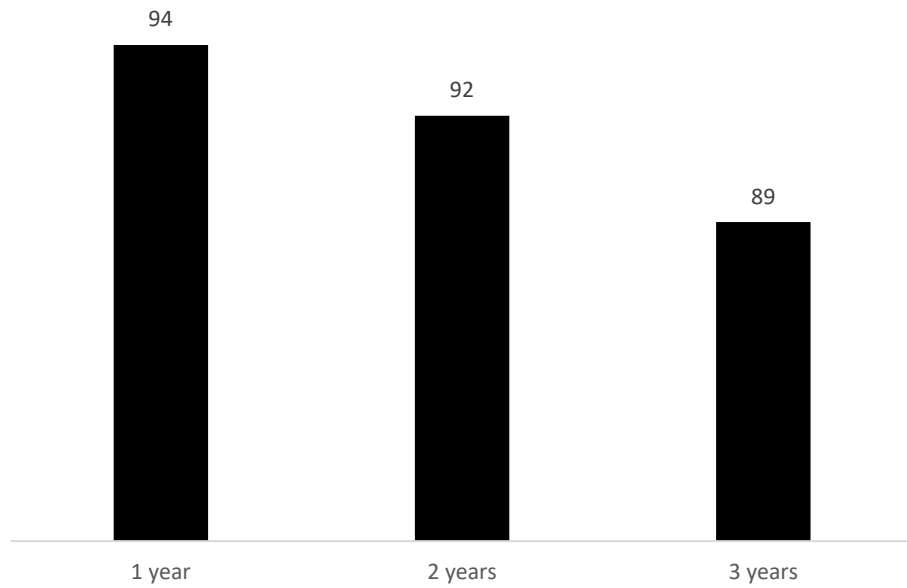
Figure 3. Companies' time in stock exchange

All 94 initial companies are listed on a public exchange after the first year from the IPO date. Two companies had been delisted after two years, and 89 companies were still publicly traded at the end of the third year following the IPO, adding up to a total of five companies that have been delisted.

4. Results

This section presents the results of the study. All three research hypotheses are reviewed in their own subsections. Goal of the research is to clarify, is there a difference of stock returns when the company goes public.

4.1. Market adjusted abnormal returns

Approximately two thirds of IPOs, 64 out of 94, were undervalued on the initial trading day, and contrariwise nearly a third of the companies saw negative market adjusted abnormal returns. Majority of companies, 56 out of 94, are within 10% of the market return of the initial trading day. IPOs have a skewness of 4.47, as seen in Table 1, which indicates significantly high outliers in the right tail in histogram of Figure 4. In fact, four companies have $MAAR_0$ over 80%, and three of those IPOs exceeded 100%. Comptel Oyj (197%), Data Fellows Oyj (256%) and BasWare Oyj (278%) are the three companies in question. All these companies went public consecutively in 1999 and 2000, just before the dot-com bubble peaked.

Although IPOs can return over 100% in the first trading day, it is practically impossible that the company going public would return less than -100%, in other words going bankrupt, in the IPO day, even when adjusted for market. Because the downside potential is limited, and the theoretical upside potential is limitless, the outliers tend to accumulate in the right end rather than the left end of the histogram. From the initial capital invested in a company, an investor can only lose 100%, but the opportunity cost can be considerably more fatal.
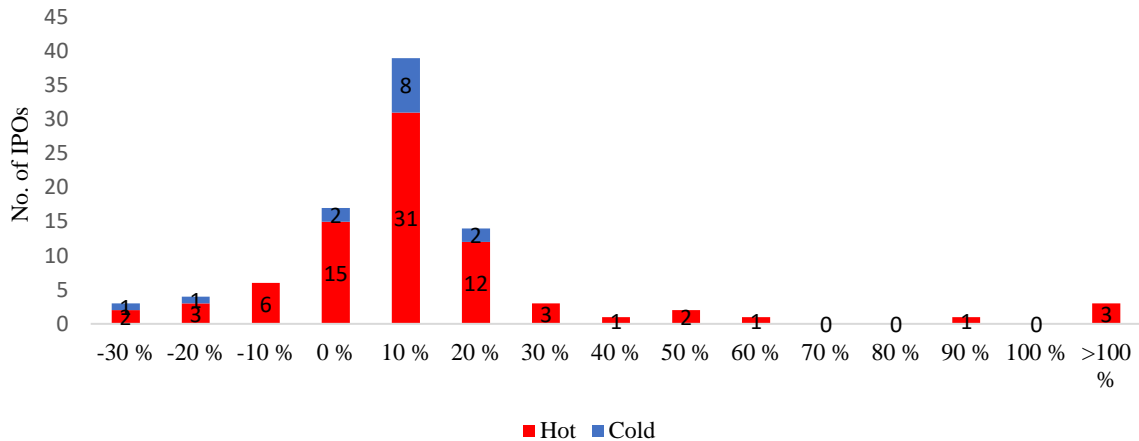
Figure 4. Market adjusted abnormal returns implementation

The initial excess return received by investors was substantial and reached almost 12% (11.70%), when all 94 IPOs are considered. The $MAAR_0$ for all IPOs has an associated t-statistic of 2.46, therefore differing statistically significantly from zero, or market return. In Table 1, are the average market adjusted first day returns and other significant statistics for the IPOs across the board and separately for hot and cold markets. The $MAAR_0$ for the whole sample has a median of 3.09% and a standard deviation of 46.06%. Having kurtosis of 21.92 and skewness of 4.47, combined with median of 3.09% means that half of the IPOs return over 3.09%, yet the returns skew to the right. This can also be observed from the Figure 4 above.

Table 1. $MAAR_0$ Summary statistics

	All	Hot	Cold
Mean (%)	11.70	13.67	0.49
t-statistic	2.46**	2.47**	0.15
Welch t-stat		2.03**	
Standard deviation (%)	46.06	49.45	12.53
Median (%)	3.09	3.09	3.70
Kurtosis	21.92	18.59	2.87
Skewness	4.47	4.16	-1.85
Issues with negative returns (%)	31.9	32.5	28.6
Total number of issues	94	80	14

Note: ***, **, * indicate significance at 1%, 5% and 10% levels, respectively

Moreover, when only hot market IPOs are considered, the market adjusted abnormal return increases by almost an additional 2 percentage points to 13.67%. The initial returns for IPOs in the hot markets are 13.67% on average, which is significantly higher than for IPOs in the cold markets, which returns only 0.49% excess return. On hot markets the abnormal return differentiates statistically significantly at the 5% level with a t-statistic of 2.47, but on cold markets not by much (0.15). As a result, the IPOs in the cold markets do not statistically differ from the average return of market index in the initial trading day.

About a third, 32.5% and 28.6%, of the IPOs in both market cycles are yielding a negative market adjusted abnormal returns. Both hot and cold market IPOs have quite similar median returns, 3.09% and 3.70%, but cold market IPOs skew slightly to the left. Although cold market IPOs have substantially smaller sample size than hot market IPOs, the standard deviation of returns is also distributed much smaller than on hot markets, being 12.53%. When hot and cold IPOs are compared against each other with t-test assuming unequal variances, the t-stat gets a value of 2.03, being statistically significant at the 5% level. This means, that IPO returns during hot and cold markets statistically differ from each other.

These results are consistent with previous research, as companies going public in cold markets are priced closer to their fair value, than they are when IPO mania is in full swing. Past studies have documented, as can also be seen in this research, that IPOs are underpriced more in hot markets than in cold markets (Agathee et al. 2012; Ibbotson and Jaffe, 1975; Ritter, 1984). The mean $MAAR_0$ statistic and relatively low standard deviation also support the idea that IPOs are being valued closer to their fair price on cold markets. As IPOs are underpriced by 13.67% on average during the hot markets, the conclusion is that companies going public leave money on the table. Derrien (2005, 515-516) claims that even though companies are aware that their IPOs are underpriced at the time of the offering because of favourable investor sentiment, they nevertheless prefer to go public while markets are booming leaving capital on the table, before economic downturn shatters the investor sentiment.

Table 2. IPO Seasonality

Period	1999-2000	2001-2013	2014-2019
Market	Hot	Cold	Hot
Mean (%)	29.42	0.49	3.16
t-statistic	2.25**	0.15	1.50
Standard deviation (%)	74.03	12.53	14.63
Median (%)	2.83	3.70	3.33
Kurtosis	6.18	2.87	1.88
Skewness	2.63	-1.85	0.00
Issues with negative returns (%)	31.3	28.6	33.3
Total number of issues	32	14	48

Note: ***, **, * indicate significance at 1%, 5% and 10% levels, respectively

Table 2 shows statistics of three different IPO cycles in Finnish stock exchange, based on IPO volume. The period includes two hot markets, and one cold. When the dot-com bubble had its peak euphoria in 1999-2000, Finnish IPOs yielded a $MAAR_0$ of 29.42%. The capitulation already started at 2000, but OMXHCAPPI reached its bottom in 2003. After that, there was a rally that rose higher than the previous one, which was once more only followed by the financial crisis. There were only 14 initial public offerings in Finland throughout 13-year period, the same number as in the entire year 2000, the year when dot-com bubble popped. The $MAAR_0$ for these cold market IPOs was 0.49%, as previously noted in this subsection. The second hot market cycle lasted from 2014 to 2019, having 48 IPOs with a $MAAR_0$ 3.16%, being statistically insignificant to market return.

When the hot markets are compared against each other, the hot market IPOs during the dot-com bubble have statistically significant initial return, 29.42% on average, whereas the hot market IPOs from 2014 to 2019 have a $MAAR_0$ of 3.16%, being statistically insignificant. Therefore, the dot-com bubble IPOs drive the hot market IPOs' initial returns.

Based on the results from the initial trading day, the 1st hypothesis is rejected (H_0: $MAAR_0$ = 0). There is indeed a statistically significant difference whether companies go public on a hot or cold market (H_1: $MAAR_0 \neq 0$). On a cold market, the market adjusted abnormal return average does not differ from the market return, although the median return is positive 3.70%. Cold market IPOs have negative return skewness of -1.85, implying a left tail risk. Hot markets IPOs have a positive skewness of 4.16, thus the right tail of IPO returns represents significant outlier returns. Hot markets also have a kurtosis of 18.59, another sign implying the data is heavy tailed to the right. Thus, on cold markets the IPOs tend to lean to negative returns and during hot markets the outliers have generally positive returns. When the hot markets are split into two cycles, the statistically significant IPO underpricings are set to the 1999-2000 cycle.

As the alternative hypothesis is accepted, IPOs in Finland have been seriously underpriced, whether cold market IPOs are included or not in the overall portfolio. However, if cold market IPOs, which as a group does not differ from benchmark index, are excluded, the mean return of IPO investor improves. On cold markets Finnish IPOs are not under- or overpriced, as a group, but rather fairly priced.

4.2. Market adjusted buy-and-hold returns

The results of monthly market adjusted buy-and-hold returns (MABHR) for all Finnish IPOs are shown in Table 3, both average (AR_t) and its t-statistic and median returns. IPO portfolio including both hot and cold market, tends to beat the market for the whole 3 years' time span, excluding the first month. Median returns, however, are negative for every month, excluding the sixth month when median return is 0.4% above market return. The portfolio has positive average abnormal returns compared to the benchmark index, but only 13 of 36 months are statistically significantly different from zero or negative returns at the 10% level, and 5 months at the 5% level. The 5 months which are statistically significant at the 5% level are months through nine to 13. The maximum AR_t for portfolio is documented after 11 months, having 34.8% abnormal return, on average.

Because the returns are highly skewed, the median return of the portfolio is also relevant. As seen from the Table 3 below, the median returns are generally negative, and decreasing in time. When the average and median returns are studied together, it is obvious that the average market adjusted buy-and-hold returns are overall significantly skewed to the right, yielding a positive return due to a few outliers, but a median return is negative in the long-term.

Table 3. All market IPO portfolio

Month	AR_t (%)	t-stat	Median (%)	Month	AR_t (%)	t-stat	Median (%)
1	-1.8	-1.18	-2.6	19	17.2	1.34*	-4.7
2	0.4	0.18	-2.3	20	15.2	1.24	-6.2
3	5.3	1.19	-2.9	21	9.7	0.96	-8.7
4	12.0	1.43	-0.8	22	8.5	0.97	-5.5
5	12.9	1.45*	-1.7	23	9.3	1.00	-8.6
6	9.5	1.50*	0.4	24	7.4	0.77	-9.3
7	8.7	1.46*	-3.7	25	5.7	0.63	-7.5
8	17.5	1.64*	-4.4	26	7.8	0.85	-6.6
9	22.4	1.75**	-1.7	27	7.1	0.79	-9.2
10	26.4	1.72**	-4.3	28	6.9	0.68	-9.5
11	34.8	1.79**	-5.4	29	7.9	0.79	-12.5
12	25.2	1.80**	-4.8	30	7.0	0.73	-12.1
13	23.7	1.66**	-2.2	31	9.1	0.91	-13.3
14	20.4	1.59*	-3.6	32	13.9	1.11	-13.2
15	16.2	1.41*	-7.0	33	14.2	1.08	-10.9
16	12.8	1.15	-4.6	34	16.9	1.17	-13.2
17	16.0	1.11	-7.2	35	21.6	1.41*	-15.6
18	15.1	1.22	-4.7	36	17.4	1.25	-16.1

Note: ***, **, * indicate significance at 1%, 5% and 10% levels, respectively

Table 4 below shows the statistics of IPOs from hot markets. Excluding the first month after IPO, the portfolio of hot market IPOs yields positive returns on average in the long term, beating the market. Although the median return is negative in the long term, therefore the right-tail outliers support the portfolios positive return. This can also be seen from the t-statistics, as only a handful of months generate statistically significant MABHRs at the 5% level, due to their high standard deviation (Table 6).

Table 4. Hot market IPO portfolio

Month	AR_t (%)	t-stat	Median (%)	Month	AR_t (%)	t-stat	Median (%)
1	-2.0	-1.15	-2.6	19	21.4	1.46*	-2.0
2	1.0	0.38	-1.9	20	19.1	1.36*	-4.5
3	6.8	1.34*	-2.2	21	13.3	1.17	-6.7
4	14.6	1.50*	0.7	22	11.6	1.17	-1.8
5	15.3	1.49*	0.7	23	12.7	1.19	-7.7
6	11.8	1.64*	1.9	24	11.1	1.01	-7.9
7	10.9	1.64*	0.8	25	9.5	0.92	0.4
8	21.2	1.73**	-1.7	26	11.7	1.10	-3.3
9	26.6	1.81**	-0.7	27	10.8	1.03	-8.9
10	31.7	1.78**	-3.3	28	9.8	0.84	-9.3
11	41.1	1.82**	-3.0	29	10.9	0.95	-12.7
12	29.2	1.82**	-2.9	30	10.2	0.91	-10.0
13	27.5	1.68**	0.1	31	12.0	1.03	-13.3
14	24.4	1.66*	-2.9	32	17.1	1.18	-14.2
15	20.0	1.51*	-2.2	33	18.2	1.19	-10.9
16	15.9	1.24	-4.1	34	20.9	1.24	-14.1
17	19.9	1.19	-2.2	35	25.8	1.44*	-17.6
18	19.8	1.38*	-2.3	36	20.9	1.30*	-18.9

Note: ***, **, * indicate significance at 1%, 5% and 10% levels, respectively

The findings imply that an investor will earn positive excess return on average if they invest in all IPOs during a year with high volume. A rational investor should be satisfied with abnormal returns of 29.2% after one year, 11.1% after two years, and 20.9% after three years holding period against the benchmark index. Hot market IPOs tend to have companies with IPO returns on the right-tail of return histogram. Although, the median return is still negative, implying a majority of companies have negative long-term returns.

When analysing the outcomes of cold market IPOs, it is important to keep in mind that the sample size of the cold market IPO portfolio, which consists of just 14 companies, is significantly smaller than that of the hot market IPO portfolio. The cold market IPO portfolio did not disprove the hypothesis at any point throughout the course of the three-year period because the premise was that market adjusted buy-and-hold returns do not differ from negative returns or zero, making it a one-sided hypothesis. 34 out of the 36 months the returns are below the surface, and the median return is never positive.

Table 5. Cold market IPO portfolio

Month	AR_t (%)	t-stat	Median (%)	Month	AR_t (%)	t-stat	Median (%)
1	-0.5	-0.25	-2.0	19	-6.8	-0.34	-12.2
2	-3.0	-0.67	-6.0	20	-7.1	-0.37	-17.1
3	-3.5	-0.66	-4.6	21	-10.6	-0.58	-20.0
4	-2.8	-0.31	-4.6	22	-9.4	-0.61	-19.5
5	-1.0	-0.11	-9.0	23	-9.9	-0.71	-15.3
6	-3.8	-0.36	-13.4	24	-14.1	-1.23	-14.1
7	-3.9	-0.30	-14.3	25	-16.3	-1.62	-11.6
8	-4.0	-0.29	-17.0	26	-14.3	-1.45	-13.1
9	-1.9	-0.11	-15.5	27	-13.8	-1.41	-12.9
10	-3.6	-0.23	-15.8	28	-9.8	-0.95	-10.2
11	-0.9	-0.04	-17.7	29	-9.6	-0.90	-7.2
12	2.7	0.12	-17.3	30	-10.8	-0.95	-19.2
13	1.9	0.09	-20.0	31	-7.3	-0.63	-11.4
14	-2.6	-0.14	-20.0	32	-4.6	-0.36	-10.9
15	-5.6	-0.38	-13.7	33	-8.3	-0.69	-11.0
16	-4.7	-0.32	-9.4	34	-5.8	-0.44	-6.6
17	-6.4	-0.38	-13.0	35	-2.1	-0.14	-1.1
18	-11.3	-0.75	-15.8	36	-2.5	-0.15	-4.2

Note: ***, **, * indicate significance at 1%, 5% and 10% levels, respectively

Based on the results, cold market IPOs have not been worth of investing. Although, the companies seem to time the IPO well, if they can maximize the money at the issue.
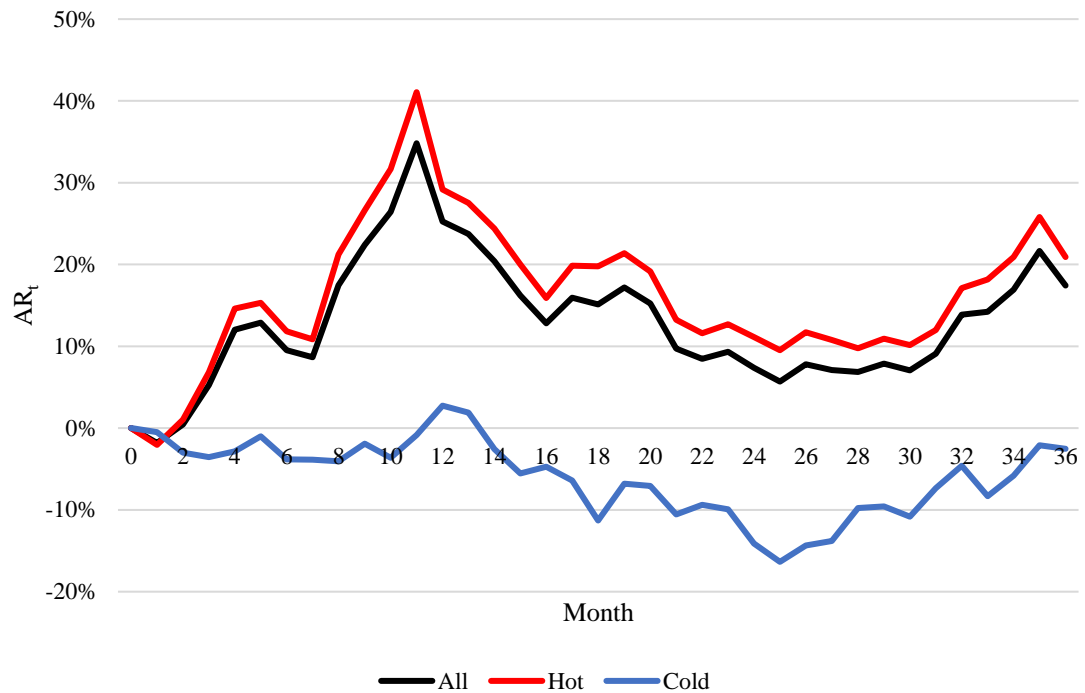
Figure 5. IPO portfolio returns

Due to the significant difference in sample sizes between the hot and cold portfolios, as shown by Figure 5, the portfolio that includes all IPOs highly correlates with the hot market IPO portfolio. Excluding the first month, hot market IPO portfolio has a better return than portfolio of all IPOs for the whole time. Although peaking around 11 months following the IPO, the hot market IPO portfolio outperforms the benchmark index over the long term. The eight to thirteen months following the IPO are when the hot market IPO portfolio's t-statistics are at their peak. Therefore, based on the average MABHR, investors who invest in IPO companies when the IPO volume is high should sell their equities after one year, even though it would be profitable to retain the stocks for three years. If an investor would have invested 1000€ to every hot market IPO at the closing price of first trading day, the profit would have been 209€ after three years, when the opportunity cost was to invest in market portfolio. By investing 1000€ to cold market IPO companies, the return would have been -25€ after three years, compared to OMX Helsinki Cap Price Index.

Table 6. Highlights of MABHR

	1 month		3 months		6 months		12 months	
	Hot	Cold	Hot	Cold	Hot	Cold	Hot	Cold
AR_t (%)	-2.05	-0.49	6.82	-3.54	11.85	-3.81	29.18	2.74
Median (%)	-2.56	-1.98	-2.16	-4.59	1.86	-13.45	-2.88	-17.28
St. dev.	0.16	0.07	0.46	0.20	0.65	0.40	1.44	0.83
t-stat	-1.15	-0.25	1.34*	-0.66	1.64*	-0.36	1.82**	0.12
p-value	0.87	0.60	0.09	0.74	0.05	0.64	0.04	0.45
Min (%)	-42.29	-10.07	-66.62	-39.62	-72.06	-48.82	-82.86	-80.14
Max (%)	49.56	16.33	320.63	47.29	473.51	101.42	902.81	272.24
N	80	14	80	14	80	14	80	14
	18 months		24 months		30 months		36 months	
	Hot	Cold	Hot	Cold	Hot	Cold	Hot	Cold
AR_t (%)	19.76	-11.30	11.13	-14.13	10.16	-10.81	20.90	-2.54
Median (%)	-2.32	-15.85	-7.91	-14.05	-9.97	-19.20	-18.92	-4.25
St. dev.	1.28	0.57	0.99	0.43	1.00	0.43	1.44	0.62
t-stat	1.38*	-0.75	1.01	-1.23	0.91	-0.95	1.30	-0.15
p-value	0.09	0.77	0.16	0.88	0.18	0.82	0.10	0.56
Min (%)	-103.21	-80.10	-115.43	-88.74	-130.42	-70.90	-128.45	-88.22
Max (%)	910.95	152.86	652.35	44.92	617.02	69.06	942.99	125.32
N	80	14	80	14	80	14	80	14

Note: ***, **, * indicate significance at 1%, 5% and 10% levels, respectively

According to the second hypothesis (H$_0$: MABHR ≤ 0) IPOs are overpriced over the long term, regardless of whether the market is in a hot or cold cycle. On a 10% risk threshold, the hypothesis can be rejected when examining the hot market IPO portfolio because the t-statistic of three-year holding period is statistically significant (H$_1$: MABHR > 0). An excellent return of 20.9% excess to market return is produced by three-year buy-and-hold strategy. Considering the cold market IPO portfolio, the benchmark index outperforms the cold market IPO portfolio's average return for nearly the entire three-year timeframe. Therefore, the portfolio does not have a single month with a statistically significant excess returns against the market, thereby indicating that investing in IPO companies during a cold market period has not been worth the effort.

Companies that have gone public in the hot market have, on average, outperformed the market over the long term; as a result, an investor who invested in all those companies during a year of high volume has received a return that is greater than the market return by

20.9%. Moreover, such stocks still have a negative median return. Therefore a few outlier stocks, which generate returns multiple times greater than the market are what account for the excess return. Since rational stock-picking investors wants to exceed the market return, everyone looks for a single company that can increase both its worth, and its owners' wealth. As it is difficult to find these multibaggers, individual investor should probably try the excluding strategy, which entails identifying companies that are not deserving of investment and working to raise the average return of a diversified IPO portfolio by increasing the hit rate of companies with positive returns. An investor who invests in companies gone public, could simply do this by not to investing cold IPO companies.

It should be mentioned, that despite the hot market IPO portfolio statistically significantly outperforms the market after a three-year holding period, the optimal buy-and-hold duration is only about one year, which cannot be regarded as a lengthy period. Due to high quantity of hot IPOs compared to cold IPOs, an excess return can be earned on average, when participating in all possible IPOs. Therefore, for any period longer than one month, investment for all IPOs on the Finnish stock exchange could have been lucrative, on average.

According to the findings of the second hypothesis, hot market IPOs are undervalued on the long term, and cold market IPOs are overvalued return-wise, but close to the fair price. The hot market IPO undervaluation on the long term is not consistent with the vast majority of research. Yung et al. (2008, 193) and Agathee et al. (2012, 190) found that companies going public during hot markets have higher variance of abnormal returns than those of cold markets, which is also true to this research.

4.3. Market adjusted buy-and-hold returns by initial returns

In the third hypothesis the first two hypotheses are combined. The hot and cold IPO portfolios are split based on the $MAAR_0$ values. Therefore, we have four portfolios based

on if the IPOs were on hot or cold markets, and whether the IPO was over- or undervalued against the market at the first trading day.
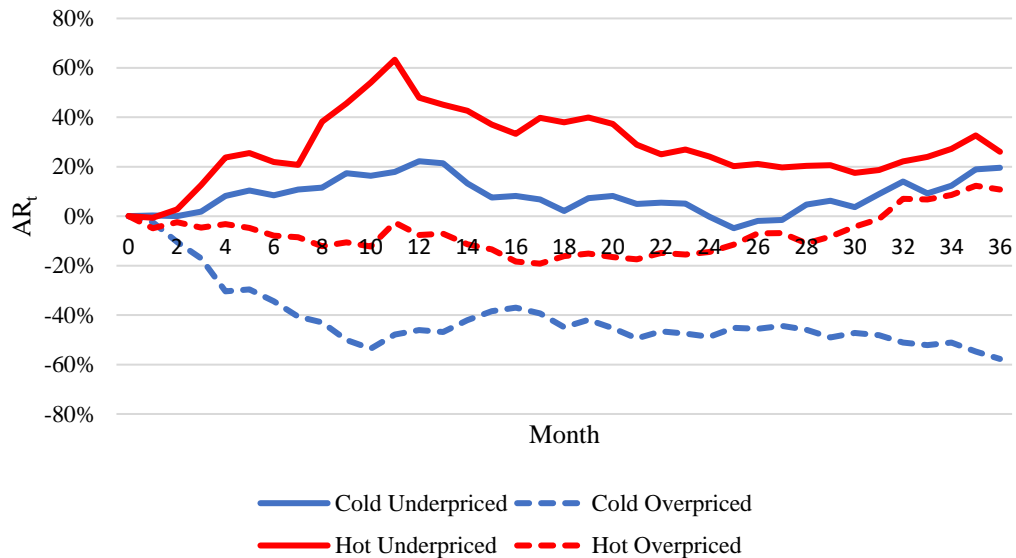

Figure 6. Portfolio AR_t returns

As shown by Figure 6, the portfolios where all initial IPOs were undervalued, beat the market on a three-year holding period, regardless of the company having gone public during hot or cold year. Both overvalued portfolios do not have excess return against the market for the first two and a half years, until hot overpriced IPO portfolio ascends above the market after 32 months. Figure 6 also shows that after the first month, average returns of portfolios do not cross the returns of other portfolios at any point in time span. Also, both undervalued portfolios peak at the 11 and 12 months against the market, and then decreasing for the next year. Hot underpriced IPO portfolio has the excess return of 63% after 11 months, but the returns decrease to 17.52% excess return until 30th month after IPO. This can also be verified from Table 7, as the statistically significant months cluster around one year after IPO.

Table 7. Hot market IPOs

	1 month		3 months		6 months		12 months	
	Under	Over	Under	Over	Under	Over	Under	Over
AR_t (%)	-0.63	-4.83	12.63	-4.58	21.91	-7.91	47.91	-7.59
Median (%)	-1.46	-4.53	0.70	-6.37	9.65	-13.34	5.47	-21.09
St. dev. (%)	15.80	16.01	53.14	21.78	75.56	25.88	168.03	64.04
t-stat	-0.29	-1.57	1.73*	-1.09	2.11**	-1.59	2.08**	-0.62
p-value	0.7731	0.1290	0.0896	0.2844	0.0396	0.1243	0.0429	0.5434
Welch t-stat	1.1146		2.0443**		2.5906**		2.1213**	
p-value	0.2701		0.0444		0.0116		0.0372	
Min (%)	-42.29	-33.52	-66.62	-42.84	-72.06	-57.80	-81.97	-82.86
Max (%)	49.56	41.39	320.63	36.82	473.51	44.07	902.81	200.38
N	53	27	53	27	53	27	53	27
	18 months		24 months		30 months		36 months	
	Under	Over	Under	Over	Under	Over	Under	Over
AR_t (%)	38.04	-16.13	24.18	-14.47	17.52	-4.29	26.05	10.81
Median (%)	6.72	-33.57	9.05	-32.50	-0.20	-24.16	-14.50	-31.96
St. dev. (%)	149.00	59.10	109.26	69.43	104.85	89.04	156.52	115.87
t-stat	1.86*	-1.42	1.61	-1.08	1.22	-0.25	1.21	0.48
p-value	0.0688	0.1681	0.1133	0.2887	0.2292	0.8043	0.2312	0.6319
Welch t-stat	2.3134**		1.9234*		0.9745		0.4919	
p-value	0.0234		0.0583		0.3336		0.6244	
Min (%)	-98.13	-103.21	-97.74	-115.43	-102.58	-130.42	-99.93	-128.45
Max (%)	910.95	165.41	652.35	174.46	617.02	274.46	942.99	369.99
N	53	27	53	27	53	27	53	27

Note: ***, **, * indicate significance at 1%, 5% and 10% levels, respectively

Underpriced hot IPO companies have excess returns to the benchmark index in three-year holding period. From the period of three months up to 18 months, the AR_t statistically differs from zero, although the percentage difference applies up to three years. Overvalued hot market IPOs, however, do not have statistically significant returns differing from zero. The results are not consistent with studies suggesting negative long-term returns compared to initial returns. Thus, if $MAAR_0$ for company was positive, the average returns for these companies tend to exceed the market return also in the long term percentagewise, and statistically in the medium term. Overvalued IPOs have negative returns for over two and a half years, until the portfolios average return increases above market return. From three months holding period up to two years, the Welch p-value is below 10%. Therefore, the two groups, when hot market IPOs are split based on the initial return, statistically differ from each other. Based on the average returns, the difference is clear, but because of

relatively small sample sizes and high standard deviation, Welch's t-test does not deliver as strong p-values in the long term.

When looking at the results from cold market IPOs, the undervalued IPO companies fare better than the overvalued IPO companies, so the conclusion is same as with hot IPO companies. However, only overpriced IPOs differ from zero statistically in the long term, underperforming against the market. Welch's t-test is statistically significant from six months to one year, and from two and a half years to three years. As a result, in the long-term, there is difference between cold market IPO companies, depending on if the IPO was under- or overpriced.

Table 8. Cold market IPOs

	1 month		3 months		6 months		12 months	
	Under	Over	Under	Over	Under	Over	Under	Over
AR_t (%)	0.29	-2.44	1.85	-17.04	8.42	-34.40	22.24	-46.00
Median (%)	-1.82	-2.36	-3.65	-16.46	-5.23	-34.56	-11.45	-44.02
St dev (%)	8.48	3.31	18.86	17.99	40.39	11.93	90.47	27.89
t-stat	0.11	-1.47	0.31	-1.89	0.66	-5.77**	0.78	-3.30**
p-value	0.9166	0.2372	0.7632	0.1546	0.5263	0.0104	0.4569	0.0458
Welch t-stat	0.8650		1.7500		3.0376**		2.1442*	
p-value	0.4040		0.1307		0.0103		0.0532	
Min (%)	-10.07	-6.01	-16.31	-39.62	-39.55	-48.82	-33.92	-80.14
Max (%)	16.33	0.99	47.29	4.40	101.42	-19.64	272.24	-15.84
N	10	4	10	4	10	4	10	4
	18 months		24 months		30 months		36 months	
	Under	Over	Under	Over	Under	Over	Under	Over
AR_t (%)	2.11	-44.83	-0.27	-48.80	3.73	-47.17	19.54	-57.75
Median (%)	-15.01	-54.62	-8.77	-60.94	-9.61	-60.48	9.37	-66.85
St dev (%)	58.22	40.72	35.33	45.58	37.63	34.27	57.49	34.20
t-stat	0.11	-2.20	-0.02	-2.14	0.31	-2.75*	1.07	-3.38**
p-value	0.9112	0.1150	0.9814	0.1217	0.7609	0.0706	0.3105	0.0432
Welch t-stat	1.7101		1.9120		2.4400*		3.0967**	
p-value	0.1256		0.1141		0.0505		0.0113	
Min (%)	-61.31	-80.10	-58.60	-88.74	-32.56	-70.90	-67.04	-88.22
Max (%)	152.86	10.02	44.92	15.44	69.06	3.19	125.32	-9.08
N	10	4	10	4	10	4	10	4

Note: ***, **, * indicate significance at 1%, 5% and 10% levels, respectively

Both hot and cold market IPOs have statistically different returns based on whether the IPO was under- or overpriced. On hot markets, underpriced IPOs differ from zero, having positive and statistically significant long-term excess returns, outperforming the market, and during cold markets, the overpriced IPOs significantly underperform against the market.

5. Conclusions

The purpose of this research was to examine whether there was difference in stock returns of IPO companies, based on the IPO cycle and whether the long-term returns were also different. The IPO returns were compared on Finnish stock market.

The data includes 94 IPOs from 1999 to 2019, of which 80 went public in the hot market, and 14 went public during cold market. A big difference in sample sizes reflects well how market cycles affect companies' willingness to go public during great economic conditions, but not during bad. The quantity of IPO companies for 21 years also illustrates the relative smallness of Finnish stock market.

Three research questions were presented, and the thesis was able to provide answers to these questions. The research questions were:

H$_1$: There is no difference in initial IPO returns during hot and cold markets

H$_2$: In the long-term, IPO returns do not differ based on the market they went public

H$_3$: Initial IPO returns are not related to long-term returns

The initial IPO returns were calculated as MAAR$_0$, market adjusted abnormal return, which represents the under- or overpricing of the IPO against the market on the stock's first trading day. 64 companies out of 94 were undervalued, and the mean MAAR$_0$ was 11.70%, which is statistically significant at the 5% level. As the IPO companies were split to hot and cold markets, hot IPO companies generated an average MAAR$_0$ of 13.67%, being also statistically significant at the 5% level. However, cold market IPOs were underpriced by 0.49% on average, which does not differ statistically from the market return. The findings are consistent with the study of Helwege and Liang (2004) and Ibbotson and Jaffe (1975). Therefore, hot market IPOs are underpriced, as cold market

IPOs are not. However, when both two hot market cycles are considered individually, in the first cycle, from 1999 to 2000, IPOs are underpriced statistically significantly, but in the second hot market cycle they are not. Thus, the hot market IPOs are as a group underpriced because of the first hot market cycle dated during the dot-com bubble.

The long-term returns were calculated by MABHR, market adjusted buy-and-hold returns, which represents how the investment in an IPO company at the closing price of its first trading day would have yielded in comparison with the market return on a three-year holding period. The average MABHR for hot IPO companies was 20.9% after three years, performing better than the market. This is a rather surprising result, as typically IPO companies tend to underperform against the market. The average MABHR for hot IPOs peaked eleven months after the IPO. As the average MABHR, 41.1%, was at its highest about one year after IPO, and the three-year MABHR was 20.9%, the hot IPO portfolio actually underperformed against the market after the first year, although the portfolio has statistically significant excess returns calculated from the closing price of the first trading day. The three-year statistically significant excess return against market is not consistent with majority of previous studies. Thus, the average MABHR is statistically significant at 20.9%, the median return is -18.9%, implying strong skewness to the right-tail of histogram, meaning a few outliers, but a vast majority of companies are underperforming against the market return.

When hot and cold IPO portfolios were split based on the initial return, the results show whether over- and underpriced IPO returns differ in the long term. Underpriced IPOs during hot markets differ from overpriced IPOs statistically significantly at the 5% level through six months to 18 months after IPO, based on Welch's t-test. The average MABHR of underpriced IPOs was significantly above market return for 18 months, along with median return, as the overpriced IPOs' average and median returns were negative at the same period. Thus, the excess return is statistically significant in the medium term. The results are consistent with Agathee et al. (2012, 190-191), who found that generally IPO companies underperform in the long run, but companies coming to market during hot periods generate higher returns than cold market IPOs.

Based on the three hypotheses, an IPO investor in Finland can have excess returns by participating in the offerings during a high-volume year, and hope for significant outlier returns, which compensate negative median returns on initial trading day. If the initial returns exceed the market return, the medium-term returns may also exceed the market return, and the long-term returns may also exceed the market return if the portfolio includes some serious multibagger stocks. However, hope is not an investment strategy. It seems that the companies tend to time the IPO during favourable market conditions. When the economy is in good conditions, investors are more optimistic, and it probably affects to companies' window of opportunity. Also, as companies go public, the company's financials and prospects are trimmed to the optimal position, and they are made to look phenomenal. As the IPO is over, usually the future outlook does not pan out as the best-case scenario, expected by investors. As the market price reflects the market's long-term expectations for a company, they will come down.

As stated by Ritter (1991, 4), companies take advantage of the window of opportunity, as the issuers successfully time the offer of new issues. Miller (1977, 1154) argued that rather conservative strategy, how security analysis should not be about finding undervalued assets which would have rapid price increases, but to avoid the overvalued ones, has beaten the market. The argument is valid for the results of this study also. Rock (1986) has also assumed that due to information asymmetry, there are better informed investors who avoid participating in overpriced IPOs. Based on the results of this thesis, it seems like the winner's curse anomaly is also present in the Finnish stock market.

For future research, the multiple valuation could be studied, whether companies are priced at a higher price during hot markets. As this research has concluded, during hot markets IPOs are on average underpriced, and therefore companies leave potential money on the table. As the market prices the company on the first trading day, it seems like companies could go public by a higher valuation. Another further research topic would be to examine whether the retail investors' sentiment change more during hot and cold periods than institutional investors sentiment, and whether the hot market underpricing is its

consequence. Also, it would be interesting to know, whether the returns differ between the companies where the owners retain a major share ownership after IPO, and the companies where the owners sell all their shares in the IPO. If the owners retain shares, they can profit from stock's performance, but by selling all may indicate that the IPO is way too overpriced, and the share price is probably going down. Another future research would be, how the ownership shifts between institutional and retail investors after the IPO.

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Appendix 1. Companies' market adjusted returns, %

Company	Market	IPO Date	$MAAR_0$	MABHR		
				12 months	24 months	36 months
Janton Oyj	Hot	11.3.1999	4.0	-29.5	-19.5	-8.7
Marimekko Oyj	Hot	12.3.1999	-17.2	-82.9	-26.2	36.3
Eimo Oyj	Hot	24.3.1999	-3.7	177.2	-54.6	-37.7
Teleste Oyj	Hot	30.3.1999	1.7	126.5	115.6	-5.8
Stonesoft Oyj	Hot	15.4.1999	0.2	902.8	183.0	12.5
TJ Group Oyj	Hot	22.4.1999	42.1	448.4	-48.1	-72.9
Technopolis Oyj	Hot	11.6.1999	-10.4	-36.1	-6.5	12.3
Perlos Oyj	Hot	22.6.1999	24.7	212.8	9.5	-25.3
Biohit Oyj	Hot	23.6.1999	12.4	6.4	16.9	-25.3
Sanitec Oyj Abp	Hot	6.7.1999	14.9	-43.9	33.1	37.8
TH Tiedonhallinta Oyj	Hot	6.9.1999	-2.4	-69.8	-62.8	-55.3
Tieto-X Oyj	Hot	28.9.1999	-2.6	-23.4	-16.4	-32.0
SysOpen Oyj	Hot	29.9.1999	53.4	-31.5	-22.4	-37.9
Oyj Liinos Abp	Hot	8.10.1999	8.0	-70.1	-53.3	-33.7
Proha Oyj	Hot	15.10.1999	-19.8	200.4	-41.7	-33.1
Aldata Solution Oyj	Hot	22.10.1999	19.1	649.7	38.6	-8.2
Data Fellows Oyj	Hot	5.11.1999	256.4	5.3	-48.4	-53.6
Comptel Oyj	Hot	9.12.1999	196.8	54.8	-28.8	-44.6
BasWare Oyj	Hot	29.2.2000	277.6	-36.1	-38.0	-25.5
Satama Interactive Oyj	Hot	15.3.2000	89.1	-58.0	-56.3	-40.0
Saunalahti Oyj	Hot	12.4.2000	-27.7	13.3	-54.5	-37.4
Etteplan Oyj	Hot	27.4.2000	2.8	-0.7	16.0	-6.0
Wecan Electronics Oyj	Hot	22.5.2000	2.1	3.0	-11.7	-17.4
Tekla Oyj	Hot	23.5.2000	2.3	-2.0	10.5	-22.3
Iocore Oyj	Hot	30.5.2000	8.4	-32.9	-47.2	-36.5
Digital Open Network Environment Oyj Done	Hot	20.6.2000	-10.8	-46.7	-54.5	-48.2
Biotie Therapies Oyj	Hot	29.6.2000	2.9	17.9	-13.7	-44.6
Tecnomen Oyj	Hot	30.6.2000	4.9	-38.8	-45.0	-45.0
Okmetic Oyj	Hot	3.7.2000	-2.4	14.7	6.4	-17.9
Beltton-Yhtiöt Oyj	Hot	9.10.2000	2.6	-4.2	32.8	58.6
Vacon Oyj	Hot	14.12.2000	15.0	42.9	29.5	48.6
SSH Communications Security Oyj	Hot	20.12.2000	-2.9	-56.3	-60.9	-65.3
QPR Software Oyj	Cold	8.3.2002	-31.1	-55.2	-71.3	-88.2
Kemira GrowHow Oyj	Cold	14.10.2004	5.9	-14.1	-58.6	18.6
Neste Oil Oyj	Cold	18.4.2005	9.3	32.6	-9.3	-14.8
AffectoGenimap Oyj	Cold	27.5.2005	-0.5	-80.1	-88.7	-62.1
Salcomp Oyj	Cold	13.3.2006	-0.4	-15.8	15.4	-9.1
Ahlstrom Oyj	Cold	14.3.2006	10.3	-18.7	-28.1	-20.2
FIM Group Oyj	Cold	13.4.2006	5.5	17.0	15.2	15.2
Outokumpu Technology Oyj	Cold	10.10.2006	1.9	272.2	44.9	106.7
Suomen Terveystalo Oyj	Cold	3.4.2007	0.5	-20.8	42.0	27.4

SRV Yhtiöt Oyj	Cold	12.6.2007	10.9	-23.1	-8.2	0.6
Eirikuva Digital Image Oyj Abp	Cold	3.12.2007	-23.2	-32.8	-50.5	-71.6
Siili Solutions Oyj	Cold	15.10.2012	9.8	-8.8	43.1	125.3
Orava Asuinkiinteistörahasto Oyj	Cold	14.10.2013	0.1	20.0	-18.8	-67.0
Restamax Oyj	Cold	28.11.2013	8.0	-33.9	-25.0	3.5
Verkkokauppa.com Oyj	Hot	4.4.2014	3.2	5.5	82.2	56.0
Herantis Pharma Oyj	Hot	11.6.2014	1.4	-82.0	-97.7	-80.3
Cleantech Invest Oyj	Hot	12.6.2014	-20.8	-21.1	78.4	370.0
Nexstim Oyj	Hot	14.11.2014	-2.0	-8.3	-110.1	-128.4
United Bankers Oyj	Hot	24.11.2014	4.2	19.6	-5.4	-19.9
Nixu Oyj	Hot	5.12.2014	-6.6	-6.3	34.2	174.8
Piippo Oyj	Hot	10.3.2015	12.2	-26.2	-31.7	-48.0
Detection Technology Oyj	Hot	16.3.2015	-3.1	31.4	174.5	279.9
Asiakastieto Group Oyj	Hot	27.3.2015	4.0	7.1	16.3	51.6
Robit Oyj	Hot	21.5.2015	8.0	10.1	65.1	-28.9
Pihlajalinna Oyj	Hot	4.6.2015	10.5	54.8	34.2	-21.9
Talenom Oyj	Hot	11.6.2015	-8.6	-14.9	53.1	66.6
FIT Biotech Oyj	Hot	1.7.2015	-34.4	-25.6	-115.4	-125.6
Kotipizza Group Oyj	Hot	7.7.2015	5.8	53.1	145.4	172.7
Elite Varainhoito Oyj	Hot	30.11.2015	4.7	-28.9	-40.9	-41.7
Evli Pankki Oyj	Hot	2.12.2015	23.5	-18.2	-3.3	-9.6
Consti Oyj	Hot	11.12.2015	5.8	41.9	-20.3	-49.4
Hoivatilat Oyj	Hot	31.3.2016	16.4	82.8	77.5	104.6
Lehto Group Oyj	Hot	28.4.2016	15.2	73.9	61.4	-56.1
Tokmanni Group Oyj	Hot	29.4.2016	1.2	9.0	-26.8	-10.5
Privanet Oyj	Hot	15.6.2016	-21.8	-34.0	-57.3	-97.5
Vincit Oyj	Hot	17.10.2016	45.4	-1.6	-11.0	-41.7
Heeros Oyj	Hot	10.11.2016	-10.4	-33.4	-32.5	-40.3
DNA Oyj	Hot	30.11.2016	-0.5	34.7	53.4	91.5
Next Games Oyj	Hot	23.3.2017	17.4	-31.0	-92.9	-70.4
Fondia Oyj	Hot	4.4.2017	28.3	20.9	11.4	-14.5
Kamux Oyj	Hot	12.5.2017	5.3	-27.5	-26.2	0.5
Remedy Entertainment Oyj	Hot	29.5.2017	18.6	2.6	29.1	223.2
Silmäasema Oyj	Hot	9.6.2017	9.3	-35.4	-26.2	-99.9
Rovio Oyj	Hot	29.9.2017	0.0	-67.0	-63.7	-53.2
Titanium Oyj	Hot	9.10.2017	12.8	4.2	33.0	49.0
Terveystalo Oyj	Hot	11.10.2017	2.5	-21.7	-9.3	-0.5
Gofore Oyj	Hot	16.11.2017	6.1	27.2	12.7	76.3
Efecte Oyj	Hot	8.12.2017	-6.5	-3.7	3.7	96.4
Admicom Oyj	Hot	9.2.2018	10.1	148.1	652.3	943.0
BBS-Bioactive Bone Substitutes Oyj	Hot	28.2.2018	-33.4	-11.5	50.8	-24.3
Harvia Oyj	Hot	22.3.2018	1.5	26.6	75.3	456.5
Altia Oyj	Hot	23.3.2018	3.5	-6.1	20.2	18.5

Enersense International Oyj	Hot	24.4.2018	-9.6	-60.1	-54.7	55.8
Kojamo Oyj	Hot	15.6.2018	1.2	60.4	120.8	103.1
Eezy Oyj	Hot	19.6.2018	5.3	-4.3	-17.7	-14.5
Fellow Finance Oyj	Hot	10.10.2018	4.1	-54.2	-73.1	-97.0
Rush Factory Oyj	Hot	16.11.2018	-0.6	-21.7	-64.2	-82.6
Viafin Service Oyj	Hot	20.11.2018	-3.9	-5.3	129.9	75.9
Nordic ID Oyj	Hot	30.11.2018	-14.2	-51.5	-87.4	-71.5
Oma Säästöpankki Oyj	Hot	30.11.2018	2.5	15.6	7.9	94.9
LeadDesk Oyj	Hot	15.2.2019	3.0	73.3	245.2	115.6
Aallon Group Oyj	Hot	8.4.2019	35.0	20.0	9.1	-1.5