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Master Thesis

How do long-run performance and underpricing of IPOs differ from private equity-backed, venture capital-backed and non-private equity-backed companies?

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0.0 Abstract

This paper investigates initial returns from the first-day, first-week, and first-month closing price to capture the underpricing of an initial public offering during two different market cycles, namely hot- and cold-issue markets. Furthermore, it investigates the long-run performance using buy-and-hold abnormal returns and cumulative abnormal returns. The data sample consists of 116 private equity-backed companies, 99 venture capital-backed companies, and 843 non-private equity-backed companies at New York Stock Exchange, Nasdaq Global Markets, and London Stock Exchange during 01.01.2000-31.12.2021. We find the first day underpricing for All Firms, PE, VC, and NPE at 16.9%, 16.4%, 16.2%, and 17.1%, respectively. We find significant evidence that larger firms outperform smaller firms in the long run in the terms of market capitalization at offer.

0.1 Preface

This thesis represents the completion of our Master of Science in Finance at BI Norwegian Business School. Writing our thesis has been challenging, time-consuming, entertaining, rewarding, and educational.

Our interest in private equity, venture capital and IPOs have been stimulated through exciting courses such as Applied Valuation and Advanced Corporate Finance and work experience. We have relevant jobs next to studying and real-life experience within finance, M&A, and capital markets.

What interests us the most with their investment methods is how they try to maximize their returns by combining several methods. Private equity firms do not have a standard way of approaching an investment, and it depends on the state of the market and the opportunities ahead.

We would like to thank, Janis Berzins, for his valuable comments and input during the process of presenting our results and writing.

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1.0 Introduction

Ritter (1984) was amongst the first academics to investigate the topic and is considered by some the leading author on the subject, having published several studies concerning IPO underpricing. An underpriced IPO in essence is when the first-day closing price exceeds the price at which the shares were offered. In financial academia, the phenomenon of underpricing of initial public offerings is a well-discussed problem. Researchers like Carter & Manaster (1990), Beatty & Ritter (1986), and Bergström et al. (2006) have looked further into exactly the reason for this phenomenon. They have been able to connect theories concerning asymmetric information, underwriters' reputation, and different market cycles with the degree of underpricing. In addition, they have investigated IPOs long-run performance and to what extent the mentioned theories impact long-run performance.

Further, researchers such as Kaplan et al. (1998), Levis (2011), Ritter (1991), Schöber (2008) and Van Frederikslust et al. (2006) investigated how underpricing, and the long-run performance of private equity-backed companies did in compared with non-backed companies. They found that due to asymmetric information, IPOs are underpriced because they need uninformed investors to participate. Prestigious underwriters should contribute to less underpricing and high investment activity periods seems to increase underpricing while decreasing the long-run performance. Further, researchers argue that IPOs, in general, underperform their benchmark in the long-run, while PE-backed firms experience a lower degree of underpricing and outperform their peers.

The global market has suffered from a lockdown of the social communities in recent years, which has affected the capital markets. We have experienced a market collapse, zero interest rates, a tough labour market, restricted travelling, home offices and a general shut down of physical communities. Interestingly, we experienced higher investing activity and new heights in the capital markets since the covid-collapse. The unintended consequences motivate us to include the recent years when studying underpricing and long-run performance.

We investigate underpricing and the long-run performance of IPOs within the period 2000 – 2021. More accurately, we try to explain and analyze the difference

in underpricing and long-run performance between private equity, venture capital and non-backed IPOs. The data sample consists of 1058 initial public offerings from New York Stock Exchange, Nasdaq Global Markets, and the London Stock Exchange from 01.01.2000 to 31.12.2021. Further, the data sample is divided between 116 PE-backed companies, 99 VC-backed companies and 843 non-backed companies. The thesis follows the methodology of Ritter (1984) when investigating underpricing by first-day, first-week, and first-month returns. We use Schöbers' (2008) methodology using buy-and-hold abnormal returns and cumulative abnormal returns to measure long-run performance by 12-month, 24-month, and 36-month periods. The thesis tries to depict the process of investing from an institutional investor or a high-net-worth individual's perspective, meaning IPOs will be bought at the offer price, which leads all measures to be calculated from the offer price.

Formally, we study how long-run performance and underpricing of IPOs differ from private equity-backed, venture capital-backed and non-private equity-backed companies.

We find significant evidence of underpricing for all definitions, meaning All firms, PE, VC and NPE. All firms experience underpricing of 16.9% for the first day close, 19.3% for the first week close, and 19.2% for the first month close on an aggregated level. Further, from an economic perspective, we see that PE has a lower underpricing in all periods compared to NPE, but unfortunately, we fail to prove it statistically. For the first day returns, we find lower mean values of underpricing in hot issue markets than cold, but we fail to prove it statistically. We also find lower mean values of underpricing for PE compared to NPE in hot issue markets, which shows that PE is less affected from an economic perspective. Still, sadly, we find no significance when investigating further. At last, we fail to prove that prestigious underwriters underprice IPOs less; in fact, we find significant evidence that they underprice IPOs more for PE in first month returns, which contradicts the research of Carter & Manaster (1990).

Our next part is to investigate the performance of our portfolios. We find sufficient evidence that "All firms" and "NPE" underperforms in 24- and 36-month period calculated by BHAR at -16.4% and -12.2%, and at -28.7% and

-28.2%, respectively, which is in line with previous research. Moreover, we find strong evidence that all firms underperform during the hot issue market compared to cold issue markets for every period by both BHAR and CAR metrics. We find compelling evidence that larger firms outperform smaller firms in terms of market capitalization at offer. Further, we also find evidence that companies that sell a higher percentage of equity outperform those that sell less. At last, we see that the technology industry is the highest performing industry for both BHAR and CAR metrics.

In section 2, we will go through theories and literature reviews on private equity, venture capital, underpricing of IPOs, and aftermarket performance. In section 3, we will go through our hypothesis and methodology, present our eleven main hypotheses, and introduce the variables used to solve our issues. In section 4, we will go through our data collection and classification of variables. Section 5 will present our results from the analyses and comment on the exciting discoveries. At last, in section 6, we will conclude our main findings of the study. Finally, we have suggested further studies and an appendix.

2.0 Theory and Literature

2.1 Private Equity

2.1.1 Definition

There are many definitions of PE, and hard to state the best fit. PE is a medium or long-term equity investment not publicly traded on an exchange, Cendrowski (2012). PE consists mainly of BO/LBO but also from investments in hedge funds, debt funds, and other securities. A BO/LBO is the process of gaining control of another company, meaning the private equity company acquire another company through an acquisition and then performs value-increasing changes. Very often, the assets of the acquired company are used as collateral for the LBO, and the cash flows from the acquired company's operations are used to service the debt. To what extent does private equity add value? Jensen (1989) argues that operational efficiencies, achieved by closer monitoring, management expertise, and higher levels of leverage are the critical value drivers for the private equity model. However, it is often assumed that such benefits typically accrue when a company is under private equity control. It is also reasonable to expect that

management and financial practices put in place at the time under private equity ownership will be maintained for at least some time after the exit, Levis (2011).

2.1.2 Structure

Private equity investing is typically carried out through a limited partnership structure in which the private equity firm or partnership serves as the general partner (GP). The limited partners (LPs) consist primarily of institutional investors and wealthy individuals who provide the bulk of the capital. We refer to each limited partnership as a fund, Kaplan et al. (2005). The LPs will commit to providing capital for the fund, and GP will invest the capital as agreed upon and return the capital after the investment horizon. PE funds can be seen as unregistered investment vehicles, and they do not report financials by the SEC compared to listed firms.

2.1.3 Life Cycle

The life cycle of a PE fund typically consists of four stages: Organization/ Fundraising, Investment, Management, and Harvest. The lifetime of the investments is limited, and the duration is ten years on average, Cendrowski, Harry et al. (2012). The mechanism through a private equity investment is an investment in another firm (BO, LBO or VC), improving the firm's value, and then, at last, an exit strategy which leaves a profit for the private equity fund.

Table 2.0 - Life Cycle of PE

The table is created with inspiration from Cendrowski, Harry et. al (2012)

Stage	**1**	**2**	**3**	**4**
Objective	Organization/ fundraising	Investment	Management	Harvest
Lifetime	Years 0 - 1.5	Years 1 - 4	Years 2 - 7	Years 4 - 10
Explanation	The PE fund will recruit investors (LPs) and determine its strategy and investment focus.	The capital raised is being placed.	GPs manage the portfolio company and make value increasing changes.	The PE fund uses an exit strategy and harvest profits.

2.1.4 Exit Strategy

There are several different exit strategies the PE fund can use to harvest its profits. The most common is selling to a strategic or financial buyer, a merger into another company, or an initial public offering (IPO). The PE funds will choose the exit strategy that maximizes the profits. They often exit through a strategic sale rather than an IPO because IPOs suffer from underpricing and leave much money on the table. Exit through an IPO can be more profitable if we are in a high investing market period, where valuations tend to be higher than normal, proven by research conducted by Ritter & Welch (2002).

2.2 Venture Capital

2.2.1 Definition

Venture capital refers to investments provided to early-stage, innovative, and high-growth startup companies. Typically, VC investments are seed-stage investments, providing financing to research, assess and develop an initial concept before a business has reached the startup chase, Cumming (2012). In essence, this is the same as private equity. The main difference is that VC does not want to take majority control of the company, impose its management strategies, and do a "turn-around" operation. Instead, they invest their money for the company to grow and let the founders continue with their business strategy.

2.3 Initial Public Offering

2.3.1 Definition

An initial public offering is when owners of a private company decide to take itself public, meaning they will offer their company's shares to third-party investors by listing on a stock exchange. Pros of IPOs are that it offers a source of liquidity to existing owners. Most companies coming to the market for the first time also exhibit some form of IPO discount, making them more attractive relative to their listed peers, Espinasse (2014). The main reasons for IPOs are raising equity capital and selling stakes in the business, providing diversification of shareholders.

2.4 Underpricing of an IPO

Underpricing of IPOs means that the shares are issued at a lower price than their intrinsic value. Underpricing in its simplest forms can be described as abnormal initial returns on a share, with the initial return as the first day, week, and month of trading. Studies suggest that underpricing of IPOs is very common. In fact, "Jay R. Ritter. IPO Data" shows that the average underpricing of IPOs in the United States from 1980 to 2021 was 18.9%, and an accumulated total of 229.72 billion dollars have been left on the table. There are many ways to explain this anomaly; one could be that the firms that do an IPO do not have any price history, making it hard to set a reasonable market price. In the eyes of investors, an IPO is only viewed as a success if the return on the first day of trading is positive. Thus, the issuer might be willing to leave money on the table, as seen from "Jay R. Ritter. IPO Data", such that the IPO will be deemed a success. Academics and researchers have researched IPO pricing since the early 60s, and the empirical evidence is solid in showing that there is significant underpricing of IPOs, which can be illustrated in the table below.

Table 2.1 - Previous Empirical Studies on IPO Pricing

The table sums up previous studies on IPO pricing with their time horizon, market, results and method used

Study	Period	Market	IPO Underprice (median)	Method
Reilly & Hatfield (1969)	1963 - 1966	US	9.9%	Price first Friday after offering
McDonald & Fisher (1972)	1969	US	28.5%	Price one week after offering
Ritter (1984)	1960 - 1982	US	18.8%	First day closing price
Beatty & Ritter (1986)	1981 - 1982	US	14.1%	First day closing price
Miller & Reilly (1987)	1982 - 1983	US	9.87%	First day closing price
Ljungqvist & Wilhelm (2003)	1996 - 2000	US	35.7%	First day closing price
Hahn, Ligon & Rhodes (2013)	1988 - 2009	Global	27.8% (11.1%)	First day closing price
Pukthuanthong et. al (2013)	1995 - 2002	Global	29.33%	Price on the 15th calender day after offering

As shown in table 2.1, we find ample empirical proof that underpricing of IPOs is a market anomaly. However, it is crucial to notice that not all use the same method. For example, McDonald & Fischer (1972) have used one-week aftermarket closing prices, while more recent studies have used first-day closing prices.

2.5 Factors That Explain IPO Underpricing

Many theories are trying to explain why underwriters underprice the IPOs. Probably the most famous theory assumes that there is some asymmetric information concerning the firms' actual value between the different entities involved (I.e., investors, underwriters, and the issuing firm) in the issuance of stock. In addition, much other research argues that one reason for this phenomenon is that the underwriter underprices IPOs as insurance against legal liability. However, Drake & Vetsuypens (1993) argued that lawsuit avoidance could not easily explain why IPOs are underpriced. In the following sections, we will review and describe in more detail the most discussed theories contributing to IPO underpricing.

2.5.1 Asymmetric Information

One of the theories with the most empirical support concerning IPO underpricing is the asymmetric information problem. The theory assumes that the pricing of an IPO is related to information inconsistency between the different stakeholders. Further, numerous theories within information asymmetry have been discussed among scholars.

First, information asymmetry might occur between uninformed and informed investors, as Rock et al. (1986) described. He theorized that uninformed investors would bid regardless of the quality of the IPO due to the lack of information. Uninformed investors require a return in the sense of risk compensation for bidding against informed investors with superior information. Also, informed investors will only bid when they can achieve good returns on their investments. In the long run, this will make uninformed investors back out of the market. However, the underwriters need the uninformed investor to participate because

there are only a select few informed investors. This is where underpricing comes in. The underwriters will underprice the IPO to attract uninformed investors.

Second, there will be information asymmetry between insiders and outsiders. As Booth & Smith (1986) argued, insiders tend to have more information than outsiders. This leads to insiders' ability to enrich themselves at the expense of the outsiders. From an outsider's perspective, they will know this and lower their bids because of the uncertainty of insider motivation leading to IPO underpricing.

Finally, Barons' (1982) model on IPO pricing predicts that offer prices will be lower than in the absence of asymmetric information between issuer and underwriter. The model assumes that underwriters and investment bankers have more information about current and future market conditions. In turn, this makes the issuer decide on the offer price to the underwriter. On the contrary, Muscarella & Vetsuypens (1989) test Barons' model when the issuer is the bank such that there, in theory, should be no information asymmetry, so-called self-marketed offerings. They find that such offerings are, on average underpriced by 7%. This concludes that information asymmetry amongst insiders and underwriters solely cannot explain why IPOs are underpriced, which leads us to believe that the combination of the three above must have some explanatory power. A possible explanation might be that underwriters may be incentivized to underprice the IPOs for future business and reputation, Loughran & Ritter (2004).

2.5.2 Hot Issue Market

Ibbotson & Jaffe (1975) and Ritter (1984) were among the first researchers to dig into the phenomenon of a hot issue market. It is defined as a market where the returns of IPOs are abnormally high. Contrary, a cold issue market is defined as a market where the returns of IPOs are lower than average. The subject has been widely studied, and researchers have found the issue market to be very cyclical. Although it proves challenging to explain the hot issue market, Ritter (1984) finds that the degree of expected underpricing is positively related to the degree of uncertainty of a security's expected intrinsic value, meaning riskier tends to have a higher degree of IPO underpricing. In addition, Loughran, Ritter & Lundqvist (1994) finds evidence that the degree of IPO underpricing will increase as the

general inflation-adjusted market valuations are higher. Based on mentioned studies, we can see a clear pattern of IPO underpricing in different market cycles. Further, Ritter & Welch (2002) investigated the IPO activity and how it relates to hot issue markets. They conclude that "high IPO activity may follow high underpricing because the underwriters will encourage more firms to go public when the public valuations turn out to be higher than expected and because the underwriters discourage firms from filing or proceeding with an offering when the public valuations turn out to be lower than expected".

2.5.3 Underwriter's Reputation

Carter & Manaster (1990) built their model based on Rock et al. (1986) to test whether the underwriter's reputation affects IPO underpricing. They argue that for prestigious investment banks to maintain their market reputation, they only market IPOs of low-risk firms. This results in a signal effect for the market as to whether the IPO will be correctly priced. They found a significant negative relation between underwriter prestige and price variance for the IPOs they run, meaning that IPOs from reputable investment banks will be less underpriced. Similarly, Schöber (2008) documents that hiring prestigious underwriters signals a certification that the price range is more accurate. This is because the expected net present value of their reputation and ability to generate business down the line is greater than the net present value of the gain of underwriting a "one-off" overpriced IPO and deceiving investors on IPO price, resulting in getting less business down the line. Michaely & Shaw (1994) also find that IPOs underwritten by reputable investment banks experience significantly less underpricing and perform better in the long run.

2.5.4 Private Equity-Backed IPO

We find evidence that there is less underpricing when the IPO is backed by PE compared to an average IPO considering the BO segment, Bergstrom et al. (2006). Their study consists of 152 PE-backed IPOs, and 1,370 NPE-backed IPOs from London Stock Exchange and Paris Stock Exchange from 1994 to 2004. The concluding analysis shows clear evidence that PE-backed IPOs tend to show lower degrees of underpricing and exhibit relatively better long-run performance than NPE-backed IPOs.

2.6 Post Listing Performance

2.6.1 Long-Run Performance

Ritter (1991) has also conducted a post-IPO performance in accordance with IPO underpricing. His study from 1975-1984 with over 1,500 observations looks at the long-run performance of listing post-IPO. His main conclusion is that new listings generally outperformed by his benchmark, which is similar companies. Other researchers such as Carter, Dark & Singh (1998), Loughran & Ritter (1995) and Levis (2011) found similar patterns when analyzing the post-IPO performance of the US- and the UK-listed firms. This suggests that there is substantial evidence of underperformance post-listing, and we should expect to find post-IPO underperformance in our study as well. Table 2.2 is a sample of selected studies that previously have researched long-run performance.

Table 2.2 - Previous Empirical Studies on IPO Long-Run Performance

The table sums up previous studies on IPO long-run performance with their time horizon, results, method, market, and benchmark used

Study	Period	Method	Performance	Market	Benchmark
Ritter (1991)	1975 - 1984	3-years BHAR 3-years CAR	-29.10% -27.40%	US US	CRSP Nasdaq CSRP Amex-NYSE
Loughan & Ritter (1995)	1970 - 1990	5-years BHAR	-50.80%	US	CRSP Nasdaq
Ritter & Welch (2002)	1980 - 2001	3-years BHAR	22.60%	US	CSRP Amex-NYSE
Bergström et al. (2006)	1994 - 2004	3-year CAR	-28.60%	UK/FR	FTSE All-Share Index
Schöber (2008)	1990 - 2006	5-years BHAR 5-years CAR	3.20% 3.10%	US US	S&P500 S&P500
Levis (2011)	1992 - 2005	3-years BHAR	-3.90%	UK	FTSE All-Share Index

2.6.2 Performance After Hot Issue Markets and Cold Issue Markets

Schultz (2003), in his paper researching pseudo market timing and long-run performance, finds a characteristic of IPO performance that had their listing during "heavy offering periods", or, as we define it ", hot issue market". He finds that offerings during these periods are more likely to underperform in the long run than those companies that go public during cold issue markets. We find evidence that offerings that occur during hot markets should expect lower long-run performance and vice versa; thus, we expect to see this in our analysis.

2.6.3 Private Equity Performance

Bergström et al. (2006) have researched the long-run performance of private equity-backed listings compared to non-private equity-backed listings on Paris Stock Exchange and London Stock Exchange. Their findings indicate that private equity-backed outperforms non-private equity-backed across all time horizons on an aggregated level. These results are consistent with the research conducted by Levis (2011), who looked at the long-run performance of private equity-backed listings and non-private equity-backed listings at the London Stock Exchange. The research concluded that private equity-backed listings outperform other listings, such as venture capital-backed and non-private equity-backed. A possible explanation for the outperformance is given by Jensen (1989), saying that private equity funds have closer monitoring, management expertise and higher levels of leverage which are the key value drivers for the private equity model, and this might result in higher value creation and better performance in the long run.

2.6.4 Abnormal Returns in Modern Times

Harris et al. (2016) investigate whether private equity funds outperform the benchmarks historically and in modern times. As we all know, in the 1980s, 1990s and early 2000s, we have sufficient evidence that investing through a private equity fund would give a premium return compared to the benchmark. However, Harris et al. (2016) report exciting findings on how the decline in the private equity overperforming the benchmark in modern days. The private equity funds still outperform the benchmarks on an aggregated level in gross returns, but is it worth it for the investor, considering the illiquidity and risk?

3.0 Hypoteses and Methodology

This section carefully explains how we plan to go ahead with testing our research question and what we need to do it. The thesis consists of two parts: first, we will investigate underpricing of IPOs and check whether there is less underpricing between our definitions, if there is higher underpricing during hot issue markets, how prestigious underwriters affect underpricing, and how the size of the firm affects the underpricing. At last, we will investigate the long-run performance of the IPOs with abnormal return measures, BHAR and CAR. We will use similar

variables as in the underpricing section to compare and investigate what affects the performances.

3.1 Hypotheses

To investigate and answer our research question, we have reviewed the literature and identified several hypotheses we wish to use to answer our questions. We have further collected variables based on our literature review to test our hypothesis questions.

3.1.1 Underpricing Hypothesis

Prior to previous research on initial public offerings, we have identified several exciting variables to investigate further that could help us solve our research question. We have found documented evidence of underpricing when companies go public, summarized in table 2.1; therefore, our first hypothesis will be:

Hypothesis 1:

There is underpricing in IPOs across all definitions (PE, VC and NPE) on NYSE, Nasdaq GM, and LSE

Previous studies, Bergström et al. (2006), also indicate the IPOs backed by private equity are less underpriced than non-backed IPOs; therefore, our second hypothesis will be:

Hypothesis 2:

There is less underpricing in PE than NPE on NYSE, Nasdaq GM, and LSE

Hot issue markets are an exciting phenome that, in past studies, have had a significant effect on underpricing; therefore, our third hypothesis will be:

Hypothesis 3:

There is higher underpricing across all definitions in "Hot Issue Markets" on NYSE, Nasdaq GM, and LSE

There is also evidence from previous studies that private equity-backed IPOs tend to be less affected by hot markets compared to non-backed IPOs; therefore, our fourth hypothesis will be:

Hypothesis 4:

PE is less affected by hot markets than NPE

Consistent with theories and research from Carter & Manaster (1990) and Schöber (2008), they found evidence that prestigious underwriters tend to underprice IPOs less; therefore, our fifth hypothesis will be:

Hypothesis 5:

There is less underpricing when the firm uses a top-ranked bookrunner

3.1.2 Long-Run Performance Hypothesis

The long-run underperformance of IPOs has been proven and documented several times in previous research; therefore, our sixth hypothesis will be:

Hypothesis 6:

All firms will experience underperformance in the long run

Moreover, the performance of IPOs backed by private equity seems to outperform non-backed IPOs; therefore, our seventh hypothesis will be:

Hypothesis 7:

PE will perform better than VC and NPE in the long run

The previous studies have given significant evidence that companies that go public in a hot issue market tend to underperform more than those who go public in a cold market; therefore, our eighth hypothesis will be:

Hypothesis 8:

All firms will experience a higher degree of underperformance when the firm is listed in a hot issue market

Again, PE is expected to be less affected by hot markets; therefore, our ninth hypothesis will be:

Hypothesis 9:

PE will be less affected by underperformance in hot markets than NPE

At last, we find it interesting to test for the matter of each firm size and how much equity sold, corresponding to some of the methodologies of Bergström et al. (2006); therefore, our tenth and eleventh hypotheses will be:

Hypothesis 10:

Firms with high market capitalization at offer will perform better than those lower amount

Hypothesis 11:

Firms that sell a more significant amount of equity will perform better in the long run

3.2 Hot Issue Market

We are inspired by the work done by Ritter & Welch (2002) and will investigate further the link between hot issue markets and IPO activity. We will identify the hot and cold market issues in our data sample by identifying the years with the most IPOs so that we can test how the underpricing and long-run performance are affected by the state of the market. Previous studies have shown that there tends to be a higher degree of underpricing when the companies go public in a hot issue market; also, firms tend to underperform in the long-run.

3.3 Asymmetric Information and Underwriter's Reputation

The literature review discusses that information asymmetry and underwriter reputation are closely linked to IPO underpricing. For assessing/testing these theories, we need to know which underwriter does which IPOs and see what degree of underpricing that particular IPO has. We will also test the significance and include this variable in our regression to see if they have any effect. We will only use this to test the underpricing phenomena. Contrary to what we have found in previous studies regarding this matter, we would like to provide our contrarian

view. It has been discussed and proved that prestigious underwriters underprice less, but we argue that it might not always be the case. For an illustration of our view: Companies like Goldman Sachs or JP Morgan, one of the "biggest" and "best" investment banks in the world, would want to keep their reputation and status. If they frequently start over-pricing and failing IPOs, they will lose their reputation as "the best", and firms will seek to use others because they are so expensive. This gives the initiative to underprice IPOs because they do not want to do failed IPOs resulting in reputational loss, leading to financial loss for the banks.

Further, investment banks also have an overallotment option, also called the "greenshoe option", when running IPOs that allows the sale of additional shares from the company. This overallotment is usually around 15%. By nature, if there is an increase in the stock price on day one, which is the same as underpricing, the investment banks can short the stock and turn around and buy shares at the original offer price from the company. Whether this is morally correct is not up to us to decide.

By these arguments, we argue that we do not expect to find precisely similar results to the previous research.

3.4 Firm Size Measures

Further, we find the measures used by Bergström et al. (2006) attractive, whereas they look into issue size and market capitalization at offer, so we wanted to create some similar. We want to see to what degree firm sizes matter on both IPO underpricing and the long-run performance of IPOs. Therefore, we have divided firm size measuring into two different variables: "Market capitalization at offer" and "Percentage Equity Sold". This is to see if any of the below can capture explanatory power in the dependent variable. To conduct this, we would need to know the offer size of the IPO, the total amount of shares offered, and the offering price. We intend to calculate the market capitalization at offer by discounting the market capitalization of every company in the sample with the total return from the IPO date to 31.12.2021.

$$Market\ Capitalization\ at\ Offer_i = \frac{Adjusted\ Share\ Price_i * Shares\ Outstanding_i}{(1 + r_{i,T})}$$

where i is the firm from the sample, $adjusted\ share\ price_i$ and $shares\ outstanding_i$ from 31.12.2021 are used to calculate market capitalization for firm i per 31.12.2021, and $r_{i,T}$ is the total return from adjusted IPO price to 31.12.2021 for every firm.

Then further calculate the equity sold by dividing the offer size/ deal size by the market capitalization at offer for every firm.

$$Equity\ Sold_i = \frac{Offer\ Size_i}{Market\ Capitalization\ at\ Offer_i}$$

where i is the firm in the sample, $offer\ size_i$ is the amount of equity sold in USD for firm i.

3.5 Value Weight

Further, we want to calculate a historical value-weighted portfolio based on the firm's size when going public. Since our sample consists of a different number of observations between our definitions, we created a value weight portfolio for "All firms", "PE", "VC", and "NPE". Our intuition is to see how a portfolio with the most prominent firms at IPO will perform in the long run compared to an equally weighted portfolio. We will calculate the weights by:

$$VW_i = \frac{V_i}{\sum V_i}$$

where V_i is the market capitalization at offer for $company_i$.

3.6 Underpricing

There are some critical considerations when addressing how to measure the initial return of IPOs. The debate on the length of the following period after an IPO and whether to adjust the return for any market movements or dividends/stock splits

must be considered. By looking at previous research, we find that earlier studies, such as Ibbotson et al. (1988), used the percentage increase from the offering price to the bid price at the end of the month following the offering. This is because, from 1960-1976, the OTC prices were not easily and readily available such as today and after the introduction of Nasdaq. While in the period 1977-1987, they used the first-day closing price. In more recent times, researchers are using the closing price on the first day to measure the initial return of an IPO (Bergström et al. (2006), Loughran & Ritter (2004), Schöber (2008)). This is backed by Ritter & Welch (2004), who use the first-day closing price and note that "Academics use the terms first-day returns and underpricing interchangeably", referring that most academics use first-day closing price as their measure. When addressing the concern of adjusting returns, researchers have discussed that it is not necessary to adjust returns for market movements because the market movements, such as an S&P 500 index, are relatively small compared to the mean returns of IPOs (Beatty & Ritter (1986), Ritter & Welch (2004), Schöber (2008)). Based on this, we will, similarly to Bergström et al. (2006) and Ritter (1984) and recent researchers, in measuring the underpricing of an IPO, define the initial return period as the period between the IPO offering price and the first-day closing price. In addition, for the thesis, we also want to look at the offer to the first week and the first month, similar to Ibbotson et al. (1988). We acknowledge that there might be a difference between the initial offering price and the opening price due to transactions on the OTC market, but we will use the offering price as this is set by the investment banks.

$$R_{i,t} = \frac{P_t - P_0}{P_0}$$

where $R_{i,t}$ is the return during the period, P_t is the share price at time t, P_0 is the adjusted IPO price, and t is either the first-day close, first week close or first month close.

We will divide the sample into different groups: one includes all IPOs (including PE-, VC- and NPE backed), one where we only have PE-backed, one VC-backed and one where we have NPE-backed. To analyze the size difference between IPOs, we will weigh (equally and value-weighted) the different IPOs by

their market capitalization at offer. The equally weighted (EW) return of the sample is calculated as follows:

$$R_t^{EW} = \frac{1}{n}\sum R_{i,t}$$

where $\sum R_{i,t}$ *is the aggregated returns of all companies in time t, and* n *is the total amount of companies in the sample.*

The value-weighted (VW) return of the sample is calculated as follows:

$$R_t^{VW} = \sum R_{i,t} * VW_i$$

where $R_{i,t}$ *is the return of* $company_i$ *in time t,* VW_i *is the corresponding company's value weight.*

3.7 Long-Run Performance

We will measure the long-run performance over three-time intervals: 12 months, 24 months, and 36 months. A more extended measurement period allows for detecting abnormal performance and identifying time-varying performance patterns, Bergström et al. (2006). A shorter time horizon of twelve months enables us to investigate whether it is profitable for an investor to hold newly listed IPO stocks over a shorter period. Previous academic literature states that the best methods for calculating long-term horizon abnormal returns are buy-and-hold abnormal returns (BHARs) and cumulative abnormal returns (CARs). BHARs have the advantage of exactly reflecting the experience of a buy-and-hold investor but tend to take extreme values due to multi-period compounding.

Consequently, some question the usefulness of BHARs in carrying out reliable statistical tests. In contrast, others are concerned that average BHARs can be dominated by a few firms whose shares skyrocket. Responding to these considerations, some academics advocate using CARs since their distributional properties are better understood than those of BHARs. However, this benefit has to be balanced against the severe drawback that CARs tend to be biased upwards

due to additive cumulation in the existence of a bid-ask spread, Schöber (2008). Further, we would like to investigate the abnormal returns for investors buying shares at the offering price to capture their total return. We follow the methodology of Schöber (2008) and calculate the monthly buy-and-hold abnormal returns (BHARs) for $company_i$ by the difference between the compounded return of the $company_i's$ stock and the compounded return of the respective benchmark:

$$BHAR_{i,T} = \prod_{t=1}^{T}(1 + R_{i,t}) - \prod_{t=1}^{T}(1 + R_{b,t})$$

where $R_{i,t}$ is the stock return of $company_i$ in month t, $R_{b,t}$ is the return of benchmark in month t, and T is the holding period. T will contain 12-months, 24-months or 36-months.

The cumulative abnormal return (CAR) for $compani_i$ until month t is derived by calculating the aggregated monthly abnormal returns:

$$CAR_{i,T} = \sum_{t=1}^{T}(R_{i,t} - R_{b,t})$$

where $R_{i,t}$ is the stock return of $company_i$ in month t, $R_{b,t}$ is the return of benchmark in month t, and T is the holding period. T will contain 12-months, 24-months or 36-months.

Finally, we use our value weighted measure to calculate abnormal returns when the portfolio is weighted by the size of the companies when going public:

$$BHAR_{i,T}^{VW} = BHAR_{i,T} * VW_i$$

where $BHAR_{i,T}$ is $company_i$ BHAR at time period T, and VW_i is the corresponding company´s value weight.

$$CAR_{i,T}^{VW} = CAR_{i,T} * VW_i$$

where $CAR_{i,T}$ is $company_i$ CAR at time period T, and VW_i is the corresponding company's value weight.

3.8 Portfolio Creation

We created four different portfolios to do our statistical analysis using described methods. One portfolio contains All firms in the sample, one where we include only NPE-backed firms, one with PE-backed firms, and one for VC-backed firms. We will use these portfolios to do the different statistical tests described below in section 3.9 Statistical Tests. Further, we will use these portfolios as an effective way to look at the difference in underpricing and performance between definitions. In addition, we created portfolios containing listings during hot/cold markets and by industry. Our control group in the sample will therefore be NPE-backed companies and use PE- and VC-backed companies as variables in our models with the purpose of testing differences and to what extent being in one portfolio means compared to another.

3.9 Statistical Tests

3.9.1 Hypothesis Testing

First, we need to check if the data is normally distributed to decide which tests we want to use. We decide to use both Shapiro Wilk and Jarque-Bera tests for this matter. This is very important because it determines which test we wish to use. Initially, we want to use means for comparison, but if our data set does not qualify for normal distribution, we may have to use medians. When testing the hypothesis to see if the means are statistically different from zero, we will use a two-sided t-test (example: Hypothesis 1, 2 and 3 etc.). Previous research (See Table 2.1 – Previous empirical studies on IPO pricing) has all reported and used means. Therefore, we will also do this in our thesis for underpricing. We use the same test when testing the difference in means across all subgroups.

Second, when testing for performance, we will use the same tests to check whether the returns are statistically different from zero and to see if any of the definitions outperform in relation to one another. We also use the same tests to check if there is any difference in performance when the company is listed in

hot/cold markets, also between all definitions. We will do this for all periods of measure, namely 12 months, 24 months and 36 months BHAR and CAR.

3.9.2 Regression Models

3.9.2.1 Underpricing

To check our models' linear correlation and robustness, we apply a multivariate regression model. All variables mentioned above are included in this model in addition to other variables such as underwriter, size of the company at offer, and how much equity was sold in the transaction. Considered relevant by previous research, Bergström et al. (2006). We choose to include these variables to ensure we capture as much explanation as possible and to reduce the issue of leaving out variables that may have importance. Also, to check whether the underpricing can be explained by industry, we will select the two industries that have the most and the least underpricing in our model.

To check for hot- and cold-issue market periods, we created a dummy variable with the value of 1 if the company is listed during a hot-issue market and 0 if not (Hot Issue Dummy). We also create dummies to control for PE and VC. For the issue of checking information asymmetry in IPO underpricing, we include a variable (Ranking), which is a dummy variable for ranking underwriters. We wanted to see whether bulge-bracket underwriters contribute to more or less underpricing; thus, we selected the top ten underwriters into one category. The dummy then takes the number 1 if the underwriter of the IPO is in the top ten and zero if otherwise. This ranking system is explained in section 4.2.2 "Underwriter Rank", and can be found in Appendix Table 9.0. The last variable we include is the percentage of equity sold in the transaction, more thoroughly described in section 4.2.3b "Equity Ranking". As previously mentioned, we run regressions on all three timings with the dependent variable as: 1. Offer to First Day Close, 2. Offer to First Week Close, 3. Offer to First Month Close and obtain the following regressions:

$$
\begin{aligned}
Undepricing_t = {} & \beta_0 + \beta_1 * PE\ DUMMY + \beta_2 * VC\ DUMMY + \beta_3 \\
& * HOT\ MARKET\ DUMMY + \beta_4 * BOOK\ RUNNER\ RANKING + \beta_5 \\
& * MARKET\ CAPITALIZATION\ AT\ OFFER + \beta_6 * EQUITY\ SOLD + \beta_7 \\
& * INDUSTRY\ LOW + \beta_8 * INDUSTRY\ HIGH + \varepsilon_t
\end{aligned}
$$

where t is either first-day close, first-week close or first-month close. Industry low is the industry subgroup with the lowest degree of underpricing in the sample. Industry high is the industry with the highest degree of underpricing in the sample.

3.9.2.2 Long Run Performance

When running a regression on performance, we use the same variables for underpricing, except that we exclude underwriter ranking. We do three different regressions for each measurement, BHAR and CAR, where our dependent variable (Y) is as follows:

$$BHAR_t = \beta_0 + \beta_1 * PE\ DUMMY + \beta_2 * VC\ DUMMY + \beta_3 * HOT\ MARKET\ DUMMY + \beta_4 * OFFER\ TO\ FIRST\ CLOSE + \beta_5 * MARKET\ CAPITALIZATION\ AT\ OFFER + \beta_6 * EQUITY\ SOLD + \beta_7 * INDUSTRY\ HIGH + \beta_8 * INDUSTRY\ LOW + \varepsilon_t$$

where t is either 12-month, 24-month or 36-month BHAR returns. Industry high is the industry subgroup with the highest returns in the sample. Industry low is the industry subgroup with the lowest returns in the sample.

And,

$$CAR_t = \beta_0 + \beta_1 * PE\ DUMMY + \beta_2 * VC\ DUMMY + \beta_3 * HOT\ MARKET\ DUMMY + \beta_4 * OFFER\ TO\ FIRST\ CLOSE + \beta_5 * MARKET\ CAPITALIZATION\ AT\ OFFER + \beta_6 * EQUITY\ SOLD + \beta_7 * INDUSTRY\ HIGH + \beta_8 * INDUSTRY\ LOW + \varepsilon_t$$

where t is either 12-month, 24-month or 36-month CAR returns. Industry high is the industry subgroup with the highest returns in the sample. Industry low is the industry subgroup with the lowest returns in the sample.

3.10 Limitations

The subject and research around underpricing and the long-run performance of companies going public are fascinating and can have many different turns. We are

primarily interested in focusing on hot vs cold markets and using market capitalization at offer and how much equity the company has sold. Therefore, we will exclude the pre-ownership from the private equity fund or the venture capital fund of the company when going public and instead look at the total amount of equity sold to the public. Also, we will use market capitalization at offer as a measure of the firm's size, rather than forecasting with inflation or rebalancing a weighted portfolio with the change in a firm's market capitalization during the time horizon, meaning we will keep the weight of each firm constant consistent to their historical size of their IPO, to test for its significance. Moreover, we will remove delisted firms from our sample to calculate a consistent market capitalization at offer for every firm in our sample.

3.11 Benchmark

To compare returns, we need a benchmark. We have chosen to use the MSCI World Total Return Index in our sample. This is because we collect data from two different markets, and for an international investor, it would make sense to use a benchmark that covers global world markets.

4.0 Data Collection

4.1 The Process and Sorting of Data

The initial data was downloaded from Bloomberg Markets, and our gross result was 2,400 observations. To sort our data, we excluded the following: Failed IPOs (meaning companies that never were traded), SPACs, Dual listings, additional Offerings (ADDL), Trust funds, REITs, companies taken private, and secondary listings because if the company is already listed on some other exchange, this will disturb the actual market price discovery or might have a bias as the market value is already known. The reason for eliminating these criteria is to reduce bias in our data sample, remove companies that are not trading in a public stock exchange, and remove data that are irrelevant to IPO underpricing.

After sorting and filtering through our data, we had a total of 1058 IPOs overall, where 400 were listed on the London Stock Exchange (LSE) and 658 were listed on the Nasdaq GM and New York Stock Exchange (NYSE) from January 2000 to December 2021. We have also collected monthly adjusted stock prices for each

company from the same period, January 2000 to December 2021, to capture the performance after listing. To calculate BHAR and CAR, we collected monthly index prices from MSCI World Total Return Index. We chose our three exchanges to analyze the biggest markets for IPOs. It is worth mentioning that we have excluded marketplaces like the OTC market and other submarkets due to insufficient data supply. All data are collected from Bloomberg terminals from BI to have a sufficient dataset. Some of the observations needed manual work due to missing data; in that case, we have collected missing data from the company's annual and quarterly reports, yahoo finance, news articles and other relevant sources.

Daily and monthly share prices was collected from 01.01.2000 - 31.12.2021 for our whole sample to be able to calculate IPO underpricing for Offer to first-day close, Offer to first-week close, Offer to first-month close, Offer to last close and lastly to be able to calculate the BHAR and CAR of each listing. We also collected other relevant data points such as industry, current shares outstanding, shares outstanding at offer, Bookrunner etc. In addition, we manually had to go through a large part of the data to see if it was correct. We then used the current number of shares outstanding, and the offer to date returns to calculate market capitalization at offer, which is one of the variables we used in our analysis. By obtaining the offer size/deal size, we could determine the amount of equity sold in each transaction.

4.2 Classification of Variables

4.2.1 Private Equity, Venture Capital and Non-Private Equity

An essential aspect of this thesis is how we define private equity and venture capital. This is crucial for the results, later on, to separate between the definitions and learn how they differ when investigating underpricing and long-run performance. We use the definitions from our literature review, Section 2.2, to divide private equity and venture capital into different portfolios. We extract our IPO data from Bloomberg Terminal, where we download separate predefined data samples of definition by pre-ownership, meaning backed by private equity or venture capital in the same periods and stock exchanges.

However, we got some observations where it was unclear to us about Bloomberg's classification of the pre-ownership. We tried to solve the problem by doing an extensive search, meaning we checked other sources such as company reports, their websites, articles, and web search. Sadly, we had to remove the observations we could not define as either private equity or venture capital. We ended up with 116 PE-backed companies, 99 VC-backed companies and 843 NPE companies. It is important to note that due to filtering, we might lose some important data.

4.2.2 Underwriter Rank

As we wish to measure the effect the underwriter has on the IPO underpricing issue, we downloaded a list of issuers participating in the deals from Bloomberg. Of course, there will be more issuers in the world than is represented by our dataset, and some of the issuers are not a participant in our dataset. However, we created a ranking system where we obtain specific measures from 01.01.2000 - 31.12.2021, see appendix table 9.0. Additionally, in some cases, there were no outright left lead bookrunner by definition. When this happened, we logically took the left-most bookrunner (left lead) from the bookrunners list.

Firstly, we measure the total deal size in terms of offer size. This data is obtained from Bloomberg Markets. Previous research argues that bulge bracket or more "prestigious" underwriters, by nature, can participate and handle more extensive offerings, which automatically will give them a higher score in our ranking system (Carter and Manaster (1990)). Second, we create a similar score on the underwriters' deal count where it is reasonable to believe that the more deals an underwriter has in combination with deal size, the more reputable they are. The third variable is "Credit", which is the aggregated amount credited to the advisor during the period. This variable shows how much money the bookrunners have made from equity offerings. The fourth variable is fees, self-explanatory, the aggregate product of the gross spread (underwriter commission) and the allocated shares. The fifth and last variable is the "Offer to date", the weighted average offer to date of all deals advised. Further, we created nine equal intervals for each metric and scored each underwriter based on an average across the indicators for a total score.

We then used this variable to create a dummy consisting of the "Top 10 underwriters" to see if the reputation of underwriters creates more underpricing or not.

Table 4.0 - Underwriter Ranking

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. The good bookrunners consists of the top 10 highest ranked, while the bad bookrunners consists of the remaining 131 underwriters.

	All firms	PE	VC	NPE
US				
Good	448	83	60	305
Bad	210	23	29	158
LN				
Good	18	2	0	16
Bad	382	8	10	364
Total				
Good	466	85	60	321
Bad	592	31	39	522

4.2.3 Firm Size Measures

4.2.3.1 Market Capitalization at Offer

To capture the size of the listed firm, we have calculated every firm's market capitalization at offer. We were able to collect every company's number of shares outstanding and their closing price per 31.12.2021, which gave us their market capitalization. Also, we had to calculate the adjusted return of every company from IPO price to the last closing price per 31.12.2021. With this measure, we could discount the market capitalization back to the company's market capitalization at offer. Since we have US- and UK-listed firms, we need the same currency. Therefore, we have collected exchange rates for GBP/USD and converted all GBP to USD on the same date the UK company goes public. This approach corresponds with Bergström et al. (2006), who conducted similar research on the London Stock Exchange and the Paris Stock Exchange.

We have investigated the spread of market capitalization of firms and made three intervals to categorize the firms in the sample. Every firm with a higher market capitalization at offer than 4 billion USD will be classified as "High". Every firm with a market capitalization at offer between 500 million USD and 4 billion USD

will be classified as “Medium”, and every firm below these intervals will be classified as “Low”.

Table 4.1 - Market Capitalization Ranking

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. High market capitalization indicates that the firm is going public with a market capitalization at offer above 4 billion, medium indicates that the firm is going public with more than 500 million but less than 4 billion, low is below 500 million.

	All firms	PE	VC	NPE
US				
High	70	14	2	54
Medium	334	68	26	240
Low	254	24	61	169
LN				
High	5	1	0	4
Medium	55	1	1	53
Low	340	8	9	323
Total				
High	75	15	2	58
Medium	389	69	27	293
Low	594	32	70	492

4.2.3.2 Equity Ranking

To capture the offering size and make it compatible with all firms, we have calculated the offering size in percentage. We collected the deal size/offer size from Bloomberg corresponding to every firm and calculated the market capitalization at offer. With these measures, we could simply calculate the equity sold to the public in percentage. Bergström et al. (2006) prove in their research that the bigger the offered size, the less underpricing of the IPO. Since our companies differ a lot in size, we made a variable applicable and comparable for every company in the sample, not depending on the firm size.

We investigated the spread of equity sold between all firms and made three intervals to categorize the firms, similar to the approach of market capitalization ranking. Every firm with a higher percentage of equity sold to the public than 50% is categorized as "High". Every firm with a percentage of equity sold between 15% and 50% are categorized as "Medium", and every firm below these intervals will be classified as "Low".

Table 4.2 - Equity Ranking

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. High equity ranking indicates that the firm sells more than 50% of the shares when going public, medium indicates that the firm sells less than 50% but more than 15%, low is below 15%.

	All firms	PE	VC	NPE
US				
High	45	4	7	34
Medium	384	68	67	249
Low	229	34	15	180
LN				
High	57	2	2	53
Medium	254	6	7	241
Low	89	2	1	86
Total				
High	102	6	9	87
Medium	638	74	74	490
Low	318	36	16	266

4.2.4 Industry

The industry in our dataset consists of Consumer Cyclical, Consumer Non-Cyclical, Energy, Technology, Utilities, Basic Materials, Communications, Financial, Industrial and Government. We followed the Bloomberg Industry Classification Standard to define our industries as it is default by Bloomberg. Table 4.3 shows how the industries are divided in the sample. In the likes of Consumer, Cyclical and Consumer, Non-Cyclical industries, we find subsectors such as retail and pharmaceutical, respectively. Further, Energy comprises mainly oil & gas related companies, not including electricity generation, which is found under Utilities. Financial cover the whole financial spectrum (excluding REITs and Trust funds etc. as described previously.) For the whole sample, we find that IPOs in the Consumer Non-Cyclical and Financial industries were the most frequent. Government IPOs are very rare; thus, we will remove those observations when calculating performance due to the low sample size. Most of our sample consists of NPE offerings, as pictured below, which, no surprise, also have the highest market capitalization at offer.

We can see a big difference in market capitalization at offer from LN and US. When looking at the average market capitalization at offer in table 4.4 we see the same pattern. In addition, Basic Materials and Consumer Non-Cyclical sectors, which contain highly volatile companies, with low assets and potentially no cash

flows, such as pharma and gold miner companies, are the most frequent in the London market. This leads us to believe or might be an indication that companies, especially within these industries, tend to seek offerings at earlier stages than those similar in the US. The same argument applies to the other sectors except the Consumer, Cyclical where the average market capitalization at offer is closer to that of the US companies. That said, we chose not to investigate this any further.

Table 4.3 - Industry Composition

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. The table display number of IPO listing per definition, and their respective total market cap in mUSD,

	IPO listings				Size (Market capitalization at offer in USDm)			
Industry	**NPE**	**PE**	**VC**	**Sample**	**NPE**	**PE**	**VC**	**Sample**
Consumer, Cyclical	47	22	1	70	71 537,3	36 100,4	102,9	107 740,6
Consumer, Non-Cyclical	235	43	53	331	226 435,0	81 367,3	14 713,7	322 515,9
Communications	55	6	14	75	120 999,4	8 247,6	14 505,5	143 752,5
Industrial	66	10	3	79	129 333,8	33 836,3	5 662,7	168 832,7
Technology	99	11	19	129	236 946,6	18 321,0	16 074,9	271 342,5
Financial	155	11	7	173	242 500,0	14 235,5	4 138,0	260 873,4
Energy	93	10	1	104	122 729,6	39 483,2	41,6	162 254,4
Basic Materials	79	3	1	83	38 845,3	3 233,0	86,2	42 164,5
Govenrment	2	0	0	2	295,8	0,0	0,0	295,8
Utilities	12	0	0	12	8 228,4	0,0	0,0	8 228,4
Total	843	116	99	1 058	1 197 851,2	234 824,2	55 325,3	1 488 000,7
				Averages	119 785,1	23 482,4	5 532,5	148 800,1
				LN Total	134 281,0			
				US Total	1 353 720,1			
				Total	1 488 001,1			

Table 4.4 - Industry Composition

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. The table display average Mcap at offer quoted in mUSD in each industry by country.

	IPO by country			
Industry	**London**	Avg. McapAt Offer (USDm)	**United States**	Avg. McapAt Offer (USDm)
Consumer, Cyclical	23	1020,1	47	1793,2
Consumer, Non-Cyclical	68	320,3	263	1143,5
Communications	23	296,4	52	2633,4
Industrial	31	199,7	45	147,9
Technology	45	162,8	84	3388,4
Financial	78	370,2	95	2442,1
Energy	59	386,4	45	3009,1
Basic Materials	69	239,7	14	1832,3
Govenrment	0	0,0	2	147,9
Utilities	4	123,2	8	967,0

4.2.5 Hot Issue Market and Cold Issue Market

Like Ibbotson & Jaffe (1975) and Ritter (1984), we identify hot and cold periods to check for this issue in our data set. We name them "Hot Issue Market" and "Cold Issue Market". We have defined our hot markets as the periods with the highest IPO activity and vice versa. Our hot market periods are 2004-2006, 2014,

and 2017-2021 due to higher IPO activity in our sample. We see a significant ramp-up in IPOs leading to the housing bubble, followed by significantly fewer offerings. Roughly 45% of our total IPOs happened from 2017 through 2021, which in our opinion, might give us an interesting result due to quantitative easing and the covid crisis.

Table 4.5 - IPO Listing

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. The hot market periods extend between 2004-2006, 2014 and 2017-2021, while the remaining years are classified as cold market periods.

	All firms	PE	VC	NPE
Whole Sample				
2000	23	0	0	23
2001	13	1	0	12
2002	9	0	0	9
2003	14	0	0	14
2004	46	0	0	46
2005	54	0	0	54
2006	55	3	0	52
2007	31	1	0	30
2008	15	0	1	14
2009	8	1	0	7
2010	23	5	0	18
2011	22	2	0	20
2012	27	4	4	19
2013	48	10	8	30
2014	95	9	23	63
2015	54	11	12	31
2016	49	6	10	33
2017	70	15	13	42
2018	90	15	19	56
2019	60	10	9	41
2020	85	9	0	76
2021	167	14	0	153
Total	**1058**	**116**	**99**	**843**

4.3 Data Criticism

We are delighted with the quality and reliability of our data sample. However, the selection and verification of data have been very challenging, and we realize that our data sample is not flawless and might contain some wrong observations. Since Bloomberg Markets is our only source of raw data, we might have missed out on some data points that other providers would be able to provide. Although we could not access many other exclusive sources, we thought Bloomberg still would provide good data.

Second, because we have excluded delisted companies, our data may suffer survival bias, as Ritter (1991) mentioned. Third, as mentioned under section 4.2.1, the main issue with companies that were both PE and VC backed. We tried our best by thoroughly researching news articles, prospectus, and other sources on the internet to find out, which we managed for some. We also contacted several different exchanges and associations to get any info on this matter, but we got no reply. The ones that we did not manage to figure out, we removed from the dataset. Another note is that the industries are classified using Bloomberg Industry Classification Standard, which may differ from other Classification Standards. Fourth, our data sample from LSE is limited compared to the US, meaning we only have ten observations from PE and ten from VC over the entire period.

At last, since our analysis ended in December 2021, our results may be misleading to the reader of the future. In hindsight, from 2017/2018, firms classified as "Growth stocks", especially in the technology and communication sector, have seen an immense increase in value prior to and through the covid pandemic. Since our data ended in 2021, we have not been able to capture the steep fall in share prices since the beginning of 2022, which may lead our return data to be biased.

4.3.1 Biases

As briefly mentioned previously, our data may suffer from different biases. Because we have had to filter through the classification of companies, exclude secondary listing and all measures we have taken to arrive at our final data set, our data may suffer from selection bias. This may lead to some of our conclusions being false. We are confident that we have done an excellent job regarding this matter, and the selection bias should not be a big issue.

Next, we want to mention the survival bias. This is linked to selection bias. Since we have removed delisted companies, we only have firms still trading and trading since inception. In some way, this is linked to selection bias and may create inaccurate results. That said, not a large portion of our data was delisted.

Lastly, as with any other model or statistical analysis, we might be subject to the omitted variable bias. Deciding which variables to pick for regression analysis is

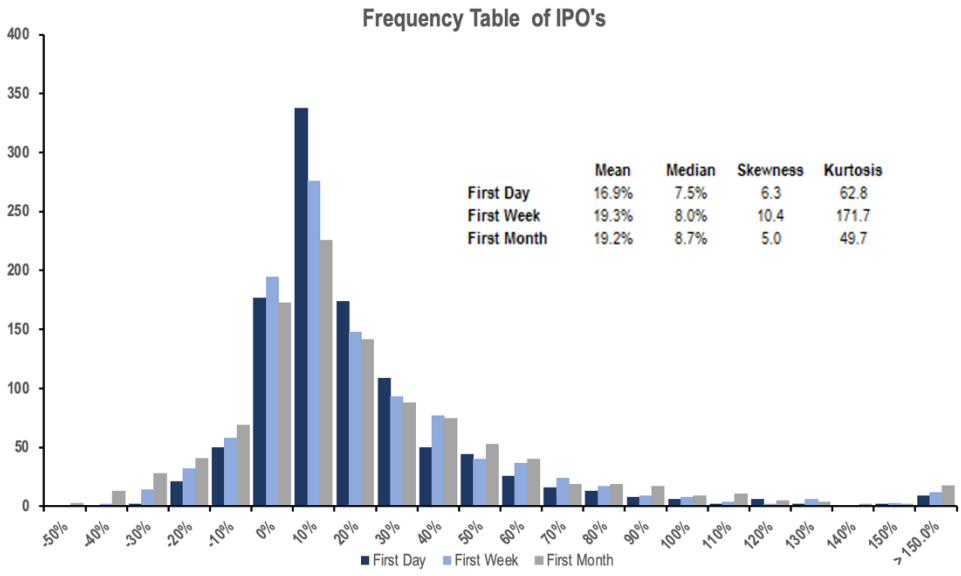
not an easy issue. Therefore, as mentioned, we will run several test regressions to see which model has the highest explanatory power to ensure the best results. However, since we have chosen not to consider the operational perspective of performance on listings, we identify this as a possible variable that has been omitted.

5.0 Analysis and Results

This section includes our analysis described in the methodology section and presents our results. First, we present our results from the underpricing analysis on a subgroup level, where we use a two-sided t-test to find out if there is any evidence for underpricing. Then we test for differences between subgroups. Second, we present our results from the performance analysis on a subgroup level. We use a Wilcoxon Signed Rank test to check which of our variables have contributed the most significant returns compared to the MSCI World Index. We will finish both analysis parts with a multivariate regression for underpricing in all periods and BHAR and CAR for 12, 24 and 36 months.

5.1 IPO Underpricing

5.1.1 Distribution of First Day, First Week and First Month Returns



From figure 5.0, we see the distribution of the first-day, first-week and first-month returns. By observing the table and calculating its skewness and kurtosis, we suspect that the data does not satisfy the normality condition. As mentioned in the

Methodology section, we run two separate tests to check for normality. The first is the Shapiro-Wilk normality test with a p-value of approx. 0, we can reject the null hypothesis that the data is normally distributed. This is also confirmed by the Jarque-Bera test, with a p-value of 0, which confirms that our data is not normally distributed. This raises an issue when looking at the data because something may pull the mean to either direction. From figure 5.0, we can see that the means and medians are pretty far apart. In our scenario, when the data is not normally distributed, it would be preferred to use the median as the source of interpretation. However, because previous studies all have used the mean, we will do the same (See Reilly & Hatfield (1969), Ritter (1984)). This has importance when choosing hypothesis testing. Since we are using means, we go forward with a standard two-sided t-test as discussed in the methodology.

5.1.2 Underpricing and Hot Issue Markets

Table 5.1 - First day, first week and first month returns by IPO subgroups by definition and market activity

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. The hot market periods extend between 2004-2006, 2014 and 2017-2021, while the remaining years are classified as cold market periods. The value weighted returns are calculated by dividing each company's market capitalization at offer by the total market capitalization at offer of all firms in the sample. The equal weighted returns are tested by using a two-sided t-test under the null hypothesis that the averages do not differ from zero.

Panel I: The entire, hot and cold period of first day returns					
		All firms	**PE**	**VC**	**NPE**
Entire period	Equal weighted average	0,169***	0,164***	0,162***	0,171***
	Value weighted average	0,229	0,149	0,240	0,251
	Observations	1058	116	99	843
Hot issue market	Equal weighted average	0,176***	0,153***	0,176***	0,180***
	Value weighted average	0,171	0,106	0,180	0,189
	Observations	722	75	64	583
Cold issue market	Equal weighted average	0,154***	0,185***	0,137**	0,152***
	Value weighted average	0,058	0,043	0,060	0,062
	Observations	336	41	35	260
Panel II: The entire, hot and cold period of first week returns					
		All firms	**PE**	**VC**	**NPE**
Entire period	Equal weighted average	0,193***	0,168***	0,180***	0,198***
	Value weighted average	0,217	0,850	0,146	0,184
	Observations	1058	116	99	843
Hot issue market	Equal weighted average	0,200***	0,156***	0,176***	0,208***
	Value weighted average	0,153	0,059	0,094	0,145
	Observations	722	75	64	583
Cold issue market	Equal weighted average	0,179***	0,189***	0,189***	0,176***
	Value weighted average	0,064	0,026	0,052	0,039
	Observations	336	41	35	260
Panel III: The entire, hot and cold period of first month returns					
		All firms	**PE**	**VC**	**NPE**
Entire period	Equal weighted average	0,192***	0,156***	0,220***	0,194***
	Value weighted average	0,224	0,062	0,125	0,196
	Observations	1058	116	99	843
Hot issue market	Equal weighted average	0,191***	0,124***	0,192***	0,199***
	Value weighted average	0,159	0,043	0,056	0,158
	Observations	722	75	64	583
Cold issue market	Equal weighted average	0,194***	0,215***	0,272***	0,181***
	Value weighted average	0,066	0,019	0,069	0,038
	Observations	336	41	35	260

****: significant at 1%, **: significant at 5%, *: significant at 10%*

Our first hypothesis is to determine whether underpricing is present when firms of any definition (PE, VC or NPE) go public. Table 5.1 summarizes the returns from the IPO price to the first day, first week and the first-month closing price for the underpricing of our different definitions. We observe that all our equal-weighted mean observations are significant at 1%, indicating sufficient evidence of underpricing in every definition subgroup in the entire period, hot market issue period and cold issue market period. For the first day returns, “All firms” are

16.9% underpriced, while “PE”, “VC”, and “NPE” are 16.4%, 16.2%, and 17.1% underpriced, respectively. This is in line with our first hypothesis and previous study in our literature review. We can see that the level of underpricing is very similar to Ritter's (1984) sample from 1960 to 1982, which proves that underpricing is still a fact. Our results bring significant evidence of underpricing, and we accept our first hypothesis.

Furthermore, we observe that PE looks less underpriced than NPE but more underpriced than VC in the first day returns in the whole period. PE remains the least underpriced definition in first-week and first-month in line with Bergström et al. (2006), while VC ends up being the most underpriced definition in the first month of returns. Moving over to hot and cold periods, we observe that for the first day returns all definitions except PE are more underpriced in hot markets. We find it interesting that cold markets are more underpriced than hot markets for all firms in first-month returns. We will test for differences in definition and hot/cold markets to look for more evidence.

Table 5.2 - Testing the difference in the average first day, first week and first month returns between subgroups of definition

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. Panel I, II and III test the hypothesis that the distribution of first day, first week and first month returns between two definition subgroups does not differ using a two-sided t-test showning the corresponding p-values.

Panel I: The entire time period of first day returns						
	NPE/PE		**NPE/VC**		**PE/VC**	
Equal weighted average	0,171	0,164	0,171	0,162	0,164	0,162
Observations	843	116	843	99	116	99
P-value	0,856		0,830		0,962	
Panel II: The entire time period of first week returns						
	NPE/PE		**NPE/VC**		**PE/VC**	
Equal weighted average	0,198	0,168	0,198	0,180	0,168	0,180
Observations	843	116	843	99	116	99
P-value	0,583		0,765		0,755	
Panel III: The entire time period of first month returns						
	NPE/PE		**NPE/VC**		**PE/VC**	
Equal weighted average	0,194	0,156	0,194	0,220	0,156	0,220
Observations	843	116	843	99	116	99
P-value	0,420		0,600		0,205	

Our interesting discoveries from table 5.1 encourage us to look deeper into the definitions' underpricing differences. This brings us to our second hypothesis, whether PE is less underpriced than NPE. Table 5.2 summarizes differences in means using a two-sided t-test, where we compare all definitions against one

another to see if one has statistically more/less underpricing than the other. Sadly, we find no evidence that there is less underpricing in PE compared with NPE for all periods, so we reject our second hypothesis. We find no significant results from any differences in definitions. This is contrary to previous research such as Levis (2011), who documents that PE-backed companies experience lower underpricing than others.

Economically speaking, we report lower mean values in PE than in NPE, which indicates that, on average in our sample, PE is less underpriced than NPE.

Table 5.3 - Testing the difference in the average first day, first week and first month returns between subgroups of definition and market activity

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. The hot market periods extend between 2004-2006, 2014 and 2017-2021, while the remaining years are classified as cold market periods. Panel I, II and III test the hypothesis that the distribution of first day, first week and first month returns between hot and cold market subgroups does not differ using a two-sided t-test showning the corresponding p-values. NPE/PE Hot/Hot tests the returns from hot NPE and hot PE does not differ using a two-sided t-test.

Panel I: The entire time period of first day returns										
	ALL Cold/Hot		**PE Cold/Hot**		**VC Cold/Hot**		**NPE Cold/Hot**		**NPE/PE Hot/Hot**	
Equal weighted averag	0,154	0,176	0,185	0,153	0,137	0,176	0,152	0,180	0,180	0,153
Observations	336	722	41	75	35	64	260	583	583	75
P-value	0,385		0,571		0,537		0,360		0,552	
Panel II: The entire time period of first week returns										
	ALL Cold/Hot		**PE Cold/Hot**		**VC Cold/Hot**		**NPE Cold/Hot**		**NPE/PE Hot/Hot**	
Equal weighted averag	0,179	0,200	0,199	0,156	0,189	0,176	0,176	0,208	0,208	0,156
Observations	336	722	41	75	35	64	260	583	583	75
P-value	0,553		0,552		0,842		0,459		0,476	
Panel III: The entire time period of first month returns										
	ALL Cold/Hot		**PE Cold/Hot**		**VC Cold/Hot**		**NPE Cold/Hot**		**NPE/PE Hot/Hot**	
Equal weighted averag	0,194	0,191	0,215	0,124	0,272	0,192	0,181	0,199	0,199	0,124
Observations	336	722	41	75	35	64	260	583	583	75
P-value	0,911		0,180		0,324		0,601		0,209	

We test whether there is a significant difference between hot and cold markets for every definition. Also, we test to see the difference between the hot-issue market for NPE and PE. Table 5.3 displays our results in relation to our third hypothesis, which was to prove that there is more underpricing in hot issue markets compared to cold issue markets. Interestingly, we cannot find evidence that there is any difference in underpricing during hot and cold markets for any subgroups, which leads us to reject our third hypothesis. Moreover, our fourth hypothesis was to test whether PE is less underpriced in hot-issue markets than NPE. We can see that the means from our sample show a lower degree of underpricing of PE compared to NPE, but sadly, we find no significance and therefore must reject the hypothesis. This contradicts Bergström et al. (2006) and Levis (2011) that there will be a higher degree of underpricing in hot markets and that PE-backed companies will

experience less underpricing than NPE. Again, we find no significance in our test results.

5.1.3 Underpricing and Bookrunner´s Effect

Table 5.4 - First day, first week and first month returns by IPO subgroups by definition and bookrunner ranking

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. The good bookrunners consists of the top 10 highest ranked, while the bad bookrunners consists of the remaining 131 underwriters. The value weighted returns are calculated by dividing each company's market capitalization at offer by the total market capitalization at offer of all firms in the sample. The equal weighted returns are tested by using a two-sided t-test under the null hypothesis that the averages do not differ from zero.

Panel I: The entire period of first day returns					
		All firms	**PE**	**VC**	**NPE**
Good bookrunners	Equal weighted average	0,169***	0,175***	0,223***	0,157***
	Value weighted average	0,196	0,122	0,224	0,219
	Observations	466	85	60	321
Bad bookrunners	Equal weighted average	0,170***	0,133***	0,069	0,180***
	Value weighted average	0,032	0,027	0,017	0,033
	Observations	592	31	39	522
Panel II: The entire period of first week returns					
		All firms	**PE**	**VC**	**NPE**
Good bookrunners	Equal weighted average	0,179***	0,193***	0,220***	0,168***
	Value weighted average	0,186	0,073	0,137	0,163
	Observations	466	85	60	321
Bad bookrunners	Equal weighted average	0,204***	0,099**	0,119***	0,217***
	Value weighted average	0,030	0,011	0,009	0,022
	Observations	592	31	39	522
Panel III: The entire period of first month returns					
		All firms	**PE**	**VC**	**NPE**
Good bookrunners	Equal weighted average	0,205***	0,203***	0,268***	0,194***
	Value weighted average	0,193	0,055	0,118	0,178
	Observations	466	85	60	321
Bad bookrunners	Equal weighted average	0,182***	0,028	0,146***	0,194***
	Value weighted average	0,031	0,007	0,008	0,017
	Observations	592	31	39	522

****: significant at 1%, **: significant at 5%, *: significant at 10%*

We test to see how prestigious bookrunners affect the underpricing of IPOs compared to less prestigious determined by our ranking system, appendix table 9.0. Our results are listed in table 5.4, and we find only significant results in first-day returns for all definitions for both good and bad bookrunners, except for VC in bad bookrunners, which is not significant. By observing the mean values, we see that for "All firms" and "NPE", good bookrunners tend to underprice less than bad bookrunners. This is not the case for PE, which has opposite results.

Moving over to the first-week returns and find only significant returns from Good and Bad bookrunners. We observe that good bookrunners underprice "All firms" and "NPE" more minor, and the opposite for "PE" and "VC".

We observe that PE has lost its significance in the first-month returns. Interestingly, we also observe that all definitions have larger mean values, meaning higher underpricing when using good bookrunners, except "NPE", which reports the same values for good and bad bookrunners.

Table 5.5 - Testing the difference in the average first day, first week and first month returns between subgroups of bookrunner ranking for All firms and PE

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. The good bookrunners consists of the top 10 highest ranked, while the bad bookrunners consists of the remaining 131 underwriters. Panel I, II and III test the hypothesis that the distribution of first day, first week and first month returns between Good and Bad bookrunner subgroups does not differ using a two-sided t-test showning the corresponding p-values.

Panel I: The entire period of first day returns				
	Good/Bad All firms		**Good/Bad PE**	
Equal weighted average	0,169	0,170	0,175	0,133
Observations	466	592	85	31
P-value	0,950		0,489	
Panel II: The entire period of first week returns				
	Good/Bad All firms		**Good/Bad PE**	
Equal weighted average	0,179	0,204	0,193	0,099
Observations	466	592	85	31
P-value	0,459		0,120	
Panel III: The entire period of first month returns				
	Good/Bad All firms		**Good/Bad PE**	
Equal weighted average	0,205	0,182	0,203	0,028
Observations	466	592	85	31
P-value	0,413		0,015	

Our fifth and last hypothesis for underpricing is to test whether there is less underpricing when using a prestigious bookrunner as an underwriter. From table 5.5, we find that the only significant difference is the first-month return between PE good and bad bookrunners at the 5% level and reports values of 20.3% and 2.8%, respectively. This tells us that "Bad" bookrunners provide less underpricing than "Good", somewhat confirming our contrary view mentioned in the methodology section. Therefore, we reject our fifth hypothesis. Interpreting these results economically, we can see a clear pattern where prestigious underwriters underprice less for all firms except for the first-month. However, the results show the opposite when looking at the difference for the PE-backed firms.

5.1.4 Underpricing and Market Capitalization Ranking

Table 5.6 - First day, first week and first month returns by IPO subgroups market capitalization ranking for All firms

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. High market capitalization indicates that the firm is going public with a market capitalization at offer above 4 billion, medium indicates that the firm is going public with more than 500 million but less than 4 billion, low is below 500 million. The value weighted returns are calculated by dividing each company's market capitalization at offer by the total market capitalization at offer of all firms in the sample. The equal weighted returns are tested by using a two-sided t-test under the null hypothesis that the averages do not differ from zero.

Panel I: The entire period of first day returns				
		High All firms	**Medium All firms**	**Low All firms**
Entire period	Equal weighted average	0,251***	0,168***	0,160***
	Value weighted average	0,158	0,062	0,008
	Observations	75	389	594
Panel II: The entire period of first week returns				
		High All firms	**Medium All firms**	**Low All firms**
Entire period	Equal weighted average	0,244***	0,184***	0,193***
	Value weighted average	0,139	0,068	0,009
	Observations	75	389	594
Panel III: The entire period of first month returns				
		High All firms	**Medium All firms**	**Low All firms**
Entire period	Equal weighted average	0,259***	0,197***	0,180***
	Value weighted average	0,142	0,072	0,010
	Observations	75	389	594

****: significant at 1%, **: significant at 5%, *: significant at 10%*

We wanted to see if there is a significant difference in the underpricing of firms depending on the size of the firm when it is taken public. Table 5.6 summarizes our results when testing that underpricing is significantly different from zero of our market capitalization at offer sizes. By looking at the first-day returns, we see a pattern that the larger market capitalization at offer, the higher degree of underpricing, whereas all are significant at 1%.

Moving on to the first-week returns, we observe a different pattern than the first-day returns. Whereas "High" still reports the highest value of underpricing, it is followed by "Low". All returns are significant at 1%.

At last, we investigate the first-month returns, and now we see the same patterns as in first-day returns. The more prominent firm in terms of market capitalization at offer, the more considerable degree of underpricing. All mean values er significant at 1%.

Table 5.7 - Testing the difference in the average first day, first week and first month returns between subgroups of market capitalization ranking for All firms

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. High market capitalization indicates that the firm is going public with a market capitalization at offer above 4 billion, medium indicates that the firm is going public with more than 500 million but less than 4 billion, low is below 500 million. Panel I, II and III test the hypothesis that the distribution of first day, first week and first month returns between two definition subgroups does not differ using a two-sided t-test showning the corresponding p-values.

Panel I: The entire time period of first day returns						
	High/Medium All firms		**High/Low All firms**		**Medium/Low All firms**	
Equal weighted average	0,251	0,168	0,251	0,160	0,168	0,160
Observations	75	389	75	594	389	594
P-value	0,037		0,076		0,743	
Panel II: The entire time period of first week returns						
	High/Medium All firms		**High/Low All firms**		**Medium/Low All firms**	
Equal weighted average	0,244	0,184	0,244	0,193	0,184	0,193
Observations	75	389	75	594	389	594
P-value	0,190		0,502		0,800	
Panel III: The entire time period of first month returns						
	High/Medium All firms		**High/Low All firms**		**Medium/Low All firms**	
Equal weighted average	0,259	0,197	0,259	0,180	0,197	0,180
Observations	75	389	75	594	389	594
P-value	0,209		0,196		0,568	

We found exciting results in table 5.6 and will investigate this matter more narrowly. Further, we test the differences between the size of the firm in terms of market capitalization at offer. We indeed see some exciting results from first-day returns, whereas we find significant results that "High" underprice more than "Medium" at 5%, and "High" underprice more than "Low" at 10%. We found evidence that larger firms underprice IPOs more than the smaller firms on the first day. These are different findings from that of Bergström et al. (2006), who argue and prove that for more prominent firms, we can expect less underpricing. Our other results are not significant.

5.1.5 Underpricing and Equity Ranking

Table 5.8 - First day, first week and first month returns by IPO subgroups equity ranking for All firms

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. High equity ranking indicates that the firm sells more than 50% of the shares when going public, medium indicates that the firm sells less than 50% but more than 15%, low is below 15%. The value weighted returns are calculated by dividing each company's market capitalization at offer by the total market capitalization at offer of all firms in the sample. The equal weighted returns are tested by using a two-sided t-test under the null hypothesis that the averages do not differ from zero.

Panel I: The entire period of first day returns				
		High All firms	Medium All firms	Low All firms
Entire period	Equal weighted average	0,194***	0,161***	0,179***
	Value weighted average	0,008	0,063	0,157
	Observations	102	638	318
Panel II: The entire period of first week returns				
		High All firms	Medium All firms	Low All firms
Entire period	Equal weighted average	0,256***	0,193***	0,173***
	Value weighted average	0,012	0,070	0,135
	Observations	102	638	318
Panel III: The entire period of first month returns				
		High All firms	Medium All firms	Low All firms
Entire period	Equal weighted average	0,248***	0,196***	0,166***
	Value weighted average	0,014	0,074	0,137
	Observations	102	638	318

****: significant at 1%, **: significant at 5%, *: significant at 10%*

We wanted to test if there is a significant difference in underpricing depending on how much equity the firm offers to the public. Table 5.8 summarizes our results when testing for significant differences in returns from zero. By looking at the first day returns, we observe the highest degree of underpricing from "High", followed by "Low", then "Medium", all significant at 1%. We see no explainable pattern at first-day returns.

Moving over to first-week returns, we see that the more significant equity offering in percentage, the higher degree of underpricing. All returns are significant at 1%.

At last, we observe the same pattern in one-month returns, all significant at 1%. We can now build a theory from our sample, stating that the more significant equity offering in percentage, the higher degree of underpricing. Economically speaking, this makes perfect sense when considering that there is more equity to be sold and to be able to sell it, there will need to be some discount. We argue that because the underwriters have to sell more, they will underprice it more to ultimately sell out the book and do a successful IPO.

Table 5.9 - Testing the difference in the average first day, first week and first month returns between subgroups of equity ranking for All firms

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. High equity ranking indicates that the firm sells more than 50% of the shares when going public, medium indicates that the firm sells less than 50% but more than 15%, low is below 15%. Panel I, II and III test the hypothesis that the distribution of first day, first week and first month returns between two definition subgroups does not differ using a two-sided t-test showning the corresponding p-values.

Panel I: The entire time period of first day returns						
	High/Medium	**All firms**	**High/Low**	**All firms**	**Medium/Low**	**All firms**
Equal weighted average	0,194	0,161	0,194	0,179	0,161	0,179
Observations	102	638	102	318	638	318
P-value	0,330		0,775		0,480	
Panel II: The entire time period of first week returns						
	High/Medium	**All firms**	**High/Low**	**All firms**	**Medium/Low**	**All firms**
Equal weighted average	0,256	0,193	0,256	0,173	0,193	0,173
Observations	102	638	102	318	638	318
P-value	0,285		0,178		0,583	
Panel III: The entire time period of first month returns						
	High/Medium	**All firms**	**High/Low**	**All firms**	**Medium/Low**	**All firms**
Equal weighted average	0,248	0,196	0,248	0,166	0,196	0,166
Observations	102	638	102	318	638	318
P-value	0,285		0,141		0,322	

Further, we investigate to seek more evidence as to how the amount of equity sold to the public will affect the underpricing. Table 5.9 tests the difference in our equity sold sizes. Although we find similar patterns as to Table 5.8, we sadly find no significant results and therefore cannot conclude that there is more or less underpricing between the amount of equity sold. Ibbotson et al. (1994) find that a more significant offer size contributes to less underpricing. We find different results when measuring equity sold instead of offer size. Also, Bergström et al. (2006) found the same evidence. We argue that it is not sufficient to only measure offer size because it depends on the company's total size, and we should look at offer size in relation to its total size.

5.1.6 Underpricing and Industry

Table 5.10 - First day, first week and first month returns by IPO subgroups industry for All firms

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. BM consists of every firm from the industry basic materials, Comm consists of every firm from the industry communications, CC consists of every firm from the industry consumer cyclical, CNC consists of every firms from the industry consumer non-cyclical, and Tech consists of every firm from the industry technology. The value weighted returns are calculated by dividing each company's market capitalization at offer by the total market capitalization at offer of all firms in the sample. The equal weighted returns are tested by using a two-sided t-test under the null hypothesis that the averages do not differ from zero.

Panel I: The entire period of first day returns									
	BM	**Comm**	**CC**	**CNC**	**Energy**	**Financial**	**Tech**	**Industrial**	**Utilities**
Entire time period									
Equal weighted average	0,137***	0,233***	0,262***	0,183***	0,147***	0,114***	0,203***	0,110***	0,161***
Value weighted average	0,003	0,041	0,017	0,063	0,009	0,027	0,063	0,004	0,001
Observations	83	75	70	331	104	173	129	79	12
Panel II: The entire period of first week returns									
	BM	**Comm**	**CC**	**CNC**	**Energy**	**Financial**	**Tech**	**Industrial**	**Utilities**
Entire time period									
Equal weighted average	0,181***	0,243***	0,239***	0,185***	0,249**	0,141***	0,227***	0,151***	0,141**
Value weighted average	0,004	0,037	0,018	0,058	0,005	0,033	0,064	-0,004	0,001
Observations	83	75	70	331	104	173	129	79	12
Panel III: The entire period of first month returns									
	BM	**Comm**	**CC**	**CNC**	**Energy**	**Financial**	**Tech**	**Industrial**	**Utilities**
Entire time period									
Equal weighted average	0,160***	0,158***	0,249***	0,201***	0,199***	0,134***	0,279***	0,179***	0,109*
Value weighted average	0,004	0,035	0,016	0,055	0,007	0,041	0,074	-0,009	0,001
Observations	83	75	70	331	104	173	129	79	12

****: significant at 1%, **: significant at 5%, *: significant at 10%*

We analyze the underpricing from different industries for all firms. Table 5.10 states that there is the highest degree of underpricing in the consumer cyclical industry and the lowest degree in the financial industry. Every means in the first-day returns is significant at 1%. These changes in the first-week returns, now the highest degree of underpricing is in the energy industry, and lowest degree is in both utilities and financial industry, also now both energy and utilities er significant at 5%, the rest is still significant at 1%. At last, in the first-month returns, the highest degree of underpricing is in the technology industry, and the lowest is in the utilities industry. Every mean is significant at 1%, except utilities which are significant at 10%. While still, the utilities are significant at different measuring periods, we can see that the number of observations is only twelve. It is important to note that this may affect the tests' power. Overall, we can see that in all periods, we find that CC and Tech are the industries with the most underpricing. We speculate that because these businesses, in its nature, are volatile, the underwriters have to justify the information asymmetry that occurs due to factors explained in the literature review and the fact that it is harder to value such firms by underpricing these industries more.

5.1.7 OLS Regression of Underpricing

Table 5.11 - OLS Regression for First day, Week and Month Returns

The table reports output from a multivariate regression of first day, first week and first month with 8 predictors. PE and VC is a dummy variable taking 1 if the company is Private Equity Backed and 0 otherwise. Hot Market Is a dummy taking the value 1 for IPO that occured in year 2004 - 2006, 2014 and 2017 - 2021 and 0 otherwise. Bookrunner Ranking is a dummy taking the value 1 if the bookrunner of the IPO is in the top ten rank and 0 otherwise. Market Capitalization At Offer is the Marketcap at offer quoted in billions USD, for each billion increase in market cap. Equity sold is the estimated amount of Equity sold in the transaction. Industry- Consumer Cyclical and Financial are dummies with the highest and lowest degree of underpricing in our sample. Further, the models are tested for heteroskedastisity using Whites test for heteroskedastisity. Note: **** = 0%, *** = 0.01%, ** = 1%, * = 5%, ^= 10%

	Underpricing		
	Returns		
Variables	First Day	First Week	First Month
Intercept	0,1469 ****	0,1671 ****	0,1594 ****
	(-0.03021)	(0.04283)	(0.03642)
PE	-0,0209	-0,0293	-0,05669
	(0.03929)	(0.0557)	(0.04736)
VC	-0,0050	-0,02072	0,01007
	(0.04153)	(0.05887)	(0.05007)
Hot Market	0,0199	0,01737	-0,007609
	(0.02536)	(0.03578)	(0.03043)
Bookrunner Ranking, Top 10	-0,0137	-0,02499	0,02573
	(0.02536)	(0.03595)	(0.03057)
Market capitalization at offer	0,006396 **	0,004144	0,003623
	0,0031	0,0044	0,0038
Equity Sold	0,0500	0,1285	0,1363 ^
	(0.06423)	(0.09106)	(0.07743)
Industry - Consumer Cyclical	0,0910 ^	0,03848	0,05143
	(0.09095)	(0.06871)	(0.05843)
Industry - Financial	-0.06462 *	-0,07435	-0,07927 *
	(0.03269)	(0.04635)	(0.03941)
Multiple R-Squared	0,0125	0,005867	0,009531
Adjusted R-Squared	0,004971	-0,001714	0,001977
Observations	1058	1058	1058
F-Statistic	1,66	0,7739	1,262

Table 5.11 shows the results from regressions displayed in the methodology section. Considering our r-squared, we see that our model has very little to no explanatory power on underpricing with 1.25% for Offer to first-day close, 0.05% for Offer to first-week and 0.09% for Offer to first-month. These figures lead us to believe that Offer to first-day close has better explanatory power than the others, confirming previous research methodology that Offer to first-day is the best to use. To test any significance of the models, we run an F-test. With F-stats at 1.66, 0.7739 and 1.262 and a p-value of 0.104, 0.6259 and 0.2598, we find that none of the models is statistically significant. Looking at specific variables, we find that the PE Dummy shows negative for all three models. Even though they are not statistically significant, this could explain (in line with previous research) that PE-backed companies have a lower degree of underpricing.

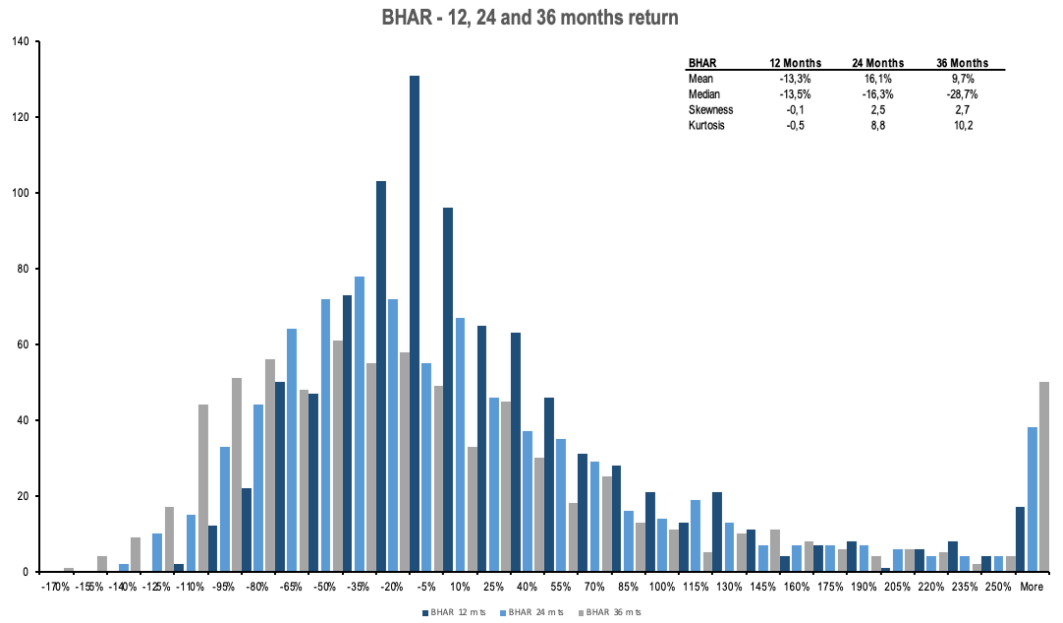
In model one (Offer to first-day close), the same goes for the Hot Market Dummy, where we see a higher degree of underpricing, considering it is not significant. Further, we see that Market capitalization at offer is significant at the 1% level with a positive sign, meaning that the larger the company is, the more underpricing it will experience. This is not what we expected should we read Ibbotson et al. (1994) and Bergström et al. (2006), who found that the larger the firm is, we should expect less underpricing. When looking at industries, we found that the Consumer Cyclicals (CC) is significant at the 10% level, with a reported beta at 0.0910, meaning if the company was classified within the CC industry, they will experience 9.1% more underpricing. For the financial industry, it is the opposite, with a beta of -0.06462, saying that if the company were in the financial industry, they would experience 6.452% less underpricing, significant at the 5% level.

We chose not to comment on our second regression (Offer to first-week) because we do not have any significant variables, and we see the same patterns as in the first regression.

Moving to the third model highlighting the offer to the first-month closing price, we find that the percentage equity sold in the transaction has a positive coefficient of 13.6% and is significant at the 10% level. Further, we find the same result: firms in the financial industry experience less underpricing of -7.9% on average.

5.2 Long-Run Performance

5.2.1 Distribution of BHAR and CAR 12-, 24-, and 36-Month Returns



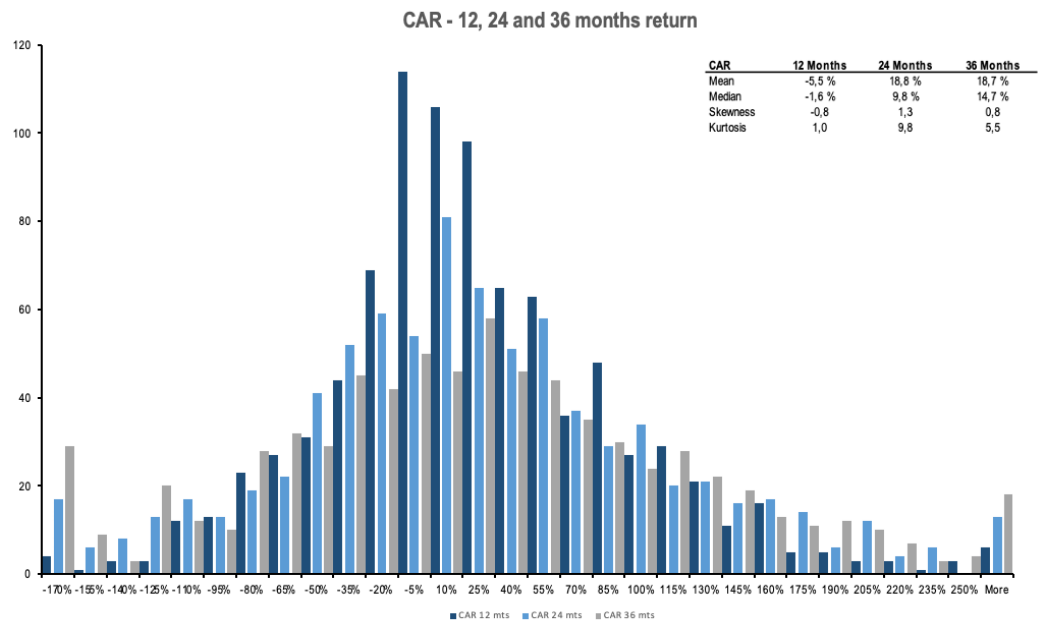


Figure 5.12 and Figure 5.13 above shows the distribution from 12, 24 and 36 months of BHAR and CAR, with the reported descriptive statistics. As mentioned in the methodology section, and as previously, we run two tests checking for normality. The data is again tested for normality. We run both the Shapiro-Wilks normality test and Jarque-Bera test reporting a significant p-value such that the data does not have a normal distribution. We can also see that the mean and median are far apart due to the skewness. This raises the same issue as underpricing when testing for significance. A median would be a better

representation, in this case, we chose to use the Wilcoxon test for differences in medians instead of a standard t-test for differences in means.

5.2.2 Long-Run Performance and Hot Issue Market

Table 5.14 - 12 months, 24 months and 36 months BHAR returns by IPO subgroups by definition and market activity

The sample size of IPOs within PE, VC and NPE varies from 12 months, 24 months and 36 months return, because some companies went public in more recent year, and the sample is from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. The hot market periods extend between 2004-2006, 2014 and 2017-2021, while the remaining years are classified as cold market periods. The value weighted returns are calculated by dividing each company's market capitalization at offer by the total market capitalization at offer of all firms in the sample. The equal weighted median returns are tested by using a Wilcoxon test under the null hypothesis that the medians do not differ from zero.

Panel I: The entire, hot and cold returns of 12 months					
		All firms	**PE**	**VC**	**NPE**
Entire period	Equal weighted median	-0,043	-0,010	-0,073	-0,046
	Value weighted average	0,132	0,200	0,249	0,162
	Observations	889	103	99	687
Hot issue market	Equal weighted median	-0,083	0,001	-0,097	-0,083
	Value weighted average	0,086	0,172	0,186	0,095
	Observations	558	62	64	432
Cold issue market	Equal weighted median	0,003***	-0,010	0,049*	0,007***
	Value weighted average	0,045	0,024	0,063	0,066
	Observations	331	41	35	255
Panel II: The entire, hot and cold returns of 24 months					
		All firms	**PE**	**VC**	**NPE**
Entire period	Equal weighted median	-0,164**	-0,242	-0,282	-0,122**
	Value weighted average	0,167	0,100	0,659	0,266
	Observations	805	95	99	611
Hot issue market	Equal weighted median	-0,296***	-0,335	-0,327	-0,272***
	Value weighted average	0,113	0,037	0,429	0,169
	Observations	474	54	64	356
Cold issue market	Equal weighted median	0,009*	0,006	-0,018	0,013
	Value weighted average	0,055	0,064	0,230	0,097
	Observations	331	41	35	255
Panel III: The entire, hot and cold returns of 36 months					
		All firms	**PE**	**VC**	**NPE**
Entire period	Equal weighted median	-0,287***	-0,316	-0,332	-0,282***
	Value weighted average	0,158	0,111	1,529	0,235
	Observations	739	84	90	565
Hot issue market	Equal weighted median	-0,427***	-0,599**	-0,500	-0,407***
	Value weighted average	0,098	0,019	1,001	0,154
	Observations	409	43	55	311
Cold issue market	Equal weighted median	-0,101	-0,019	0,062	-0,117
	Value weighted average	0,061	0,092	0,528	0,081
	Observations	330	41	35	254

****: significant at 1%, **: significant at 5%, *: significant at 10%*

Our sixth hypothesis is to find whether our portfolio of IPOs underperforms in the long run across all definitions. We start by testing with buy-and-hold abnormal returns. Table 5.14 shows the 12, 24 and 36 months BHAR for all definitions

listed during the whole period, hot- and cold issue periods. The returns are tested using a Wilcoxon test to see whether the medians are statistically different from zero. First, examining the 12 months' BHAR for the whole period, we find that only negative median values for all definitions indicate that the benchmark generates higher returns than our portfolio. We also observe from the medians that all definitions except PE perform better when the company goes public during a cold market compared to hot markets. Sadly, we can only conclude with returns significant different from zero in cold markets from All firms, VC and NPE, whereas All firms and NPE are significant at 1%.

Second, looking at 24-month BHAR for the entire period, we find that all definitions deliver negative returns. This time, All firms and NPE are significant at the 5% level with values of -16.4% and -12.2%, respectively, showing evidence that the returns are different from zero. Further, we observe that all definitions generate worse median returns in hot markets than in cold ones. Now we find significant results at 1% for All firms and NPE in hot markets and 10% for All firms in cold markets.

Lastly, and most interestingly, we find more substantial evidence that All firms and NPE have a negative BHAR at 1% in 36 months, with values of -28.7% and -28.2%, respectively. Also, we find evidence that All firms, PE, and NPE have negative BHARs when issued in hot issue markets. This is in line with Ritter (1991), who finds that IPOs in hot markets do worse than others. The results confirm our first hypothesis regarding underperforming in 24-month and 36-month periods, but not for 12 months. To our surprise, it looks like PE is the worst performer in our sample by looking at 36-month BHAR in hot markets. This intrigues us to investigate the differences further. Economically, when looking at the value-weighted, we see different returns. We argue that this is due to our large sample; for an investor, it would be better to value-weight his portfolio rather than having an equal-weight. Note that none of these is significant; thus, we cannot conclude based on these results.

Table 5.15 - 12 months, 24 months and 36 months CAR returns by IPO subgroups by definition and market activity

The sample size of IPOs within PE, VC and NPE varies from 12 months, 24 months and 36 months return, because some companies went public in more recent year, and the sample is from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. The hot market periods extend between 2004-2006, 2014 and 2017-2021, while the remaining years are classified as cold market periods. The value weighted returns are calculated by dividing each company's market capitalization at offer by the total market capitalization at offer of all firms in the sample. The equal weighted median returns are tested by using a Wilcoxon test under the null hypothesis that the medians do not differ from zero.

Panel I: The entire, hot and cold returns of 12 months					
		All firms	**PE**	**VC**	**NPE**
Entire period	Equal weighted median	0,094***	0,107**	0,172***	0,067***
	Value weighted average	0,170	0,198	0,359	0,223
	Observations	889	103	99	687
Hot issue market	Equal weighted median	0,079***	0,156*	0,164***	0,060***
	Value weighted average	0,109	0,147	0,276	0,133
	Observations	558	62	64	432
Cold issue market	Equal weighted median	0,111***	0,078*	0,220**	0,111***
	Value weighted average	0,061	0,029	0,084	0,090
	Observations	331	41	35	255
Panel II: The entire, hot and cold returns of 24 months					
		All firms	**PE**	**VC**	**NPE**
Entire period	Equal weighted median	0,102***	0,076	0,282***	0,087***
	Value weighted average	0,164	0,159	0,585	0,263
	Observations	805	95	99	611
Hot issue market	Equal weighted median	0,033**	-0,027	0,345*	0,025
	Value weighted average	0,096	0,064	0,416	0,135
	Observations	474	54	64	356
Cold issue market	Equal weighted median	0,188***	0,168*	0,248**	0,176***
	Value weighted average	0,068	0,096	0,168	0,128
	Observations	331	41	35	255
Panel III: The entire, hot and cold returns of 36 months					
		All firms	**PE**	**VC**	**NPE**
Entire period	Equal weighted median	0,147***	0,067	0,587***	0,138***
	Value weighted average	0,167	0,207	0,828	0,289
	Observations	739	84	90	565
Hot issue market	Equal weighted median	0,079*	-0,076	0,720***	0,018
	Value weighted average	0,081	0,114	0,529	0,127
	Observations	409	43	55	311
Cold issue market	Equal weighted median	0,221***	0,156**	0,543**	0,202***
	Value weighted average	0,086	0,093	0,298	0,162
	Observations	330	41	35	254

****: significant at 1%, **: significant at 5%, *: significant at 10%*

We test the same hypothesis as in table 5.14, but now we use cumulative abnormal returns to test. Table 5.15 shows CAR from 12-, 24-, and 36-months periods. First, by looking at the 12 month period, we find only positive and significant CAR. Further, we observe that VC is the best performer with 17.2%, next is PE with 10.7%, and the worst is NPE with 6.7%. In fact, VC is the best performer in all periods. We also see higher median values in cold markets for all definitions except PE, which is very interesting.

Second, by looking at the 24 month period, we see that PE has lost its significance during the entire period and the hot market period, and that VC is still the best performer in all periods. What interests us the most is that VC now has higher returns in hot markets than cold markets. This may be because the VC portfolio holds many technologies and communications companies from 2017-2021, which we know have performed very well on average.

At last, we look at the 36 month period and still find no significance from PE in the entire period and hot market period. VC is crushing the other definitions with extreme high median CAR in the entire period, hot and cold markets.

BHAR and CAR have given us very different results. BHAR gave us a primarily negative performance from our portfolios and very little significance, and CAR gave us a positive performance and much significance. One could argue that BHAR is a better and more realistic measure over a more extended period because the measure considers the compound effect, which is an essential aspect of returns over time. The compound effect might also be the reason for less significant results since it would confuse the test and make it harder to explain the results. At last, one would wonder why the different performance metrics show different signs of returns. We could say that the benchmark has gained more from the compounding effect over time than our portfolios, and the portfolios have generated higher returns on an aggregated level.

Table 5.16 - Testing the difference in the average median of 12 months, 24 months and 36 months BHAR and CAR returns between subgroups of definition

The sample size of IPOs within PE, VC and NPE varies from 12 months, 24 months and 36 months return, because some companies went public in more recent year, and the sample is from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. Panel I, II and III test the hypothesis that the distribution of 12 months, 24 months and 36 months returns between two definition subgroups does not differ using a Wilcoxon test showning the corresponding p-values.

Panel I: The entire period of 12 months return												
	BHAR						**CAR**					
	NPE/PE		**NPE/VC**		**PE/VC**		**NPE/PE**		**NPE/VC**		**PE/VC**	
Equal weighted median	-0,046	-0,010	-0,046	-0,073	-0,010	-0,073	0,067	0,107	0,067	0,172	0,107	0,172
Observations	687	103	687	103	103	99	687	103	687	103	103	99
P-value	0,485		0,617		0,870		0,824		0,100		0,232	
Panel II: The entire period of 24 months return												
	BHAR						**CAR**					
	NPE/PE		**NPE/VC**		**PE/VC**		**NPE/PE**		**NPE/VC**		**PE/VC**	
Equal weighted median	-0,122	-0,242	-0,122	-0,282	-0,242	-0,282	0,087	0,076	0,087	0,282	0,076	0,282
Observations	611	95	611	99	95	99	611	95	611	99	95	99
P-value	0,565		0,617		0,755		0,814		0,115		0,170	
Panel III: The entire period of 36 months return												
	BHAR						**CAR**					
	NPE/PE		**NPE/VC**		**PE/VC**		**NPE/PE**		**NPE/VC**		**PE/VC**	
Equal weighted median	-0,282	-0,316	-0,282	-0,332	-0,316	-0,332	0,138	0,067	0,138	0,587	0,067	0,587
Observations	565	84	565	90	84	90	565	84	565	90	84	90
P-value	0,817		0,515		0,872		0,857		0,001		0,010	

We find exciting results in tables 5.14 and 5.15, which brings us to our seventh hypothesis that PE will outperform both VC and NPE. Table 5.16 tests the difference between our definitions in both BHAR and CAR metrics for 12 months, 24 months and 36 months to look for evidence that one definition performs better than the others. At first glance, we see no significant differences in our BHAR in all periods. Furthermore, we observe the differences in CAR and see that we have significant evidence at 10% that VC have greater returns than NPE over 12 month period. At last, we observe more substantial evidence at 1% that VC outperformed PE and NPE over 36 months. We reject our hypothesis that our PE portfolio outperforms the VC and NPE portfolios in all periods. In fact, we have evidence that VC outperforms NPE in 12- and 36-month CAR and PE in 36-month CAR.

Table 5.17 - Testing the difference in the average median 12 months, 24 months and 36 months BHAR and CAR returns between subgroups of definition and market activity

The sample size of IPOs within PE, VC and NPE varies from 12 months, 24 months and 36 months return, because some companies went public in more recent year, and the sample is from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. The hot market periods extend between 2004-2006, 2014 and 2017-2021, while the remaining years are classified as cold market periods. Panel I, II and III test the hypothesis that the distribution of 12 months, 24 months and 36 months returns between hot and cold market subgroups does not differ using a Wilcoxon test showning the corresponding p-values. NPE/PE Hot/Hot tests the returns from hot NPE and hot PE does not differ using a Wilcoxon test.

	Panel I: The entire period of 12 months return										
		ALL Cold/Hot		**PE Cold/Hot**		**VC Cold/Hot**		**NPE Cold/Hot**		**NPE/PE Hot/Hot**	
	Equal weighted median	0,003	-0,083	-0,010	0,001	0,049	-0,097	0,007	-0,083	-0,083	0,001
	Observations	331	558	41	62	35	64	255	432	432	62
	P-value	0,002		0,816		0,300		0,002		0,283	
	Panel II: The entire period of 24 months return										
		ALL Cold/Hot		**PE Cold/Hot**		**VC Cold/Hot**		**NPE Cold/Hot**		**NPE/PE Hot/Hot**	
BHAR	Equal weighted median	0,009	-0,296	0,006	-0,335	-0,018	-0,327	0,013	-0,272	-0,272	-0,335
	Observations	331	474	41	54	35	64	255	356	356	54
	P-value	0,001		0,089		0,182		0,001		0,606	
	Panel III: The entire period of 36 months return										
		ALL Cold/Hot		**PE Cold/Hot**		**VC Cold/Hot**		**NPE Cold/Hot**		**NPE/PE Hot/Hot**	
	Equal weighted median	-0,101	-0,427	-0,019	-0,599	0,062	-0,500	-0,117	-0,407	-0,407	-0,599
	Observations	330	409	41	43	35	55	254	311	311	43
	P-value	0,001		0,015		0,145		0,001		0,477	
	Panel I: The entire period of 12 months return										
		ALL Cold/Hot		**PE Cold/Hot**		**VC Cold/Hot**		**NPE Cold/Hot**		**NPE/PE Hot/Hot**	
	Equal weighted median	0,111	0,079	0,073	0,156	0,220	0,164	0,111	0,060	0,060	0,156
	Observations	331	558	41	62	35	64	255	432	432	62
	P-value	0,088		0,848		0,772		0,054		0,524	
	Panel II: The entire period of 24 months return										
		ALL Cold/Hot		**PE Cold/Hot**		**VC Cold/Hot**		**NPE Cold/Hot**		**NPE/PE Hot/Hot**	
CAR	Equal weighted median	0,188	0,033	0,168	-0,027	0,248	0,345	0,176	0,025	0,025	-0,027
	Observations	331	474	41	54	35	64	255	356	356	54
	P-value	0,023		0,327		0,546		0,032		0,840	
	Panel III: The entire period of 36 months return										
		ALL Cold/Hot		**PE Cold/Hot**		**VC Cold/Hot**		**NPE Cold/Hot**		**NPE/PE Hot/Hot**	
	Equal weighted median	0,221	0,079	0,156	-0,076	0,543	0,720	0,202	0,018	0,018	-0,076
	Observations	330	409	41	43	35	55	254	311	311	43
	P-value	0,031		0,053		0,927		0,044		0,474	

We observed in tables 5.14 and 5.15 that All firms showed lower median values in hot markets compared to cold markets, which brings us to the eighth hypothesis to look for evidence that All firms experience a higher degree of underperformance when the company has been listed in a hot market. Table 5.17 shows the results from testing the differences from BHAR and CAR between hot and cold markets for all definitions and testing the difference between NPE and PE performance in hot markets. By observing the BHAR from all periods, we find significant evidence at 1% that All firms underperform in hot markets. The CAR from all periods indicate the same, with 10% significance at 12 months and 5% significance at 24- and 36-months. We have clear evidence that All firms underperform in a hot market and can accept our hypothesis. In fact, we also find sufficient evidence that PE and NPE underperform in hot markets in both metrics, BHAR and CAR. On the other hand, we find no evidence that the VC underperform in hot markets.

We are moving over to our ninth hypothesis, seeking evidence that PE is less affected by hot markets than NPE. Sadly, we find no evidence in either BHAR or CAR performance in all periods and reject the hypothesis.

5.2.3 Long Run Performance and Market Capitalization Ranking

Table 5.18 - 12 months, 24 months and 36 months BHAR and CAR return by IPO subgroups market capitalization ranking for All firms

The sample size of IPOs within PE, VC and NPE varies from 12 months, 24 months and 36 months return, because some companies went public in more recent year, and the sample is from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. High market capitalization indicates that the firm is going public with a market capitalization at offer above 4 billion, medium indicates that the firm is going public with more than 500 million but less than 4 billion, low is below 500 million. The value weighted returns are calculated by dividing each company's market capitalization at offer by the total market capitalization at offer of all firms in the sample. The equal weighted median returns are tested by using a Wilcoxon test under the null hypothesis that the medians do not differ from zero.

Panel I: The entire period of 12 months return						
	BHAR			**CAR**		
	High	**Medium**	**Low**	**High**	**Medium**	**Low**
Equal weighted median	0,062	0,003**	-0,078	0,159**	0,128***	0,051***
Value weighted average	0,017	0,058	0,057	0,018	0,070	0,081
Observations	59	334	496	59	334	496
Panel II: The entire period of 24 months return						
	BHAR			**CAR**		
	High	**Medium**	**Low**	**High**	**Medium**	**Low**
Equal weighted median	0,120**	-0,078	-0,279***	0,337***	0,155***	0,036*
Value weighted average	0,101	0,056	0,010	0,090	0,062	0,012
Observations	45	301	459	45	301	459
Panel III: The entire period of 36 month return						
	BHAR			**CAR**		
	High	**Medium**	**Low**	**High**	**Medium**	**Low**
Equal weighted median	0,084	-0,178	-0,399***	0,163**	0,226***	0,011
Value weighted average	0,089	0,063	0,005	0,092	0,065	0,010
Observations	41	276	422	41	276	422

****: significant at 1%, **: significant at 5%, *: significant at 10%*

More prominent firms are more complex and more diversified than smaller ones, and we initially expect them to perform better over time than small ones. We ran a test to see if we could find any significant BHAR and CAR different from zero depending on their market capitalization at offer for All firms in all periods. Our results are listed in table 5.18. We find significant evidence from the BHAR that "Medium" firms deliver close to zero but positive returns at 5% level at 12 month BHAR. Moreover, we also observe that "High" give positive 12% returns at a significance level of 5% at 24 month BHAR. At last, we observe that "Low" have negative returns at -27.9% and -39.9% in 24 month BHAR and 36 month BHAR, respectively. Indeed, we see significantly higher median returns for more prominent firms than smaller ones.

We move over to the CAR to test for their significance as well. At first glance, we observe that we only have significant returns except for "Low" firms in 36 month

period. Furthermore, we observe that "High" firms have the most significant median returns in 12 months and 24 months, followed by "Medium" firms. In fact, in the 24 months period ", High" firms have a median return of almost ten times the "Low" firms' return, 33.7% vs 3.6%. This is comparable to Bergström et al. (2006), who finds similar results. He argues that this is due to "Large IPOs on average perform relatively better than small IPOs, which may be attributable to larger IPOs being less subject to over-optimistic investors adjusting their expectations". Interestingly, in the 36 month period, "Medium" firms report more significant median returns than "High" firms. We are indeed intrigued and will investigate these matters further.

Table 5.19 - Testing the difference in the median 12 months, 24 months and 36 months BHAR and CAR returns between subgroups of market capitalization ranking for All firms

The sample size of IPOs within PE, VC and NPE varies from 12 months, 24 months and 36 months return, because some companies went public in more recent year, and the sample is from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. High market capitalization indicates that the firm is going public with a market capitalization at offer above 4 billion, medium indicates that the firm is going public with more than 500 million but less than 4 billion, low is below 500 million. Panel I, II and III test the hypothesis that the distribution of 12 months, 24 months and 36 months returns between two definition subgroups does not differ using a Wilcoxon test showning the corresponding p-values.

Panel I: The entire period of 12 months return												
	BHAR						**CAR**					
	High/Medium		**High/Low**		**Medium/Low**		**High/Medium**		**High/Low**		**Medium/Low**	
Equal weighted median	0,062	0,003	0,062	-0,078	0,003	-0,078	0,159	0,128	0,159	0,051	0,128	0,051
Observations	59	334	59	496	334	496	59	334	59	496	334	496
P-value	0,988		0,261		0,021		0,894		0,233		0,042	
Panel II: The entire period of 24 months return												
	BHAR						**CAR**					
	High/Medium		**High/Low**		**Medium/Low**		**High/Medium**		**High/Low**		**Medium/Low**	
Equal weighted median	0,120	-0,078	0,120	-0,279	-0,078	-0,279	0,337	0,155	0,337	0,036	0,155	0,036
Observations	45	301	45	459	301	459	45	301	45	459	301	459
P-value	0,074		0,001		0,002		0,361		0,050		0,011	
Panel III: The entire period of 36 months return												
	BHAR						**CAR**					
	High/Medium		**High/Low**		**Medium/Low**		**High/Medium**		**High/Low**		**Medium/Low**	
Equal weighted median	0,084	-0,178	0,084	-0,399	-0,178	-0,399	0,163	0,226	0,163	0,011	0,226	0,011
Observations	41	276	41	422	276	422	41	276	41	422	276	422
P-value	0,273		0,006		0,001		0,860		0,121		0,009	

Our interesting results from table 5.18 need further investigation to conclude our tenth hypothesis: to find evidence that more prominent firms in market capitalization generate higher abnormal returns than smaller firms. If we read Bergström et al. (2006), we expect companies with higher offer sizes to perform better than those with less. Therefore, we test the differences in the size of the firms at IPO over 12-, 24- and 36-months with BHAR and CAR. Table 5.19 summarizes our results, and we start by investigating our BHAR results. From the 12-month period, we can see significant results from "Medium/Low" at 5%, stating that "Medium" firms generate higher BHAR than "Low" firms. From the 24 month period, we see significant results from all differences, stating that the

larger firm outperforms the smaller firm. Both "High/Low" and "Medium/Low" is significant at 1%, while "High/Medium" is significant at 10%.

At last, we look at the 36 month period and still find strong evidence that larger firms outperform smaller ones. Again, both "High/Low" and "Medium/Low" is significant at 1%. We find evidence from BHAR from all periods that larger firms perform better than smaller firms.

Further, we investigate the CAR for the same matter. We find significant returns for "Medium/Low" at 5% in the 12-month period, stating that "Medium" perform better than "Low". Furthermore, we observe that both "High/Low" and "Medium/Low" are significant at 5%, stating that larger firms outperform smaller firms. At last, we see that the difference in "Medium/Low" is significant at 1%, and still saying that "Medium" perform better than "Low". We have sufficiently strong evidence from both BHAR and CAR that larger firms outperform smaller firms in both metrics and, therefore, can prove our hypothesis.

5.2.4 Long Run Performance and Equity Ranking

Table 5.20 - 12 months, 24 months and 36 months BHAR and CAR return by IPO subgroups equity ranking for All firms

The sample size of IPOs within PE, VC and NPE varies from 12 months, 24 months and 36 months return, because some companies went public in more recent year, and the sample is from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. High equity ranking indicates that the firm sells more than 50% of the shares when going public, medium indicates that the firm sells less than 50% but more than 15%, low is below 15%. The value weighted returns are calculated by dividing each company's market capitalization at offer by the total market capitalization at offer of all firms in the sample. The equal weighted median returns are tested by using a Wilcoxon test under the null hypothesis that the medians do not differ from zero.

Panel I: The entire period of 12 months return

	BHAR			CAR		
	High	**Medium**	**Low**	**High**	**Medium**	**Low**
Equal weighted median	-0,011	-0,011**	-0,109	0,058**	0,120***	0,002**
Value weighted average	0,017	0,058	0,057	0,018	0,070	0,081
Observations	78	533	278	78	533	278

Panel II: The entire period of 24 months return

	BHAR			CAR		
	High	**Medium**	**Low**	**High**	**Medium**	**Low**
Equal weighted median	-0,103	-0,106	-0,250	0,028	0,134***	0,077**
Value weighted average	0,035	0,083	0,050	0,022	0,085	0,057
Observations	73	479	253	73	479	253

Panel III: The entire period of 36 month return

	BHAR			CAR		
	High	**Medium**	**Low**	**High**	**Medium**	**Low**
Equal weighted median	-0,222	-0,258***	-0,377***	0,032	0,154***	0,159**
Value weighted average	0,031	0,073	0,054	0,021	0,068	0,078
Observations	71	440	228	71	440	228

****: significant at 1%, **: significant at 5%, *: significant at 10%*

When we created the variable "Equity Ranking", we had a theory about how it should give us some evidence that firms selling a more significant equity stake to the public will perform better than those who sell less. Our theory is based on the fact that we calculate these abnormal return metrics, BHAR and CAR, based on the adjusted share price of each firm in the portfolio. When a company sells a more significant portion of equity, the firm becomes more liquid because it has more shares traded daily in larger volumes, which could indeed generate higher share price returns. This brings us to test for significant evidence that "All firms" selling "High", "Medium" or "Low" portion of equity have returns different from zero. The results are summarized in Table 5.20.

First, we look at our BHAR. We see that only "Medium" firms have significant median returns in 12 month period at 5%, with negative values at -1.1%. Further, we observe that we have no significant values in the 24 month period. At last, we find significant median returns in both "Medium" and "Low" firms, both at 1%. We also see that both values are negative, but "Medium" firms perform better than "Low" firms

We move on to investigate the CAR. First, we observe that "High" and "Low" are significant at 5%, while "Medium" is significant at 1% in the 12 month period. What interest us is that "Medium" have the greatest returns, followed by "High". Moving on to the 24 month period, we see that "High" has lost its significance, "Medium" is significant at 1%, and "Low" is significant at 5%. Again, "Medium" have greater median returns than "Low". At last, we find significant returns from "Medium" at 1% and "Low" at 5% in the 36 month period; at this time, "Low" shows larger median values than "Medium.

Table 5.21 - Testing the difference in the median 12 months, 24 months and 36 months BHAR and CAR returns between subgroups of equity ranking for All firms

The sample size of IPOs within PE, VC and NPE varies from 12 months, 24 months and 36 months return, because some companies went public in more recent year, and the sample is from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. High equity ranking indicates that the firm sells more than 50% of the shares when going public, medium indicates that the firm sells less than 50% but more than 15%, low is below 15%. Panel I, II and III test the hypothesis that the distribution of 12 months, 24 months and 36 months returns between two definition subgroups does not differ using a Wilcoxon test showning the corresponding p-values.

Panel I: The entire period of 12 months return												
	BHAR						**CAR**					
	High/Medium		**High/Low**		**Medium/Low**		**High/Medium**		**High/Low**		**Medium/Low**	
Equal weighted median	-0,011	-0,011	-0,011	-0,109	-0,011	-0,109	0,058	0,120	0,058	0,002	0,120	0,002
Observations	78	533	78	278	533	278	78	533	78	278	533	278
P-value	0,988		0,113		0,025		0,427		0,556		0,068	
Panel II: The entire period of 24 months return												
	BHAR						**CAR**					
	High/Medium		**High/Low**		**Medium/Low**		**High/Medium**		**High/Low**		**Medium/Low**	
Equal weighted median	-0,103	-0,106	-0,103	-0,250	-0,106	-0,250	0,028	0,134	0,028	0,077	0,134	0,077
Observations	73	479	71	253	479	253	73	479	71	253	479	253
P-value	0,934		0,001		0,099		0,290		0,616		0,567	
Panel III: The entire period of 36 months return												
	BHAR						**CAR**					
	High/Medium		**High/Low**		**Medium/Low**		**High/Medium**		**High/Low**		**Medium/Low**	
Equal weighted median	-0,222	-0,258	-0,222	-0,377	-0,258	-0,377	0,032	0,154	0,032	0,159	0,154	0,159
Observations	71	440	71	228	440	228	71	440	71	228	440	228
P-value	0,424		0,083		0,106		0,525		0,746		0,767	

By testing for significant returns different from zero, we found some exciting results and are intrigued to investigate further. Which brings us to our eleventh and last hypothesis, namely, to find evidence that firms selling a more significant portion of equity have larger abnormal returns than those who sell less. We start by testing for differences between the median BHAR and CAR of "High", "Medium", and "Low" for all periods. Our results are summarized in table 5.21, and we start by commenting on the results on BHAR.

First, we observe that we have significant results from "Medium/Low" at 5%, proving that "Medium" have more significant results than "Low" in 12 month period. Further, we observe that "High/Low" is significant at 1% and "Medium/Low" is significant at 10%, whereas both "High" and "Medium" perform better than "Low" in the 24 month period. At last, we observe significant "High/Low" results at 10% in the 36 month period. To summarize, our results from BHAR prove that firms that sell a more significant portion of the equity to the public perform better in the long run.

Furthermore, we move on to the CAR results. We observe significant results in the difference between "Medium/Low", which is significant at 10%. The results state that "Medium" perform better than "Low". By comparing our results from BHAR and CAR, we have evidence to prove that firms selling a more significant

amount of equity sold to the public outperform firms selling less. As mentioned, BHAR and CAR metrics are calculated by adjusted share price returns from each company in the portfolio and index returns. When a company sells a more significant portion of the equity to the public, the company's shares become more liquid, which could affect the returns. We could get different results if we measured performance with operational multiples such as P/E or EV/EBITDA.

5.2.5 Long Run Performance and Industry

Table 5.22 - 12 months, 24 months and 36 months BHAR return by IPO subgroups definition and industry

The sample size of IPOs within PE, VC and NPE varies from 12 months, 24 months and 36 months return, because some companies went public in more recent year, and the sample is from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. BM consists of every firm from the industry basic materials, Comm consists of every firm from the industry communications, CC consists of every firm from the industry consumer cyclical, CNC consists of every firms from the industry consumer non-cyclical, and Tech consists of every firm from the industry technology. The value weighted returns are calculated by dividing each company's market capitalization at offer by the total market capitalization at offer of all firms in the sample. The equal weighted returns are tested by using a Wilcoxon test under the null hypothesis that the medians do not differ from zero.

Panel I: The entire period of 12 months return										
		BM	Comm	CC	CNC	Energy	Financial	Industrial	Tech	Utilities
All firms	Equal weighted median	-0,076	-0,232*	-0,029	-0,119	-0,012	-0,036	0,024*	0,263***	0,133
	Value weighted average	-0,001	0,017	0,013	0,010	0,008	0,001	0,078	0,003	0,002
	Observations	74	62	57	268	97	154	69	99	9
PE	Equal weighted median	-0,583	-0,603	0,127*	0,008	-0,129	-0,166	0,028	0,079	na
	Value weighted average	-0,004	-0,002	0,064	0,132	0,016	0,003	-0,012	-0,001	na
	Observations	3	5	20	36	10	11	10	8	0
VC	Equal weighted median	-0,697	0,122	-0,446	-0,124	-0,230	-0,379**	-0,218	0,439***	na
	Value weighted average	-0,001	0,120	-0,001	0,032	0,000	-0,032	-0,021	0,152	na
	Observations	1	14	1	53	1	7	3	19	0
NPE	Equal weighted median	-0,051	-0,254**	-0,109	-0,151	-0,002	-0,019	0,027*	0,249***	0,133
	Value weighted average	0,001	0,022	0,008	-0,014	0,009	0,003	0,009	0,121	0,003
	Observations	70	43	36	179	86	136	56	72	9
Panel II: The entire period of 24 months return										
		BM	Comm	CC	CNC	Energy	Financial	Industrial	Tech	Utilities
All firms	Equal weighted median	-0,327**	-0,473	0,035	-0,224	-0,257	-0,099**	-0,073	0,180***	0,137
	Value weighted average	-0,002	0,031	0,036	0,016	0,006	0,031	0,049	-0,004	0,003
	Observations	73	56	50	230	96	142	64	85	9
PE	Equal weighted median	-0,973	-0,446	0,060	-0,290	-0,281	-0,505**	0,295	0,089	na
	Value weighted average	-0,031	-0,023	0,075	0,108	-0,004	-0,058	0,037	-0,003	na
	Observations	3	5	20	30	10	11	10	6	0
VC	Equal weighted median	-0,934	-0,533	-0,637	-0,215	-0,498	-0,830**	-0,386	1,238***	na
	Value weighted average	-0,001	0,359	-0,001	0,044	0,000	-0,062	-0,033	0,354	na
	Observations	1	14	1	53	1	7	3	19	0
NPE	Equal weighted median	-0,258*	-0,467**	-0,051	-0,210	-0,249	-0,052	-0,091	0,096	0,137
	Value weighted average	-0,002	0,043	0,057	-0,012	0,015	0,083	-0,008	0,081	0,008
	Observations	69	37	29	147	85	124	51	60	9
Panel III: The entire period of 36 months return										
		BM	Comm	CC	CNC	Energy	Financial	Industrial	Tech	Utilities
All firms	Equal weighted median	-0,419**	-0,431**	-0,205	-0,513***	-0,376**	-0,146**	-0,198	0,110	0,179
	Value weighted average	-0,001	0,033	0,062	-0,011	-0,011	0,025	0,059	-0,003	0,005
	Observations	73	49	48	201	91	134	61	73	9
PE	Equal weighted median	-0,844	-0,561	-0,049	-0,292	-0,618**	-0,689	0,070	-0,594	na
	Value weighted average	-0,013	-0,002	0,135	0,085	-0,052	-0,021	-0,008	-0,012	na
	Observations	3	4	19	23	9	11	10	5	0
VC	Equal weighted median	-0,915	-0,261	-0,318	-0,529	-1,291	-0,997	0,291	0,634***	na
	Value weighted average	-0,002	1,120	-0,001	0,025	-0,001	-0,080	-0,034	0,502	na
	Observations	1	12	1	47	1	7	3	18	0
NPE	Equal weighted median	-0,348***	-0,431***	-0,205	-0,532***	-0,309*	-0,133	-0,283	-0,056	0,179
	Value weighted average	0,000	-0,012	0,118	-0,052	-0,013	0,074	-0,002	0,108	0,013
	Observations	69	33	28	131	81	116	48	50	9

****: significant at 1%, **: significant at 5%, *: significant at 10%*

Table 5.22 summarizes all industry BHAR median for all definitions by the three periods 12-, 24- and 36-months. By looking at the 12-month BHAR, we find very significant 1% positive returns in the technology industry from "All firms", "VC", and "NPE", indicating that the technology industry has outperformed the benchmark. Moreover, we observe that the communication industry is significant at 10% and 5% for "All firms" and "NPE", respectively. This indicates that the communication industry has been the worst performer in the 12-month BHAR. It is also interesting to see that "VC" has been outperformed in the financial sector with negative returns at 37.9%, which is significant at 5%.

Furthermore, we move over to the 24 month BHAR. We observe that the technology industry still is generating the highest BHAR, with significance at 1% for both "All firms" and "VC"; in fact, "VC" returns are 123.8%. We observe significant negative results from the basic materials industry for both "All firms" and "NPE", at 5% and 10%, respectively. Moreover, we see that the financial industry shows some significant negative returns at 5% for "All firms", "PE", and "VC". The best performer for 24 month BHAR is the technology industry and the worst in the financial industry.

At last, we move over til the 36-month BHAR. Again, we observe high significant positive returns at 1% for "VC" in the technology industry, but the other definitions are no longer significant. "PE" shows significant negative returns at 5% of -61.8% in the energy industry. We see that consumer non-cyclical is the worst performer with significant negative results at 1% for both "All firms" and "NPE".

To summarize our results from the BHAR over all periods, it looks like the best performer is the technology industry, specifically from the VC portfolio. The worst performers have been varying from the different periods and consist of communications, financial and consumer non-cyclical. It makes sense that the technology industry is the best performer; from our data sample, we have targeted firms going IPO in 2000-2021. Technology is one of the industries that have performed best during this period; also, many of our companies (approximately 45%) went IPO during the last five years, which also have been outstanding years for the technology industry.

Table 5.23 - 12 months, 24 months and 36 months CAR return by IPO subgroups definition and industry

The sample size of IPOs within PE, VC and NPE varies from 12 months, 24 months and 36 months return, because some companies went public in more recent year, and the sample is from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. BM consists of every firm from the industry basic materials, Comm consists of every firm from the industry communications, CC consists of every firm from the industry consumer cyclical, CNC consists of every firms from the industry consumer non-cyclical, and Tech consists of every firm from the industry technology. The value weighted returns are calculated by dividing each company's market capitalization at offer by the total market capitalization at offer of all firms in the sample. The equal weighted returns are tested by using a Wilcoxon test under the null hypothesis that the medians do not differ from zero.

Panel I: The entire period of 12 months return

		BM	Comm	CC	CNC	Energy	Financial	Industrial	Tech	Utilities
All firms	Equal weighted median	0,021	-0,061	0,118**	0,009***	0,054**	0,008	0,168***	0,448***	0,132
	Value weighted average	0,001	0,021	0,020	0,016	0,008	0,016	0,085	0,002	0,002
	Observations	74	62	57	268	97	154	69	99	9
PE	Equal weighted median	-0,744	-0,612	0,368**	0,222*	-0,046	-0,098	0,067	0,230	na
	Value weighted average	-0,004	-0,007	0,058	0,117	0,017	0,004	-0,012	0,001	na
	Observations	3	5	20	36	10	11	10	8	0
VC	Equal weighted median	-0,773	0,229	-0,264	0,191**	-0,224	-0,295*	0,275	0,619***	na
	Value weighted average	0,000	0,105	-0,011	0,072	-0,010	-0,029	0,016	0,218	na
	Observations	1	14	1	53	1	7	3	19	0
NPE	Equal weighted median	0,059	-0,075	0,061	-0,014	0,123**	0,026	0,179***	0,448***	0,132
	Value weighted average	0,002	0,030	0,020	-0,002	0,009	0,027	0,006	0,127	0,003
	Observations	70	43	36	179	86	136	56	72	9

Panel II: The entire period of 24 months return

		BM	Comm	CC	CNC	Energy	Financial	Industrial	Tech	Utilities
All firms	Equal weighted median	0,054	-0,171	0,263***	0,188***	0,036	-0,005	0,056	0,477***	0,146
	Value weighted average	-0,001	0,031	0,034	0,013	0,006	0,018	0,056	0,003	0,003
	Observations	73	56	50	230	96	142	64	85	9
PE	Equal weighted median	-1,523	-0,283	0,279***	0,110	-0,057	-0,424*	0,363**	0,150	na
	Value weighted average	-0,050	-0,012	0,105	0,109	0,009	-0,049	0,038	0,009	na
	Observations	3	5	20	30	10	11	10	6	0
VC	Equal weighted median	-0,879	0,004	-0,344	0,387*	-0,544	-0,389**	1,057	1,033***	na
	Value weighted average	-0,001	0,212	-0,001	0,091	0,000	-0,074	-0,001	0,360	na
	Observations	1	14	1	53	1	7	3	19	0
NPE	Equal weighted median	0,099	-0,171	0,260*	0,169***	0,091	0,032	0,005	0,507***	0,146
	Value weighted average	0,002	0,050	0,057	-0,016	0,013	0,053	0,003	0,096	0,006
	Observations	69	37	29	147	85	124	51	60	9

Panel III: The entire period of 36 months return

		BM	Comm	CC	CNC	Energy	Financial	Industrial	Tech	Utilities
All firms	Equal weighted median	0,165	0,082	0,113**	0,118**	0,027	-0,003	0,136	0,603***	0,195
	Value weighted average	0,003	0,013	0,043	0,015	0,000	0,021	0,063	0,007	0,003
	Observations	73	49	48	201	91	134	61	73	9
PE	Equal weighted median	-0,56	-0,269	0,080*	0,068	-0,285	-0,076	0,299*	0,312	na
	Value weighted average	-0,003	0,006	0,093	0,105	-0,006	-0,009	0,019	0,003	na
	Observations	3	4	19	23	9	11	10	5	0
VC	Equal weighted median	-0,712	0,448	1,046	0,543***	-1,555	-1,047	1,477	1,019***	na
	Value weighted average	-0,001	0,387	0,002	0,136	-0,001	-0,131	0,018	0,418	na
	Observations	1	12	1	47	1	7	3	18	0
NPE	Equal weighted median	0,170	0,032	0,110	-0,068	0,169	-0,001	-0,037	0,483***	0,195
	Value weighted average	0,008	-0,001	0,081	-0,002	0,002	0,064	0,010	0,119	0,008
	Observations	69	33	28	131	81	116	48	50	9

****: significant at 1%, **: significant at 5%, *: significant at 10%*

Table 5.23 summarizes all industry CAR median for all definitions by the three periods 12-, 24- and 36-months. We start by looking at the 12-month returns and observe more significant returns across all definitions than the BHAR. We see that the technology industry is still the most incredible performer with highly significant positive returns at 1% for "All firms", "VC", and "NPE". The highest performing industry for "PE" is consumer cyclical, which is significant at 5%. Furthermore, we do not see a clear, consistent significant underperformer between the definitions with the lowest median values. Both "All firms" and "PE" have

significant lowest median returns at 5% from consumer non-cyclical, while “VC” has significant negative returns at 10% from the financial industry. At last, “NPE” shows the lowest significant returns at 5% from the energy industry.

Moving to the 24 month period, we again observe highly significant returns at 1% for "All firms", "VC", and "NPE" in the technology industry, whereas "VC" report median returns of 103.3%. The highest performing industry for "PE" is industrial, which is significant at 5%. We observe that the worst significant performing industry for "All firms" and "NPE" was the consumer non-cyclical industry, whereas both returns are significant at 1%. At last, we observe the worst significant performing industry for "PE" and "VC" as the financial industry, which generates negative returns for the definitions at -42.4% and -38.9%, respectively.

At last, we move to the 36-month period. First, we observe that the technology industry is still superior, with highly significant returns from "All firms", "VC", and "NPE", whereas all are significant at 1%. The highest performing industry for "PE" is still industrial, which is significant at 10%. We observe that the lowest median significant performer for "All firms" and "PE" is consumer cyclical, which is significant at 5% and 10%, respectively. "NPE" have no other significant median return, and the lowest-performing significant return from "VC" is consumer non-cyclical, with a median return of 54.3% at 1% significance.

To summarize our results from both BHAR and CAR median across all periods, we find the technology industry as a clear overperformer. It is hard to determine the worst performer based on significance and lowest returns. We have several candidates and will introduce both the technology and communications industry to our regressions.

5.2.6 OLS Regression of Long Run Performance

Table 5.24 - OLS Regression for 12, 24 and 36 months BHAR

The table reports output from a multivariate regression of 12, 24 and 36 months BHAR with 8 predictors. PE and VC is a dummy variable taking 1 if the company is Private Equity Backed and 0 otherwise. Hot Market Is a dummy taking the value 1 for IPO that occured in year 2004 - 2006, 2014 and 2017 - 2021 and 0 otherwise. Offer To First Close is the initial 1 day underpricing. Market Capitalization At Offer is the Marketcap at offer quoted in billions USD, for each billion increase in market cap. Equity sold is the estimated amount of Equity sold in the transaction. Industry- Technology and Communication are dummies with the highest and lowest degree of performance in our sample. Further, the models are tested for heteroskedastisity using Whites test for heteroskedastisity. Note: **** = 0%, *** = 0.01%, ** = 1%, * = 5%, ^ = 10%

	Performance		
	BHAR		
Variables	12 Months	24 Months	36 Months
Intercept	0,1168 ^	0,08179 ***	-0,03459
	(0.0646)	(0.09687)	(0.1223)
PE	0,2158	-0,05279	-0,1284
	(0.08735)	(0.1318)	(0.1731)
VC	0,0944	0,316 **	0,5273 ***
	(0.09021)	(0.1275)	(0.1651)
Hot Market	-0,0836	-0,1826 **	-0,2267 **
	(0.05713)	(0.08335)	(0.1064)
Offer To First Close	0,5594 ****	0,7006 ****	0,6533
	(0.09279)	(0.1493)	(0.1911)
Market capitalization at offer	-0,006916	0,001677	0,002485
	0,00871	0,001676	0,002125
Equity Sold	-0,0765	-0,1894	-0,004474
	(0.1560)	(0.2278)	(0.2892)
Industry - Technology	0,2948 ***	0,4532 ****	0,5973 ****
	(0.08966)	(0.1350)	(0.1797)
Industry - Communications	-0,2143 ^	0,1831	0,4947 **
	(0.107)	(0.1749)	(0.2214)
Multiple R-Squared	0,05994	0,06157	0,06236
Adjusted R-Squared	0,05141	0,05215	0,0521
Observations	891	806	740
F-Statistic	7,03 ****	6,537 ****	6,077 ****

Table 5.24 summarizes results from our models on performance listed in the methodology section. For the three models (12-, 24- and 36-months), we find an F-stat of 7.03, 6.537 and 6.077, which is all significant at the 0% level, leading us to believe we have found significant results. In addition, when looking at the adjusted r-squared, we find values of 5.14%, 5.12% and 5.21%, respectively, indicating that our model has somewhat explanatory power. Narrowing in on each variable, we will first examine the 12 months' BHAR. What first comes to mind is the PE Dummy. With a beta of 0.2158, although it is not statistically significant, we can see that if the company were to be PE-backed, it would have experienced 21.58% better BHAR. Looking at the 24 and 36 months, we see that the beta turns negative. We speculate that as the market gains information as time passes, the

participants realize that the initial underpricing was wrong and that the stocks will trade more closely to their offer price. However, we cannot conclude anything.

If the company were to be listed in a hot-issue market, it would experience negative BHAR, which is reasonable to believe. However, only significant for 24- and 36-months, in line with Kaplan et al. (2005) and Bergström et al. (2006), offering hot-issue markets perform worse in the long run. Interestingly, Offer To First Close has a statistically significant effect on 12 months BHAR at the 0% level. We find that the more underpriced a company is on the first day, the larger the BHAR over 12 months. We find significant results for both industries. Technology has a positive coefficient, indicating that firms within the technology industry will significantly perform better than others at the 1% level, while communications have underperformed at the 10% level.

Moving to the second model (24 months), we are now finding some exciting results. The first that catches the eye is the VC dummy. With a positive coefficient and significance at a 1% level, we find that VC-backed companies highly outperform their peers. We argue that because most of the observations in our returns data are from 2017 - 2021, we all know how the technology and communications sector has done in the last years. Over the last years, we have been experiencing high returns in "growth companies", which are often backed by venture capital, and we find it reasonable to believe. The PE dummy is negative and insignificant, and although our hypothesis states that we expect PE firms to do better in the long run than other backings, we cannot conclude that this is the case for our model.

We see that companies listed in "Hot Issue Markets" perform significantly worse at the 1% level. This finding aligns with previous research, which supports our hypothesis that firms will experience higher underperformance when listed in a hot issue market. As with the 12 months BHAR, we find that companies who experience a higher degree of underpricing will experience higher BHAR over 24 months. In this model, the technology industry is performing even better and with a higher degree of significance.

Lastly, and probably the most “important” of our three BHAR models, we now look at the 36 months BHAR. We consider this model the most relevant because this is what previous research mainly have focused on. We find that PE has a negative coefficient but is not significant at reasonable levels. We cannot infer our hypothesis that states PE will perform better in the long run. We now find that VC will outperform its peers significantly at the 0.01% level, suggesting even more substantial evidence of what we saw for the 24 months.

The hot issue market problem is backed by previous research. Significant at the 1% level, we find that if companies were to be listed during hot markets, they would experience a negative BHAR. One critical notice is that our data ended in 2021, so we have not been able to capture the steep decline experienced thus far in 2022, and our data representation may be biased to what has happened lately. For the 36 months, we no longer see any effect from initial underpricing as we did for both the 12- and 24-months models. As for the 12- and 24-months model, we find that the technology industry is significant now at the 0% level with a positive coefficient. In addition, the communications industry has a positive coefficient that is significant at the 1% level.

Table 5.25 - OLS Regression for 12, 24 and 36 months CAR

The table reports output from a multivariate regression of 12, 24 and 36 months CAR with 8 predictors. PE and VC is a dummy variable taking 1 if the company is Private Equity Backed and 0 otherwise. Hot Market Is a dummy taking the value 1 for IPO that occured in year 2004 - 2006, 2014 and 2017 - 2021 and 0 otherwise. Offer To First Close is the initial 1 day underpricing. Market Capitalization At Offer is the Marketcap at offer quoted in billions USD, for each billion increase in market cap. Equity sold is the estimated amount of Equity sold in the transaction. Industry- Technology and Communication are dummies with the highest and lowest degree of performance in our sample. Further, the models are tested for heteroskedastisity using Whites test for heteroskedastisity. Note: **** = 0%, *** = 0.01%, ** = 1%, * = 5%, ^ = 10%

	Performance		
	CAR		
Variables	12 Months	24 Months	36 Months
Intercept	0,0876	0,07654	0,0976
	(0.0578)	(0.0805)	(0.0948)
PE	-0,0095	-0,0575 ***	-0,0273
	(0.0760)	(0.1096)	(0.1305)
VC	0,1901 **	0,2892	0,5480 **
	(0.0785)	(0.1061)	(0.1283)
Hot Market	-0,0507	-0,0691	-0,0897
	(0.0498)	(0.0693)	(0.0823)
Offer To First Close	0,7162 ****	0,6623 ****	0,5308 ****
	(0.0808)	(0.1242)	(0.1489)
Market capitalization at offer	-0,004974	0,009374	0,001802
	0,007585	0,001394	0,01642
Equity Sold	-0,0400	-0,1436	-0,1123
	(0.1358)	(0.1895)	(0.2235)
Industry - Technology	0,2973 ****	0,3942 ****	0,3988 ****
	(0.0780)	(0.1124)	(0.1395)
Industry - Communications	-0,2801 ***	0,2037	0,4210
	(0.0964)	(0.1455)	(0.1674)
Multiple R-Squared	0,113	0,066	0,068
Adjusted R-Squared	0,105	0,056	0,058
Observations	891	806	740
F-Statistic	14,05 ****	6,524 ****	7,288 ****

A similar approach was done for returns measured in CAR. Again, all three models are significant at the 0% level. Despite this, our results did not change very much. Considering the 12 months CAR, we see that VC Dummy, Offer to first close, the technology and communications industry is significant. The only difference between 12 months BHAR and CAR are that VC Dummy is now significant, and the models seem to have gained much more explanatory power (looking at R-squared figures). It has an F-statistic of approx. 14 and its R-squared reports 11.3% showing significant improvement. For 24 months CAR, we have a significant model reporting an F-statistic of 6.52. On the other hand, we see almost half of the R-square compared to 12 months CAR. For the first time, we can see any significant effects with regards to the PE dummy, with a coefficient of -0.0575 and significant at the 1% level. This indicates that PE-backed firms

deliver negative results measuring CAR over 24 months, which contradicts our hypothesis that PE-backed firms will outperform the others. Similarly, compared to the 12 months regression, we find that Offer to First Close and Technology industry again is significant at high levels, strengthening our belief that tech firms perform better in the long run. Now the Communications are no longer significant. Lastly, for the 36 months, we again see that VC is significant like the 36 months BHAR, strengthening the results regarding BHAR. The same goes for Offer to First close and technology. The model is significant, reporting an F-statistic of approx. 7.3 while we see an R-squared of 6.8%. Looking at the r-squares, we can see that the models' explanatory power drops significantly as time goes on, suggesting that when measuring CAR, the best way is to use the 12 months return.

6.0 Conclusion

We have investigated patterns regarding underpricing and long-run performance of All firms, PE, VC and NPE firms listed on the NYSE, Nasdaq GM, and LSE exchanges from 01.01.2000 - 31.12.2021. The sample consists of 1058 initial public offerings divided by 116 PE IPOs, 99 VC IPOs and 843 NPE IPOs. Our thesis focus on explaining the following questions about underpricing: Is there underpricing in IPOs? Do PE-backed IPOs show less underpricing than peers? Is there more underpricing when listed during hot markets, and will PE-backed firms be less affected in these markets? What effect does the choice of underwriter have on underpricing?

We tried to answer the following questions regarding long-run performance: Will all firms underperform relative to the benchmark in the long run? Will PE listings perform better than their comparisons? Will all listings experience a higher degree of underperformance when listing in a hot market, and will PE listings be less affected by hot markets than NPE? Further, we investigate if larger firms in size of market capitalization at offer outperform smaller firms, and if firms sell a more significant percentage of the equity to the public perform better than those who sell less.

On an aggregate level, all IPOs will experience underpricing in all definitions. Our results show significant proof that our total sample will experience an average underpricing of 16.9% for the first-day close, 19.3% for first-week close, and 19.2% for first-month close, which is in line with previous research, recall table 2.1. However, we could not find significant results that PE companies have less underpricing than other definitions, which has been proved by Bergström et al. (2006) and Levis (2011). Moreover, we observe higher significant mean values, meaning higher underpricing from companies going public in a hot issue market compared to cold. However, we find no sufficient evidence when testing for differences in hot and cold markets, meaning we cannot prove the fact that there is a higher degree of underpricing in a hot issue market from our sample. There are no evidence that PE experiences less underpricing during hot issue markets compared to NPE. We find significant mean values that prestigious bookrunner underprice IPOs more than less prestigious ones. However, when testing for differences between bookrunners, we find no significant evidence to prove a lower degree of underpricing from prestigious bookrunners for All firms. Finally, we find strong evidence that more significant IPOs in terms of Market Capitalization at Offer result in more underpricing for first-day returns. This might be due to the complexity of valuating larger firms and the physical job of selling the shares offered, which could explain this phenomenon.

When calculating our four portfolios' performance, we use BHAR and CAR metrics, and MSCI World Index as a benchmark. We find sufficient evidence that "All firms" and "NPE" underperform using a BHAR metric for 24- and 36-months period at -16.4% and -12.2%, and at -28.7% and -28.2%, respectively. Moreover, we also find sufficient evidence that all definitions overperform in every period in the CAR metric, except PE for 24- and 36-month, which is insignificant. However, since BHAR is a more realistic measure than CAR, considering the compounding effect, we conclude that "All firms" and "NPE" underperforms in a 24- and 36-month period, which is in line with some previous research, recall table 2.2. CAR metric is reasonable to use when comparing variables such as definitions (All firms, PE, VC and NPE) since they have the same foundation in the calculations. Moving on to our following hypothesis, we fail to prove that PE outperforms VC and NPE. In fact, our results prove that VC outperforms NPE (in 12- and 36-month periods) and PE (in 36 month period) by applying the CAR

metric. By looking at the characteristics of our data sample, we find that a significant portion of our VC observations consists of companies in the technologies and communications industries, which performed very well during 2017 – 2021, which can explain our results.

We found strong evidence that "All firms" underperform in hot issue markets compared to cold for all periods in both BHAR and CAR measures. Sadly, we could not prove that PE is less affected by hot issue markets than NPE. However, our more exciting result is our discovery that the larger size of the firms in our sample, measured in Market Capitalization at Offer, outperforms smaller firms, whereas we find strong evidence for both BHAR for all periods and CAR metrics, indeed size matters when it comes to performance. Finally, we find significant evidence that those companies selling a higher percentage of the equity to the public will outperform those who sell less, which we argue could make sense because we measure performance by share price, and a higher portion of public shares makes them more liquid, which lowers the risk of holding the shares.

7.0 Recommended Further Studies

We have produced some exciting results from our thesis, and we can see that it builds up to further investigation. First, a large part of our sample (approximately 45%) went public in the time horizon 2017-2021, and this is indeed a very hot issue market. There has also been very high investment activity in recent years due to low-interest rates and the pandemic, which has disrupted the market and helped the technology and communication industry skyrocket. This is highly reflected in our results from the industry analysis. We suggest studying the industries more specific and benchmarking them with an industry index.

We find it interesting to investigate and compare different hot markets. In our sample, it would be to separate and create three different hot markets for the periods 2004-2006, 2014, and 2017-2021. The test for significant differences amongst them. We know for sure that the hot issue market around the pandemic has been very special; we are in a world crisis but still have low-interest rates and high investing activity. This might be why we discovered that PE is less underpriced in hot issue markets than cold. Most of our PE samples went public

during the hot market in 2017-2021 (63 firms out of 116). We suggest investigating this matter further to see if this is a coincidence from our sample or if PE funds are more aware of limiting underpricing when they take their investments public during hot markets.

We found it interesting that more prominent firms perform better than smaller firms. Our suggestion is to research a value-weighted portfolio, where the investor starts with a fictive amount of money to invest with, the rebalance the portfolio every time a firm from the sample goes public on that specific day, and re-weight every firm in the portfolio based on the increase/decrease on to the same date as the rebalancing of the portfolio. If we ignore transaction costs, we believe it could be an optimal investing strategy that could create higher returns than the benchmark.

Finally, our thesis investigates and shows how the percentage of equity sold in an offering affects the underpricing and performance. We did not study whether there is an optimal amount of equity sold to achieve less underpricing or better performance. When looking at our results economically, we can see that issuing a "Medium" amount of equity will be the best. Therefore, we recommend other researchers investigate this matter further to see if there are some kinds of equilibrium of what amount of equity is best to issue for best results.

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9.0 Appendices

9.1 Index of Abbreviations

All firms – a portfolio of every firm in the sample
BHAR – Buy-and-Hold Abnormal Return
BM – Basic Materials industry
BO – Buyout
CAR – Cumulative Abnormal Return
CC – Consumer Cyclical industry
CNC – Consumer Non-Cyclical industry
Comm – Communications industry
Definition: Private Equity-Backed, Venture Capital-Backed and/or Non-Private Equity-Backed
EV/EBITDA - Enterprise Value to Earnings Before Interests, Taxes, Depreciation and Amortization
GP – General Partner
IPO – Initial Public Offering

LBO – Levered Buyout

LLC – Limited Liability Company

LP – Limited Partner

LN – Our observations from LSE

LSE – London Stock Exchange

NPE – Non-Private Equity-Backed/ Non-Venture Capital-Backed

NYSE – New York Stock Exchange

OLS – Ordinary Least Squares

OTC – Over-The-Counter

PE – Private Equity-Backed

P/E - Price-to-earnings multiple

REIT – Real Estate Investment Trust

SEC – Securities and Exchange Commission

SPAC – Special Purpose Acquisition Company

Tech – Technology industry

US – Our observations from NYSE and Nasdaq GM

VC – Venture Capital-Backed

9.2 Underwriter´s Ranking Score

Table 9.0 - Underwriter´s Ranking Score System

This lists consists of 140 bookrunners and 1 bookrunner called "other" which consists of all other bookrunners that is not on the list. Credit is the aggregated amount creditet to the advisor. Fees is the aggregated underwriters commision. Value (USD) is the aggregated total deal size. Offer to Date is total return of all deals advised. Deal Count is the amount of deals the underwriter have been a part of. The ranking systems consists of scores on each metric with nine equal intervals.

Ranking	Bookrunner	Credit (USD)	Fees	Value (USD)	Offer to Date	Deal Count	Score
1	JP Morgan	5	9	9	6	7	7,2
2	Goldman Sachs	9	1	1	4	9	4,8
3	Morgan Stanley	8	1	1	3	9	4,4
4	BofA Securities	4	1	1	3	7	3,2
5	Credit Suisse	6	1	1	2	6	3,2
6	Citi	4	1	1	3	5	2,8
7	Wunderlich Securities Inc	1	0	0	9	0	2
8	Lehman Brothers	2	1	1	4	2	2
9	Deutsche Bank	2	1	1	4	2	2
10	Robert W Baird & Co	1	1	1	5	1	1,8
11	Piper Sandler & Co	1	1	1	4	1	1,6
12	William Blair & Co LLC	1	1	1	4	1	1,6
13	UBS	1	1	1	3	2	1,6
14	Cowen & Co	1	1	1	3	2	1,6
15	China International Capital Corp	1	1	1	4	1	1,6
16	Truist Securities Inc	1	1	1	4	1	1,6
17	Craft Capital Management LLC	1	1	1	4	1	1,6
18	DNB ASA	1	0	0	5	1	1,4
19	Jefferies	1	1	1	1	3	1,4
20	Stifel	1	1	1	2	2	1,4
21	Sandler O'Neill & Partners	1	1	1	3	1	1,4
22	AG Edwards & Sons LLC	1	1	1	3	1	1,4
23	WR Hambrecht + Co LLC	1	1	1	3	1	1,4
24	Craig-Hallum Capital Group Ltd	1	1	1	3	1	1,4
25	Barclays	1	1	1	2	2	1,4
26	Axis Bank Ltd	1	0	0	5	0	1,2
27	Neidiger Tucker Bruner Inc	1	1	1	3	0	1,2
28	RBC Capital Markets	1	1	1	2	1	1,2
29	CIBC	1	1	1	2	1	1,2
30	BMO Capital Markets	1	1	1	2	1	1,2
31	Wells Fargo	1	1	1	2	1	1,2
32	Canaccord Genuity	1	1	1	2	1	1,2
33	Stephens Inc	1	1	1	2	1	1,2
34	NatWest Markets	1	1	1	2	1	1,2
35	FIG Partners LLC	1	1	1	2	1	1,2
36	Alexander Capital LP	1	1	1	2	1	1,2
37	B Riley Financial Inc	1	1	1	1	1	1
38	Raymond James & Associates	1	1	1	1	1	1
39	Cantor Fitzgerald	1	1	1	1	1	1
40	SVB Financial Group	1	1	1	1	1	1
41	EarlybirdCapital Inc/DE	1	1	1	1	1	1
42	Lazard Ltd	1	1	1	1	1	1
43	Oppenheimer & Co	1	1	1	1	1	1
44	US Bancorp	1	1	1	1	1	1
45	Roth Capital Partners Inc	1	1	1	1	1	1

46	Maxim Group LLC	1	1	1	1	1	1
47	Nomura	1	1	1	1	1	1
48	AMTD Global Markets Ltd	1	1	1	1	1	1
49	KeyBanc Capital Markets	1	1	1	1	1	1
50	BTIG LLC	1	1	1	1	1	1
51	Ladenburg Thalmann & Co	1	1	1	1	1	1
52	Johnson Rice & Co LLC	1	1	1	1	1	1
53	Morgan Joseph TriArtisan Group Inc	1	1	1	1	1	1
54	Needham Group Inc/The	1	1	1	1	1	1
55	Rodman & Renshaw Inc	1	1	1	1	1	1
56	HSBC	1	1	1	1	1	1
57	Chardan Capital Markets LLC	1	1	1	1	1	1
58	Paulson Investment Co Inc	1	1	1	1	1	1
59	Feltl & Co	1	1	1	1	1	1
60	ThinkEquity LLC	1	1	1	1	1	1
61	Wedbush Securities Inc	1	1	1	1	1	1
62	I-Bankers Securities Inc	1	1	1	1	1	1
63	Lifesci Capital LLC	1	1	1	1	1	1
64	HCFP/Brenner Securities LLC	1	1	1	1	1	1
65	Benchmark Co LLC/The	1	1	1	1	1	1
66	Aegis Capital Corp	1	1	1	1	1	1
67	Evercore Partners Inc	1	1	1	1	1	1
68	MDB Capital Group LLC	1	1	1	1	1	1
69	Network 1 Financial	1	1	1	1	1	1
70	Banco Itau BBA	1	1	1	1	1	1
71	Gilford Securities Inc	1	1	1	1	1	1
72	Boustead Securities LLC	1	1	1	1	1	1
73	GunnAllen Financial Inc	1	1	1	1	1	1
74	Broadband Capital Management LLC	1	1	1	1	1	1
75	DA Davidson & Co	1	1	1	1	1	1
76	Kashner Davidson	1	1	1	1	1	1
77	Joseph Gunnar & Co	1	1	1	1	1	1
78	Westpark Capital Inc	1	1	1	1	1	1
79	Prime Number Capital LLC	1	1	1	1	1	1
80	Northland Securities Group LLC	1	1	1	1	1	1
81	Sunrise Securities	1	1	1	1	1	1
82	EF Hutton	1	1	1	1	1	1
83	Spartan Capital Securities LLC	1	1	1	1	1	1
84	Dawson James Securities	1	1	1	1	1	1
85	Janney Montgomery Scott LLC	1	1	1	1	1	1
86	Newbridge Securities Corp	1	1	1	1	1	1
87	Wallachbeth Capital LLC	1	1	1	1	1	1
88	Jones Gable & Co Ltd	1	0	0	3	0	0,8
89	NH Investment & Securities Co Ltd	1	1	1	1	0	0,8
90	Flagstone Securities LLC	1	1	1	1	0	0,8

91	HC Wainwright & Co	1	1	1	1	0	0,8
92	Prudential Financial Inc	1	1	1	1	0	0,8
93	Canaccord Financial Inc	1	1	1	1	0	0,8
94	Brean Murray Carret & Co LLC	1	1	1	1	0	0,8
95	Nedbank Ltd	1	1	1	1	0	0,8
96	Cohen & Co	1	1	1	1	0	0,8
97	Taglich Brothers Inc	1	1	1	1	0	0,8
98	First Dunbar Securities Corp	1	1	1	1	0	0,8
99	Viewtrade Securities Inc	1	1	1	1	0	0,8
100	Shemano Group	1	1	1	1	0	0,8
101	Joseph Stone Capital LLC	1	1	1	1	0	0,8
102	THCG Inc	1	1	1	1	0	0,8
103	Global Hunter Securities LLC	1	1	1	1	0	0,8
104	Schneider Securities	1	1	1	0	1	0,8
105	Oak Ridge Financial Services Group Inc	1	1	1	1	0	0,8
106	Kirlin Securities	1	1	1	1	0	0,8
107	HD Brous & Co	1	1	1	1	0	0,8
108	Burnham Securities Inc	1	1	1	1	0	0,8
109	Dominick & Dominick	1	1	1	1	0	0,8
110	Northland Capital Partners Ltd	1	1	1	1	0	0,8
111	Capital Growth Financial LLC	1	1	1	1	0	0,8
112	TD Securities	1	0	0	1	1	0,6
113	Scotiabank	1	0	0	1	1	0,6
114	National Bank Financial Inc	1	0	0	1	1	0,6
115	Banco Santander	1	0	0	1	1	0,6
116	Derayah Financial Co	1	0	0	2	0	0,6
117	Peters & Co Ltd	1	0	0	2	0	0,6
118	Eight Capital	1	0	0	1	1	0,6
119	Laidlaw & Co UK Ltd	1	1	1	0	0	0,6
120	Credit Mutuel-CIC	1	0	0	2	0	0,6
121	Haywood Securities Inc	1	0	0	1	1	0,6
122	Somerset Financial Group	1	0	1	1	0	0,6
123	KTM Capital	1	0	0	2	0	0,6
124	Bank of China	1	0	0	1	0	0,4
125	Caixa Banco de Investimento SA	1	0	0	1	0	0,4
126	ING Groep	1	0	0	1	0	0,4
127	Carnegie	1	0	0	1	0	0,4
128	DBS Group	1	0	0	1	0	0,4
129	Cormark Securities Inc	1	0	0	1	0	0,4
130	Guotai Junan Securities	1	0	0	1	0	0,4
131	Natixis	1	0	0	1	0	0,4
132	Industrial Alliance Insurance & Financial	1	0	0	1	0	0,4
133	HCFP/Capital Markets LLC	1	0	0	1	0	0,4
134	Paradigm Capital Inc	1	0	0	1	0	0,4
135	Bonwick Capital Partners LLC	1	0	0	1	0	0,4
136	Capitol Securities Management Inc	1	0	0	1	0	0,4
137	Europe Finance et Industrie	1	0	0	1	0	0,4
138	Desjardins Capital Markets	1	0	0	1	0	0,4
139	MGI Securities Inc	1	0	0	1	0	0,4
140	Clarus Securities	1	0	0	1	0	0,4
141	Other	1	0	0	1	0	0,4

9.3 List of Companies in the Sample

Table 9.1 - Companies in the Sample

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange.

Name	Country	IPO Date	Definition	Industry
111 Inc	US	9/2018	PE	ConsumerNonCyclical
1stdibs.com Inc	US	6/2021	NPE	Communications
4basebio PLC	LN	2/2021	NPE	ConsumerNonCyclical
4d pharma plc	LN	2/2014	NPE	ConsumerNonCyclical
4Global PLC	LN	12/2021	NPE	Technology
89bio Inc	US	11/2019	NPE	ConsumerNonCyclical
908 Devices Inc	US	12/2020	NPE	Industrial
AB Dynamics PLC	LN	5/2013	NPE	ConsumerNonCyclical
Abingdon Health PLC	LN	12/2020	NPE	ConsumerNonCyclical
AC Immune SA	US	9/2016	NPE	ConsumerNonCyclical
Acceler8 Ventures Ltd	LN	7/2021	NPE	Financial
Accenture PLC	US	7/2001	NPE	Technology
Access Intelligence PLC	LN	12/2003	NPE	Technology
Accsys Technologies PLC	LN	10/2005	NPE	Industrial
AcelRx Pharmaceuticals Inc	US	2/2011	NPE	ConsumerNonCyclical
ACM Research Inc	US	11/2017	NPE	Technology
Adagene Inc	US	2/2021	NPE	ConsumerNonCyclical
Adagio Therapeutics Inc	US	8/2021	NPE	ConsumerNonCyclical
ADC Therapeutics SA	US	5/2020	PE	ConsumerNonCyclical
Adept Technology Group PLC	LN	2/2006	NPE	Communications
Adicet Bio Inc	US	1/2018	VC	ConsumerNonCyclical
ADMA Biologics Inc	US	10/2013	NPE	ConsumerNonCyclical
ADT Inc	US	1/2018	PE	ConsumerNonCyclical
Adverum Biotechnologies Inc	US	7/2014	NPE	ConsumerNonCyclical
ADVFN PLC	LN	3/2000	NPE	Communications
Aeglea BioTherapeutics Inc	US	4/2016	PE	ConsumerNonCyclical
Aerie Pharmaceuticals Inc	US	10/2013	NPE	ConsumerNonCyclical
Aerovate Therapeutics Inc	US	6/2021	NPE	ConsumerNonCyclical
Aesthetic Medical Internationa	US	10/2019	NPE	ConsumerNonCyclical
AEW UK REIT PLC	LN	5/2015	NPE	Financial
AFC Energy PLC	LN	4/2007	NPE	Energy
Affimed NV	US	9/2014	NPE	ConsumerNonCyclical
AfriTin Mining Ltd	LN	11/2017	NPE	BasicMaterials
Agiliti Inc	US	4/2021	NPE	ConsumerNonCyclical
agilon health Inc	US	4/2021	PE	ConsumerNonCyclical
Air Lease Corp	US	4/2011	PE	Financial
Airtel Africa PLC	LN	6/2019	PE	Communications
aka Brands Holding Corp	US	9/2021	NPE	Communications
Akebia Therapeutics Inc	US	3/2014	VC	ConsumerNonCyclical
Akso Health Group	US	11/2017	NPE	Financial
Alimera Sciences Inc	US	4/2010	NPE	ConsumerNonCyclical
Alkemy Capital Investments PLC	LN	9/2021	NPE	Financial
Allegiance Bancshares Inc	US	10/2015	NPE	Financial
Allergy Therapeutics PLC	LN	10/2004	NPE	ConsumerNonCyclical

Alpha Teknova Inc	US	6/2021	PE	ConsumerNonCyclical
Alpine Immune Sciences Inc	US	6/2015	NPE	ConsumerNonCyclical
Alteryx Inc	US	3/2017	NPE	Technology
Altitude Group PLC	LN	11/2005	NPE	Technology
Altus Strategies PLC	LN	8/2017	NPE	BasicMaterials
AltynGold PLC	LN	6/2004	NPE	BasicMaterials
Aluminum Corp of China Ltd	US	12/2001	NPE	BasicMaterials
Amala Foods PLC	LN	8/2018	NPE	Technology
Ambrx Biopharma Inc	US	6/2021	NPE	ConsumerNonCyclical
Amedeo Air Four Plus Ltd	LN	5/2015	NPE	Industrial
American Equity Investment Lif	US	12/2003	NPE	Financial
AMN Healthcare Services Inc	US	11/2001	PE	ConsumerNonCyclical
Amur Minerals Corp	LN	9/2009	NPE	BasicMaterials
Anaplan Inc	US	10/2018	VC	Communications
Angel Oak Mortgage Inc	US	6/2021	NPE	Financial
Angle PLC	LN	3/2004	NPE	ConsumerNonCyclical
Anglo Asian Mining PLC	LN	7/2005	NPE	BasicMaterials
Angus Energy PLC	LN	11/2016	NPE	Energy
Animalcare Group PLC	LN	1/2008	NPE	Industrial
Annovis Bio Inc	US	1/2020	NPE	ConsumerNonCyclical
Anpac Bio-Medical Science Co L	US	1/2020	NPE	ConsumerNonCyclical
Anpario PLC	LN	6/2005	NPE	ConsumerNonCyclical
Anthem Inc	US	10/2001	NPE	ConsumerNonCyclical
Appfolio Inc	US	6/2015	VC	Technology
Appian Corp	US	5/2017	NPE	Technology
Applied Genetic Technologies C	US	3/2014	VC	ConsumerNonCyclical
Applied Graphene Materials PLC	LN	11/2013	NPE	BasicMaterials
Applied Therapeutics Inc	US	5/2019	PE	ConsumerNonCyclical
Aptamer Group PLC	LN	12/2021	NPE	ConsumerNonCyclical
Aptorum Group Ltd	US	12/2018	NPE	ConsumerNonCyclical
Aquestive Therapeutics Inc	US	7/2018	NPE	ConsumerNonCyclical
Arcimoto Inc	US	9/2017	VC	ConsumerCyclical
Arcus Biosciences Inc	US	3/2018	VC	ConsumerNonCyclical
Ardelyx Inc	US	6/2014	VC	ConsumerNonCyclical
Ardmore Shipping Corp	US	8/2013	NPE	Industrial
Arecor Therapeutics PLC	LN	6/2021	NPE	ConsumerNonCyclical
Ares Management Corp	US	5/2014	NPE	Financial
Argo Blockchain PLC	LN	8/2018	VC	Financial
Argos Resources Ltd	LN	7/2010	NPE	Energy
Ariana Resources PLC	LN	7/2005	NPE	BasicMaterials
Aris Water Solution Inc	US	10/2021	NPE	Utilities
Arista Networks Inc	US	6/2014	NPE	Communications
Arix Bioscience Plc	LN	2/2017	NPE	Financial
Arkle Resources PLC	LN	7/2007	NPE	BasicMaterials
Arlo Technologies Inc	US	8/2018	NPE	ConsumerNonCyclical
Armadale Capital PLC	LN	2/2006	NPE	Financial
Arricano Real Estate PLC	LN	9/2013	NPE	Financial
Arrow Exploration Corp	LN	10/2021	NPE	Energy
Arteris Inc	US	10/2021	NPE	Technology
Aseana Properties Ltd	LN	4/2007	NPE	Financial
Asia Strategic Holdings Ltd	LN	8/2017	NPE	Financial

Asimilar Group PLC	LN	4/2003	NPE	Financial
Aslan Pharmaceuticals Ltd	US	5/2018	NPE	ConsumerNonCyclical
Aspen Aerogels Inc	US	6/2014	NPE	ConsumerCyclical
Assured Guaranty Ltd	US	4/2004	NPE	Financial
Astria Therapeutics Inc	US	6/2015	VC	ConsumerNonCyclical
ATA Creativity Global	US	1/2008	VC	Technology
ATAI Life Sciences NV	US	6/2021	NPE	ConsumerNonCyclical
Atalaya Mining PLC	LN	5/2005	NPE	BasicMaterials
Atlantic Lithium Ltd	LN	2/2015	NPE	Financial
Atome Energy PLC	LN	12/2021	NPE	Energy
Atrato Onsite Energy PLC	LN	11/2021	NPE	Financial
ATRenew Inc	US	6/2021	NPE	ConsumerCyclical
AtriCure Inc	US	8/2005	NPE	ConsumerNonCyclical
Aura Biosciences Inc	US	10/2021	NPE	ConsumerNonCyclical
Aura Energy Ltd	LN	9/2016	NPE	BasicMaterials
Autins Group PLC	LN	12/2021	NPE	Industrial
Autohome Inc	US	12/2013	PE	Communications
Avacta Group PLC	LN	9/2003	NPE	ConsumerNonCyclical
Avalara Inc	US	6/2018	NPE	Technology
Avantor Inc	US	5/2019	PE	ConsumerNonCyclical
Avidity Biosciences Inc	US	6/2020	NPE	ConsumerNonCyclical
Axcella Health Inc	US	5/2019	VC	ConsumerNonCyclical
Axos Financial Inc	US	3/2005	NPE	Financial
Axsome Therapeutics Inc	US	11/2015	NPE	ConsumerNonCyclical
Ayala Pharmaceuticals Inc	US	5/2020	NPE	ConsumerNonCyclical
AZEK Co Inc/The	US	6/2020	NPE	Industrial
Aziyo Biologics Inc	US	10/2020	NPE	ConsumerNonCyclical
B90 Holdings PLC	LN	7/2013	NPE	ConsumerCyclical
Backblaze Inc	US	11/2021	NPE	Communications
Bain Capital Specialty Finance	US	11/2018	NPE	Financial
Banc of California Inc	US	8/2002	NPE	Financial
Barings BDC Inc	US	2/2007	NPE	Financial
BAY Capital PLC	LN	9/2021	NPE	Financial
Belluscura PLC	LN	5/2021	NPE	ConsumerNonCyclical
Belvoir Group PLC	LN	2/2012	NPE	Financial
Benchmark Holdings Plc	LN	12/2013	NPE	ConsumerNonCyclical
Bens Creek Group PLC	LN	10/2021	NPE	Energy
Berkshire Hills Bancorp Inc	US	6/2000	NPE	Financial
Berry Global Group Inc	US	10/2012	PE	Industrial
BEST Inc	US	9/2017	VC	Industrial
Best Of The Best PLC	LN	8/2006	NPE	ConsumerCyclical
Beximco Pharmaceuticals Ltd	LN	10/2005	NPE	ConsumerNonCyclical
Bidstack Group Plc	LN	10/2004	NPE	Communications
Bill.com Holdings Inc	US	12/2019	NPE	Technology
BioAtla Inc	US	12/2020	PE	ConsumerNonCyclical
Biodesix Inc	US	10/2020	NPE	ConsumerNonCyclical
Biohaven Pharmaceutical Holdin	US	5/2017	PE	ConsumerNonCyclical
Bion PLC	LN	5/2016	NPE	Energy
Bionomics Ltd	US	12/2021	NPE	ConsumerNonCyclical
Biora Therapeutics Inc	US	6/2020	NPE	ConsumerNonCyclical
BIT Mining Ltd	US	11/2013	NPE	ConsumerNonCyclical

BiVictriX Therapeutics plc	LN	8/2021	NPE	ConsumerNonCyclical
BJ's Wholesale Club Holdings I	US	6/2018	PE	ConsumerCyclical
Black Stone Minerals LP	US	5/2015	NPE	Energy
Blackstone Inc	US	6/2007	NPE	Financial
Blancco Technology Group PLC	LN	3/2005	NPE	Technology
Blencowe Resources PLC	LN	4/2019	NPE	Energy
Blend Labs Inc	US	7/2021	NPE	Technology
Block Energy PLC	LN	6/2018	NPE	Energy
Bloom Energy Corp	US	7/2018	VC	Industrial
Blue Apron Holdings Inc	US	6/2017	NPE	ConsumerNonCyclical
Blue Star Capital PLC	LN	10/2004	NPE	Financial
Bluebird Merchant Ventures Ltd	LN	4/2016	NPE	BasicMaterials
BlueCity Holdings Ltd	US	7/2020	NPE	Technology
Blueknight Energy Partners LP	US	7/2007	NPE	Energy
BlueLinx Holdings Inc	US	12/2004	NPE	ConsumerCyclical
Boise Cascade Co	US	2/2013	PE	Industrial
boohoo Group PLC	LN	3/2014	NPE	ConsumerCyclical
Boot Barn Holdings Inc	US	10/2014	PE	ConsumerCyclical
Booz Allen Hamilton Holding Co	US	11/2010	PE	ConsumerNonCyclical
Boqii Holding Ltd	US	9/2020	NPE	Communications
Borders & Southern Petroleum P	LN	5/2005	NPE	Energy
Borr Drilling Ltd	US	7/2019	NPE	Energy
Boston Omaha Corp	US	6/2017	NPE	Communications
Botswana Diamonds PLC	LN	2/2011	NPE	BasicMaterials
BowLeven PLC	LN	12/2004	NPE	Energy
Bowman Consulting Group Ltd	US	5/2021	NPE	Industrial
Box Inc	US	1/2015	NPE	Technology
Bradda Head Lithium Ltd	LN	7/2021	NPE	BasicMaterials
Brainsway Ltd	US	4/2019	NPE	ConsumerNonCyclical
Brave Bison Group PLC	LN	11/2013	NPE	Communications
Bread Financial Holdings Inc	US	6/2001	NPE	Financial
Breedon Group PLC	LN	6/2008	NPE	Industrial
Brickability Group PLC	LN	8/2019	PE	ConsumerCyclical
Bridge Investment Group Holding	US	7/2021	NPE	Financial
Brigham Minerals Inc	US	4/2019	NPE	Energy
Bright Health Group Inc	US	6/2021	NPE	ConsumerNonCyclical
Bright Horizons Family Solution	US	1/2013	PE	ConsumerNonCyclical
Bright Scholar Education Holding	US	5/2017	NPE	ConsumerNonCyclical
BrightView Holdings Inc	US	6/2018	PE	ConsumerNonCyclical
Brilliant Earth Group Inc	US	9/2021	NPE	ConsumerCyclical
Bunge Ltd	US	8/2001	NPE	ConsumerNonCyclical
Burberry Group PLC	LN	7/2002	NPE	ConsumerCyclical
Burford Capital Ltd	LN	10/2009	NPE	Financial
Burlington Stores Inc	US	10/2013	PE	ConsumerCyclical
Burning Rock Biotech Ltd	US	6/2020	NPE	ConsumerNonCyclical
Byotrol PLC	LN	7/2005	NPE	BasicMaterials
Bytes Technology Group PLC	LN	12/2020	NPE	Technology
C3.ai Inc	US	12/2020	NPE	Technology
C4X Discovery Holdings PLC	LN	10/2014	NPE	ConsumerNonCyclical
Cactus Inc	US	2/2018	PE	Industrial
Cadence Minerals PLC	LN	3/2005	NPE	BasicMaterials

Cadogan Petroleum PLC	LN	6/2008	NPE	Energy
Cadre Holdings Inc	US	11/2021	NPE	Industrial
Caerus Mineral Resources PLC	LN	3/2021	NPE	BasicMaterials
Cairn Homes PLC	LN	6/2015	NPE	ConsumerCyclical
Calnex Solutions PLC	LN	10/2020	NPE	Communications
Calyxt Inc	US	7/2017	NPE	ConsumerNonCyclical
Cambium Global Timberland Ltd	LN	3/2007	NPE	BasicMaterials
Cambium Networks Corp	US	6/2019	NPE	Communications
Cambria Africa PLC	LN	12/2007	NPE	Financial
Camping World Holdings Inc	US	10/2016	PE	ConsumerCyclical
Camtek Ltd/Israel	US	7/2000	NPE	Industrial
Canaan Inc	US	11/2019	NPE	Technology
Candel Therapeutics Inc	US	7/2021	NPE	ConsumerNonCyclical
Cango Inc/KY	US	7/2018	PE	ConsumerCyclical
Cap-XX Ltd	LN	4/2006	NPE	Industrial
Capital Metals PLC	LN	2/2010	NPE	BasicMaterials
Cara Therapeutics Inc	US	1/2014	VC	ConsumerNonCyclical
Caracal Gold PLC	LN	6/2016	NPE	Financial
Cardlytics Inc	US	2/2018	VC	Technology
CareCloud Inc	US	7/2014	NPE	Technology
CareDx Inc	US	7/2014	NPE	ConsumerNonCyclical
Carvana Co	US	4/2017	NPE	ConsumerCyclical
Castle Biosciences Inc	US	7/2019	NPE	ConsumerNonCyclical
Catalent Inc	US	7/2014	PE	ConsumerNonCyclical
Catenae Innovation PLC	LN	7/2003	NPE	Technology
CELADON PHARMACEUTICALS PLC	LN	10/2018	NPE	ConsumerNonCyclical
Celanese Corp	US	1/2005	NPE	BasicMaterials
Cellectis SA	US	3/2015	PE	ConsumerNonCyclical
Cellular Goods PLC	LN	2/2021	NPE	ConsumerNonCyclical
Celyad Oncology SA	US	6/2015	NPE	ConsumerNonCyclical
Centamin PLC	LN	12/2001	NPE	BasicMaterials
Centaur Media PLC	LN	3/2004	NPE	Communications
Centogene NV	US	11/2019	PE	ConsumerNonCyclical
Central Asia Metals PLC	LN	9/2010	NPE	BasicMaterials
Cerillion PLC	LN	3/2016	VC	Technology
CF Industries Holdings Inc	US	8/2005	NPE	BasicMaterials
Chaarat Gold Holdings Ltd	LN	11/2007	NPE	BasicMaterials
Challenger Energy Group PLC	LN	12/2004	NPE	Energy
ChannelAdvisor Corp	US	5/2013	VC	Communications
Chariot Ltd	LN	5/2008	NPE	Energy
Charles River Laboratories Int	US	6/2000	NPE	ConsumerNonCyclical
Chart Industries Inc	US	7/2006	NPE	Industrial
Checkmate Pharmaceuticals Inc	US	8/2020	NPE	ConsumerNonCyclical
Cheetah Mobile Inc	US	5/2014	NPE	Technology
Chicago Atlantic Real Estate F	US	12/2021	NPE	Financial
Chicken Soup For The Soul Ente	US	8/2017	PE	ConsumerCyclical
Chimerix Inc	US	4/2013	VC	ConsumerNonCyclical
China Life Insurance Co Ltd	US	12/2003	NPE	Financial
China Nonferrous Gold Ltd	LN	12/2004	NPE	BasicMaterials
China Online Education Group	US	6/2016	VC	ConsumerNonCyclical

China Petroleum & Chemical Cor	US	10/2000	NPE	Energy
Chrysalis Investments Ltd	LN	11/2018	NPE	Financial
Cidara Therapeutics Inc	US	4/2015	VC	ConsumerNonCyclical
Cineworld Group PLC	LN	4/2007	NPE	ConsumerCyclical
Circle Property PLC	LN	2/2016	NPE	Financial
City of London Investment Grou	LN	4/2006	NPE	Financial
Clear Channel Outdoor Holdings	US	11/2005	NPE	Communications
Clear Secure Inc	US	6/2021	NPE	Technology
Clearside Biomedical Inc	US	6/2016	NPE	ConsumerNonCyclical
Clearwater Analytics Holdings	US	9/2021	NPE	Technology
Clontarf Energy PLC	LN	6/2005	NPE	Energy
Cloopen Group Holding Ltd	US	2/2021	PE	Technology
Cloudbreak Discovery PLC	LN	6/2021	NPE	Financial
Cloudcoco Group PLC	LN	12/2004	NPE	Technology
Cloudflare Inc	US	9/2019	NPE	Technology
CLPS Inc	US	5/2018	NPE	Technology
CNFinance Holdings Ltd	US	11/2018	PE	Financial
Cobra Resources PLC	LN	11/2018	NPE	BasicMaterials
Codiak Biosciences Inc	US	10/2020	NPE	ConsumerNonCyclical
Cognition Therapeutics Inc	US	10/2021	NPE	ConsumerNonCyclical
Coherus Biosciences Inc	US	11/2014	NPE	ConsumerNonCyclical
Community Health Systems Inc	US	6/2000	NPE	ConsumerNonCyclical
Compass Diversified Holdings	US	5/2006	NPE	Financial
Compass Inc	US	4/2021	NPE	Financial
Compugen Ltd	US	8/2000	NPE	ConsumerNonCyclical
Concert Pharmaceuticals Inc	US	2/2014	NPE	ConsumerNonCyclical
Condor Gold PLC	LN	5/2006	NPE	BasicMaterials
Conduit Holdings Ltd	LN	12/2020	NPE	Financial
Conifer Holdings Inc	US	8/2015	PE	Financial
Connect Biopharma Holdings Ltd	US	3/2021	NPE	ConsumerNonCyclical
Container Store Group Inc/The	US	11/2013	PE	ConsumerCyclical
Conygar Investment Co PLC/The	LN	10/2003	NPE	Financial
CooTek Cayman Inc	US	9/2018	VC	Technology
Cora Gold Ltd	LN	10/2017	NPE	BasicMaterials
Cordel Group PLC	LN	5/2018	NPE	Technology
Core & Main Inc	US	7/2021	PE	ConsumerCyclical
Cornerstone FS Plc	LN	4/2021	NPE	Technology
Coro Energy PLC	LN	2/2017	NPE	Energy
Corvus Pharmaceuticals Inc	US	3/2016	NPE	ConsumerNonCyclical
Costamare Inc	US	11/2010	NPE	Industrial
Creo Medical Group plc	LN	12/2016	NPE	ConsumerNonCyclical
Crescent Capital BDC Inc	US	11/2021	NPE	Financial
CRISPR Therapeutics AG	US	10/2016	VC	ConsumerNonCyclical
Croma Security Solutions Group	LN	12/2003	NPE	ConsumerNonCyclical
CrossAmerica Partners LP	US	10/2012	NPE	Energy
CT Automotive Group PLC	LN	12/2021	NPE	ConsumerCyclical
CureVac NV	US	8/2020	NPE	ConsumerNonCyclical
Curo Group Holdings Corp	US	12/2017	PE	Financial
Cushman & Wakefield PLC	US	8/2018	PE	Financial
CVR Energy Inc	US	10/2007	NPE	Energy
CVR Partners LP	US	4/2011	NPE	BasicMaterials

Cypress Environmental Partners	US	1/2014	NPE	Industrial
Danaos Corp	US	10/2006	NPE	Industrial
Daqo New Energy Corp	US	10/2010	PE	BasicMaterials
Datto Holding Corp	US	10/2020	PE	Technology
DCP Midstream LP	US	12/2005	NPE	Energy
Deepverge PLC	LN	4/2017	NPE	ConsumerNonCyclical
Dekel Agri-Vision PLC	LN	3/2013	NPE	ConsumerNonCyclical
Delek Logistics Partners LP	US	11/2012	NPE	Energy
Deltic Energy PLC	LN	5/2012	NPE	Energy
Designer Brands Inc	US	6/2005	NPE	ConsumerCyclical
Destiny Pharma PLC	LN	9/2017	PE	ConsumerNonCyclical
DG INNOVATE PLC	LN	3/2017	NPE	Energy
DHT Holdings Inc	US	10/2005	NPE	Industrial
Diana Shipping Inc	US	3/2005	NPE	Industrial
DICE Therapeutics Inc	US	9/2021	NPE	ConsumerNonCyclical
DiDi Global Inc	US	6/2021	NPE	Industrial
Digitalbox PLC	LN	4/2003	NPE	Communications
DigitalOcean Holdings Inc	US	3/2021	NPE	Technology
Dillistone Group PLC	LN	6/2006	NPE	Technology
DingDong Cayman Ltd	US	6/2021	NPE	Communications
Diurnal Group PLC	LN	12/2015	NPE	ConsumerNonCyclical
Diversified Energy Co PLC	LN	2/2017	NPE	Energy
Dogness International Corp	US	12/2017	NPE	ConsumerCyclical
Dole PLC	US	7/2021	NPE	ConsumerNonCyclical
Dolphin Capital Investors Ltd	LN	12/2005	NPE	Financial
Domo Inc	US	6/2018	VC	Technology
DoorDash Inc	US	12/2020	NPE	Communications
Dorian LPG Ltd	US	5/2014	NPE	Industrial
Doric Nimrod Air Three Ltd	LN	7/2013	NPE	ConsumerCyclical
Doric Nimrod Air Two Ltd	LN	7/2011	NPE	Financial
DP Aircraft I Ltd	LN	10/2013	NPE	Industrial
Dr Reddy's Laboratories Ltd	US	4/2001	NPE	ConsumerNonCyclical
DSW Capital PLC	LN	12/2021	NPE	ConsumerNonCyclical
Dukemount Capital PLC	LN	3/2017	NPE	Financial
Dun & Bradstreet Holdings Inc	US	7/2020	NPE	ConsumerNonCyclical
e-Therapeutics PLC	LN	11/2007	NPE	ConsumerNonCyclical
Eagle Pharmaceuticals Inc/DE	US	2/2014	NPE	ConsumerNonCyclical
easyJet PLC	LN	11/2000	NPE	ConsumerCyclical
Eco Atlantic Oil & Gas Ltd	LN	2/2017	NPE	Energy
Ecovyst Inc	US	9/2017	PE	BasicMaterials
Ediston Property Investment Co	LN	10/2014	NPE	Financial
Eenergy Group PLC	LN	4/2005	NPE	Utilities
EHang Holdings Ltd	US	12/2019	NPE	Industrial
Eiger BioPharmaceuticals Inc	US	1/2014	VC	ConsumerNonCyclical
Elanco Animal Health Inc	US	9/2018	NPE	ConsumerNonCyclical
Elastic NV	US	10/2018	VC	Technology
Elevate Credit Inc	US	4/2017	VC	Financial
Eliem Therapeutics Inc	US	8/2021	NPE	ConsumerNonCyclical
Embraer SA	US	7/2000	NPE	Industrial
Emergent BioSolutions Inc	US	11/2006	NPE	ConsumerNonCyclical

Employers Holdings Inc	US	1/2007	NPE	Financial
Empyrean Energy PLC	LN	7/2005	NPE	Energy
Endeavor Group Holdings Inc	US	4/2021	NPE	Communications
Eneraqua Technologies PLC	LN	11/2021	NPE	Industrial
Energean PLC	LN	3/2018	NPE	Energy
Energy Transfer LP	US	2/2006	PE	Energy
EnerSys	US	7/2004	NPE	Industrial
Eneti Inc	US	12/2013	NPE	Energy
Engage XR Holdings PLC	LN	3/2018	NPE	Technology
Enphase Energy Inc	US	3/2012	NPE	Energy
Entain PLC	LN	12/2004	NPE	ConsumerCyclical
Entasis Therapeutics Holdings	US	9/2018	VC	Financial
Enteq Technologies PLC	LN	7/2011	NPE	Energy
Entrada Therapeutics Inc	US	10/2021	PE	ConsumerNonCyclical
Entravision Communications Cor	US	8/2000	NPE	Communications
Envista Holdings Corp	US	9/2019	NPE	ConsumerNonCyclical
Enviva Inc	US	4/2015	NPE	Energy
Equals Group PLC	LN	8/2014	NPE	Financial
Equillium Inc	US	10/2018	NPE	ConsumerNonCyclical
Ergomed PLC	LN	7/2014	NPE	ConsumerNonCyclical
Esperion Therapeutics Inc	US	6/2013	NPE	ConsumerNonCyclical
Ethernity Networks Ltd	LN	6/2017	PE	Communications
Eton Pharmaceuticals Inc	US	11/2018	NPE	ConsumerNonCyclical
Eurocell PLC	LN	3/2015	PE	Industrial
Euronav NV	US	1/2015	NPE	Industrial
Europa Oil & Gas Holdings PLC	LN	11/2004	NPE	Energy
Eve Sleep PLC	LN	5/2017	VC	Communications
Eventbrite Inc	US	9/2018	VC	Communications
Evercore Inc	US	8/2006	NPE	Financial
Everspin Technologies Inc	US	10/2016	VC	Technology
Everyman Media Group Plc	LN	11/2013	PE	ConsumerCyclical
Evolent Health Inc	US	6/2015	PE	Technology
Evolus Inc	US	2/2018	NPE	ConsumerNonCyclical
Exagen Inc	US	9/2019	PE	ConsumerNonCyclical
Experian PLC	LN	10/2006	NPE	ConsumerNonCyclical
Expro Group Holdings NV	US	8/2013	NPE	Energy
Falanx Group Ltd	LN	6/2013	NPE	ConsumerNonCyclical
Fangdd Network Group Ltd	US	11/2019	NPE	Financial
Faron Pharmaceuticals Oy	LN	11/2015	NPE	ConsumerNonCyclical
Fastly Inc	US	5/2019	VC	Technology
Fate Therapeutics Inc	US	10/2013	VC	ConsumerNonCyclical
FB Financial Corp	US	9/2016	NPE	Financial
FDM Group Holdings PLC	LN	6/2014	NPE	Technology
Federated Hermes Premier Munic	US	12/2002	NPE	Government
Fevertree Drinks PLC	LN	11/2014	NPE	ConsumerNonCyclical
FG Financial Group Inc	US	4/2014	NPE	Financial
FinVolution Group	US	11/2017	VC	Financial
Finwise Bancorp	US	11/2021	NPE	Financial
Firering Strategic Minerals pl	LN	11/2021	NPE	BasicMaterials
First Guaranty Bancshares Inc	US	11/2015	NPE	Financial
First Northwest Bancorp	US	1/2015	NPE	Financial

Fiske PLC	LN	3/2000	NPE	Financial
Five Point Holdings LLC	US	5/2017	PE	Financial
Five9 Inc	US	4/2014	NPE	Technology
Fiverr International Ltd	US	6/2019	VC	Communications
Floor & Decor Holdings Inc	US	4/2017	PE	ConsumerCyclical
Foghorn Therapeutics Inc	US	10/2020	NPE	ConsumerNonCyclical
Foresight Sustainable Forestry	LN	11/2021	NPE	Financial
ForgeRock Inc	US	9/2021	NPE	Technology
Forma Therapeutics Holdings In	US	6/2020	NPE	ConsumerNonCyclical
Forward Partners Group PLC	LN	7/2021	NPE	Financial
Fox Marble Holdings Plc	LN	8/2012	NPE	BasicMaterials
Franchise Brands plc	LN	8/2016	NPE	ConsumerNonCyclical
Frasers Group PLC	LN	2/2007	NPE	ConsumerCyclical
Freshpet Inc	US	11/2014	PE	ConsumerCyclical
Frontier Developments PLC	LN	7/2013	NPE	Technology
FTC Solar Inc	US	4/2021	NPE	Utilities
Fulcrum Therapeutics Inc	US	7/2019	NPE	ConsumerNonCyclical
Fulcrum Utility Services Ltd	LN	12/2009	NPE	Utilities
Fulgent Genetics Inc	US	9/2016	NPE	ConsumerNonCyclical
Full Truck Alliance Co Ltd	US	6/2021	NPE	Industrial
Futu Holdings Ltd	US	3/2019	NPE	Financial
Gain Therapeutics Inc	US	3/2021	NPE	ConsumerNonCyclical
Galera Therapeutics Inc	US	11/2019	NPE	ConsumerNonCyclical
Gama Aviation PLC	LN	11/2010	NPE	ConsumerNonCyclical
Gambling.com Group Ltd	US	7/2021	PE	Communications
GameStop Corp	US	2/2002	NPE	ConsumerCyclical
Gamida Cell Ltd	US	10/2018	NPE	ConsumerNonCyclical
Gaotu Techedu Inc	US	6/2019	NPE	Technology
Garmin Ltd	US	12/2000	NPE	Industrial
GasLog Partners LP	US	5/2014	NPE	Industrial
Gateley Holdings PLC	LN	6/2015	NPE	ConsumerNonCyclical
Gates Industrial Corp PLC	US	1/2018	PE	Industrial
Gatos Silver Inc	US	10/2020	NPE	BasicMaterials
GCM Resources PLC	LN	4/2004	NPE	Energy
GDS Holdings Ltd	US	11/2016	VC	Communications
Generac Holdings Inc	US	2/2010	PE	Industrial
Genetron Holdings Ltd	US	6/2020	PE	ConsumerNonCyclical
GENinCode PLC	LN	7/2021	NPE	ConsumerNonCyclical
Gfinity plc	LN	12/2014	NPE	Communications
GH Research PLC	US	6/2021	NPE	ConsumerNonCyclical
Glaukos Corp	US	6/2015	NPE	ConsumerNonCyclical
Global Partners LP/MA	US	9/2005	NPE	Utilities
Global Water Resources Inc	US	4/2016	NPE	Utilities
GlycoMimetics Inc	US	1/2014	VC	ConsumerNonCyclical
GMS Inc	US	5/2016	PE	ConsumerCyclical
GoDaddy Inc	US	4/2015	NPE	Communications
Goldman Sachs BDC Inc	US	3/2015	NPE	Financial
Goldplat PLC	LN	7/2006	NPE	BasicMaterials
Goldstone Resources Ltd	LN	3/2004	NPE	BasicMaterials
Grand Fortune High Grade Ltd	LN	5/2017	NPE	ConsumerNonCyclical
Graphite Bio Inc	US	6/2021	NPE	ConsumerNonCyclical

Graybug Vision Inc	US	9/2020	PE	ConsumerNonCyclical
Great Southern Copper plc	LN	12/2021	NPE	BasicMaterials
Greatland Gold PLC	LN	7/2006	NPE	BasicMaterials
Green Plains Partners LP	US	6/2015	NPE	Energy
Greenhill & Co Inc	US	5/2004	NPE	Financial
Greenroc Mining PLC	LN	9/2021	NPE	BasicMaterials
GreenTree Hospitality Group Lt	US	3/2018	NPE	ConsumerCyclical
Grupo Aeroportuario del Surest	US	9/2000	NPE	Industrial
Guidewire Software Inc	US	1/2012	VC	Technology
Guild Esports PLC	LN	10/2020	NPE	Technology
Gulf Keystone Petroleum Ltd	LN	9/2004	NPE	Energy
Gunsynd PLC	LN	3/2006	NPE	Financial
Hailiang Education Group Inc	US	7/2015	NPE	ConsumerNonCyclical
Hannon Armstrong Sustainable I	US	4/2013	VC	Financial
Harmony Biosciences Holdings I	US	8/2020	NPE	ConsumerNonCyclical
Haydale Graphene Industries pl	LN	4/2014	NPE	Industrial
HCI Group Inc	US	7/2008	NPE	Financial
HCW Biologics Inc	US	7/2021	NPE	ConsumerNonCyclical
Helium One Global Ltd	LN	12/2020	NPE	Energy
Herc Holdings Inc	US	11/2006	PE	ConsumerNonCyclical
Hercules Capital Inc	US	6/2005	NPE	Financial
Heritage Insurance Holdings In	US	5/2014	NPE	Financial
Hermes Pacific Investments PLC	LN	12/2004	NPE	Financial
HireRight Holdings Corp	US	10/2021	NPE	Technology
Hochschild Mining PLC	LN	11/2006	NPE	BasicMaterials
Hoegh LNG Partners LP	US	8/2014	NPE	Industrial
Holly Energy Partners LP	US	7/2004	NPE	Energy
Home BancShares Inc/AR	US	6/2006	NPE	Financial
Horizonte Minerals PLC	LN	5/2006	NPE	BasicMaterials
HubSpot Inc	US	10/2014	VC	Technology
Huize Holding Ltd	US	2/2020	NPE	Financial
Hurricane Energy PLC	LN	2/2014	NPE	Energy
HUTCHMED China Ltd	LN	5/2006	NPE	ConsumerNonCyclical
HUYA Inc	US	5/2018	NPE	Technology
I-Mab	US	1/2020	PE	ConsumerNonCyclical
iClick Interactive Asia Group	US	12/2017	NPE	Communications
Ide Group Holdings PLC	LN	6/2010	NPE	Technology
IDOX PLC	LN	12/2000	NPE	Technology
iEnergizer Ltd	LN	9/2010	NPE	Technology
IHS Holding Ltd	US	10/2021	NPE	Industrial
iHuman Inc	US	10/2020	NPE	ConsumerNonCyclical
Ikena Oncology Inc	US	3/2021	PE	ConsumerNonCyclical
Ilika PLC	LN	5/2010	NPE	Industrial
Image Scan Holdings PLC	LN	4/2002	NPE	Industrial
Immotion Group PLC	LN	7/2018	VC	Technology
Immuneering Corp	US	7/2021	PE	ConsumerNonCyclical
Impel Pharmaceuticals Inc	US	4/2021	PE	ConsumerNonCyclical
IN8bio Inc	US	7/2021	NPE	ConsumerNonCyclical
Ince Group PLC/The	LN	3/2006	NPE	ConsumerNonCyclical
Independence Contract Drilling	US	8/2014	PE	Energy
Induction Healthcare Group PLC	LN	5/2019	NPE	Technology

Indus Gas Ltd	LN	6/2008	NPE	Energy
Informatica Inc	US	10/2021	NPE	Technology
Ingersoll Rand Inc	US	5/2017	PE	Industrial
Inhibrx Inc	US	8/2020	NPE	ConsumerNonCyclical
Inland Homes PLC	LN	4/2007	NPE	Financial
Inspire Medical Systems Inc	US	5/2018	NPE	ConsumerNonCyclical
Inspired PLC	LN	11/2011	NPE	Energy
Inspirit Energy Holdings PLC	LN	3/2006	NPE	Industrial
Installed Building Products In	US	2/2014	NPE	ConsumerCyclical
Instem PLC	LN	10/2010	NPE	Technology
Instructure Holdings Inc	US	7/2021	PE	Technology
Integer Holdings Corp	US	9/2000	NPE	ConsumerNonCyclical
Intellia Therapeutics Inc	US	5/2016	NPE	ConsumerNonCyclical
Intelligent Ultrasound Group P	LN	8/2014	NPE	ConsumerNonCyclical
Intercede Group PLC	LN	1/2001	NPE	Technology
Intersect ENT Inc	US	7/2014	VC	ConsumerNonCyclical
Intrepid Potash Inc	US	4/2008	NPE	BasicMaterials
Intuitive Investments Group PL	LN	12/2020	NPE	Financial
Investar Holding Corp	US	7/2014	NPE	Financial
Investec PLC	LN	7/2002	NPE	Financial
Invinity Energy Systems PLC	LN	4/2006	NPE	Energy
Invitae Corp	US	2/2015	NPE	ConsumerNonCyclical
Iofina PLC	LN	5/2008	NPE	BasicMaterials
Itaconix PLC	LN	7/2012	VC	BasicMaterials
iTeos Therapeutics Inc	US	7/2020	NPE	ConsumerNonCyclical
Itim Group PLC	LN	6/2021	NPE	Technology
Jade Road Investments Ltd	LN	10/2009	NPE	Financial
Jangada Mines PLC	LN	6/2017	NPE	BasicMaterials
Janux Therapeutics Inc	US	6/2021	NPE	ConsumerNonCyclical
Jarvis Securities PLC	LN	12/2004	NPE	Financial
Jersey Oil & Gas PLC	LN	3/2011	NPE	Energy
Jianpu Technology Inc	US	11/2017	VC	Financial
Jiayin Group Inc	US	5/2019	NPE	Financial
JinkoSolar Holding Co Ltd	US	5/2010	NPE	Energy
Jubilee Metals Group PLC	LN	7/2002	NPE	BasicMaterials
Jumia Technologies AG	US	4/2019	NPE	Communications
KalVista Pharmaceuticals Inc	US	4/2015	VC	ConsumerNonCyclical
Kape Technologies PLC	LN	9/2014	NPE	Technology
KAR Auction Services Inc	US	12/2009	NPE	ConsumerCyclical
Karelian Diamond Resources PLC	LN	9/2005	NPE	BasicMaterials
Karuna Therapeutics Inc	US	6/2019	VC	ConsumerNonCyclical
Katoro Gold PLC	LN	4/2015	NPE	BasicMaterials
Kavango Resources PLC	LN	7/2018	NPE	BasicMaterials
Kazera Global PLC	LN	6/2006	NPE	Financial
KBR Inc	US	11/2006	NPE	Technology
KE Holdings Inc	US	8/2020	NPE	Financial
Keras Resources PLC	LN	7/2011	NPE	BasicMaterials
Keros Therapeutics Inc	US	4/2020	NPE	ConsumerNonCyclical
Kimbell Royalty Partners LP	US	2/2017	PE	Energy
Kistos PLC	LN	11/2020	NPE	Financial
Knight-Swift Transportation Ho	US	12/2010	NPE	Industrial

KNOT Offshore Partners LP	US	4/2013	NPE	Industrial
Kodal Minerals plc	LN	12/2013	NPE	BasicMaterials
Kodiak Sciences Inc	US	10/2018	NPE	ConsumerNonCyclical
Kosmos Energy Ltd	US	5/2011	PE	Energy
Kromek Group PLC	LN	10/2013	NPE	Technology
Krystal Biotech Inc	US	9/2017	NPE	ConsumerNonCyclical
Kuke Music Holding Ltd	US	1/2021	NPE	ConsumerCyclical
Kura Sushi USA Inc	US	8/2019	NPE	ConsumerCyclical
Kymera Therapeutics Inc	US	8/2020	NPE	ConsumerNonCyclical
Lake Shore Bancorp Inc	US	4/2006	NPE	Financial
Lancashire Holdings Ltd	LN	12/2005	NPE	Financial
Landore Resources Ltd	LN	4/2005	NPE	BasicMaterials
Landos Biopharma Inc	US	2/2021	NPE	ConsumerNonCyclical
Lansdowne Oil & Gas PLC	LN	4/2006	NPE	Energy
Lantheus Holdings Inc	US	6/2015	PE	ConsumerNonCyclical
Laredo Petroleum Inc	US	12/2011	NPE	Energy
Larimar Therapeutics Inc	US	6/2014	VC	ConsumerNonCyclical
Las Vegas Sands Corp	US	12/2004	NPE	ConsumerCyclical
Lazard Ltd	US	5/2005	NPE	Financial
Leidos Holdings Inc	US	10/2006	NPE	Technology
Leju Holdings Ltd	US	4/2014	NPE	Communications
LeMaitre Vascular Inc	US	10/2006	NPE	ConsumerNonCyclical
Lemonade Inc	US	7/2020	NPE	Financial
Lexington Gold Ltd	LN	8/2004	NPE	BasicMaterials
LianBio	US	11/2021	NPE	ConsumerNonCyclical
Libertine Holdings Plc	LN	12/2021	NPE	Technology
Liberty Energy Inc	US	1/2018	PE	Energy
Life Time Group Holdings Inc	US	10/2021	NPE	ConsumerCyclical
Light Science Technologies Hol	LN	10/2021	NPE	Technology
Likewise Group PLC	LN	8/2021	NPE	ConsumerCyclical
Litigation Capital Management	LN	12/2018	NPE	Financial
Livent Corp	US	10/2018	NPE	BasicMaterials
Lixiang Education Holding Co L	US	10/2020	NPE	Government
Lizhi Inc	US	1/2020	NPE	Technology
Location Sciences Group PLC	LN	4/2008	NPE	Technology
LogicBio Therapeutics Inc	US	10/2018	NPE	ConsumerNonCyclical
Longboard Pharmaceuticals Inc	US	3/2021	PE	ConsumerNonCyclical
Longboat Energy PLC	LN	11/2019	NPE	Energy
LoopUp Group PLC	LN	8/2016	VC	Technology
Lovesac Co/The	US	6/2018	PE	ConsumerCyclical
Lucid Diagnostics Inc	US	10/2021	NPE	ConsumerNonCyclical
Lufax Holding Ltd	US	10/2020	NPE	Financial
Lulu's Fashion Lounge Holdings	US	11/2021	NPE	Communications
Lumos Pharma Inc	US	11/2011	NPE	ConsumerNonCyclical
Lunglife AI Inc	LN	7/2021	NPE	ConsumerNonCyclical
Lyra Therapeutics Inc	US	5/2020	NPE	ConsumerNonCyclical
M Winkworth PLC	LN	11/2009	NPE	Financial
Macquarie Infrastructure Holdi	US	12/2004	NPE	Utilities
Magellan Midstream Partners LP	US	2/2001	NPE	Energy
Magenta Therapeutics Inc	US	6/2018	VC	ConsumerNonCyclical
Magyar Bancorp Inc	US	1/2006	NPE	Financial

Main Street Capital Corp	US	10/2007	NPE	Financial
Malvern International PLC	LN	12/2004	NPE	ConsumerNonCyclical
MannKind Corp	US	7/2004	NPE	ConsumerNonCyclical
Marin Software Inc	US	3/2013	VC	Communications
Marinus Pharmaceuticals Inc	US	7/2014	NPE	ConsumerNonCyclical
Marshall Motor Holdings plc	LN	4/2015	NPE	ConsumerCyclical
Mast Energy Developments PLC	LN	4/2021	NPE	Energy
Mastercard Inc	US	5/2006	NPE	Financial
MaxCyte Inc	LN	3/2016	NPE	ConsumerNonCyclical
Mayville Engineering Co Inc	US	5/2019	NPE	Industrial
MediWound Ltd	US	3/2014	NPE	ConsumerNonCyclical
Melrose Industries PLC	LN	10/2003	NPE	Financial
Membership Collective Group In	US	7/2021	PE	ConsumerCyclical
Mercantile Ports and Logistics	LN	10/2010	NPE	Industrial
Mercia Asset Management PLC	LN	12/2014	NPE	Financial
Merrimack Pharmaceuticals Inc	US	3/2012	NPE	ConsumerNonCyclical
Merus NV	US	5/2016	NPE	ConsumerNonCyclical
Meta Data Ltd	US	3/2018	NPE	ConsumerNonCyclical
Metacrine Inc	US	9/2020	NPE	ConsumerNonCyclical
Metalnrg PLC	LN	7/2019	NPE	Financial
Metro Bank PLC	LN	3/2016	NPE	Financial
Metropolitan Bank Holding Corp	US	11/2017	NPE	Financial
Michelmersh Brick Holdings PLC	LN	5/2004	NPE	Industrial
Micro Focus International PLC	LN	5/2005	NPE	Technology
Midatech Pharma PLC	LN	12/2014	NPE	ConsumerNonCyclical
Mind CTI Ltd	US	8/2000	NPE	Technology
Minerva Neurosciences Inc	US	7/2014	VC	ConsumerNonCyclical
Minerva Surgical Inc	US	10/2021	NPE	ConsumerNonCyclical
MINISO Group Holding Ltd	US	10/2020	NPE	ConsumerCyclical
Mirum Pharmaceuticals Inc	US	7/2019	NPE	ConsumerNonCyclical
Missfresh Ltd	US	6/2021	NPE	ConsumerNonCyclical
Mission Group PLC/The	LN	4/2006	NPE	Communications
Mkango Resources Ltd	LN	6/2016	NPE	BasicMaterials
Mobile Streams PLC	LN	2/2006	NPE	Communications
MobilityOne Ltd	LN	7/2007	NPE	ConsumerNonCyclical
Mode Global Holdings Plc	LN	10/2020	NPE	Technology
Moelis & Co	US	4/2014	NPE	Financial
MOGU Inc	US	12/2018	NPE	Communications
Molina Healthcare Inc	US	7/2003	NPE	ConsumerNonCyclical
Molten Ventures PLC	LN	6/2016	NPE	Financial
MongoDB Inc	US	10/2017	NPE	Technology
Montrose Environmental Group I	US	7/2020	NPE	Industrial
Morphic Holding Inc	US	6/2019	VC	ConsumerNonCyclical
Morses Club PLC	LN	5/2016	NPE	Financial
Mosman Oil & Gas Ltd	LN	3/2014	NPE	Energy
MPLX LP	US	10/2012	NPE	Energy
MSCI Inc	US	11/2007	NPE	Technology
Mueller Water Products Inc	US	5/2006	NPE	Industrial
Myanmar Investments Internatio	LN	6/2013	NPE	Financial
Myovant Sciences Ltd	US	10/2016	PE	ConsumerNonCyclical
MySale Group PLC	LN	6/2014	VC	Communications

Nano-X Imaging Ltd	US	8/2020	NPE	ConsumerNonCyclical
Nanoco Group PLC	LN	8/2004	NPE	Technology
NanoString Technologies Inc	US	6/2013	VC	ConsumerNonCyclical
Nanosynth Group PLC	LN	11/2014	NPE	ConsumerNonCyclical
Natural Gas Services Group Inc	US	10/2002	NPE	Energy
Navios Maritime Partners LP	US	11/2007	NPE	Industrial
Ncondezi Energy Ltd	LN	6/2010	NPE	Energy
Nelnet Inc	US	12/2003	NPE	Financial
Neoleukin Therapeutics Inc	US	3/2014	VC	ConsumerNonCyclical
NeoPhotonics Corp	US	2/2011	NPE	Communications
NerdWallet Inc	US	11/2021	NPE	Financial
Neuronetics Inc	US	6/2018	VC	ConsumerNonCyclical
NeuroPace Inc	US	4/2021	PE	ConsumerNonCyclical
Nevro Corp	US	11/2014	VC	ConsumerNonCyclical
New Oriental Education & Techn	US	9/2006	PE	ConsumerNonCyclical
New Relic Inc	US	12/2014	NPE	Technology
NexImmune Inc	US	2/2021	NPE	ConsumerNonCyclical
NextEra Energy Partners LP	US	6/2014	NPE	Energy
NGL Energy Partners LP	US	5/2011	NPE	Energy
Nightcap Plc	LN	1/2021	NPE	ConsumerCyclical
Nine Energy Service Inc	US	1/2018	NPE	Energy
NIO Inc	US	9/2018	NPE	ConsumerCyclical
Niu Technologies	US	10/2018	PE	ConsumerCyclical
Noah Holdings Ltd	US	11/2010	PE	Financial
Non-Standard Finance PLC	LN	2/2015	VC	Financial
Northcoders Group Plc	LN	7/2021	NPE	Technology
Northern Bear PLC	LN	12/2006	NPE	Industrial
Norwegian Cruise Line Holdings	US	1/2013	PE	ConsumerCyclical
NRG Energy Inc	US	5/2000	NPE	Utilities
Nurix Therapeutics Inc	US	7/2020	NPE	ConsumerNonCyclical
NuStar Energy LP	US	4/2001	NPE	Energy
Nyxoah SA	US	7/2021	NPE	ConsumerNonCyclical
Oak Street Health Inc	US	8/2020	PE	ConsumerNonCyclical
Octopus Renewables Infrastruct	LN	12/2019	NPE	Financial
Ocular Therapeutix Inc	US	7/2014	VC	ConsumerNonCyclical
Ollie's Bargain Outlet Holding	US	7/2015	PE	ConsumerCyclical
Olo Inc	US	3/2021	NPE	Technology
Omeros Corp	US	10/2009	NPE	ConsumerNonCyclical
Oncimmune Holdings PLC	LN	5/2016	NPE	ConsumerNonCyclical
Oncorus Inc	US	10/2020	NPE	ConsumerNonCyclical
Ondine Biomedical Inc	LN	12/2021	NPE	ConsumerNonCyclical
OneConnect Financial Technolog	US	12/2019	NPE	Technology
OneWater Marine Inc	US	2/2020	NPE	ConsumerCyclical
Onion Global Ltd	US	5/2021	NPE	Communications
OnTheMarket PLC	LN	2/2018	NPE	Communications
Ooma Inc	US	7/2015	VC	Communications
OP Bancorp	US	3/2018	NPE	Financial
OPG Power Ventures PLC	LN	5/2008	NPE	Utilities
OptiBiotix Health PLC	LN	9/2011	NPE	Financial
Orcadian Energy PLC	LN	7/2021	NPE	Energy
Orient Telecoms PLC	LN	10/2017	NPE	Communications

Oriole Resources PLC	LN	1/2006	NPE	BasicMaterials
Ormat Technologies Inc	US	11/2004	NPE	Utilities
OrthoPediatrics Corp	US	10/2017	NPE	ConsumerNonCyclical
Otaq PLC	LN	11/2018	PE	Technology
Owl Rock Capital Corp	US	7/2019	NPE	Financial
Oxford Cannabinoid Technologie	LN	5/2021	NPE	ConsumerNonCyclical
Pagegroup PLC	LN	3/2001	NPE	ConsumerNonCyclical
Pantheon Infrastructure PLC	LN	11/2021	NPE	Financial
Pantheon Resources PLC	LN	4/2006	NPE	Energy
Paragon 28 Inc	US	10/2021	NPE	ConsumerNonCyclical
Paratek Pharmaceuticals Inc	US	5/2006	NPE	ConsumerNonCyclical
Parsons Corp	US	5/2019	NPE	Technology
Party City Holdco Inc	US	4/2015	PE	ConsumerCyclical
Paymentus Holdings Inc	US	5/2021	NPE	ConsumerNonCyclical
PBF Energy Inc	US	12/2012	PE	Energy
PBF Logistics LP	US	5/2014	NPE	Energy
PennantPark Floating Rate Capi	US	4/2011	NPE	Financial
PennantPark Investment Corp	US	4/2007	NPE	Financial
Penumbra Inc	US	9/2015	NPE	ConsumerNonCyclical
Personalis Inc	US	6/2019	VC	ConsumerNonCyclical
PetroChina Co Ltd	US	3/2000	NPE	Energy
PetroNeft Resources PLC	LN	9/2006	NPE	Energy
PGT Innovations Inc	US	6/2006	NPE	Industrial
PhaseBio Pharmaceuticals Inc	US	10/2018	VC	ConsumerNonCyclical
PhenixFIN Corp	US	1/2011	NPE	Financial
Phoenix Copper Ltd	LN	6/2017	NPE	BasicMaterials
Physiomics PLC	LN	12/2004	NPE	ConsumerNonCyclical
Picton Property Income Ltd/The	LN	10/2005	NPE	Financial
Ping Identity Holding Corp	US	9/2019	PE	Technology
Pintec Technology Holdings Ltd	US	10/2018	NPE	Communications
Pinterest Inc	US	4/2019	NPE	Communications
Pipehawk PLC	LN	12/2000	NPE	Industrial
Plant Health Care PLC	LN	7/2004	NPE	BasicMaterials
PlayAGS Inc	US	1/2018	PE	Technology
Playtech Plc	LN	3/2006	NPE	Technology
Plaza Centers NV	LN	10/2006	NPE	Financial
Plexus Holdings PLC	LN	12/2005	NPE	Energy
Plus500 Ltd	LN	7/2013	NPE	Financial
Polarean Imaging PLC	LN	3/2018	VC	ConsumerNonCyclical
Polymetal International PLC	LN	10/2011	NPE	BasicMaterials
PolyPid Ltd	US	6/2020	NPE	ConsumerNonCyclical
Pop Culture Group Co Ltd	US	6/2021	NPE	ConsumerNonCyclical
Power Metal Resources PLC	LN	10/2012	NPE	BasicMaterials
PowerSchool Holdings Inc	US	7/2021	NPE	Technology
Predator Oil & Gas Holdings PL	LN	5/2018	NPE	Financial
Premier African Minerals Ltd	LN	12/2012	NPE	BasicMaterials
President Energy PLC	LN	7/2004	NPE	Energy
Prestige Consumer Healthcare I	US	2/2005	NPE	ConsumerNonCyclical
PROCEPT BioRobotics Corp	US	9/2021	NPE	ConsumerNonCyclical
Procore Technologies Inc	US	5/2021	NPE	Technology
ProQR Therapeutics NV	US	9/2014	VC	ConsumerNonCyclical

Protagonist Therapeutics Inc	US	8/2016	VC	ConsumerNonCyclical
Protara Therapeutics Inc	US	10/2014	VC	ConsumerNonCyclical
Proto Labs Inc	US	2/2012	VC	Industrial
Proton Motor Power Systems PLC	LN	10/2006	NPE	Energy
Provexis PLC	LN	6/2004	NPE	ConsumerNonCyclical
Provident Financial Services I	US	1/2003	NPE	Financial
Prudential Bancorp Inc	US	3/2005	NPE	Financial
Prudential Financial Inc	US	12/2001	NPE	Financial
Pure Storage Inc	US	10/2015	VC	Technology
PureTech Health PLC	LN	6/2015	NPE	ConsumerNonCyclical
Puxin Ltd	US	6/2018	NPE	ConsumerNonCyclical
Q&K International Group Ltd	US	11/2019	NPE	Financial
Qilian International Holding G	US	1/2021	NPE	ConsumerNonCyclical
Quadrise Fuels International P	LN	2/2005	NPE	BasicMaterials
Quanterix Corp	US	12/2017	VC	ConsumerNonCyclical
Quhuo Ltd	US	7/2020	NPE	Technology
Quotient Technology Inc	US	3/2014	NPE	Communications
RA International Group PLC	LN	6/2018	NPE	Industrial
Rainbow Rare Earths Ltd	LN	1/2017	NPE	BasicMaterials
Rambler Metals and Mining PLC	LN	4/2005	NPE	BasicMaterials
Randolph Bancorp Inc	US	7/2016	NPE	Financial
Ranger Energy Services Inc	US	8/2017	NPE	Energy
Rani Therapeutics Holdings Inc	US	7/2021	NPE	ConsumerNonCyclical
Rapid7 Inc	US	7/2015	VC	Technology
RAPT Therapeutics Inc	US	10/2019	NPE	ConsumerNonCyclical
RE/MAX Holdings Inc	US	10/2013	PE	Financial
REACT Group PLC	LN	10/2005	NPE	ConsumerNonCyclical
Real Estate Investors PLC	LN	6/2004	NPE	Financial
Real Good Food Co PLC	LN	9/2003	NPE	ConsumerNonCyclical
Realogy Holdings Corp	US	10/2012	PE	Financial
Reata Pharmaceuticals Inc	US	5/2016	VC	ConsumerNonCyclical
Redx Pharma PLC	LN	3/2015	NPE	ConsumerNonCyclical
Relay Therapeutics Inc	US	7/2020	NPE	ConsumerNonCyclical
Renalytix PLC	LN	11/2018	NPE	ConsumerNonCyclical
Renalytix PLC	US	7/2020	NPE	ConsumerNonCyclical
Reneo Pharmaceuticals Inc	US	4/2021	NPE	ConsumerNonCyclical
ReNeuron Group PLC	LN	8/2005	NPE	ConsumerNonCyclical
Revance Therapeutics Inc	US	2/2014	VC	ConsumerNonCyclical
Rhythm Pharmaceuticals Inc	US	10/2017	NPE	ConsumerNonCyclical
RLX Technology Inc	US	1/2021	NPE	ConsumerNonCyclical
Rocket Cos Inc	US	8/2020	NPE	Financial
Rocket Pharmaceuticals Inc	US	2/2015	VC	ConsumerNonCyclical
Rockhopper Exploration PLC	LN	8/2005	NPE	Energy
Rurelec PLC	LN	8/2004	NPE	Utilities
RxSight Inc	US	7/2021	NPE	ConsumerNonCyclical
Ryan Specialty Group Holdings	US	7/2021	NPE	Financial
Sabien Technology Group PLC	LN	12/2006	NPE	Industrial
Safestay PLC	LN	5/2014	NPE	ConsumerCyclical
Saga PLC	LN	5/2014	PE	ConsumerCyclical
Sage Therapeutics Inc	US	7/2014	NPE	ConsumerNonCyclical
Salesforce Inc	US	6/2004	NPE	Technology

Samsara Inc	US	12/2021	NPE	Technology
Sancus Lending Group Ltd	LN	8/2005	NPE	Financial
SandRidge Energy Inc	US	11/2007	NPE	Energy
Saratoga Investment Corp	US	3/2007	NPE	Financial
Sareum Holdings PLC	LN	10/2004	NPE	ConsumerNonCyclical
Satsuma Pharmaceuticals Inc	US	9/2019	PE	ConsumerNonCyclical
Savannah Energy PLC	LN	8/2014	NPE	Energy
Savannah Resources PLC	LN	11/2010	NPE	BasicMaterials
Scholium Group Plc	LN	3/2014	PE	ConsumerNonCyclical
Schroder Bsc Social Impact Tru	LN	12/2020	NPE	Financial
Science Group PLC	LN	7/2008	NPE	ConsumerNonCyclical
SCYNEXIS Inc	US	5/2014	VC	ConsumerNonCyclical
Sdcl Energy Efficiency Income	LN	12/2018	NPE	Financial
SDV 2025 ZDP PLC	LN	1/2018	NPE	Financial
Sea Ltd	US	10/2017	VC	Communications
Secoo Holding Ltd	US	9/2017	NPE	Communications
Secure Property Development &	LN	8/2007	NPE	Financial
Seeing Machines Ltd	LN	12/2005	NPE	Technology
Select Energy Services Inc	US	4/2017	PE	Energy
Select Medical Holdings Corp	US	9/2009	PE	ConsumerNonCyclical
Selecta Biosciences Inc	US	6/2016	NPE	ConsumerNonCyclical
SEMrush Holdings Inc	US	3/2021	NPE	Technology
Sensei Biotherapeutics Inc	US	2/2021	NPE	ConsumerNonCyclical
SentinelOne Inc	US	6/2021	NPE	Technology
SEPLAT Energy PLC	LN	4/2014	NPE	Energy
Sera Prognostics Inc	US	7/2021	NPE	ConsumerNonCyclical
Serabi Gold PLC	LN	5/2005	NPE	BasicMaterials
Serica Energy PLC	LN	12/2005	NPE	Energy
Serinus Energy PLC	LN	5/2018	VC	Energy
ServisFirst Bancshares Inc	US	5/2014	NPE	Financial
Sesen Bio Inc	US	2/2014	VC	ConsumerNonCyclical
Shake Shack Inc	US	1/2015	PE	ConsumerCyclical
Shanta Gold Ltd	LN	7/2005	NPE	BasicMaterials
Shearwater Group PLC	LN	5/2004	NPE	Technology
Shell Midstream Partners LP	US	10/2014	NPE	Energy
Shield Therapeutics PLC	LN	2/2016	NPE	ConsumerNonCyclical
Shift4 Payments Inc	US	6/2020	PE	ConsumerNonCyclical
Shopify Inc	US	5/2015	VC	Communications
Shutterstock Inc	US	10/2012	VC	Communications
SI-BONE Inc	US	10/2018	NPE	ConsumerNonCyclical
Sierra Oncology Inc	US	7/2015	NPE	ConsumerNonCyclical
Signify Health Inc	US	2/2021	NPE	Technology
Silver Bullet Data Services Gr	LN	6/2021	NPE	Technology
Silverback Therapeutics Inc	US	12/2020	NPE	ConsumerNonCyclical
Simec Atlantis Energy Ltd	LN	2/2014	NPE	Energy
Sirius Real Estate Ltd	LN	5/2007	NPE	Financial
Sisecam Resources LP	US	9/2013	NPE	BasicMaterials
SiTime Corp	US	11/2019	NPE	Technology
Sixth Street Specialty Lending	US	3/2014	NPE	Financial
Skinbiotherapeutics PLC	LN	4/2017	NPE	ConsumerNonCyclical
Smart Metering Systems PLC	LN	7/2011	NPE	Industrial

Snowflake Inc	US	9/2020	NPE	Technology
So-Young International Inc	US	5/2019	NPE	Communications
Sol-Gel Technologies Ltd	US	2/2018	NPE	ConsumerNonCyclical
Solaris Oilfield Infrastructur	US	5/2017	PE	Energy
SolarWinds Corp	US	10/2018	PE	Technology
SolGold PLC	LN	2/2006	NPE	BasicMaterials
Solo Brands Inc	US	10/2021	NPE	Communications
Sonendo Inc	US	10/2021	NPE	ConsumerNonCyclical
Sono Group NV	US	11/2021	NPE	ConsumerCyclical
SOS Ltd	US	4/2017	PE	Financial
Sound Energy PLC	LN	6/2005	NPE	Energy
SourceBio International Plc	LN	10/2020	NPE	ConsumerNonCyclical
SpaceandPeople PLC	LN	12/2004	NPE	Communications
Spirit Airlines Inc	US	5/2011	NPE	ConsumerCyclical
Sprague Resources LP	US	10/2013	NPE	Energy
Springfield Properties PLC	LN	10/2017	NPE	ConsumerCyclical
Sprinklr Inc	US	6/2021	NPE	Communications
SQZ Biotechnologies Co	US	10/2020	NPE	ConsumerNonCyclical
SRT Marine Systems PLC	LN	11/2005	NPE	Communications
Staffline Group PLC	LN	12/2004	NPE	ConsumerNonCyclical
Stealth BioTherapeutics Corp	US	2/2019	NPE	ConsumerNonCyclical
Stellus Capital Investment Cor	US	11/2012	NPE	Financial
Strategic Minerals PLC	LN	6/2011	NPE	BasicMaterials
Strix Group PLC	LN	8/2017	NPE	Industrial
Stronghold Digital Mining Inc	US	10/2021	NPE	Utilities
Studio City International Hold	US	10/2018	NPE	ConsumerCyclical
Summit Materials Inc	US	3/2015	PE	Industrial
Summit Midstream Partners LP	US	9/2012	NPE	Energy
Summit State Bank	US	7/2006	NPE	Financial
Sun Life Financial Inc	US	3/2000	NPE	Financial
Sunlands Technology Group	US	3/2018	NPE	Communications
Sunnova Energy International I	US	7/2019	PE	Energy
Sunoco LP	US	9/2012	NPE	Energy
Sunrise Resources plc	LN	6/2005	NPE	Industrial
Superdry PLC	LN	3/2010	NPE	ConsumerCyclical
Supernus Pharmaceuticals Inc	US	5/2012	NPE	ConsumerNonCyclical
Supply@Me Capital PLC	LN	3/2020	NPE	Technology
Sure Ventures PLC	LN	1/2018	NPE	Financial
Surface Oncology Inc	US	4/2018	VC	ConsumerNonCyclical
Sutro Biopharma Inc	US	9/2018	VC	ConsumerNonCyclical
Sweetgreen Inc	US	11/2021	NPE	ConsumerCyclical
Switch Inc	US	10/2017	NPE	Communications
Symphony International Holding	LN	7/2007	NPE	Financial
Synchrony Financial	US	7/2014	NPE	Financial
Synlogic Inc	US	10/2015	VC	ConsumerNonCyclical
System1 Group PLC	LN	12/2006	NPE	Communications
T2 Biosystems Inc	US	8/2014	NPE	ConsumerNonCyclical
T42 LoT Tracking Solutions PLC	LN	2/2013	NPE	Communications
Tabula Rasa HealthCare Inc	US	9/2016	VC	Technology
Tactile Systems Technology Inc	US	7/2016	NPE	ConsumerNonCyclical
TAL Education Group	US	10/2010	PE	ConsumerNonCyclical

Talaris Therapeutics Inc	US	5/2021	NPE	ConsumerNonCyclical
Talis Biomedical Corp	US	2/2021	NPE	ConsumerNonCyclical
Tandem Diabetes Care Inc	US	11/2013	NPE	ConsumerNonCyclical
Tapestry Inc	US	10/2000	NPE	ConsumerCyclical
Tasty PLC	LN	7/2006	NPE	ConsumerCyclical
Tavistock Investments PLC	LN	4/2004	NPE	Financial
Taylor Maritime Investments Lt	LN	5/2021	NPE	Industrial
Taylor Maritime Investments Lt	LN	5/2021	NPE	Industrial
Taylor Morrison Home Corp	US	4/2013	PE	ConsumerCyclical
TDCX Inc	US	10/2021	NPE	Technology
Technology Minerals PLC	LN	11/2021	NPE	BasicMaterials
Teekay Tankers Ltd	US	12/2007	NPE	Industrial
Tekcapital plc	LN	4/2014	NPE	Communications
Tekmar Group PLC	LN	6/2018	NPE	Industrial
Tela Bio Inc	US	11/2019	PE	ConsumerNonCyclical
Teladoc Health Inc	US	7/2015	VC	ConsumerNonCyclical
Telos Corp	US	11/2020	NPE	Technology
Terminix Global Holdings Inc	US	6/2014	PE	ConsumerNonCyclical
Tern Plc	LN	3/2006	NPE	Technology
Ternium SA	US	2/2006	NPE	BasicMaterials
Textainer Group Holdings Ltd	US	10/2007	NPE	ConsumerNonCyclical
TFF Pharmaceuticals Inc	US	10/2019	NPE	ConsumerNonCyclical
TFI International Inc	US	2/2020	NPE	Industrial
Thalassa Holdings Ltd	LN	7/2008	NPE	Technology
Thor Mining PLC	LN	6/2005	NPE	BasicMaterials
Thruvision Group PLC	LN	3/2010	NPE	Industrial
Time out Group PLC	LN	6/2016	NPE	Communications
Tirupati Graphite PLC	LN	12/2020	NPE	Industrial
TMT Investments PLC	LN	12/2010	NPE	Financial
Toast Inc	US	9/2021	NPE	ConsumerNonCyclical
Toople PLC	LN	5/2016	NPE	Communications
Tower Resources PLC	LN	1/2005	NPE	Energy
Townsquare Media Inc	US	7/2014	PE	Communications
TPI Composites Inc	US	7/2016	NPE	Energy
Tracsis PLC	LN	11/2007	NPE	Technology
TransMedics Group Inc	US	5/2019	VC	ConsumerNonCyclical
TransUnion	US	6/2015	PE	ConsumerNonCyclical
Trellus Health Plc	LN	5/2021	NPE	Technology
Tremor International Ltd	US	6/2021	NPE	Communications
Trevi Therapeutics Inc	US	5/2019	VC	ConsumerNonCyclical
Tricon Residential Inc	US	10/2021	NPE	Financial
Trident Royalties PLC	LN	10/2018	NPE	BasicMaterials
Trinity Exploration & Producti	LN	7/2011	NPE	Energy
TriplePoint Venture Growth BDC	US	3/2014	NPE	Financial
Tritax EuroBox PLC	LN	7/2018	NPE	Financial
Trufin PLC	LN	2/2018	NPE	Financial
Trupanion Inc	US	7/2014	NPE	Financial
Tsakos Energy Navigation Ltd	US	3/2002	NPE	Industrial
TScan Therapeutics Inc	US	7/2021	NPE	ConsumerNonCyclical
Tufin Software Technologies Lt	US	4/2019	NPE	Technology
Tungsten Corp PLC	LN	10/2013	NPE	Financial

Tungsten West Plc	LN	10/2021	NPE	BasicMaterials
Turning Point Brands Inc	US	5/2016	NPE	ConsumerNonCyclical
Tuya Inc	US	3/2021	NPE	Technology
Twilio Inc	US	6/2016	VC	Technology
Twitter Inc	US	11/2013	NPE	Communications
Ucloudlink Group Inc	US	6/2020	NPE	Communications
UK OIL & GAS PLC	LN	3/2005	NPE	Energy
Ukrproduct Group Ltd	LN	2/2005	NPE	ConsumerNonCyclical
United Microelectronics Corp	US	9/2000	NPE	Technology
Unity Software Inc	US	9/2020	NPE	Technology
Universe Pharmaceuticals Inc	US	3/2021	NPE	ConsumerNonCyclical
UniVision Engineering Ltd	LN	12/2005	NPE	Industrial
Upland Software Inc	US	11/2014	VC	Technology
Urban Logistics REIT PLC	LN	4/2016	NPE	Financial
UroGen Pharma Ltd	US	5/2017	VC	ConsumerNonCyclical
US Foods Holding Corp	US	5/2016	PE	ConsumerNonCyclical
USA Compression Partners LP	US	1/2013	PE	Energy
USD Partners LP	US	10/2014	NPE	Industrial
UserTesting Inc	US	11/2021	NPE	Technology
Vaccitech PLC	US	4/2021	NPE	ConsumerNonCyclical
Valvoline Inc	US	9/2016	NPE	BasicMaterials
Vanda Pharmaceuticals Inc	US	4/2006	NPE	ConsumerNonCyclical
Vapotherm Inc	US	11/2018	NPE	ConsumerNonCyclical
Various Eateries PLC	LN	9/2020	NPE	ConsumerCyclical
Vascular Biogenics Ltd	US	10/2014	VC	ConsumerNonCyclical
Vaxxinity Inc	US	11/2021	NPE	ConsumerNonCyclical
Vector Capital PLC	LN	12/2020	NPE	Financial
Velocity Financial Inc	US	1/2020	NPE	Financial
Velocys PLC	LN	4/2006	NPE	Energy
Venture Life Group Plc	LN	3/2014	NPE	ConsumerNonCyclical
Venus Concept Inc	US	10/2017	VC	ConsumerNonCyclical
Vera Therapeutics Inc	US	5/2021	NPE	ConsumerNonCyclical
Veracyte Inc	US	10/2013	VC	ConsumerNonCyclical
Verastem Inc	US	1/2012	NPE	ConsumerNonCyclical
Verditek plc	LN	8/2017	NPE	Energy
Verici Dx plc	LN	11/2020	NPE	ConsumerNonCyclical
Veritex Holdings Inc	US	10/2014	NPE	Financial
Veritone Inc	US	5/2017	NPE	Technology
Verrica Pharmaceuticals Inc	US	6/2018	NPE	ConsumerNonCyclical
Versarien PLC	LN	6/2013	NPE	Industrial
VH Global Sustainable Energy O	LN	2/2021	NPE	Financial
VIA Optronics AG	US	9/2020	NPE	ConsumerCyclical
Victoria Oil & Gas PLC	LN	7/2004	NPE	Energy
Vipshop Holdings Ltd	US	3/2012	NPE	Communications
Visa Inc	US	3/2008	NPE	Financial
Vista Energy SAB de CV	US	7/2019	NPE	Energy
VMware Inc	US	8/2007	NPE	Technology
W Resources Plc	LN	11/2004	NPE	BasicMaterials
WANdisco PLC	LN	6/2012	NPE	Technology
Waterdrop Inc	US	5/2021	NPE	Financial
WaVe Life Sciences Ltd	US	11/2015	PE	ConsumerNonCyclical

Weave Communications Inc	US	11/2021	PE	Technology
Weber Inc	US	8/2021	NPE	ConsumerCyclical
Weidai Ltd	US	11/2018	NPE	Financial
Western Alliance Bancorp	US	6/2005	NPE	Financial
Western Midstream Partners LP	US	12/2012	NPE	Energy
Westlake Chemical Partners LP	US	7/2014	NPE	BasicMaterials
Westlake Corp	US	8/2004	NPE	BasicMaterials
Westminster Group PLC	LN	6/2007	NPE	ConsumerNonCyclical
WideOpenWest Inc	US	5/2017	PE	Communications
Wildcat Petroleum PLC	LN	12/2020	NPE	Energy
WiMi Hologram Cloud Inc	US	4/2020	PE	Technology
Wipro Ltd	US	10/2000	NPE	Technology
Wishbone Gold PLC	LN	7/2012	NPE	BasicMaterials
Woodbois Ltd	LN	4/2008	NPE	Industrial
Workiva Inc	US	12/2014	PE	Technology
X Financial	US	9/2018	NPE	Financial
Xencor Inc	US	12/2013	VC	ConsumerNonCyclical
Xenon Pharmaceuticals Inc	US	11/2014	VC	ConsumerNonCyclical
Xeros Technology Group PLC	LN	3/2014	NPE	BasicMaterials
Xinyuan Real Estate Co Ltd	US	12/2007	PE	Financial
XP Factory PLC	LN	7/2016	NPE	ConsumerCyclical
Xpediator PLC	LN	8/2017	NPE	Industrial
XPeng Inc	US	8/2020	NPE	ConsumerCyclical
Xponential Fitness Inc	US	7/2021	NPE	ConsumerCyclical
Yalla Group Ltd	US	9/2020	NPE	Technology
Yatsen Holding Ltd	US	11/2020	NPE	Communications
Yellow Cake PLC	LN	7/2018	NPE	Financial
Yext Inc	US	4/2017	VC	Technology
Yiren Digital Ltd	US	12/2015	NPE	Financial
Youdao Inc	US	10/2019	NPE	Technology
Yunji Inc	US	5/2019	VC	Communications
Zai Lab Ltd	US	9/2017	VC	ConsumerNonCyclical
Zaim Credit Systems PLC	LN	11/2019	NPE	Financial
Zendesk Inc	US	5/2014	VC	Communications
Zenith Energy Ltd	LN	1/2017	NPE	Energy
Zenova Group Plc	LN	7/2021	NPE	BasicMaterials
Zentalis Pharmaceuticals Inc	US	4/2020	NPE	ConsumerNonCyclical
Zephyr Energy PLC	LN	6/2004	NPE	Energy
Zhangmen Education Inc	US	6/2021	NPE	Communications
Zhihu Inc	US	3/2021	NPE	Communications
ZIM Integrated Shipping Servic	US	1/2021	NPE	Industrial
Zinnwald Lithium PLC	LN	12/2017	PE	BasicMaterials
ZTO Express Cayman Inc	US	10/2016	PE	Industrial
Zuora Inc	US	4/2018	NPE	Technology
Zurn Water Solutions Corp	US	3/2012	PE	Industrial
Zymeworks Inc	US	4/2017	VC	ConsumerNonCyclical
Zynerba Pharmaceuticals Inc	US	8/2015	NPE	ConsumerNonCyclical

9.4 Measure Sizes

Table 9.2 - Mean and median for Market Capitalization at Offer, Offer Size and Equity Sold for all Definitions

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. The table shows the mean and median values of Market Capitalization at Offer, Offer Size (meaning the dollar amount offered to the public), and the Equity Sold in percentage for every Definition from our sample over the entire period. Market Capitalization at Offer and Offer Size is quoted in millions, and Equity sold is quoted in percentage.

	All firms	PE	VC	NPE
Market Capitalization at Offer				
Mean	1 358,5	1 996,1	555,1	1 365,1
Median	381,0	1 063,4	284,5	337,4
Offer Size				
Mean	230,2	351,0	112,1	227,4
Median	79,1	210,9	76,8	69,0
Equity Sold				
Mean	26,6%	22,1%	31,4%	26,6%
Median	21,7%	19,9%	28,9%	21,2%

Table 9.2 shows the mean and median values for the market capitalization at offer, offer size, and equity sold across all definitions. Market capitalization at offer and offer size is quoted in millions of dollars, while equity sold are quoted in percentage. We observe a significant difference between the mean and median values, indicating that we have a some very large measure sizes. PE has the largest market capitalization and offer size on average and median values. VC sells the most significant amount of equity on average and median.

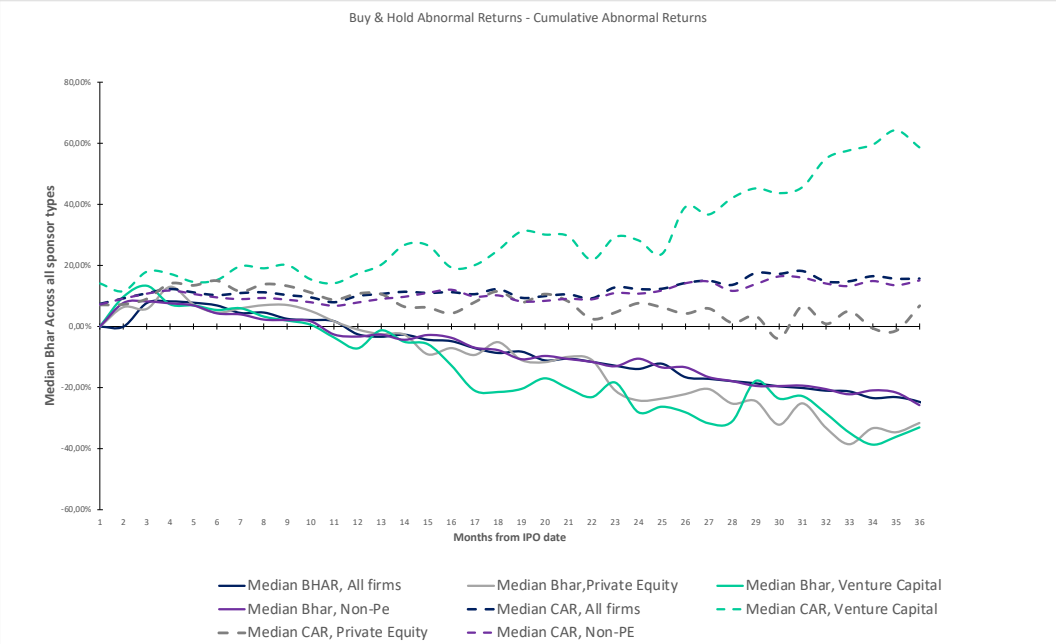
Table 9.3 - Total Offer Size by Years for all Definitions

The total sample of 1058 IPOs is comprised by 116 private equity-backed companies, 99 venture capital-backed companies and 843 non private equity backed companies from January 2000 to December 2021 listed on New York Stock Exchange, Nasdaq Global Markets and London Stock Exchange. The table shows the sum of Offer Size by each Definition for every year in our sample. All numbers are quoted in dollar millions.

	All firms	PE	VC	NPE
2000	9 136,2	na	na	9 136,2
2001	9 125,4	195,5	na	8 929,9
2002	1 056,2	na	na	1 056,2
2003	4 457,1	na	na	4 457,1
2004	4 012,0	na	na	4 012,0
2005	5 781,8	na	na	5 781,8
2006	11 535,5	1 960,1	na	9 575,5
2007	11 323,1	281,8	na	11 041,3
2008	21 147,2	na	47,5	21 099,7
2009	835,9	336,0	na	499,8
2010	2 617,0	884,1	na	1 732,9
2011	4 142,3	1 544,2	na	2 598,1
2012	5 197,8	2 815,8	324,4	2 057,6
2013	8 840,0	2 913,0	753,6	5 173,4
2014	15 583,3	3 236,9	1 738,4	10 607,9
2015	8 219,8	2 701,9	1 500,0	4 017,9
2016	6 777,4	3 284,1	765,1	2 728,3
2017	8 890,6	3 160,5	2 593,3	3 136,9
2018	16 443,1	6 110,0	2 322,2	8 010,9
2019	13 041,6	4 759,8	1 049,6	7 232,2
2020	33 005,3	2 428,7	na	30 576,6
2021	42 365,2	4 102,7	na	38 262,5

Table 9.3 shows the total offer size by each year across all definitions. All numbers are quoted in millions of dollars. We observe a substantially more significant amount of equity raised in the last years, 2018-2021, which is our hottest issue market. NPE offers the most significant portion of equity, which makes sense because our sample consists of approximately 80% of NPE firms.

9.5 BHAR and CAR



The figure 9.4 shows the monthly median BHAR and CAR for all definitions. We see that all BHAR for every definitions generate negative abnormal returns after 10-12 months, and CAR generate positive abnormal returns for every definition, except PE for month 30 and 34.