Eirik Kittelsen & Martin James H. Richmond

How Private Placements of Equity Influence SPAC Returns

An event study of how the relative size of PIPE impacts abnormal SPAC returns

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Abstract

This thesis conducts an event study of how the size of capital raised by special purpose acquisition companies (SPAC) through private investment in public equity (PIPE) affects the performance of SPACs. This is done by looking at the daily abnormal stock returns at the event window affiliated with the PIPE-announcement, as well as the long-term returns following the event window. To be able to measure and compare the size of a SPAC's PIPE-funding, the companies are grouped into quintiles based on the size of what will be referred to as PIPE-ratio, which is a relative PIPE measurement. The quintile portfolios consist of 52 companies each, all merged through SPACs listed in the U.S. between 2008 and 2022.

From the output it can be observed that the market reacts positively to the announcement in the event window for the portfolios in our sample and the portfolio with the largest PIPE-ratio exhibits the largest abnormal returns. All the portfolios experience statistically significant different returns between the estimation period and either the event window or the event day, except for the portfolio with the smallest PIPE-ratio. When testing the differences in abnormal returns between the portfolios in the event window, there is evidence of the largest PIPE-ratio portfolio yielding on average greater returns compared to the other portfolios. This shows that SPACs with very large relative PIPE-funding have on average higher returns compared to SPACs with lower relative PIPE-funding.

In the long run, the smallest and largest PIPE-ratio portfolios exhibit evidence of lesser and greater relative returns respectively. However, the evidence of difference is lost when controlling for, amongst other variables, recent SPAC activity and redemption rates. The output then shows statistically significant lesser returns in the portfolio with the second largest PIPE-ratios, when compared to the other portfolios.

Preface

This thesis represents the concluding stage of our master's degree, and we wanted to use the opportunity to take a deep dive into something which we both found interesting and original. We decided early on that SPACs were a good option, due to a common interest in securities and financial markets. Considering its recent popularity, the SPAC-phenomenon is relevant to the contemporary financial market. When reviewing the research of existing literature on SPACs, we realized that not much investigation has been conducted towards the PIPE-element in this field, and we decided to go forward with this. The work has been frustrating at times, but we are pleased with our result, and enjoyed the learning process of researching some new aspects in the SPAC-environment.

We would like to thank our supervisor, Johann Reindl, for providing us with his, expertise, guidance, and inspiring conversations which helped us overcome the obstacles we faced throughout this journey. We would like to thank Erik Smith-Meyer for guidance in statistical modelling. Lastly, a thanks to those who showed us support and understanding, our friends and family.

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Eirik Kittelsen

Martin James H. Richmond

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Abbreviations

AR	Abnormal return
CAR	Cumulative abnormal return
EMH	Efficient Market Hypothesis
EPS	Earnings per share
ETF	Exchange traded fund
FPA	Forward purchase agreement
IPO	Initial public offering
NYSE	New York Stock Exchange
OLS	Ordinary least squares
PIPE	Private investment in public equity
SEC	Security & Exchange Commission
SPAC	Special purpose acquisition company
US	United States of America
VIX	Volatility index

1. Introduction

The recent years in the financial market has seen both new and old concepts come to life. Along with meme-stocks, cryptocurrency, and even crypto-art, special purpose acquisition companies, or SPACs, managed to get the market's attention. SPACs are publicly traded blank check companies, whose sole purpose is to find a private company to take public through a merger as an alternative to a traditional IPO. Since 2020 and until now at the time of writing, the financial market has seen a great increase in the popularity of SPACs, as well as their portion of total IPOs in the U.S. This is visualized in figure 1, where we can see that SPAC IPOs accounted for 55%, 63% and 80% of total U.S. IPOs in 2020, 2021 and the first 5 months of 2022 respectively (SPAC Analytics, 2022).

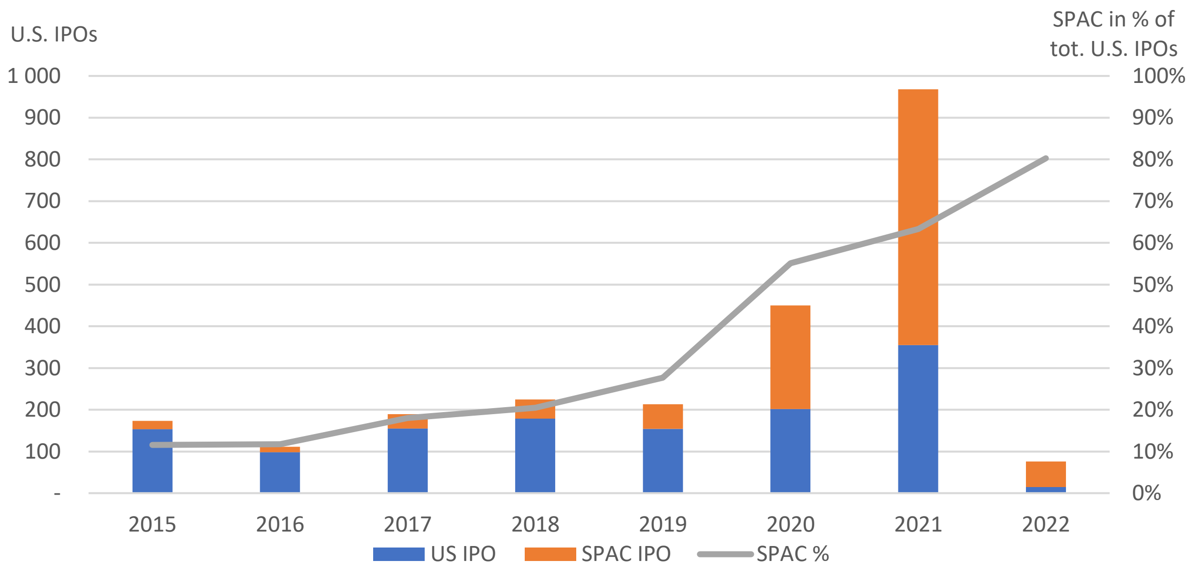

Figure 1: SPAC and U.S. IPOs from 2015-2022.

This is the second time the financial market has seen a "wave" of SPAC activity, however this time around it caught the attention of the news agencies, social media, and retail investors to a larger degree than before.

We will take a much deeper dive into the different aspects surrounding SPACs in section 2, but to get a grasp of what this thesis is analysing we will continue this section with some background information which is necessary to understand the research question, before we will end this section with the structure of the rest of this thesis.

1.1. Background information

The general rule for the SPAC investors, is that when buying shares in a SPAC prior to the merger-vote, the investors have the option to redeem their shares. As a result of this, the SPAC's management, or sponsors, will have to make sure that the SPAC have enough capital to go through with the merger. They do so through what is known as private investment in public equity, or simply, PIPE. The quality of the target company can be valued by, amongst other things, the private placement of equity, or more precisely, the subscription deal in which the PIPE investors and the sponsors reach. During the capital raise process, the sponsors provide the potential PIPE-investors with non-public information about the merger-target. The idea is therefore that the PIPE-investors are more willing to invest if the proposed target company is attractive and less willing if the target is less attractive. The size of the PIPE-funding could therefore be interpreted as a sign of approval to the market and is likely to influence the SPACs' stock returns when the information is made public. This is the focus of this thesis, where we investigate whether the PIPE influences the returns and if differences occur because of the size of their PIPE-funding. Due to different sizes in the market value of SPACs, we adjust the PIPE-size to a unit which is relative to the size of the SPAC, and comparable between them. Based on this discussion, our research question is:

How does the relative size of PIPE-funding influence SPAC-returns?

To do this, we will conduct an event study centred around the announcement date of the PIPE-agreement and use the three-factor model by Fama and French as the basis for the return calculations. The SPACs are then grouped into five equally weighted and equally large portfolios based in their relative PIPE size, before we look at the portfolios' performance in the event window and in the long run through the SPAC's cumulative abnormal returns. Lastly, the differences in abnormal returns in the event window are tested against the days prior to the event window, and the differences in abnormal returns between the portfolios are tested in both the event window and in the long run.

1.2. Thesis Structure

The outline of the research consists of section 2, literature review and theoretical framework; section 3, Methodology; section 4, Findings; and section 5, Conclusion. Section 6 and 7 consist of the reference list and appendices.

Section 2 introduces SPACs and their different aspects through reviewed literature, followed by a description of a typical SPAC's life cycle. The section ends with some relevant theoretical framework, what this thesis contributes to existing literature, and an outline of the research's hypotheses.

Section 3 will present the methodological design, where we will describe the process of collecting and cleansing our data, before going through the methodology of event studies and our analysis.

Section 4 contains the testing of hypotheses, followed by discussions of what can be observed from the findings, as well as a robustness test of the regression models.

The thesis ends with section 5, where we present our conclusion and answer the research question, before discussing limitations and provide recommendations for future research.

2. Literature Review and Theoretical Framework

In this section, we will introduce special purpose acquisition companies, the sponsors, redemption, and PIPE by reviewing and discussing existing literature. Further we will go through the de-SPAC process, and then compare SPACs to market conditions. We will end the section with a discussion of relevant theories, a description of our contribution to existing literature on the research of SPACs, and our hypotheses.

2.1. Description of a SPAC

A special purpose acquisition company is a type of shell company which stem from blank check companies. A shell company is described by the Securities and Exchange Commission (SEC) as "a registrant with no or nominal operations and either no or nominal assets, assets consisting solely of cash and cash equivalents and nominal other assets" (SEC, 2005, p. 42,234). The SPACs' purpose is to raise funds by issuing units, which consists of shares and fractions of warrants, through an IPO, and then merge or acquire a non-listed company within a given time. From the target company's perspective, the SPAC offers them an alternative to a traditional IPO. However, if the SPAC does not manage to find a target company within the given time limit, the company is liquidated, meaning that while investors are refunded their investment, the sponsors lose theirs.

2.1.1. From Blank Check to SPAC

In the 1980s, the optimism in the financial market experienced a huge growth partly due to the Reagan administration's intentions to reduce the interest rate and promote economic growth (Duggan, 2019). With the financial market's optimism came an increase in the frequency and magnitude of fraud and corruption, with penny stocks swindles being reported as the number 1 threat to retail investors (Hinden, 1989). Among these penny stocks was where you could find blank check companies. Blank check companies became formally recognized by the SEC as a tool of fraud by the end of the 1980s (Riemer, 2007). In 1990 they became governed under Rule 419 in the Securities Act of 1933 (Offerings by blank check companies, 1933, § 230.419). This made it difficult for even the legitimate blank check companies to operate, resulting in different reactions. Some tried to pump out as many blank checks as possible before the Rule took effect, others utilized the blank check bankruptcy to exercise reverse mergers, and a third group decided to take the blank check companies through traditional public listings. The companies associated with the latter group is what became the first-generation of SPACs.

Based on descriptions by Riemer (2007), we see that during the 1990s, David Nussbaum, of GKN Securities, created the hybrid blank check companies we now know as SPACs. The idea was to create blank check companies which would regain the trust of investors who were sceptical towards blank checks or victims of the penny stock fraud. As a result, the hybrid made sure to have enough assets to not fall under the penny stock category and therefore not falling under Rule 419, yet voluntarily adopted some restrictions of this Rule (see appendix 1). The hybrid blank check created much more trading ability, volume, and larger offerings due to this (Auguste, 2008). Between 1993 and 1994, twelve out of Nussbaum's 13 SPACs successfully completed acquisitions. In the years leading up to the dot-com bubble, smaller companies were not as dependant on blank check mergers to become publicly listed and the market did not see a significant return in SPAC IPOs until the years leading up to the financial crisis of 2008.

2.1.2. Sponsors – The Questionable Fiduciaries

The sponsors engage an underwriter to issue shares in an IPO and promote the SPAC to investors. The sponsors are typically parties affiliated with large private equity, venture capital, hedge funds and former fortune 500 executives, but can also be parties with no particularly relevant background or even celebrities (Naumovska, 2021). A study conducted by Cumming et al. (2014) found that experienced managers and boards do not enhance the probability of a successful merger, and that younger management teams tend to have a higher deal approval probability. However, SPACs with high-quality sponsors have been observed to have higher returns, as well as a tendency to have larger IPOs, lower redemptions, and higher PIPE-funding (Klausner et al., 2022).

The sponsors acquire 20% ownership of their SPAC for a nominal price. These funds (together with the IPO proceeds) are locked up in an escrow account and will serve as the "sponsors promote", or compensation, if they manage to successfully acquire a private company (Chauviere et al, 2020). If the Sponsors are not successful in finding a target within the given time-limit, the funds are liquidated, and they lose their investment. Due to this, Klausner et al. (2022) argues that the sponsors have an incentive to make as many SPACs as possible, to propose questionable acquisitions, and to glorify the target so that the proposal will be accepted by the shareholders and minimize the number of redemptions. This is supported by Dimitrova (2016), which documents that the incentives in the SPAC contract may encourage some SPAC sponsors and underwriters to make bad acquisitions.

We see that there are some obvious asymmetries when it comes to the interests of the investors and the sponsors, and we present additional findings about the sponsors which further enhance this claim in the next sections. Yet, investors still allocate their assets into the hands of a group of people with questionable motives, and who does not necessarily work towards the shareholders' interest.

2.1.3. Redemption – The investors' Upper Hand

When investors take a position in a SPAC at the early pre-merger stage, they do not actually know which company they are investing in. To protect their downside, the investors have the option to redeem their shares around the period of the merger-vote. Their units will be split up, and they redeem their shares for the offering price of $10.00, plus interest earned during the holding period. In other words, the investors get their investment returned to them, while also keeping the warrants. Some investors, utilize this opportunity to earn large risk-free returns, given that they will be left with their initial investment, plus interest, and the market value of the warrants. In the sample studied by Klausner et al., redeeming investors earned an annualized average risk-free return of 11.6% (2022).

According to Bazerman & Patel (2021), redemption rates have seen a decline in recent times. In their July 2020 to March 2021 Merger Announcement SPAC-sample, they found an average redemption rate of 24%, and that over 80% of the SPACs experienced redemption rates of less than 5%. Klausner et al. have taken a deeper look into the redemptions and find that it is not uncommon for large investment managers affiliated with hedge funds, which make up almost all the investors in a SPACs IPO, to carry out a big sell-off after the proposed merger-announcement. They then define the divestment rate as the combined redemption rate and sell-off rate, and find that in their 2019-20 sample, SPACs which experienced 30% or fewer redemptions had an average divestment rate of 83% (2022).

The sample period of Klausner et al. and the sample period of Bazerman & Patel is January 2019 to June 2020 and July 2020 to March 2021 respectively. By using the S&P U.S. SPAC Index we can estimate that the former sample period saw a return of 96.48%, while the latter sample period saw a return of 64.19%, which is approximately 73% and 37% more than the S&P 500 index respectively, as illustrated in figure 2 and appendix 2.[1] Taking this into account, it makes sense that the investors who were going to redeem their shares in the first place, would rather choose to sell them in the market.

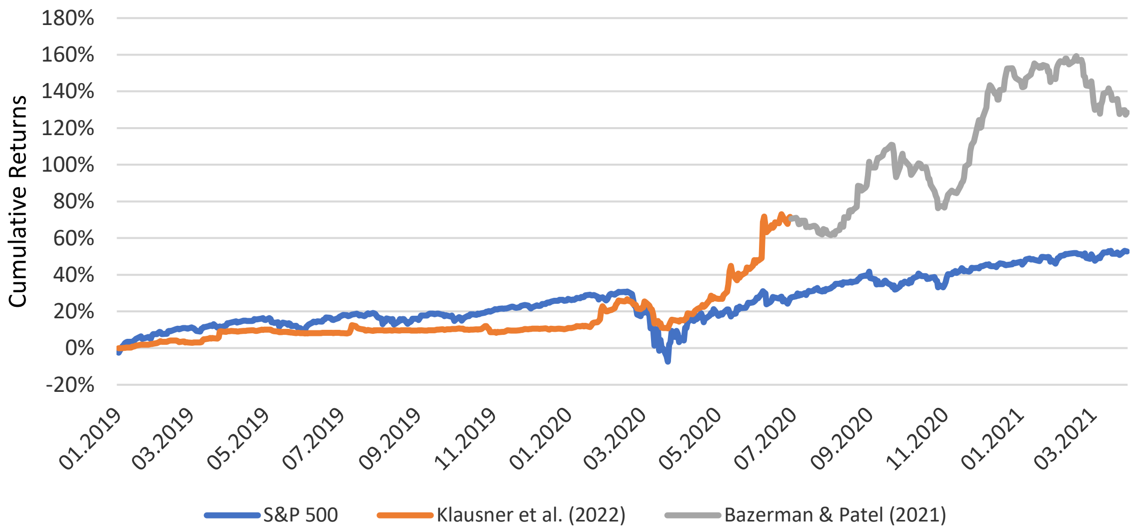

Figure 2: S&P U.S. SPAC Index Cumulative Returns.

Additionally, there is also evidence of SPAC sponsors making side-agreements to existing shareholders which commit not to redeem their shares (Klausner et al., 2022). One of the requirements for a merger proposal to be accepted is that the redemption rate must be below a given threshold. Considering that sponsors have an incentive to make sure the SPAC is successful (as mentioned in section 2.1.2.), it creates the risk of sponsors "buying loyalty" to make sure the redemption rate does not exceed the threshold.

[1] https://www.spglobal.com/spdji/en/indices/strategy/sp-us-spac-index/#overview. The launch date of the S&P U.S. SPAC Index is August 23, 2021. All information prior to the launch date is hypothetical back-tested and not actual performance.

Taking this into account, as well as the difference between the redemption rate and the divestment rate, and that SPAC share redemptions can be exploited by investors to earn large risk-free returns, a lot points towards the redemption rate as an unreliable measurement of a SPACs quality. However, it is hard to argue against that a high redemption rate means anything less than a situation the investors no longer want to be a part of.

2.1.4. PIPE – The Accredited Investors' Approval

Some of the lost equity due to redemption is replaced through subscription agreements by sponsors or third-party investors, defined by Rule 501(a) and/or Rule 144A under the Securities Act of 1933 (Definitions and terms used in regulation D., 1933, § 239.501; Private resales of securities to institutions., 1933, §230.144A). We will refer to these investors as the PIPE investors.

Through an FAQ published by Morrison & Foerster, PIPE is defined as "any private placement of securities of an already-public company that is made to selected accredited investors (usually to selected institutional accredited investors). (…) In a typical PIPE transaction, investors enter into a purchase agreement that commits them to purchase securities(...)." (Pinedo & Tanenbaum, 2018, p. 1). The benefit of raising capital through PIPEs is that they save both time and money for the company. However, the PIPE-securities are generally sold to the investors at a discount, which means less capital raised; and the issuance dilutes the outstanding shares (Segal, 2022).

When the sponsors are looking for PIPE-funding, the potential PIPE-investors receive confidential information which is not known to the market. Most importantly, they gain insight into the target company so they can perform valuations of the proposed target to-be. Should the sponsors and the investors enter a PIPE-agreement, the investors agree to be locked up for six months (Bazerman & Patel, 2021). For SPACs, we have seen in our own sample that generally the price per PIPE-share is $10.00, with very few exceptions. Deviations from the usual $10.00 could be interpreted as a measurement of SPAC validation for the market. This is however not as straight forward as it seems, as the PIPE-agreements might include components which are hard to price, and there have been cases where the sponsors transfer their own shares or warrants to the investors instead of issuing new shares (Klausner et al., 2022).

As mentioned in section 2.1.2., we can expect greater PIPE-fundings in SPACs with a high-quality sponsor team, which should also indicate that we can expect greater PIPE-fundings if such investors are presented a quality target. As long as PIPE investors pay a price per share which is greater than a SPAC's net cash per share, they increase the net cash per share at the time of a merger, which can yield higher returns for the shareholders (Klausner et al., 2022). This claim is based on a positive relation between net cash per share and SPAC returns.

2.2. SPAC lifecycle: The De-SPAC Process

The lifecycle of a SPAC can be divided into three segments: no target, target found, and acquisition completed/SPAC withdrawn (Cumming et al., 2014). Figure 3 shows an illustration of the SPAC lifecycle.

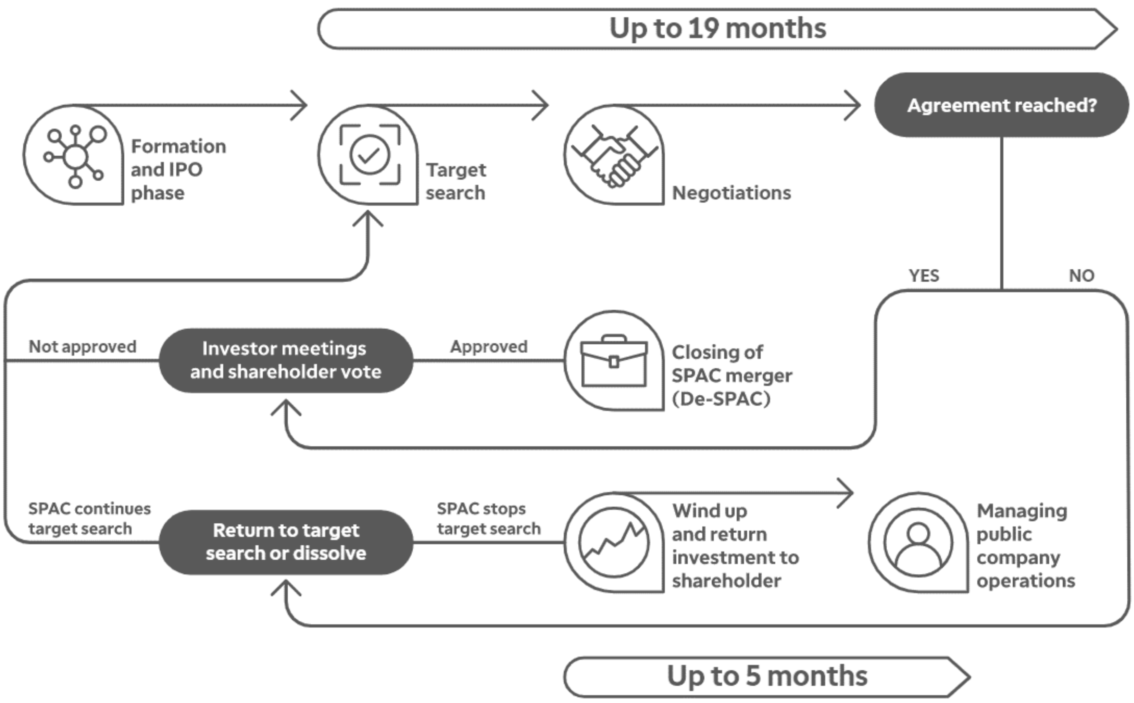

Figure 3: A typical 24-month SPAC Timeline (Coffey, 2021)

Stage 1 – No Target: The SPAC IPO

At the initial offering of the SPAC securities, both stocks and fractions of warrants are issued in the form of units and the price per unit is $10.00 as a standard. Typically, whole warrants are exercisable at $11.50 per share. As mentioned, the investors during this stage also get an option to redeem their shares at a later period, which is during the vote for a proposed acquisition. The proceeds which are raised in the offering and put in the escrow account are invested in treasury notes to protect the investors (see appendix 1). The funds in the trust account can only be withdrawn to finance an acquisition or to repay the investors due to liquidation or redemption.

In this period, we can expect low volatility and returns similar to Treasury Notes (Cumming et al., 2014), which is supported by Lewellen (2009) that SPACs with no announced target typically earn an annualized excess return of less than 1%. This can also be observed through the CrossingBridge Pre-Merger SPAC-ETF (CrossingBridge, 2022), which has a daily standard deviation of 0.09%, or 1.4% annualized, between November 2021 and May 2022.

Stage 2 – Target Found: The Vote

The sponsors' task is to find a fitting company for the SPAC to merge with. When a potential target is found, the sponsors will start a negotiation process before announcing the target. During this stage the sponsors also enter into the private placement agreements, forward purchase agreements (FPA) and subscription agreements, which we refer to as PIPE-agreements. The only required condition before entering the voting process is that the size of the target company must be at least 80% of the SPAC's net asset value (Cumming et al., 2014).

When the potential target is made public, the shareholders will vote on whether they accept the proposed company. This requires the fulfilment of two conditions: the majority of shareholders votes in favour, and the redemption rate must not exceed the given threshold (Cumming et al., 2014). As mentioned in stage 1, this is the period where the investors have the opportunity to exercise their redemption-rights. If the shareholders reject the proposed company, the sponsors will have to begin looking for another target (given that the SPAC has sufficient time left).

In this stage we can expect more volatility as the market will have a company to form a value assessment on (Cumming et al., 2014). This is supported by the findings of Lewellen (2009), in that SPACs who have announced a target earn an average annualized excess return of around 11%. SPACs where the shareholders have rejected the proposed acquisition earn barely positive excess returns (Lewellen, 2009), which makes sense as the SPAC is now back at stage 1.

Stage 3 – Acquisition Completed/SPAC Withdrawn

In the event of an approved merger vote, the private company goes public through a reverse merger, the SPAC becomes the target company, and the sponsors receive their promote. Depending on the SPAC's terms and conditions however, the sponsor promote shares might be locked up to avoid opportunistic behaviour by the managers, while in other cases the promote is tied to the company's returns or share performance (Cumming et al., 2014).

If the sponsors are unable to find a target company approved by the shareholders within the given time, the SPAC becomes liquidated. In this case, the full trust account, plus interest earned are distributed to the shareholders, while the sponsors lose their promote.

According to Lewellen (2009), SPACs which have completed their acquisition earn an average annual excess stock return of negative 36.5%, which means that the expected return is higher for investors in liquidated SPACs compared to successfully merged SPACs.

2.3. SPACs and the Market

As mentioned in section 2.1.1., the modern SPACs returned in the early 2000s. In the years leading up to the Financial Crisis in 2008, the number of SPAC IPOs increased every year resulting in what we call the first SPAC wave. SPAC IPOs saw some growth in the years leading up to the Covid Pandemic but following the Pandemic the number of SPAC IPOs surged into a second wave. In 2020, 2021 and 2022, more than half of the newly listed companies in the U.S. were SPACs (see appendix 3). This is supported by the findings of Blomkvist and Vulanovic (2020), who reports that there is an inversion between both SPAC volume and SPAC share of total IPOs, and market uncertainty (VIX) and the variance risk premium (VRP).

In figure 4 we have plotted the VIX and end-of-year SPAC IPOs relative to U.S. IPOs for further illustration, which shows a massive growth in SPAC IPO share in 2020, 2021 and 2022. The observed SPAC share data is plotted at the end of their respective year in the diagram, apart from 2022 which is shown above its respective year. Even though we have seen a massive increase in SPAC IPOs in the last couple of years, CEO of Goldman Sachs, David Solomon, states that this growth is not sustainable in the medium term and that we can expect a reduction in SPAC IPO activity levels (Clarke, 2021).

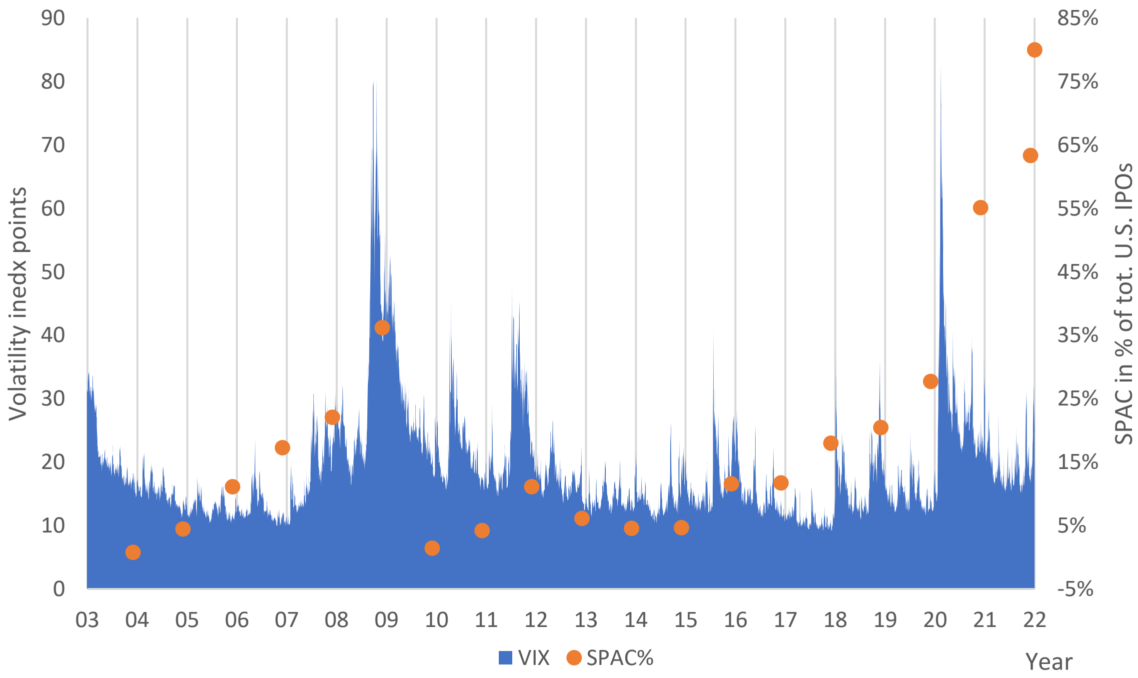

Figure 4: Daily VIX performance & SPAC IPO Share of total U.S. IPOs.

2.4. Theory

In this subsection, we will introduce the theories which are relevant to consider when going forward with our thesis. This includes the Efficient Market Hypothesis, and the Fama & French Three Factor Model.

2.4.1. Efficient Market Hypothesis

Eugene F. Fama defines an efficient market as “a market in which prices always ‘fully reflect’ available information” (Fama, 1970, p. 383). This means that achieving a long-term excess return should be impossible. The theory can be divided into three subsets (Brealey et al., 2020):

The weak form: Share prices will incorporate all historical price data in the market and result in the random-walk principle. This makes the use of technical analysis of historical data as a method to beat the market useless.

The semi-strong form: All public information is incorporated into the share prices, and the market will react immediately to news. According to this form, fundamental analysis cannot be used as a method to beat the market. The semi-strong form contains the terms for the weak form as well, and the assumption for using historical prices to beat the market applies.

The strong form: All information, including insider information is incorporated in the share price. The strong form also contains the terms for the weak and semi-strong form. This results in a situation where only luck can help investors beat the market.

The efficient market hypothesis has been criticized throughout the years, and players in the financial market are constantly looking for ways to beat it. An example of such criticism came from Shostak (1997) where he claims that the framework behind the efficient market hypothesis contains flawed methodology and that the main cause behind instability in the financial market comes from central banks’ monetary policy.

2.4.2. Fama & French

The Fama French three-factor model is an expansion of the Capital Asset Pricing Model (CAPM). Where the CAPM describes the relationship between systematic risk and expected return, the three-factor model includes the effect of size and book-to-market equity. Fama and French realized that market equity (size) and the book-to-market equity also absorbed the roles of leverage and earnings/price in average returns, which made the two variables do a good job explaining average returns of the market indices (Fama & French, 1992). They found direct evidence that “if assets are priced rationally, variables that are related to average returns, such as size and book-to-market equity, must proxy for sensitivity to common (shared and thus undiversifiable) risk factors in returns" (Fama & French, 1992, p. 4).

2.5. Contribution to Existing Literature

After reviewing existing literature, we find that high-quality sponsors tend to manage more attractive SPACs, which again lead to higher PIPE-funding by institutional and accredited investors. However, we fail to find any research measuring the size of PIPE-funding to the performance of SPACs directly.

As the PIPE-agreement is usually announced at the same time as the merger-proposal, it will be difficult to remove the effect of the merger from the effect of the PIPE-size. It will therefore make more sense to look at the differences between the market's reaction to the SPAC's announcement. A big enough sample would be necessary to be able to make a form a conclusion, but this could result in information overload from comparing the differences in returns between all the SPACs. Based on this we find it fitting to conduct an event study of SPACs grouped into portfolios based on the size of PIPEs and then test the differences between the portfolios. Our contribution to the existing literature and research with regards to SPACs is therefore to analyse the differences in abnormal SPAC returns based on the size of PIPE-funding through an event study of PIPE-portfolios.

2.6. Hypotheses

Based on the discussion of our contribution to existing SPAC literature, we have arrived at three main hypotheses. The first hypothesis is divided into part 1a and 1b and considers the differences in returns between the event window and the period prior to the event window for the portfolios. The second hypothesis considers differences between the portfolios in the event window and the third hypothesis considers the differences between the portfolios in the long run. In all the hypotheses, the coefficients which are tested are dummy variables. This means that we can test if the coefficients are different from zero.

2.6.1. Hypothesis 1a

First, we want to find out if there is a significant market reaction to the announcement for the different portfolios. The testing will have to answer the question of whether the abnormal returns during the event window are different from the abnormal returns before the window. The null hypothesis will state that there is no connection between the portfolios' abnormal returns and the announcement, while the alternative hypothesis 1a will state that there is a connection between the portfolios' abnormal returns and the announcement. Let H denote the hypothesis, β the coefficient, i the portfolio of interest and $event$ the event window:

$$H_0: \beta_i^{event} = 0$$

$$H_{1a}: \beta_i^{event} \neq 0$$

2.6.2. Hypothesis 1b

As our event window will be composed of three days, it would make sense to see if there are any changes in significance when looking at the days individually. We will then consider a joint hypothesis, where the null hypothesis states that there is no difference between the portfolios' abnormal return prior to the event window and the abnormal return on any given day in the event window. The alternative hypothesis 1b will state that there is a difference between the portfolios' abnormal return prior to the event window and the abnormal return on any given day within the event window. Let t denote the day of announcement:

$$H_0: \beta_i^{t-1} = \beta_i^{t} = \beta_i^{t+1} = 0$$

$$H_{1b}: \beta_i^{t-1} \neq 0, or\ \beta_i^{t} \neq 0, or\ \beta_i^{t+1} \neq 0$$

2.6.3. Hypothesis 2

After looking at how the different portfolios react to the announcement, we will test if the differences in the abnormal returns are significantly different from each other during the event window. Our null hypothesis then states that there are no differences in abnormal returns between the PIPE-portfolios in the event-window, while the alternative hypothesis 2 states that there is a difference in abnormal returns between the PIPE-portfolios in the event window:

$$H_0: \beta_i^{portfolio} = 0$$

$$H_2: \beta_i^{portfolio} \neq 0$$

2.6.4. Hypothesis 3

After observing the differences in abnormal returns to the different portfolios during the event window, we are interested in testing if there is a difference between the PIPE portfolios in the long run. The null hypothesis states that there are no differences in abnormal returns between the portfolios in the long run, while the alternative hypothesis 3 states that there is a difference in abnormal returns between the portfolios in the long run:

$$H_0: \beta_i^{portfolio} = 0$$

$$H_3: \beta_i^{portfolio} \neq 0$$

3. Methodological Design

The following sub-sections will give description of how we limited our sample and put together a dataset to perform the wanted analysis, before the steps of an event study are explained. We then go through the return calculations and the regression models and present a definition of our variables.

3.1. Sample

In relation with our research question, we are only interested in SPACs that have announced a merger with their respective target company. Since SPACs are primarily in the U.S., we have limited our sample to companies listed on either the New York Stock Exchange (NYSE) or the Nasdaq stock exchange as per February 8, 2022.

After implementing our criteria, we were left with a sample of 314 different SPACs. For some of these, our data source did not supply us with enough historical data, and others did not have enough observations after announcement. These were cut from the sample, and we also removed a few companies due to faulty data. The result from this was a sample consisting of 260 companies. These 260 were divided into five equally weighted portfolios with 52 companies each. We found this sufficient to carry on with the testing of the hypotheses.

3.2. Data Collection

We have used a few sources to collect the necessary data. As our screener software, we utilized the Thomson Reuters Eikon Deal Screener tool in Microsoft Excel to find the SPACs for our sample. To collect historical stock prices and historical market values for the companies from the screener, we used Datastream, another Thomson Reuters Eikon extension in Excel. The output yielded historical data for the initial companies from October 2006 until February 8, 2022, and after the data cleanse we were left with historical data from 2008 and until the end of 2021. We also used Datastream to download data for the earnings per share (EPS). However, we noticed that there were some missing data and mistakes throughout the output. To solve the issue with the faulty EPS data, we went through the companies manually in Refinitiv Eikon to validate the quality and correct the numbers.

The size, price per share and announcement dates for the PIPE-agreements was hand-collected manually from current report filings, and proxy and information statements from the SEC EDGAR company search engine. We went through the sample list twice in an effort to correct for human error. Additional information in the current report filings was further investigated to filter out companies with unique terms in the agreements.

The redemption rates were collected manually from Boardroom Alpha, a SPAC data and analysis platform.[2] We were critical to this as a source, as there was only a list of values and no calculations. To check the validity of the platform we compared several of the redemption rates to information found in news articles and reports. This gave us enough confidence in the data to trust Boardroom Alpha as a source for the redemption rates.

The Fama/French market data have been downloaded from Kenneth R. French's data library on Dartmouth College's webpage.[3] This contains daily historical data for the three research factors within the three-factor model and the risk-free rate of return.

To compare the PIPEs from the 260 SPACs remaining in our sample, we created a PIPE-variable which is relative to the SPACs' market value. We did this by dividing the PIPE-funding by the SPAC's market value on the day before the PIPE-announcement, and we will refer to this variable as the PIPE-ratio:

$$PIPE - ratio = \frac{PIPE_t}{Market\ Value_{t-1}}$$

This means that for a SPAC with a PIPE-ratio above 1, the PIPE-funding is larger than the SPAC's market value. The SPACs' IPO proceeds could have been used as an alternative to the market value, but it would not capture the market's expectations of the SPAC at the time of the PIPE-announcement.

[2] https://www.boardroomalpha.com/
[3] https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

3.2.1. Survivorship Bias

Survivorship bias can be caused by only including “winners” in the sample of an analysis (Chen, 2021). This can result in an overestimated result because the companies included would already be seen as stronger, given bankrupt or delisted companies would not make it to our sample. We do not see this as a critical issue with our research question. A substantial portion of SPACs have been listed during the last couple of years, which decreases the possibility that a company went through bankruptcy and delisting before we collected our dataset. This coheres with Stefan M. Lewellen’s belief that the youth of the SPAC-market eliminate survivorship bias (Lewellen, 2009). Even though this article is from 2009, we still find it relevant for our research considering the overweight of recently listed companies. This could still be a potential drawback however, which is one of the reasons for controlling for time effects in the regressions.

3.3. Methodology

As A. Craig Mackinlay states early in his article in the Journal of Economic Literature, event studies have been around since 1933 and have a wide area of application (Mackinlay, 1997). Frunza (2016) points out that the aim of an event study is to assess the extent to which security price returns around the time of an event becomes abnormal. By building a model with expected returns we can investigate the abnormal returns around the event compared to the estimation period. Since event studies rely on the premise of market efficiency (Skrepnek & Lawson, 2001), the information announced on the event-day should be quickly incorporated into the share price. This concurs with the semi-strong efficient market hypothesis from section 2.4.1, and our analysis should be able to confirm or deny whether this is true for the event window.

An event study outline is provided by Skrepnek and Lawson (2001) where they describe a generalization of steps previously conducted throughout literature. The steps consist of defining the date of interest, defining the event window, modelling security price returns, estimating model parameters, calculating aggregate abnormal returns, and conducting statistical testing. The rest of the section is focused on this process and showcases the methodological steps in our process before results are presented in section 4.

The event of interest is the announcement of a PIPE-investor agreement. As mentioned in section 2, increased SPAC returns have been observed for the announcement of a merger proposal in the past and we want to check if there exist differences in these returns which can be explained by the size of the PIPE-funding. By grouping the SPACs into portfolios sorted by size of PIPE-ratios, it enables us to observe these differences.

Given the fact that the events are publicly announced through the SEC, we do not believe there is a great need to include time before the event itself, and we do expect the market to react quickly. However, we decided to include the day before the announcement in our event window as a precaution. There is a chance of information slippage, which could affect the returns prior to the event. Despite this, diversification due to portfolio construction should be able to decrease the impact of said slippage. This is observable through our data, which is why we find it sufficient to only include one day prior to the event in the event window. The day after announcement is included as well, as filings can be announced after the stock exchange is closed. If this is the case, the reaction from the market would not be observable until the stock exchange opens the following trading day.

We have decided to look at daily data for 100 trading days for the long run analysis after the announcement date to get an idea of how the market reacts and settles with the news. We believe 100 trading days will be sufficient to see if the PIPE-size affects the returns, as well as showcasing the reaction to the announcement itself. As for the pre-event estimation period we have chosen 30 trading days. We consider this sufficient due to the expected returns and volatilities for SPACs without targets mentioned in section 2.4.

According to Mackinlay the event period should be excluded from the estimation of normal return so that the event does not affect the calculations of abnormal return (Mackinlay, 1997). As our defined event window is the event day plus/minus 1 day, we remove day $t - 1$ when calculating normal returns.

A visualization of our entire sample period is shown in figure 5 below.

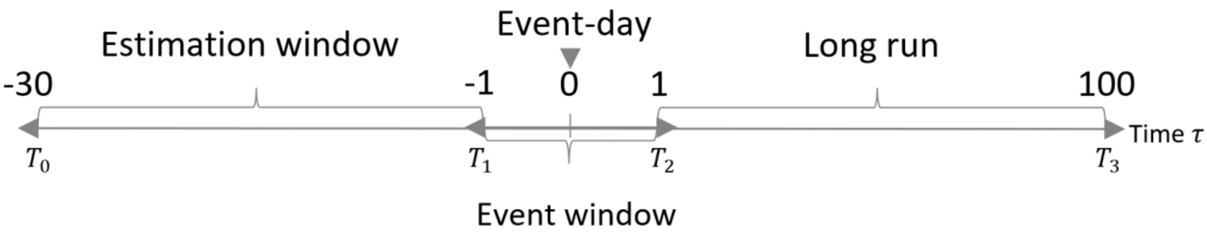

Figure 5: Event study periods

3.3.1. Return calculations

To use the three-factor model from section 2.4.2 to calculate expected returns, we match the dates in the Fama/French historical market data with the individual SPACs' estimation period.

The Fama French three-factor model utilizes three distinct factors to capture the mentioned variables' effect on the average return (Hayes, 2021), where the risk-free rate of return is denoted r_f:

$r_m - r_f$:	Historical excess return of the market
SMB:	Historical excess return of small-cap companies over large-cap companies
HML:	Historical excess return of value stocks with high book-to-market equity compared to growth stocks with low book-to-market equity

The resulting regression formula looks like this, where R denotes the normal return, β the coefficient estimates and ϵ the random error term:

$$R = r_f + \beta_1(r_m - r_f) + \beta_2(SMB) + \beta_3(HML) + \varepsilon$$

We then run individual regressions on the return for each SPAC with the SMB and HML data for the relevant days in the estimation period as independent variables. The estimated coefficients are then used to calculate the expected daily normal return for each SPAC, $E[R_\tau^i]$, where τ denotes time.

The next step is to find the abnormal returns. We do this by subtracting the expected daily normal returns from the actual returns:

$$AR_{\tau}^{i} = R_{\tau}^{i} - E\left[R_{\tau}^{i}\right]$$

At this stage we have 131 days of abnormal returns for each SPAC which are no longer linked to the dates of their historical data. The SPACs were then sorted by the size of their PIPE-ratios and grouped into quintiles to create the different portfolios. The first quintile consists of the 52 companies with the lowest PIPE-ratios, the 52 next are in the second quintile, and so on until we are left with 5 portfolios.[4] Then, we find the equally weighted average abnormal returns for the portfolios for each day:

$$AAR_{\tau} = \frac{1}{N}\sum_{i=1}^{N} AR_{\tau}^{i}$$

Next, we calculate the cumulative abnormal return for each portfolio throughout the entire sample by summarizing the daily AAR with the previous daily AAR in period $T_0$to T_3, resulting in the graph showcased in figure 6:

$$CAR_{T_3} = \sum_{\tau=T_0}^{T_3} AR_{\tau}^{i}$$

[4] SPACs which have not filed any information about PIPE-agreements are assumed to have no PIPE-funding, which consequently yields a PIPE-ratio of zero.

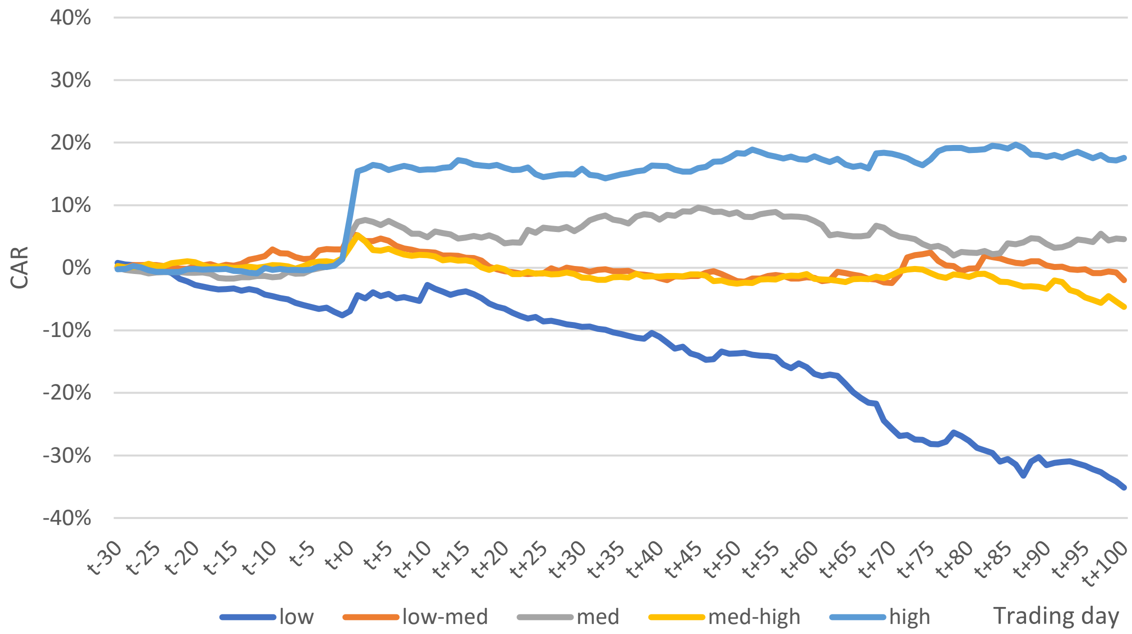

Figure 6: Cumulative abnormal return by portfolio.

These portfolio calculations are mostly completed for performing visual analyses, to get a bearing of how our sample is behaving. Intuitively, we see tendencies which supports the claim by Klausner et al. in section 2.1.4., that higher PIPE-funding can yield higher stock returns.

3.3.2. Research model

From figure 6 above we can observe how the abnormal returns has developed for each SPAC portfolio over the entire window. The most visible observation is the increase in returns around the event date, which is visualized in figure 7 below. What else we observe in this stage is a large reaction to the announcement for the portfolio containing the SPACs with the largest PIPE-ratios, while it seems that the low-PIPE portfolio could have a weaker performance in the long-run, as well as a weaker performance during the estimation period.

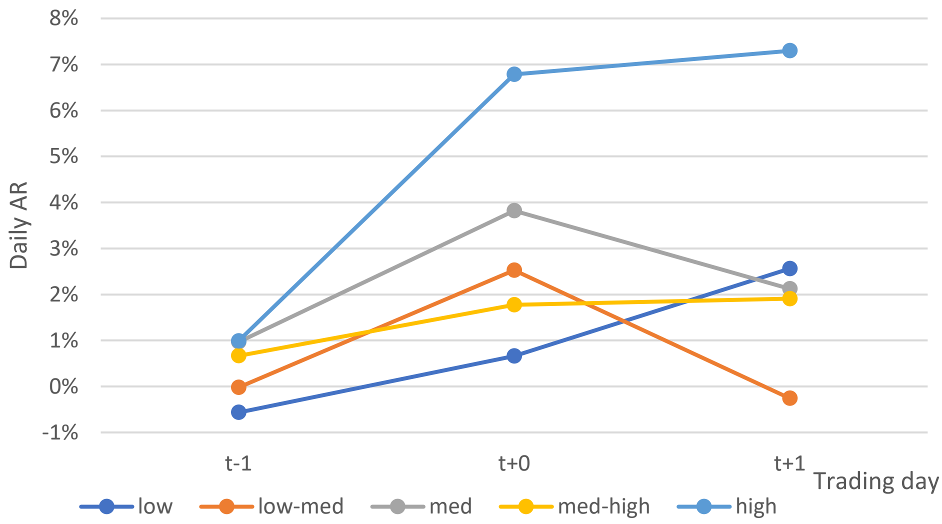

Figure 7: Abnormal return during the event window by portfolio.

We want to test whether the abnormal returns in the event window are different from the returns in the estimation period for the different portfolios, and if there are differences in abnormal returns between the portfolios. The following regression formulas are constructed for this purpose, where we look at the effect of different PIPE-ratios during the event window and in the long run.

The model for hypothesis 1a runs a regression on abnormal returns from the estimation period to the event window, $[T_0, T_2]$, where we have included a dummy variable for the event window. This way, differences between event window and the days prior will become clear for each portfolio and we can test the hypothesis. The model controls for positive earnings per share and a premium PIPE-price per share. A description of the variables is in table 1.

$$AR_i = \beta_0 + \beta_1 event_i + \beta_2 e + \beta_3 highprice_i \ + \epsilon_i$$

When testing hypothesis 1b, we replace the event window dummy variable with three dummy variables in our regression formula, where each represents a day in the event window. This regression model will test if the abnormal returns on the individual days in the event window are significantly different from the estimation period.

$$AR_i = \beta_0 + \beta_1(dn_1)_i + \beta_2(d_0)_i + \beta_3(d_1)_i + \beta_4 e_i + \beta_6 highprice_i + \epsilon_i$$

For hypothesis 2, all the event window-variables are omitted from the formula. Instead, the regressions will be run on the abnormal returns on the days in the event window, $[T_1, T_2]$. To test the differences between the portfolios the model will have to include all the abnormal SPAC returns, in contrast to the previous regression models where only the SPACs in the portfolio of interest were in the regression's sample. The model also includes a variable to control for SPAC activity in the recent years, *cov*. As we are interested in the differences between the individual portfolios and the other portfolios combined, we only include one PIPE-ratio portfolio dummy variable per regression, where *pipe* denotes the PIPE-ratio dummy variable.

$$AR_i = \beta_0 + \beta_1 pipe_i + \beta_2 cov_i + \beta_3 e_i + \beta_4 highprice_i + \epsilon_i$$

The regression model to test hypothesis 3 is almost the same as the one testing for hypothesis 2. There are only two adjustments which separate the models, the time window, and the redemption rate. As the model will test the differences between the portfolios in the long run, the regressions are run on abnormal returns on the 99 days following the event window, $[T_2, T_3]$. To control for the market's reaction to redeeming investors following the event window, a variable for the redemption rate, *highred*, is included. In the regression models for hypothesis 1 and 2 we did not have to consider the redemption rate as the redemption option for the investors is not exercisable until after the merger announcement.

$$AR_i = \beta_0 + \beta_1 pipe_i + \beta_2 cov_i + \beta_3 e_i + \beta_4 highred_i + \beta_5 highprice_i + \epsilon_i$$

3.3.2.1. Multicollinearity Through the Dummy Variable Trap

Multicollinearity is a phenomenon which arises in a regression when one of the variables is a perfect linear combination of the other variables, which would cause the regression to fail. The dummy variable trap is a source of perfect multicollinearity, and the issue arises if binary variables which all fall into the same category are included in the regression. The general way to avoid the dummy variable trap is by excluding one of the dummy variables for the regression (Stock & Watson, 2020). The omitted dummy variable will then serve as a reference point for the ones left in the regression.

Given that the PIPE-ratio portfolios are binary variables which fall under the same category, the risk of stepping into the dummy variable trap must be considered. As we are most interested in how the PIPE-ratio portfolio of interest performs compared to all the other portfolios, we have automatically solved this by excluding all the PIPE-ratio portfolio dummy variables except for one in each regression in table 4, 6 and 7. The regressions in table 5 and table 14 have avoided the dummy variable trap in the traditional way by including all the portfolio dummy variables except for one.

We also have dummy variables for each day within the event window, however, this is not an issue as the omitted variable in this case is the estimation period prior to the event window.

3.3.2.2. Variables

The dependent variable throughout this research is the abnormal return for each SPAC from 30 days before event to 100 days after, dependent on the regression model. With this variable we can observe the effects of PIPE-ratios and other variables on the returns in the event period and after.

The most important variables in the regression models are the PIPE-ratio and the dummy variables for the PIPE-ratio portfolios. The PIPE-ratio variable is used to group the SPACs into their respective portfolios, while the PIPE-ratio dummy variables are used to test our hypotheses which will answer the research question.

The year variable indicates in which year the announcement was made. As mentioned, a high portion of the companies in the sample have announcements from 2020 and onwards, which is why the *cov*-variable will be used to control for effects in the abnormal returns which occur due to announcements made during the second SPAC wave. Next, we have a variable for the weighted average price, which refers to the weighted average price per share the private investors pay for shares in the PIPE-agreement. To control for Klausner et al.'s claim about higher PIPE-price per share being a quality sign to the market, we made a dummy-variable, *highprice*, which is equal to 1 if the PIPE-price per share is at least 5% larger than the standard $10.00 (i.e., $10.50). We also control for positive earnings with the variable e, which returns 1 if the EPS is positive. The last control variable is the redemption rate. Here the dummy returns 1 if the redemption rate exceeds the median at 0.538 and we can catch the effect of a relative higher redemption.

The variable *event* captures the difference in AR between the event window and the estimation period. *Dn1, D0* and *D1* captures the individual days within the event window.

Dependent variables	**Description**
ar	Daily abnormal returns for SPAC
Independent variables	**Description**
pipe_r	PIPE-ratio
pipe_low -…- *pipe_high*	Binary variables taking the value of 1 if *pipe_r* is within a given quintile, or 0 if otherwise
year	Indicator of which year announcement was made
cov	Binary variable taking the value of 1 if *year* is 2020 or later, and 0 if otherwise
wap	Weighted average price per share in PIPE-agreement
highprice	Binary variable taking the value of 1 if *wap* is equal to or greater than 10.5, and 0 if otherwise
earn	EPS last reported at announcement
e	Binary variable taking the value of 1 if *earn* is positive, and 0 if otherwise
red	Redemption rate
highred	Binary variable taking the value of 1 if *red* is greater than the median redemption rate, and 0 if otherwise
dn1, *d0*, *d1*	Binary variables indicating each day in the event window. $dn1 = 1$ if $day = t - 1$, $d0 = 1$ if $day = t$ and $d1 = 1$ if $day = t + 1$, and 0 if otherwise
event	Binary variable indicating the event window. $event = 1$ if $day = (t - 1), or\ (t), or\ (t + 1)$, and 0 if otherwise

Table 1: Description of variables

4. Findings

In this section, results from research and analysis will be presented and discussed. We begin with the regression models testing hypothesis 1a and 1b, hypothesis 2 and hypothesis 3. Following the regression models, we will discuss further observations and the robustness of the models.

4.1. Hypothesis 1 OLS Regression

In this subsection we will run regressions to test the hypotheses 1a, 1b, 2 and 3. The regressions for 1a and 1b are quite similar, as we look at the effect of the event window on abnormal returns for each portfolio sample. The only difference is that in the regressions testing hypothesis 1a we look at the event window as a whole, while in the regressions testing hypothesis 1b we look at the individual days within the event window.

4.1.2. Hypothesis 1a Regressions

The hypothesis 1a regressions includes the variables for the event window (*event*), earnings (*e*) and price premium (*highprice*). Table 2 contains identical regression models with different PIPE-ratio portfolio samples, as can be seen in the table's column titles. From the table, we can read the coefficients-values for the different variables in the relevant sample, controlled for the other variables in the regression. As these are binary variables, we can interpret them as how much more or less they on average affect the abnormal returns compared to their respective reference. The coefficients' t-statistics are in the parenthesis and the statistical significance levels are indicated by stars, where * indicates a p-value below the 5% significance level, ** under the 1% level, and *** under the 0.1% level. Lastly, the variable at the bottom represents the constant, and the N tells us the number of observations in the regression's sample. The number of observations in all our regressions can be found by multiplying the number of sample-days with the number of sample-SPACs.

	low PIPE	low-med PIPE	med PIPE	med-high PIPE	high PIPE
event	0.0113	0.00647	0.0229**	0.0142*	0.0501***
	(1.64)	(1.08)	(2.74)	(2.06)	(3.98)
e	0.00327	-0.00117	-0.00446*	-0.00103	-0.00264
	(1.86)	(-1.07)	(-2.15)	(-0.73)	(-0.82)
highprice	0.00953	0.0459	0.00920	0	0
	(1.08)	(1.84)	(0.78)	(.)	(.)
_cons	-0.00337***	0.000422	0.000486	0.000371	0.000320
	(-4.26)	(0.58)	(1.02)	(0.65)	(0.57)
N	1664	1664	1664	1664	1664

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 2: Regressions testing hypothesis 1a in interval [t-30, t+1], incl. control variables

We see from the outputs in table 2 that the abnormal returns in the event window are on average higher than on days which are prior to the event window for all the portfolios, controlling for the other variables. However, the coefficients are only statistically significant for the medium, medium-high, and high PIPE-ratio portfolios at the 1%-level, 5%-level, and 0.1%-level respectively. We reject the null hypothesis that there are no differences in abnormal returns between the event window and the estimation period for these PIPE-ratio portfolios. This means that during their event window, the SPACs in these portfolios have abnormal returns that are, on average, higher than the returns in the estimation period, proving the effect of the announcement. We fail to reject said null hypothesis for the low and low-medium PIPE-ratio portfolios and cannot say there is a difference in returns for the SPACs in these portfolios between the two periods.

Positive earnings yield on average less abnormal returns than negative earnings for all the portfolios, apart from the low PIPE-ratio portfolio, controlling for the other variables. An explanation for the negative relation could be that many of the target companies tend to be speculative growth companies. Since the earnings for these types of companies are usually negative and the SPACs yielded a positive stock-return, the model might interpret this as an inverse relationship. We see that none of the earnings coefficients for the PIPE-ratio portfolios are statistically significant, except for the medium portfolio.

The PIPE-price premium has on average a positive effect on abnormal returns compared to more neutral PIPE-prices (less than $10.50) for all the relevant portfolios, controlling for the other variables. However, none of these coefficients are statistically significant. The coefficient is 0 for medium-high and high PIPE-ratio portfolios since none of these portfolios includes any SPACs with a weighted PIPE price per share above $10.50.

4.1.2. Hypothesis 1b Regressions

The regression model for hypothesis 1b tests the difference between each individual day and the estimation period.

	low PIPE	low-med PIPE	med PIPE	med-high PIPE	high PIPE
dn1	-0.00324	-0.00124	0.00951	0.00636	0.00978
	(-1.48)	(-0.35)	(1.19)	(0.56)	(1.82)
d0	0.00905	0.0242*	0.0381*	0.0174	0.0677**
	(1.03)	(1.97)	(2.29)	(1.39)	(2.67)
d1	0.0281	-0.00360	0.0211	0.0188	0.0728**
	(1.54)	(-0.30)	(1.26)	(1.61)	(2.74)
e	0.00327	-0.00117	-0.00446*	-0.00103	-0.00264
	(1.88)	(-1.08)	(-2.17)	(-0.73)	(-0.83)
highprice	0.00953	0.0459	0.00920	0	0
	(1.08)	(1.86)	(0.81)	(.)	(.)
_cons	-0.00337***	0.000422	0.000486	0.000371	0.000320
	(-4.27)	(0.58)	(1.03)	(0.65)	(0.57)
N	1664	1664	1664	1664	1664

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 3: Regressions testing hypothesis 1b in interval [t-30, t+1], incl. control variables

Comparing table 3 to table 2, the control variables *e* and *highprice* remain the same, and we will therefore not comment on these. We can see that the abnormal return was on average lower on day $t-1$ than the days in the estimation period for the low- and low-medium PIPE-ratio portfolios, while the abnormal return was on average larger on this day compared to the pre-event window days for the medium, medium-high and high PIPE-ratio portfolios, controlling for the other variables. However, none of these coefficients are statistically significant.

On the event day t, the abnormal return is on average larger than the estimation period for all the portfolios, controlling for the other variables. The coefficient for day t is statistically significant for the low-medium, medium, and high PIPE-ratio portfolios, while the coefficient for day t is not statistically significant for the low- and medium-high PIPE-ratio portfolios.

The abnormal return on day $t + 1$ in the event window is on average larger than the estimation period for all the portfolios, apart from the low-medium PIPE-ratio portfolio, controlling for the other variables. Among these coefficients, only the coefficient for the high PIPE-ratio portfolio is statistically significant.

From the regressions, we can reject the joint null hypothesis 1b stating that there is no difference in abnormal returns between at least one of the event days and the estimation period for the low-medium, medium, and high PIPE-ratio portfolios, while we fail to reject this joint null hypothesis for the low and medium-high PIPE ratio portfolios. Comparing the regressions in table 2 with the regressions in table 3, we see that the low-medium PIPE-ratio portfolio became statistically significant when looking at the individual days within the event window. However, we also observe that the medium-high PIPE ratio portfolio lost its statistical significance.

Taking a closer look at the coefficients for individual days, we see that the abnormal returns on the first day in the event window are generally the smallest among the three days. This confirms the assumption made in section 3.3. of minimal impact from information slippage. It caused some curiosity though, and to check if the inclusion of the first day in the event window reduced the average return enough to affect the event window-coefficients' statistical significance, we ran a new regression. Here we generated an alternative event window dummy variable (*altevent*), which consist of only day 0 and 1, and ran the same regression with the new variable. We observed slightly larger coefficients, but no change in their statistical significance (see table 12 in appendix 5) and we continue with our original model.

4.1.3. Hypothesis 1 Regressions Summary

From hypothesis 1a, we see that there is a statistically significant difference in the abnormal returns between the estimation period and the event window for the three portfolios with the largest PIPE-ratios. When testing for individual days in hypothesis 1b, we get a statistically significant difference between the event day, t, and the estimation period for the low-medium PIPE-ratio portfolio as well. Based on this we can say that there is a difference in abnormal returns for SPACs in the low-medium, medium, medium-high, and high PIPE-ratio portfolios during the announcement period or the announcement day. However, we did not find a statistically significant difference between the event and the days prior for the low PIPE-ratio portfolio in neither the regression in table 2 nor 3, and we therefore cannot say that there exists a difference in abnormal returns for SPACs with low PIPE-ratios with regards to the announcement.

4.2. Hypothesis 2 Regressions

When testing hypothesis 2, we first ran the regressions without any control variables, and then with control variables. The coefficient values for the different portfolio-variables changed some, but the statistical significance remained the same, so we will only discuss the regressions with the control variables. The regressions without control variables can be found in table 13, appendix 5.

	AR:L	AR:LM	AR:M	AR:MH	AR:H
pipe_low	-0.00525				
	(-0.56)				
pipe_low_med		-0.0166*			
		(-2.28)			
pipe_med			0.00192		
			(0.20)		
pipe_med_h~h				-0.0138	
				(-1.58)	
pipe_high					0.0330*
					(2.53)
cov	0.0231***	0.0260***	0.0251***	0.0274***	0.0206***
	(3.79)	(5.37)	(5.31)	(5.17)	(4.73)
e	-0.00710	-0.00479	-0.00745	-0.00891	-0.00416
	(-1.03)	(-0.69)	(-1.07)	(-1.26)	(-0.61)
highprice	-0.0458	-0.0444	-0.0472	-0.0503	-0.0389
	(-0.79)	(-0.79)	(-0.82)	(-0.87)	(-0.68)
_cons	0.00464	0.00415	0.00167	0.00318	-0.00152
	(0.86)	(1.70)	(0.61)	(1.34)	(-0.61)
N	780	780	780	780	780

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 4: Regressions testing hypothesis 2 in interval [t-1, t+1], incl. control variables

We observe from the individual regressions in table 4 that the low, low-medium, and medium-high portfolios in our have on average less abnormal returns compared to the other portfolios during the event window. The medium and high PIPE-ratio portfolios exhibit on average a higher abnormal return than the other portfolios during the event window. However, only the medium-low and high PIPE-ratio portfolios are statistically significant, and we can reject the null hypothesis stating that there is no difference in abnormal returns between the two portfolios and the other portfolios. This means that we fail to reject the null hypothesis for the other PIPE-ratio portfolios, and we cannot say that there is a statistically significant difference in abnormal returns between these.

We can see that SPACs with PIPE-announcements in 2020 or later yield on average a higher abnormal return than those with PIPE-announcements before 2020, controlling for the other variables. The variable is also statistically significant in all the regression models. This makes sense due to the recent increase in SPAC popularity and it seems only natural that it has attracted more money and more targets are considering this alternative.

To investigate the relationship between the portfolios further, we decided to run the regressions the other way around to test the differences between the portfolios and an omitted portfolio.

	AR:L	AR:LM	AR:M	AR:MH	AR:H
pipe_low		0.00847 (0.84)	-0.00665 (-0.58)	0.00487 (0.43)	-0.0313* (-2.08)
pipe_low_med	-0.00847 (-0.84)		-0.0151 (-1.49)	-0.00360 (-0.40)	-0.0398** (-2.90)
pipe_med	0.00665 (0.58)	0.0151 (1.49)		0.0115 (1.05)	-0.0246 (-1.63)
pipe_med_h~h	-0.00487 (-0.43)	0.00360 (0.40)	-0.0115 (-1.05)		-0.0362* (-2.51)
pipe_high	0.0313* (2.08)	0.0398** (2.90)	0.0246 (1.63)	0.0362* (2.51)	
cov	0.0219*** (3.54)	0.0219*** (3.54)	0.0219*** (3.54)	0.0219*** (3.54)	0.0219*** (3.54)
e	-0.00310 (-0.45)	-0.00310 (-0.45)	-0.00310 (-0.45)	-0.00310 (-0.45)	-0.00310 (-0.45)
highprice	-0.0401 (-0.70)	-0.0401 (-0.70)	-0.0401 (-0.70)	-0.0401 (-0.70)	-0.0401 (-0.70)
_cons	-0.00101 (-0.20)	-0.00948 (-1.32)	0.00564 (0.67)	-0.00588 (-0.68)	0.0303* (2.40)
N	780	780	780	780	780

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 5: Regressions testing hypothesis 2 in interval [t-1, t+1], incl. control variables

From table 5 we observe that the differences in the low-medium PIPE-ratio portfolio is only statistically significant when comparing it to the high PIPE-ratio portfolio. However, we see that this portfolio yields less abnormal returns compared to all the other portfolios in the sample, which is most likely the cause of its difference being statistically significant in the regression in table 4. Combining this with the observations from hypothesis 1a and 1b, and figure 6 and 7, it makes sense that SPACs within this portfolio yield on average less returns than SPACs in the other portfolios, during the event window. We therefore trust our findings in table 4.

4.3. Hypothesis 3 OLS regression

We will now go through the testing of hypothesis 3, where we look at the effect PIPE-size has on long run abnormal SPAC returns.

	AR:L	AR:LM	AR:M	AR:MH	AR:H
pipe_low	-0.00262***				
	(-3.53)				
pipe_low_med		0.000360			
		(0.57)			
pipe_med			0.000912		
			(1.37)		
pipe_med_h~h				-0.000184	
				(-0.33)	
pipe_high					0.00153*
					(2.31)
_cons	-0.000485	-0.00108***	-0.00119***	-0.000972**	-0.00132***
	(-1.75)	(-3.66)	(-4.10)	(-3.18)	(-4.53)
N	25740	25740	25740	25740	25740

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 6: Regressions testing hypothesis 3 in interval [t+2, t+100], excl. control variables

In our sample, we see that the coefficients for the low PIPE and medium-high PIPE portfolios on average have a negative effect on the abnormal returns relative to the other portfolios. The coefficients for the low-medium PIPE, medium PIPE and high PIPE portfolios have on average a positive effect on abnormal returns relative to the other portfolios. However, the only two coefficients which are statistically significant are the low (at the 0.001 level) and high (at the 0.05 level) PIPE-ratio portfolios, and we can reject the null hypotheses for these PIPE-sizes at this stage. The other three portfolios are not statistically significant. This means that SPACs in the low and high PIPE-ratio portfolios exhibit abnormal returns that are significantly different from the other portfolios in the long run.

Now we control for the effects of the announcement being made in 2020 or 2021, positive earnings per share at the announcement time, high redemption rate and a premium PIPE-price. As before, the portfolios with low and medium-high PIPE-ratios have a negative effect on the abnormal returns, while the portfolios with low-medium, medium, and high PIPE-ratios have a positive effect on the abnormal returns. We observe that the *cov*- and *e*-coefficients are positively related to AR, while the coefficients for *highred* and *highprice* are negatively related to AR.

	AR:L	AR:LM	AR:M	AR:MH	AR:H
pipe_low	-0.000478				
	(-0.55)				
pipe_low_med		0.000340			
		(0.56)			
pipe_med			0.000745		
			(1.12)		
pipe_med_h~h				-0.00122*	
				(-2.13)	
pipe_high					0.000532
					(0.78)
cov	0.00591***	0.00609***	0.00607***	0.00630***	0.00601***
	(8.21)	(10.07)	(10.00)	(10.12)	(9.80)
e	0.000996	0.000903	0.000992	0.000838	0.00101
	(1.40)	(1.32)	(1.43)	(1.20)	(1.43)
highred	-0.00152**	-0.00159**	-0.00153**	-0.00159**	-0.00149**
	(-2.95)	(-3.12)	(-3.00)	(-3.08)	(-2.91)
highprice	-0.00677*	-0.00695*	-0.00697*	-0.00720*	-0.00673*
	(-2.20)	(-2.28)	(-2.29)	(-2.36)	(-2.20)
_cons	-0.00521***	-0.00548***	-0.00558***	-0.00533***	-0.00551***
	(-7.95)	(-9.86)	(-10.23)	(-9.70)	(-10.00)
N	25740	25740	25740	25740	25740

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 7: Regressions testing hypothesis 3 in interval [t+2, t+100], incl. control variables

Like in the regression for hypothesis 2, we observe that the *cov*-coefficient indicates that SPACs with an announcement in 2020 and 2021 have on average higher abnormal returns in our sample than those with announcement before 2020. The coefficient for earnings shows the opposite in this model, compared to the models for hypothesis 1 and 2. It is now more intuitive, as one would expect higher abnormal returns for companies which has a profit.

We observe that SPACs with higher redemption rates experience less abnormal returns than those with lower redemption rates. The variable is also statistically significant, which is in line the findings mentioned in section 2.1.3., that the redemption rates could be used as a quality measurement

When looking at the *highprice*-variable however, section 2.1.4. suggests that a high PIPE-price per share could be seen as a quality sign, we observe the opposite in our sample. This could be due to the lack of observed deviations from a PIPE price per share of $10.00 in our dataset, and that there are several SPACs with "neutral" PIPE prices which have experienced larger returns. An additional explanation could be that there are terms within the PIPE-agreements which are difficult to put a dollar-value on.

In this regression, all the control variables are statistically significant for all the portfolios, apart from the variable for earnings. Due to the introduction of the control variables in our model, we lose the statistical significance for the previously significant PIPE-ratio coefficients. We also observe that the medium-high PIPE portfolio coefficient has decreased and has now become statistically significant at the 5%-level.

As for the other PIPE-ratio variables, their coefficients have generally decreased slightly, and are still not significant. This means that we mainly see no effect from the size of PIPE-ratios on abnormal returns in the long-run, except for the case with the portfolio containing SPACs with medium-high PIPE-ratios. We can therefore reject the third null hypothesis saying that there is no difference between the medium-high PIPE-ratio portfolio and the other portfolios in the long run.

When considering table 8 below, this does not seem completely intuitive, as there is another portfolio with lower return. We see that for the 99 days after the event window, the medium-high portfolio has delivered a cumulative abnormal return of negative 10.44% while the low portfolio exhibits an even lower return of negative 30.28% during the same period.

low	low-med	med	med-high	high
-30.28%	-6.21%	-3.09%	-10.44%	1.75%

Table 8: Long-run CAR by PIPE-ratio from day 2 to day 100.

One could expect the low PIPE portfolio to have a lower coefficient, but this is in fact not the case, because most of what was a significant variable in table 6, have been caught by our control variables in table 7. Here we see a reduction in the variable for low PIPE-ratio from -0.00262 to -0.000478, mostly caused by the positive relation of being announced in 2020 or later (which means there is an equally negative effect of being announced before 2020). A large portion of the low portfolio have announcements pre-2020, which is what caused the negative returns, no longer captured by the low PIPE coefficient. The medium-high portfolio does not react in the same way, which means it could be affected by factors our model does not catch.

To investigate further, we conducted a regression similar to the one in table 5, only adjusted for the terms in the long run regression. We found that the difference was only statistically significant compared to the medium portfolio. However, since we observe lower average abnormal returns for the medium-high portfolio compared to all the other portfolios, we trust the findings in table 7 and move on with our analysis. The results can be seen in table 14, appendix 5.

Another topic worth discussing is market efficiency. As previously mentioned, semi-strong market efficiency assumes that all available public information is reflected in a company's share price right after it is made public, while the strong market efficiency implies that all information, including insider information, is reflected in the share price. Throughout our analysis and results we see evidence of the semi-strong form of efficient market hypothesis (EMH), but not the strong form. Starting with the figures in section 3, we see generally consistent movement in the cumulative returns up to the event, then a sharp reaction to the announcement, and a rather consistent movement until the end of our period. This is also shown in the findings from the previous the regressions. We have significantly different abnormal returns for all the portfolios, except the low PIPE-ratio portfolio, during the event window and then we see no signs of this for the same portfolios in the long run, except for the medium-high portfolio. This indicates that generally the market reacts quickly to the news, and the news do not contribute to lasting anomalies in the abnormal returns supporting semi-strong EMH. PIPE-investors are given insider information prior to the announcement, and we observe no statistically different abnormal returns until the event day. This means that the strong form of EMH does not hold as the insider information is not reflected in the share price immediately.

4.4. Robustness

There are various methods to analyse data such as the one we have, and we will therefore investigate the robustness of our models. We want to make sure that certain specifications do not cause changes in the overall conclusions. One area of importance is outliers, and working with OLS regressions, the results can be sensitive to the presence of outliers and high leverage data points (Sorokina et al., 2013). Non-normality is a normal phenomenon when working with daily stock returns and could lead to more outliers (Brown & Warner, 1985). We will investigate this further and comment on heteroskedasticity and robustness of standard errors.

Since there is no reason to expect complete homoskedasticity (Mackinlay, 1997) and the use of robust standard errors would not impede our results if this was the case (White, 1980), we have run all our regressions with robust standard errors. We did run regressions controlling for random effects, feasible generalized least squares regression for covariances, and clustered standard errors, but found no critical differences and continue with the OLS regression.

4.4.1. Outliers

We initially believed that outliers would not be a large concern due to diversification and a relatively short time frame for both models. Volatility is expected to be large during the event window considering the importance of the event itself for the SPACs. Even though strong reactions are part of the game and to be expected we investigate further. The cumulative abnormal returns for each SPAC for both event window and long run have been visualized through scatter plots in appendix 6. We see that the CAR is rather concentrated, but some of the SPACs stand out both positively and negatively.

During the event window we observe three SPACs amassing a total CAR of more than 90%, which is far above the average. These are the most extreme, and we try running the regressions without them. In addition, we run a new regression where the largest negative values have also been removed. We see that for both these regressions, we do not get results that differ greatly from the original. The significance of the coefficients remains at the same levels, and the coefficients themselves only experience minor changes which does not alter our findings.

For the post-event model, we make similar observations. There are some large cumulative returns and a more spread sample here, which is to be expected for this data during 99 trading days (figure 10, appendix 6). We run new regressions here as well and the results are similar. No change in the coefficients' significance, and only minor changes in the coefficient values, which does not alter our findings. Therefore, we do not consider outliers to be critical to the robustness of our models, and we maintain our sample.

4.4.2. Non-normality

As for non-normality, there appears to be a case present in our data. Both visually through residual histograms and tests for skewness and kurtosis in Stata we observe a distribution which resembles that of a leptokurtic distribution. This occurs when there is a kurtosis exceeding 3 and means that the distribution is heavy-tailed (Stock & Watson, 2020). This is not surprising considering we are using daily abnormal returns. This is considered a normal phenomenon (Fama, 1965). The implications of non-normality have been tested by Brown and Warner (1985) where they discover that: "The non-normality of daily returns has no obvious impact on event study methodologies." (p. 25). Later, studies have been conducted suggesting that non-normality can lead to both over- and under-rejection of the null hypothesis during testing and therefore inaccurate conclusions (Jackson et al., 2007). Jackson et al. concludes with non-normality as a genuine issue when working with merger-event studies and suggests using a form of bootstrapping or simulation to control the robustness if this is the case.

Even though the event study conducted in this thesis has focused on the sizes of PIPEs, it is in many ways a study of mergers. Therefore, we investigate our models and the standard errors relating to our coefficients through running a bootstrap sampling and estimation model in Stata (Stata, 2022). We do this for the models in table 15, 16 and 17 (appendix 7), with the original sample sizes, 1,000 repetitions and repeat it four times for each. This draws observations randomly and replaces them for every repetition, giving us a bootstrap standard error. We see standard errors for the coefficients in both models that are consistent through the different runs, as well as with our original models. Excerpts of these are presented in appendix 7. Non-normality is worth noting, but we dismiss this as a major problem for our model's robustness.

5. Conclusion

Throughout our thesis we have taken a deep dive into the private investment in public equity aspect of SPACs, to answer the research question:

How does the relative size of PIPE-funding influence SPAC-returns?

To answer this question, we created five SPAC portfolios based on their relative size of PIPE-funding, or PIPE-ratio, and conducted an event study where the PIPE-announcement is the event of interest. The Fama French three-factor model was used to find the daily normal returns, abnormal returns, and cumulative abnormal returns. We formed hypothesis 1a and sub-hypothesis 1b, which both considers the differences in abnormal returns between the estimation period and the event window for the different portfolios; hypothesis 2, which considers the difference in abnormal returns between the portfolios in the event window; and hypothesis 3, which considers the difference in abnormal returns between SPAC portfolios in the long run.

From the regressions testing hypothesis 1a, we find that there is evidence of higher abnormal returns in the event window compared to the estimation period for the three portfolios with the largest PIPE-ratios. When comparing the individual days in the event window with the estimation period in the testing of hypothesis 1b, we find that there is evidence of a difference in abnormal returns of the event day and the days in the estimation period for the second smallest PIPE portfolio as well. The only portfolio which showed no evidence of a significant market reaction to the event was the smallest PIPE-ratio portfolio.

We then went on with testing the differences in abnormal returns between the portfolios in the event window, as in accordance with hypothesis 2, and find evidence of larger (3.3%) abnormal returns for the high PIPE portfolio and smaller (-1.7%) abnormal returns for the low-medium portfolio. We also see that much of the effect in abnormal returns is captured by being announced in 2020 or later, which makes sense when considering the recent SPAC activity.

Lastly, we ran regressions for hypothesis 3 to see if there are significant differences between the portfolios in the long run. When testing without any control variables we find evidence of differences in the low and high PIPE portfolios, which yielded on average less and more abnormal returns, respectively, compared to the other portfolios. When we tested with control variables however, we find only evidence of a difference for the high-medium PIPE portfolio, which was on average 0.12% lower than the other portfolios. Again, we find that much of the differences in abnormal returns are captured by announcements being made in 2020 or later. We also find that the differences are captured by redemption rates and the price per share in the PIPE-agreement.

We observe that the returns surrounding the SPACs' announcements appear to behave in line with the semi-strong efficient market hypothesis, where the market reacts quickly to new information.

After reviewing the results from the testing of the hypotheses, we are confident that there are higher returns surrounding the announcement day for SPACs with the highest relative PIPE-funding, and lower for SPACs with semi-low relative PIPE-funding. As for the long-run returns, generally there appears to be no effect from the PIPE, except for the medium-high portfolio which has a relative negative effect on the abnormal returns. The reason for this could be due to something our model does not capture and would require further research to confirm. Based on this, we reluctant to say that the PIPE influences return in the long run.

5.1. Limitations

A concern in this research would be the consistency of our data. Thomson Reuters Refinitiv Eikon might not give us reliable data, which could potentially lead to poorly estimated coefficients throughout our research and therefore biased results. In addition, the risk of human error when hand-collecting data from SEC filings is present and would also potentially lead to a biased result. However, considering diversification effects and the size of our sample, we do not consider human error to be a threat to the research. Also, due to the all-time high SPAC wave being quite recent, most our data is focused on this period. This also contributes to uneven distributions for some of our variables, an example is the PIPE-ratio, which in general have occurred more rapidly and with larger size recently (figure 11, appendix 8). SPACs are a youthful part of the stock market, constantly changing and could have more reliable data in the future.

We found many arguments for deeming the redemption rate as a possibly unreliable measurement of SPAC quality in the literature review. This raises the question if it would be more relevant to take the SPAC shares which are sold in the market by the initial investors into account and control for a divestment rate (as mentioned in section 2.1.3.).

Furthermore, we do not have the capacity to investigate the identity of PIPE-investors or information regarding the target companies. This means that there could be further variables with importance for the performance.

The SPAC as an investment vehicle is relatively new and have been changing recently. There could be implementations of new regulations or market conditions affecting the way a SPAC or a SPAC-merger functions, which could hinder the adaptiveness of the model in the future.

5.2. Recommendations for Further Research

A more detailed investigation with regards to the sophistication level of the PIPE-investors would be an area of interest for future research. There are some studies conducted on the quality of sponsors, but not so much on the people and institutions who invests in the SPACs through the private placements.

Another suggestion is analysing the relationship between the size of private investments in SPACs and the quality of the target company it merges with. As we have mentioned, there might be a relation between receiving large private investments and attracting quality targets.

Considering we observe a significant time effect, a recommendation could be to retest this study at a later point with more data. The market has been quite volatile lately, and SPACs have not been the strongest performers.

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7. Appendix

Appendix 1 – Comparison of Rule 419 Offerings with SPAC Offerings

The table is retrieved from Riemer (2007).

	Rule 419	SPACs
Escrow of offering proceeds	At least ninety percent of offering proceeds must be deposited in an escrow account or "[a] separate bank account established by a broker or dealer … in which the broker or dealer acts as trustee for persons having the beneficial interests in the account."	Early SPACs held between eighty-five and ninety-five percent of offering proceeds in escrow. Later SPACs have tended to hold between ninety-seven and ninety-eight percent of offering proceeds in escrow.
Investment of offering proceeds	Proceeds may be invested in 1. an account constituting a "deposit" under the Federal Deposit Insurance Act; 2. a money market fund registered under the Investment Company Act of 1940; and/or 3. "[s]ecurities that are direct obligations of, or obligations guaranteed as to principal or interest by, the United States."	Proceeds are invested in money market funds meeting the requirements of the Investment Company Act of 1940 or short-term U.S. government securities, such as treasury bills
Limitation on value of target business	Must be equal to or greater than eighty percent of all proceeds.	Must be equal to or greater than eighty percent of net assets at the time of a proposed business combination, excluding such funds used for "working capital, investment income and other fluctuations in value."
Trading of issued securities	No trading of IPO units is permitted until a business combination is completed	IPO units may be traded following the filing of the Prospectus, and common shares and warrants may be traded separately after a period of time specified in the Prospectus.
Exercise of warrants	Warrants may be exercised at any time, but all securities must remain in the Rule 419 Account.	Warrants may not be exercised until either a business combination is completed (or, if the combination is completed within one year of the filing of the prospectus, one year after the filing of the Prospectus), or when the SPAC is liquidated.
Right of rescission	Investors must communicate their approval or disapproval of a proposed combination in writing between twenty and forty-five days after the filing of a post-effective amendment. Unless "a sufficient number of purchasers confirm their investment," the fund is dissolved and investors are entitled to a pro rata share of the Rule 419 Account.	Investors are sent a proxy statement disclosing the details of the proposed combination. Election to rescind investment entitles investors to a pro rata share of the escrow account. Unless a majority of investors affirmatively approve a combination, and less than twenty percent of investors vote against the combination, the fund is dissolved and investors are entitled to a pro rata share of the escrow account.
Business combination deadline	Eighteen months.	Eighteen months to announce a pending business combination; twenty-four months to complete the combination if a Letter of Intent is filed within eighteen months.
Release of funds	The earlier of a successful combination or fund liquidation upon failure to complete a combination within the allowed time limit.	The earlier of a successful combination or fund liquidation upon failure to complete a combination within the allowed time limit.

Table 9: Descriptions of securities acts governing blank checks and SPACs.

Appendix 2 – S&P U.S. SPAC Index & S&P 500 Index

Diagram made by using data retrieved from spglobal.com[5]:

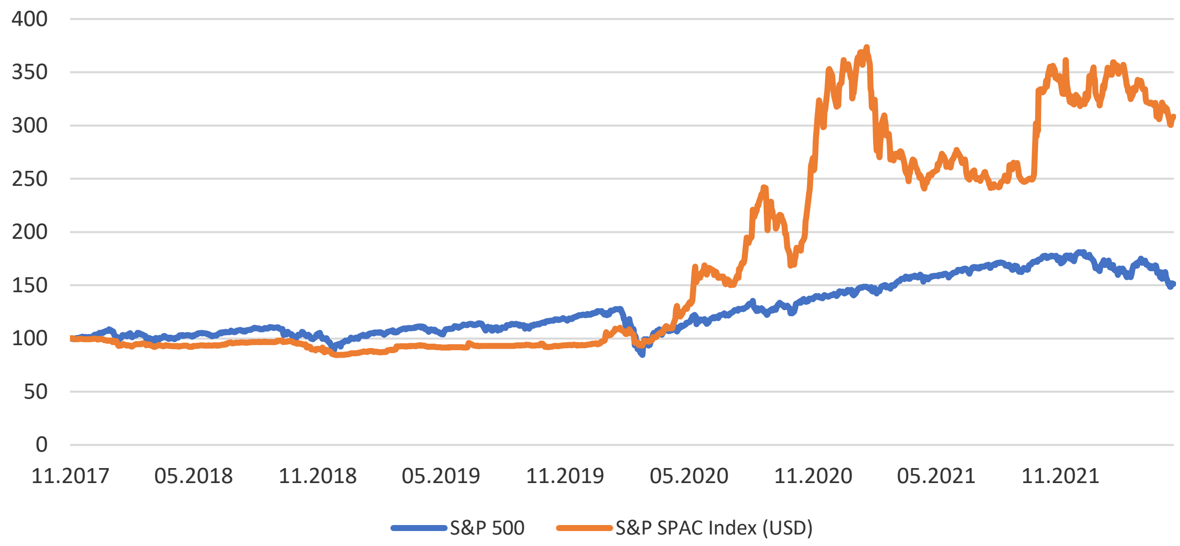

Figure 8. S&P vs SPAC Index

[5] https://www.spglobal.com/spdji/en/indices/strategy/sp-us-spac-index/#overview

Appendix 3 – Comparison in Activity Between US SPAC IPO and US IPO

This table is made by data collected from SPAC Analytics (2022), as of May 4th, 2022[6].

Year	SPAC IPOs	Total US IPOs	SPAC IPO %
2022	61	76	80 %
2021	613	968	63 %
2020	248	450	55 %
2019	59	213	28 %
2018	46	225	20 %
2017	34	189	18 %
2016	13	111	12 %
2015	20	173	12 %
2014	12	258	5 %
2013	10	220	5 %
2012	9	147	6 %
2011	16	144	11 %
2010	7	166	4 %
2009	1	70	1 %
2008	17	47	36 %
2007	66	299	22 %
2006	37	214	17 %
2005	28	252	11 %
2004	12	268	4 %
2003	1	127	1 %
Total	1 310	4 617	28 %

Table 10: Overview of IPOs: 2003-2022.

[6] https://www.spacanalytics.com/

Appendix 4 – SPACs by portfolio

SPAC Name	*Target name*	*Ticker*	*Announcement*	*$ PIPE*	*PIPE-ratio*
High PIPE-ratio portfolio					
Aldel Financial Inc.	Hagerty, Inc.	HGTY	17.08.2021	703 850 000	6,01
Altimeter Growth Corp.	Grab Holdings inc	GRAB	12.04.2021	4 040 000 000	5,88
HighCape Capital Acquisition Corp.	Quantum-Si Incorporated	QSI	18.02.2021	425 000 000	3,44
Consonance-HFW Acquisition Corp.	Surrozen, Inc.	SRZN	15.04.2021	120 200 000	3,02
Novus Capital Corp. II	AppHarvest, Inc.	APPH	28.09.2020	375 000 000	2,96
Panacea Acquisition Corp	Nuvation Bio Inc.	NUVB	20.10.2020	477 550 000	2,93
Roth CH Acquisition I Co.	PureCycle Technologies, Inc.	PCT	16.11.2020	250 000 000	2,52
Landcadia Holdings III, INC	Hillman Solutions Corp.	HLMN	24.01.2021	375 000 000	2,48
Reinvent Technology Partners Z	Hippo Holdings Inc.	HIPO	03.03.2021	550 000 000	2,43
Aspirational Consumer Lifestyle Corp.	Wheels Up Experience Inc.	UP	01.02.2021	550 000 000	2,18
CM Life Sciences III Inc.	EQRx, Inc.	EQRX	05.08.2021	1 200 000 000	2,17
Alussa Energy Acquisition Corp.	FREYR Battery	FREY	29.01.2021	600 000 000	2,03
Property Solutions Acquisition Corp	Faraday Future Intelligent Electric Inc.	FFIE	27.01.2021	775 000 000	1,98
LifeSci Acquisition II Corp.	Science 37 Holdings, Inc.	SNCE	06.05.2021	200 000 000	1,97
Deerfield Healthcare Technology Acquisition Corp.	CareMax, Inc.	CMAX	18.12.2020	305 000 000	1,88
Silver Run Acquisition Corporation	Centennial Resource Development Inc	CDEV	21.07.2016	1 010 050 000	1,76
NewHold Investment Corp.	Evolv Technologies Holdings, Inc.	EVLV	05.03.2021	300 000 000	1,75
Good Works Acquisition Corp.	Cipher Mining Inc.	CIFR	05.03.2021	375 000 000	1,75
DiamondPeak Holdings Corp.	Lordstown Motors Corp.	RIDE	01.08.2020	500 000 000	1,74
GS Acquisition Holdings Corp	Vertiv Holdings, LLC	VRT	10.12.2019	1 239 000 000	1,72
VectoIQ Acquisition Corp.	Nikola Corporation	NKLA	02.03.2020	525 000 000	1,71
BowX Acquisition Corp.	WeWork Inc	WE	25.03.2021	800 000 000	1,68
Dragoneer Growth Opportunities Corp. II	Cvent Holding Corp.	CVT	23.07.2021	475 000 000	1,67
Alpha Healthcare Acquisition Corp.	Humacyte, Inc.	HUMA	17.02.2021	175 000 000	1,62
CC Neuberger Principal Holdings I	E2open Parent Holdings, Inc.	ETWO	22.12.2020	695 000 000	1,60
Decarbonization Plus Acquisition Corp	Hyzon Motors Inc.	HYZN	08.02.2021	400 000 000	1,56
Kayne Anderson Acquisition Corp.	Kinetik Holdings Inc.	KNTK	08.08.2018	572 340 230	1,52
Vector Acquisition Corporation	Rocket Lab USA, Inc.	RKLB	01.03.2021	467 000 000	1,52
Haymaker Acquisition Corp.	OneSpaWorld Holdings Limited	OSW	01.11.2018	122 496 370	1,50
CIIG Merger Corp.	Arrival	ARVL	18.11.2020	400 000 000	1,44
Foley Trasimene Acquisition Corp. II	Paysafe Limited	PSFE	07.12.2020	2 150 000 000	1,38
Seven Oaks Acquisition Corp.	Boxed, Inc.	BOXD	13.06.2021	350 000 000	1,38
Qell Acquisition Corp.	Lilium GmbH	LILM	30.03.2021	450 000 000	1,37
Rice Acquisition Corp.	Archaea Energy Inc.	LFG	07.04.2021	320 000 000	1,33
Industrial Tech Acquisitions, Inc.	Arbe Robotics Ltd.	ARBE	18.03.2021	100 000 000	1,29
Tortoise Acquisition Corp.	Hyliion Holdings Corp.	HYLN	18.06.2020	307 500 000	1,28
Climate Change Crisis Real Impact I Acquisition Corp.	EVgo Inc.	EVGO	21.01.2021	400 000 000	1,28
Silver Spike Acquisition Corp.	WM Technology, Inc.	MAPS	10.12.2020	325 000 000	1,24
DFP Healthcare Acquisition Corp.	The Oncology Institute, Inc.	TOI	28.06.2021	275 000 000	1,20
GS Acquisition Holdings Corp II	Mirion Technologies, Inc.	MIR	21.06.2021	900 000 000	1,20

Thoma Bravo Advantage	ironSource Ltd.	IS	20.03.2021	1 300 000 000	1,17
Foley Trasimene Acquisition Corp.	Alight, Inc.	ALIT	25.01.2021	1 550 000 000	1,17
Arya Science Acquisition Corp. III	Nautilus Biotechnology, Inc.	NAUT	07.02.2021	200 000 000	1,15
Jaws Acquisition Corp.	Cano Health, Inc.	CANO	11.11.2020	800 000 000	1,14
Yellowstone Acquisition Corp.	Sky Harbour Group Corporation	SKYH	01.08.2021	155 000 000	1,13
Collective Growth Corporation	Innoviz Technologies Ltd.	INVZ	10.12.2020	230 000 000	1,11
Social Capital Hedosophia Holdings Corp. II	Opendoor Technologies Inc	OPEN	15.09.2020	600 000 000	1,11
European Sustainable Growth Acquisition Corp.	ADS-TEC Energy PLC	ADSE	10.08.2021	156 000 000	1,10
Motion Acquisition Corp.	DocGo Inc.	DCGO	08.03.2021	125 000 000	1,10
Churchill Capital Corp III	MultiPlan Corporation	MPLN	13.07.2020	1 300 000 000	1,09
CBRE ACQUISITION HOLDINGS, INC.	Altus Power, Inc.	AMPS	12.07.2021	425 000 000	1,08
Sustainable Opportunities Acquisition Corp.	TMC the metals company Inc.	TMC	04.03.2021	330 300 000	1,08
Medium-high PIPE-ratio portfolio					
Gores Holding IV, Inc.	UWM Holdings Corporation	UWMC	22.09.2020	500 000 000	1,08
Atlas Crest Investment Corp.	Archer Aviation Inc.	ACHR	10.02.2021	600 000 000	1,07
Gores Holdings V Inc	Ardagh Metal Packaging S.A.	AMBP	22.02.2021	600 000 000	1,05
Falcon Capital Acquisition Corp.	Sharecare, Inc.	SHCR	12.02.2021	425 000 000	1,05
Reinvent Technology Partners Y	Aurora Innovation, Inc.	AUR	14.07.2021	1 000 000 000	1,04
Insurance Acquisition Corp.	Shift Technologies, Inc.	SFT	29.06.2020	185 000 000	1,03
Spartacus Acquisition Shelf Corp.	NextNav Inc.	NN	09.06.2021	205 000 000	1,03
Live Oak Acquisition Corp.	Danimer Scientific, Inc.	DNMR	03.10.2020	210 000 000	1,02
Conyers Park II Acquisition Corp.	Advantage Solutions Inc.	ADV	08.09.2020	500 000 000	1,02
Roth CH Acquisition II Co.	Reservoir Media, Inc..	RSVR	14.04.2021	150 000 000	1,02
Acon S2 Acquisition Corp.	ESS Tech, Inc.	GWH	06.05.2021	250 000 000	1,02
Navsight Holdings, Inc.	Spire Global, Inc.	SPIR	28.02.2021	245 000 000	1,02
Amplitude Healthcare Acquisition Corp.	Jasper Therapeutics, Inc.	JSPR	05.05.2021	100 000 000	1,01
Hennessy Capital Acquisition Corp IV	Canoo Inc.	GOEV	17.08.2020	323 250 000	1,00
Gores Holdings II, INC.	Verra Mobility Corporation	VRRM	21.06.2018	400 000 001	0,99
CF Finance Acquisition Corp.	GCM Grosvenor Inc.	GCMG	17.11.2020	225 000 000	0,99
Capri Listco	Cazoo Group Ltd	CZOO	29.03.2021	800 000 000	0,97
New Providence Acquisition Corp	AST SpaceMobile, Inc.	ASTS	15.12.2020	230 000 000	0,97
EMPOWER LTD	Holley Inc.	HLLY	11.03.2021	240 000 000	0,97
Stable Road Acquisition Corp.	Momentus Inc.	MNTS	07.10.2020	175 000 000	0,96
VPC Impact Acquisition Holdings	Bakkt Holdings, Inc.	BKKT	11.01.2021	325 000 000	0,95
DMY Technology Group, Inc. III	IonQ, Inc.	IONQ	07.03.2021	350 000 000	0,92
Trine Acquisition Corp.	Desktop Metal Inc.	DM	26.08.2020	275 000 000	0,90
Orisun Acquisition Corp.	Ucommune International Ltd	UK	18.08.2020	53 000 000	0,90
PTK Acquisition Corp.	Valens Semiconductor Ltd	VLN	25.05.2021	125 000 000	0,88
Therapeutics Acquisition Corp.	POINT Biopharma Global Inc.	PNT	15.03.2021	165 000 000	0,88
Andina Acquisition Corp. III	Stryve Foods, Inc.	SNAX	28.01.2021	42 500 000	0,87
Tuscan Holdings Corp	Microvast Holdings, Inc.	MVST	01.02.2021	482 500 000	0,87
Double Eagle Acquisition Corp.	Willscot Corp	WSC	29.11.2017	418 261 450	0,84
one	Markforged Holding Corporation	MKFG	23.02.2021	210 000 000	0,83
Reinvent Technology Partners	Joby Aviation, Inc.	JOBY	23.02.2021	835 000 000	0,83

Gores Holdings, INC	Hostess Brands LLC	Twnk	05.07.2016	300 186 000	0,82
PropTech Acquisition Corporation	Porch Group, Inc.	PRCH	30.07.2020	150 000 000	0,81
ION Acquisition Corp 2 LTD.	Innovid Corp.	CTV	24.06.2021	200 000 000	0,80
BCTG Acquisition Corp.	Tango Therapeutics, Inc.	TNGX	13.04.2021	186 100 000	0,79
Software Acquisition Group Inc. II	Otonomo Technologies Ltd.	OTMO	31.01.2021	142 500 000	0,79
Tortoise Acquisition Corp. II	Volta, Inc.	VLTA	07.02.2021	300 000 000	0,78
South Mountain Merger Corp.	BTRS Holdings Inc.	BTRS	18.10.2020	200 000 000	0,77
GigCapital3, Inc.	Lightning eMotors, Inc	ZEV	10.12.2020	250 000 000	0,77
Peridot Acquisition Corp.	Li-cycle	LICY	15.02.2021	315 000 000	0,76
Arya Sciences Acquisition Corp.	Immatics N.V.	IMTX	17.03.2020	104 150 000	0,74
LGL Systems Acquisition Corp.	IronNet, Inc.	IRNT	15.03.2021	125 000 000	0,72
Fortress Value Acquisition Corp. II	ATI Physical Therapy, Inc.	ATIP	21.02.2021	300 000 000	0,72
TPG Pace Solutions Corp	Vacasa LLC	VCSA	28.07.2021	200 000 048	0,70
Ivanhoe Capital Acquisition Corp.	SES AI Corporation	SES	12.07.2021	200 000 000	0,69
Nebula Acquisition Corporation	Open Lending Corp.	LPRO	05.01.2020	200 000 000	0,69
Foresight Acquisition Corp.	P3 Health Partners Inc.	PIII	25.05.2021	208 703 070	0,68
Athena Technoology Acquisition Corp.	Heliogen, Inc.	HLGN	06.07.2021	165 000 000	0,68
Boxwood Merger Corp.	Atlas Technical Consultants, INC	ATCX	14.02.2020	141 840 000	0,68
Replay Acquisition Corp	Fin of America Eq Capital LLC	FOA	12.10.2020	250 000 000	0,68
Fintech Acquisition Corp. III	Paya Holdings Inc.	PAYA	03.08.2020	250 000 000	0,67
Virtuoso Acquisition Corp.	Wejo Group Limited	WEJO	28.05.2021	128 500 000	0,67
Medium PIPE-ratio portfolio					
Holicity Inc.	Astra Space, Inc.	ASTR	02.02.2021	200 000 000	0,64
Hudson Executive Investment Corp.	Talkspace, Inc.	TALK	12.01.2021	300 000 000	0,64
Khosla Ventures Acquisition Co. II	Nextdoor Holdings, Inc.	KIND	06.07.2021	270 000 000	0,64
MOSAIC Acquisition Corp	Vivint Smart Home, Inc.	VVNT	16.09.2019	225 000 000	0,63
Genesis Park Acquisition Corp.	Redwire Corporation	RDW	25.03.2021	100 000 000	0,62
DMY Technology Group Inc	Rush Street Interactive, Inc.	RSI	27.07.2020	160 430 020	0,62
Healthcare Merger Corp.	SOC Telemed, Inc.	TLMD	29.07.2020	165 000 000	0,62
Pivotal Investment Corp. II	XL Fleet Corp.	XL	17.09.2020	150 000 000	0,61
Quinpario Acquisition Corp. 2	Exela Technologies Inc	XELA	15.06.2017	265 493 640	0,61
Spartan Energy Acquisition Corp.	Fisker Inc.	FSR	10.07.2020	500 000 000	0,60
Healthcor Catalio Acquisition Corp.	Hyperfine, Inc.	HYPR	07.07.2021	126 100 000	0,60
Isos Acquisition Corp.	Bowlero Corp.	BOWL	01.07.2021	150 000 000	0,60
dMY Technology Group, INC IV	Planet Labs PBC	PL	07.07.2021	200 000 000	0,59
Star Peak Energy Transition Corp	Stem, Inc.	STEM	03.12.2020	225 000 000	0,58
Thayer Ventures Acquisition Corp.	Inspirato LLC	ISPO	30.06.2021	100 000 000	0,58
Live Oak Acquisition Corp. II	Navitas Semiconductor Corporation	NVTS	06.05.2021	145 000 000	0,57
RMG Acquisition Corp.	Romeo Power, Inc.	RMO	05.10.2020	150 000 000	0,57
FS Development Corp	Gemini Therapeutics, Inc.	GMTX	15.10.2020	95 000 000	0,56
TPG Pace Energy Holdings Corp.	Magnolia Oil & Gas Corporation	MGY	20.03.2018	355 000 000	0,56
FinServ Acquisition Corp.	Katapult Holdings, Inc.	KPLT	18.12.2020	150 000 000	0,56
Starboard Value Acquisition Corp	Cyxtera Technologies, Inc.	CYXT	21.02.2021	250 000 000	0,55
Juniper Industrial Holdings, Inc.	Janus International Group, Inc.	JBI	07.06.2021	250 000 000	0,55

Star Peak Corp II	Benson Hill, Inc.	BHIL	08.05.2021	225 000 000	0,55
Gores Holding III, Inc.	PAE Incorporated	PAE	01.11.2019	220 000 005	0,54
Switchback Energy Acquisition Corporation	ChargePoint Holdings, Inc.	CHPT	23.09.2020	225 000 000	0,54
Montes Archimedes Acquisition Corp.	Roivant Sciences Ltd.	ROIV	18.06.2021	220 000 000	0,54
NATIONAL ENERGY SERVICES REUNITED CO.	Gulf Energy Saoc Nps Hldg Ltd Natl Petro Svcs Co Ksc	NESR	12.11.2017	150 000 000	0,53
Sandbridge Acquisition Corp.	Owlet, Inc.	OWLT	15.02.2021	130 000 000	0,53
Roth CH Acquisition III Co.	QualTek USA LLC	QTEK	16.06.2021	66 100 000	0,53
Gores Metropoulos II, INC	Sonder Holdings Inc.	SOND	29.04.2021	200 000 000	0,52
Tottenham Acquisition I Limited	Clene Inc.	CLNN	30.12.2020	22 200 000	0,52
Thunder Bridge Acquisition, LTD	Repay Holdings Corporation	RPAY	09.05.2019	135 000 000	0,51
CM Life Sciences, Inc.	Sema4 Holdings Corp.	SMFR	10.02.2021	350 000 000	0,51
Switchback II Corp	Bird Rides Inc	BRDS	11.05.2021	160 000 000	0,51
New beginnings Acquisition Corp.	Airspan Networks Holdings Inc.	MIMO	08.03.2021	75 000 000	0,50
TWC Tech Holdings II Corp.	Cellebrite DI	CLBT	08.04.2021	300 000 000	0,50
Colonnade Acquisition Corp.	Ouster, Inc.	OUST	21.12.2020	100 000 000	0,50
Northern Genesis Acquisition Corp.	The Lion Electric Company	LEV	30.11.2020	200 402 000	0,48
Supernova Partners Acquisition Company, Inc.	Offerpad Solutions Inc.	OPAD	17.03.2021	200 000 000	0,47
Leo Holdings III Corp.	Local Bounti Corporation	LOCL	17.06.2021	125 000 000	0,46
Nextgen Acquisition Corporation	Xos, Inc.	XOS	21.02.2021	220 000 000	0,45
Experience Investment Corp.	Blade Air Mobility, Inc.	BLDE	14.12.2020	125 000 000	0,44
Rodgers Silicon Valley Acquisition Corp.	Enovix Corporation	ENVX	22.02.2021	175 000 000	0,44
Fifth Wall Acquisition Corp. I	SmartRent, Inc.	SMRT	21.04.2021	155 000 000	0,44
Jaws Spitfire Acquisition Corporation	Velo3D, Inc.	VLD	22.03.2021	155 000 000	0,44
Forum Merger III Corporation	Electric Last Mile Solutions, Inc.	ELMS	10.12.2020	130 000 000	0,43
Longview Acquisition Corp.	Butterfly Network, Inc.	BFLY	19.11.2020	175 000 000	0,43
Galileo Acquisition Corp.	Shapeways Holdings, Inc.	SHPW	28.04.2021	75 000 000	0,43
Kensington Capital Acquisition Corp. II	Wall Box Chargers SL	WBX	09.06.2021	100 000 000	0,43
Horizon Acquisition Corp.	Vivid Seats Inc.	SEAT	21.04.2021	225 000 000	0,42
Industrea Acquisition Corp.	Concrete Pumping Holdings, Inc.	BBCP	07.09.2018	96 900 000	0,42
Matlin & Partners Acquisition Corp.	U.S. Well Services, Inc.	USWS	13.07.2018	135 000 000	0,42
Low-medium PIPE-ratio portfolio					
Sprey Technology Acquisition Corp.	BlackSky Technology Inc.	BKSY	17.02.2021	180 000 000	0,41
Gores Metropoulos Inc.	Luminar Technologies, Inc.	LAZR	24.08.2020	170 000 000	0,40
Greenvision Acquisition Corp.	Helbiz, Inc.	HLBZ	08.02.2021	30 000 000	0,40
Acamar Partners Acquisition Corp.	CarLotz, Inc.	LOTZ	21.10.2020	125 000 000	0,40
Union Acquisition Corp. II	Procaps SAS	PROC	31.03.2021	100 000 000	0,40
MCAP Acquisition Corp.	AdTheorent Holding Company, Inc.	ADTH	27.07.2021	121 500 000	0,40
DFB Healthcare Acquisition Corp.	AdaptHealth Corp.	AHCO	08.07.2019	125 000 000	0,40
Legato Merger Corp.	Algoma Steel Group Inc.	ASTL	24.05.2021	100 000 000	0,39
One Madison Corporation	Ranpak Holdings Corp.	PACK	13.05.2019	161 999 992	0,39
Trebia Acquisition Corp.	System1, Inc.	SST	28.06.2021	200 000 000	0,39
Thunder Bridge Acquisition II, Ltd.	indie Semiconductor, Inc.	INDI	10.06.2021	150 000 000	0,39
Apex Technology Acquisition Corporation	AvePoint, Inc.	AVPT	23.11.2020	140 000 000	0,39

Crescent Acquisition Corp.	LiveVox Holding, Inc.	LVOX	13.01.2021	100 000 000	0,38
Thimble Point Acquisition Corp.	Pear Therapeutics, Inc.	PEAR	21.06.2021	102 800 000	0,38
Social Capital Hedosophia Holdings Corp. III	Clover Health Investments, Corp.	CLOV	05.10.2020	400 000 000	0,37
Capstar Special Purpose Acquisition Corp.	Gelesis Holdings, Inc.	GLS	19.07.2021	100 000 000	0,37
FS Development Corp. II	Pardes Biosciences, Inc.	PRDS	29.06.2021	75 000 000	0,37
VG Acquisition Corp.	23andMe Holding Co.	ME	04.02.2021	250 000 000	0,36
Novus Capital Corp. II	Energy Vault Inc	NRGV	08.09.2021	100 000 050	0,36
Graf Industrial Corp.	Velodyne Lidar, Inc.	VLDR	02.07.2020	150 000 000	0,36
Seaport Global Acquisition Corp.	Redbox Entertainment Inc.	RDBX	16.05.2021	50 000 000	0,35
Hennessy Capital Corp.	School Bus Holdings Inc	BLBD	23.09.2014	50 000 000	0,35
Growth Capital Acquisition Corp.	Cepton Technologies Inc	CPTN	04.08.2021	58 500 000	0,35
Vistas Media Acquisition Company Inc.	Anghami Inc.	ANGH	03.03.2021	40 000 000	0,35
Locust Walk Acquisition Corp.	eFFECTOR Therapeutics, Inc.	EFTR	26.05.2021	60 000 000	0,34
Ascendant Digital Acquisition Corp.	MarketWise, Inc.	MKTW	01.03.2021	150 000 000	0,34
D8 Holdings Corp.	Vicarious Surgical Inc.	RBOT	15.04.2021	115 000 000	0,33
AMCI Acquisition Corp.	Advent Technologies Holdings, Inc.	ADN	22.12.2020	65 000 000	0,33
Oaktree Acquisition Corp.	Hims & Hers Health, Inc.	HIMS	30.09.2020	75 000 000	0,32
Northern Genesis Acquisition Corp. II	Embark Technology, Inc.	EMBK	22.06.2021	160 000 000	0,31
TPG Pace Tech Opportunities Corp.	Nerdy Inc.	NRDY	28.01.2021	150 000 000	0,31
FTAC Olympus Acquisition Corp.	Payoneer Global Inc.	PAYO	03.02.2021	300 000 000	0,30
Mudrick Capital Acquisition Corporation	Hycroft Mining Holding Corporation	HYMC	13.01.2020	65 000 000	0,30
Pacific Special Acquisition Corp.	Borqs Intl Hldg Corp	BRQS	11.05.2017	24 000 000	0,30
CF Acquisition Corp. V	Satellogic Inc.	SATL	05.07.2021	69 667 700	0,28
Liv Capital Acquisition Corp.	AgileThought, Inc.	AGIL	09.05.2021	22 500 000	0,28
Chardan Healthcare Acquisition 2 Corp.	Renovacor, Inc.	RCOR	22.03.2021	30 000 000	0,28
GP Investment Acquisition Corp.	Rimini Street Inc	RMNI	09.04.2016	58 000 000	0,28
Bespoke Capital Acquisition Corp.	Vintage Wine Estates, Inc.	VWE	22.04.2021	100 000 000	0,28
GX Acquisition Corp.	Celularity Inc.	CELU	08.01.2021	83 400 000	0,25
Act II Global Acquisition Corp.	Whole Earth Brands, Inc.	FREE	19.12.2019	75 000 000	0,25
Hydra Industries Acquisition Corp.	Inspired Gaming Group Ltd	INSE	21.12.2016	25 000 000	0,25
Haymaker Acquisition Corp. II	ARKO Corp.	ARKO	18.11.2020	100 000 000	0,25
Platinum Eagle Acquisition Corp.	Target Logistics Mgmt LLC	TH	13.11.2018	80 000 000	0,25
Marquee Raine Acquisition Corp.	Enjoy Technology, Inc.	ENJY	28.04.2021	80 000 000	0,25
LF Capital Acquisition Corp.	Landsea Homes Corporation	LSEA	31.08.2020	35 000 000	0,25
Artius Acquisitio Inc.	Origin Materials, Inc.	ORGN	16.02.2021	200 000 000	0,24
Altimar Acquisition Corp. II	Fathom Digital Manufacturing Corp.	FATH	15.07.2021	80 000 000	0,24
Churchill Capital Corp IV	Lucid Group, Inc.	LCID	22.02.2021	2 500 000 005	0,23
ECP Environmental Growth Opportunities Corp.	Fast Radius, Inc.	FSRD	18.07.2021	75 000 000	0,22
Flying Eagle Acquisition Corp	Skillz Inc.	SKLZ	01.09.2020	158 530 520	0,21
B. Riley Principal Merger Corp. II	Eos Energy Enterprises, Inc.	EOSE	16.11.2020	40 000 000	0,20
Low PIPE-ratio portfolio					
Roman DBDR Tech Acquisition Corp.	CompoSecure, Inc.	CMPO	19.04.2021	45 000 000	0,19
Newborn Acquisition Corp.	Nuvve Holding Corp.	NVVE	11.11.2020	14 250 000	0,19
Levy Acquisition Corp.	Del Taco Restaurants Inc	TACO	11.03.2015	35 000 000	0,19

Far Point Acquisition Corporation	Global Blue Group Holding AG	GB	21.02.2020	125 000 000	0,19
LifeSci Acquisition Corp.	Vincera Pharma, Inc.	VINC	15.09.2021	50 750 000	0,18
Software Acquisition Group Inc.	CuriosityStream Inc.	CURI	10.08.2020	25 000 000	0,17
Dragoneer Growth Opportunities Corp.	CCC Intelligent Solutions Holdings Inc.	CCCS	02.02.2021	150 000 000	0,16
Big Rock Partners Acquisition Corp.	NRX Pharmaceuticals, Inc.	NRXP	12.03.2021	10 000 000	0,15
Hennesy Capital Acquisition Corp. II	Daseke Inc	DSKE	22.12.2016	35 000 000	0,14
GigCapital2, Inc.	UpHealth, Inc.	UPH	20.01.2021	30 000 000	0,12
Constellation Alpha Capital Corp.	DermTech, Inc.	DMTK	22.05.2019	21 538 465	0,11
Megalith Financial Acquisition Corp.	BankMobile Technology Inc	BMTX	06.08.2020	20 000 000	0,11
TPG Pace Holdings Corp	Accel Entertainment, Inc.	ACEL	13.06.2019	45 000 009	0,10
Diamond Eagle Acquisition Corp.	DraftKings Inc.	DKNG	22.12.2019	30 471 352	0,07
Collier Creek Holdings	Utz Brands Inc	UTZ	28.08.2020	35 000 000	0,05
Decarbonization Plus Acquisition Corp.	Tritium DCFC	DCFC	27.07.2021	15 000 000	0,04
Social Capital Hedosophia Holdings Corp.	Virgin Galactic Holdings, Inc.	SPCE	25.10.2019	20 000 000	0,03
CM Seven Star Acquisition Corp.	Kaixin Auto Holdings	KXIN	29.01.2019	7 500 000	0,03
Churchill Capital Corp.	Clarivate Plc	CLVT	14.01.2019	-	0,00
Sports Entertainment Acquisition Corp.	Super Group (SGHC) Limited	SGHC	07.03.2021	-	0,00
Power & Digital Infrastructure Acquisition Corp.	Core Scientific, Inc.	CORZ	20.06.2021	-	0,00
Forum Merger II Corporation	Tattooed Chef, Inc.	TTCF	11.06.2020	-	0,00
DD3 Acquisition Corp.	Betterware de Mexico, S.A. de C.V.	BWMX	02.08.2019	-	0,00
GigCapital4, inc.	BigBear.ai, Inc.	BBAI	04.06.2021	-	0,00
Health Sciences Acquisition Corp.	Immunovant, Inc.	IMVT	29.09.2019	-	0,00
Monocle Acquisition Corporation	AerSale Corporation	ASLE	08.12.2019	-	0,00
Fintech Acquisition Corp. IV	International Money Express Inc.	IMXI	19.12.2017	-	0,00
Global Partner Acquisition Corp.	Purple Innovation Inc	PRPL	11.01.2017	-	0,00
Landcadia Holdings II, Inc.	Golden Nugget Online Gaming, Inc.	GNOG	29.06.2020	-	0,00
GigCapital, Inc.	Kaleyra, Inc.	KLR	22.02.2019	-	0,00
Atlantic Acquisition Corp.	Hf Foods Group Inc.	HFFG	28.03.2018	-	0,00
Big Cypress Acquisition Corp.	SAB Biotherapeutics, Inc.	SABS	21.06.2021	-	0,00
890 5th Avenue Partners, Inc.	BuzzFeed, Inc.	BZFD	24.06.2021	-	0,00
Legacy Acquisition Corp.	PARTS iD, Inc.	ID	18.09.2020	-	0,00
FG New America Acquisition Corp.	OppFi Inc.	OPFI	09.02.2021	-	0,00
8i Enterprises Acquisition Corp.	Diginex Limited	EQOS	08.10.2019	-	0,00
Jensyn Acquisition Corp.	iSun, Inc.	ISUN	30.12.2020	-	0,00
Net Element International, Inc.	Mullen Automotive, Inc.	MULN	18.08.2021	-	0,00
Leisure Acquisition Corp.	Ensysce Biosciences, Inc.	ENSC	31.01.2021	-	0,00
Blue Water Acquisition Corp.	Clarus Therapeutics Holdings, Inc.	CRXT	27.04.2021	-	0,00
Petra Acquisition, Inc	Revelation Biosciences, Inc.	REVB	29.08.2021	-	0,00
Merida Merger Corp. I	Leafly Holdings, Inc.	LFLY	08.09.2021	-	0,00
Proficient Alpha Acquisition Corp.	Lion Finl Grp Ltd	LGHL	10.03.2020	-	0,00
Chardan Healthcare Acquisition Corp.	BiomX Ltd	PHGE	16.07.2019	-	0,00
Union Acquisition Corp.	Bioceres Semillas SA	BIOX	08.11.2018	-	0,00
Black Ridge Acquisition Corp.	Allied Esports Intl Inc	AESE	19.12.2018	-	0,00
KBL Merger Corp. IV	180 Life Sciences Corp	ATNF	25.07.2019	-	0,00

Harmony Merger Corp.	NextDecade Corp	Next	17.04.2017	-	0,00
Quartet Merger Corp.	Pangaea Logistics Solutions Lt	PANL	30.04.2014	-	0,00
Capitol Acquisition Corp- II	Lindblad Expeditions Inc	LIND	09.03.2015	-	0,00
JWC Acquisition Corp.	The Tile Shop LLC	TTSH	27.06.2012	-	0,00
Rhapsody Acquisition Corp	Primoris Corp	PRIM	19.02.2008	-	0,00

Table 11: SPAC sample, target company, ticker, announcement date, PIPE & PIPE-ratio

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Appendix 5 – Regressions

	low PIPE	low-med PIPE	med PIPE	med-high PIPE	high PIPE
altevent	**0.0187**	**0.0104**	**0.0292***	**0.0179***	**0.0699*****
	(1.84)	**(1.18)**	**(2.47)**	**(2.08)**	**(3.81)**
e	**0.00327**	**-0.00117**	**-0.00446***	**-0.00103**	**-0.00264**
	(1.88)	**(-1.08)**	**(-2.16)**	**(-0.73)**	**(-0.83)**
highprice	**0.00953**	**0.0459**	**0.00920**	**0**	**0**
	(1.08)	**(1.84)**	**(0.79)**	**(.)**	**(.)**
_cons	**-0.00348*****	**0.000381**	**0.000803**	**0.000583**	**0.000646**
	(-4.48)	**(0.53)**	**(1.46)**	**(0.85)**	**(1.12)**
N	**1664**	**1664**	**1664**	**1664**	**1664**

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 12: Regressions testing hypothesis 1b in interval [t, t+1], incl. control variables

	AR:L	AR:LM	AR:M	AR:MH	AR:H
pipe_low	**-0.0149**				
	(-1.83)				
pipe_low_med		**-0.0167***			
		(-2.26)			
pipe_med			**0.00276**		
			(0.29)		
pipe_med_h~h				**-0.00791**	
				(-0.97)	
pipe_high					**0.0368****
					(2.81)
_cons	**0.0238*****	**0.0241*****	**0.0203*****	**0.0224*****	**0.0135*****
	(5.36)	**(5.33)**	**(4.73)**	**(5.04)**	**(3.82)**
N	**780**	**780**	**780**	**780**	**780**

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 13: Regressions testing hypothesis 2 in interval [t-1, t+1], excl. control variables

	AR:L	AR:LM	AR:M	AR:MH	AR:H
pipe_low		-0.000605	-0.000935	0.000591	-0.000751
		(-0.64)	(-0.92)	(0.60)	(-0.71)
pipe_low_med	0.000605		-0.000330	0.00120	-0.000146
	(0.64)		(-0.41)	(1.66)	(-0.18)
pipe_med	0.000935	0.000330		0.00153*	0.000184
	(0.92)	(0.41)		(2.02)	(0.22)
pipe_med_h~h	-0.000591	-0.00120	-0.00153*		-0.00134
	(-0.60)	(-1.66)	(-2.02)		(-1.79)
pipe_high	0.000751	0.000146	-0.000184	0.00134	
	(0.71)	(0.18)	(-0.22)	(1.79)	
cov	0.00602***	0.00602***	0.00602***	0.00602***	0.00602***
	(8.22)	(8.22)	(8.22)	(8.22)	(8.22)
e	0.000920	0.000920	0.000920	0.000920	0.000920
	(1.28)	(1.28)	(1.28)	(1.28)	(1.28)
highred	-0.00153**	-0.00153**	-0.00153**	-0.00153**	-0.00153**
	(-2.98)	(-2.98)	(-2.98)	(-2.98)	(-2.98)
highprice	-0.00704*	-0.00704*	-0.00704*	-0.00704*	-0.00704*
	(-2.29)	(-2.29)	(-2.29)	(-2.29)	(-2.29)
_cons	-0.00572***	-0.00512***	-0.00479***	-0.00631***	-0.00497***
	(-7.75)	(-6.81)	(-5.67)	(-8.06)	(-5.80)
N	25740	25740	25740	25740	25740

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 14: Regressions testing hypothesis 3 in interval [t+2, t+100], incl. control variables

Appendix 6 – CAR Scatter plots

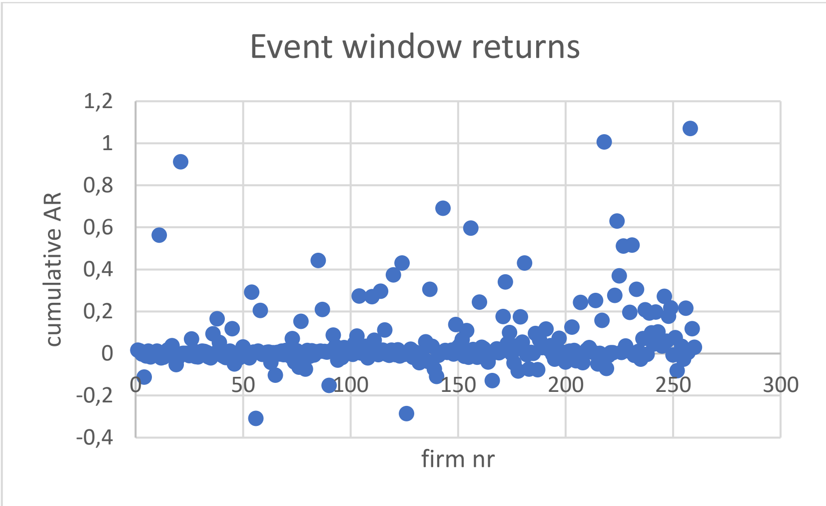

Figure 9: Event window returns.

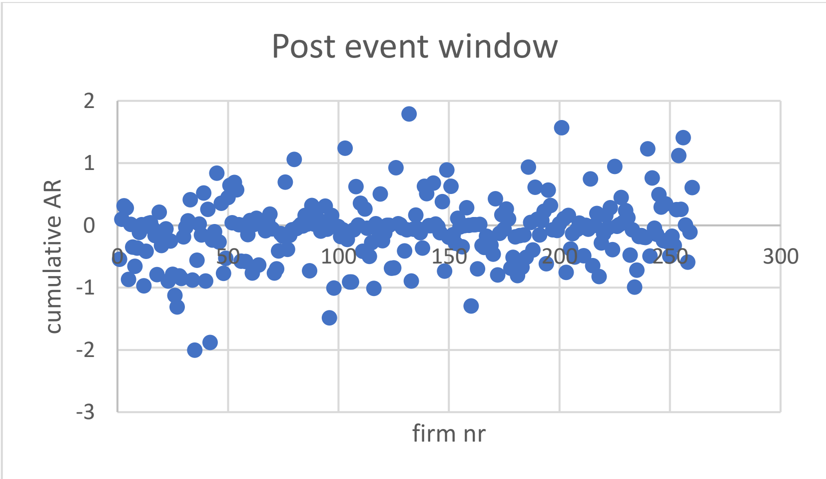

Figure 10: Post event window returns.

Appendix 7 – Bootstrap results

ar	Coef.	Bootstrap std. Err.	z	P>|z|	[95% Conf. Interval]	
low						
event	0,0112888	0,0067764	1,67	0,096	-0,0019928	0,0245703
event	0,0112888	0,0069384	1,63	0,104	-0,0023102	0,0248878
event	0,0112888	0,006953	1,62	0,104	-0,0023389	0,0249165
event	0,0112888	0,0067129	1,68	0,093	-0,0018682	0,0244458
low_med						
event	0,0064676	0,0060075	1,08	0,282	-0,0053069	0,018242
event	0,0064676	0,0059992	1,08	0,281	-0,0052907	0,0182259
event	0,0064676	0,0060595	1,07	0,286	-0,0054089	0,018344
event	0,0064676	0,0059508	1,09	0,277	-0,0051957	0,0181309
med						
event	0,0228723	0,0080491	2,84	0,004	0,0070963	0,0386483
event	0,0228723	0,0084564	2,7	0,007	0,0062981	0,0394466
event	0,0228723	0,0087182	2,62	0,009	0,005785	0,0399597
event	0,0228723	0,0087182	2,62	0,009	0,005785	0,0399597
med_high						
event	0,0141976	0,0069196	2,05	0,04	0,0006355	0,0277597
event	0,0141976	0,006938	2,05	0,041	0,0005994	0,0277958
event	0,0141976	0,006975	2,04	0,042	0,0005269	0,0278684
event	0,0141976	0,0068249	2,08	0,038	0,0008211	0,0275742
high						
event	0,0501096	0,012615	3,97	0	0,0253847	0,0748346
event	0,0501096	0,0127766	3,92	0	0,0250679	0,0751514
event	0,0501096	0,0131179	3,82	0	0,024399	0,0758202
event	0,0501096	0,0119386	4,2	0	0,0267104	0,0735088

Table 15: Regressions for hypothesis 1a bootstrapped standard errors.

ar	Coef.	Bootstrap std. Err.	z	P>|z|	[95% Conf. Interval]	
pipe_low	-0,0052453	0,0089439	-0,59	0,558	-0,0227751	0,0122844
pipe_low	-0,0052453	0,0096643	-0,54	0,587	-0,024187	0,0136963
pipe_low	-0,0052453	0,0094488	-0,56	0,579	-0,0237647	0,013274
pipe_low	-0,0052453	0,0095257	-0,55	0,582	-0,0239154	0,0134247
pipe_low_med	-0,0166415	0,0072145	-2,31	0,021	-0,0307816	-0,0025014
pipe_low_med	-0,0166415	0,0070601	-2,36	0,018	-0,030479	-0,002804
pipe_low_med	-0,0166415	0,0072849	-2,28	0,022	-0,0309196	-0,0023634
pipe_low_med	-0,0166415	0,0071553	-2,33	0,02	-0,0306657	-0,0026173
pipe_med	0,0019239	0,0093336	0,21	0,837	-0,0163695	0,0202174
pipe_med	0,0019239	0,0096266	0,2	0,842	-0,0169438	0,0207917
pipe_med	0,0019239	0,0096292	0,2	0,842	-0,0169489	0,0207968
pipe_med	0,0019239	0,008925	0,22	0,829	-0,0155687	0,0194166
pipe_med_high	-0,0137876	0,0085295	-1,62	0,106	-0,030505	0,0029298
pipe_med_high	-0,0137876	0,0089263	-1,54	0,122	-0,0312828	0,0037076
pipe_med_high	-0,0137876	0,0088395	-1,56	0,119	-0,0311128	0,0035376
pipe_med_high	-0,0137876	0,0088691	-1,55	0,12	-0,0311708	0,0035956
pipe_high	0,0330491	0,0132711	2,49	0,013	0,0070381	0,05906
pipe_high	0,0330491	0,0134172	2,46	0,014	0,0067518	0,0593463
pipe_high	0,0330491	0,0133794	2,47	0,014	0,0068259	0,0592723
pipe_high	0,0330491	0,0129508	2,55	0,011	0,007666	0,0584321

Table 16: Regressions for hypothesis 2 bootstrapped standard errors.

ar	Coef.	Bootstrap std. Err.	z	P>|z|	[95% Conf. Interval]	
pipe_low	-0,00048	0,0008765	-0,55	0,585	-0,0022	0,00124
pipe_low	-0,00048	0,0008533	-0,56	0,575	-0,00215	0,001194
pipe_low	-0,00048	0,0008985	-0,53	0,595	-0,00224	0,001283
pipe_low	-0,00048	0,0008624	-0,55	0,579	-0,00217	0,001212
pipe_low_med	0,00034	0,0006263	0,54	0,588	-0,00089	0,001567
pipe_low_med	0,00034	0,0006043	0,56	0,574	-0,00084	0,001524
pipe_low_med	0,00034	0,000612	0,55	0,579	-0,00086	0,001539
pipe_low_med	0,00034	0,0006206	0,55	0,584	-0,00088	0,001556
pipe_med	0,000745	0,0006838	1,09	0,276	-0,0006	0,002085
pipe_med	0,000745	0,0006576	1,13	0,258	-0,00054	0,002033
pipe_med	0,000745	0,0006743	1,1	0,27	-0,00058	0,002066
pipe_med	0,000745	0,000651	1,14	0,253	-0,00053	0,00202
pipe_med_high	-0,00122	0,0005684	-2,14	0,032	-0,00233	-0,00011
pipe_med_high	-0,00122	0,0005863	-2,08	0,038	-0,00237	-0,00007
pipe_med_high	-0,00122	0,0005699	-2,14	0,032	-0,00234	-0,0001
pipe_med_high	-0,00122	0,0005511	-2,21	0,027	-0,0023	-0,00014
pipe_high	0,000532	0,0006691	0,8	0,426	-0,00078	0,001844
pipe_high	0,000532	0,0006957	0,77	0,444	-0,00083	0,001896
pipe_high	0,000532	0,0006649	0,8	0,423	-0,00077	0,001836
pipe_high	0,000532	0,0006799	0,78	0,434	-0,0008	0,001865

Table 17: Regressions for hypothesis 3 bootstrapped standard errors.

Appendix 8 – Size and frequency of PIPEs over time

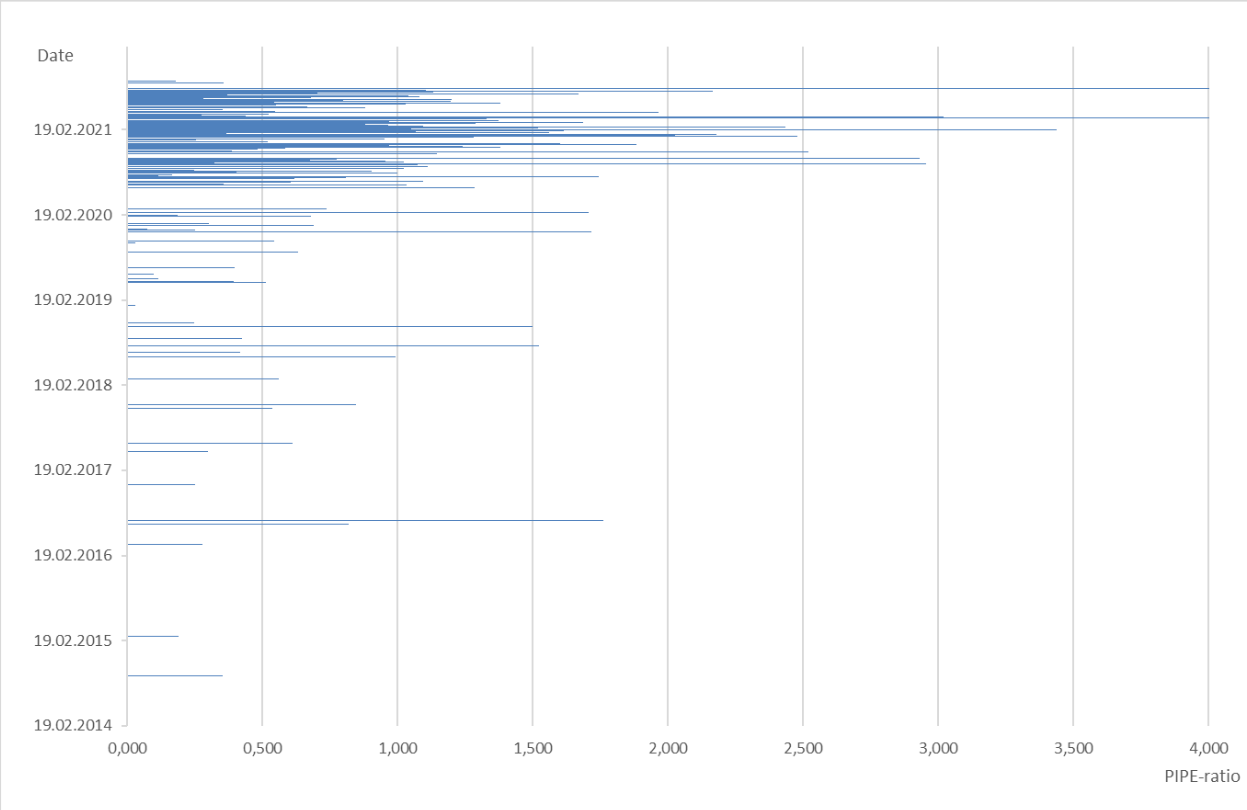

Figure 11: Size and frequency of PIPEs over time.