



**UNIVERSITY OF GOTHENBURG**  
**SCHOOL OF BUSINESS, ECONOMICS AND LAW**

## Return of the SPAC

Master of Science in Finance

Graduate School

Spring of 2021

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## Abstract

Past empirical research on Special Purpose Acquisition Companies has demonstrated long-term negative returns following the merger due to the flawed structure, mainly attributed to incomplete information. This paper examines the return of SPACs in the short-term surrounding two events: target deal announcement and merger completion. Furthermore, we study the effect of SPAC target industry, trust size, event timing, and institutional ownership extent, on the return at the events. Using a sample of 113 US SPACs during 2015–2020 we find abnormal returns surrounding the two events, discussed as market anomalies and in contrast to research on efficient markets. An opportunistic investor can use these anomalies to buy SPACs prior to the deal announcement and sell or even short the SPAC prior to the merger. Building on the research on the long-term returns of SPACs, this study finds support that also the short-term returns are affected by the structure of SPACs. This paper sheds new light on the upturn in SPAC activity, their performance, and their long-term implications.

*Key words:* SPAC, Efficient Market Hypothesis, Market anomalies, Event study, Incomplete information

JEL Classification: G14, G34

## Acknowledgements

We would like to express our appreciation to our supervisor Taylan Mavruk for his useful support during the writing process of this thesis. Furthermore, we would like to offer our thanks to the Finance Department at the School of Business, Economics and Law at the University of Gothenburg for providing us access to financial databases such as Bloomberg.

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# 1. Introduction

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## 1.1 Background

This thesis tests whether the returns of SPACs are in line with the efficient market hypothesis. A Special Purpose Acquisition Company, commonly referred to as a “SPAC”, is an alternative approach to the traditional Initial Public Offering (IPO) for a company to enter the public markets. In short, a SPAC is a publicly traded blank check company with the goal of bringing a private company public via an acquisition. Subsequent to the IPO of the SPAC, the acquisition is to be completed within a period of usually two years as the management of the SPAC searches for an appropriate target company. When the management of the SPAC eventually finds a target and a deal is proposed, the SPAC shareholders vote on the deal. If passed, the SPAC shares are converted to shares of the acquired company. If not, shareholders are repaid the proportion of the trust attributed to their shares and the SPAC is liquidated.

After some troublesome decades for SPACs in the US, recent years have seen a vast increase in the alternative route to the public markets. Although the number of SPAC IPOs have been consistently rising since 2017, 2020 saw an enormous increase in the U.S. The number of SPAC IPOs amounted to 248 in 2020, rising from 59 in 2019, but more notably, higher than the number of traditional IPOs which ended at 223 (Nasdaq, 2021). So far in 2021, in less than four months, an excess of 300 SPACs has been introduced to the markets (Spacinsider, 2021). The massive increase in SPAC IPOs is undoubtedly the result of many aligning conditions, including macro factors (Lowry, 2003; Choe et al, 1993; Loughran et al, 1994) and opportunistic behaviour (Pastor and Veronesi, 2005; Lowry and Schwert 2002; Maksimovic and Pichler 2001), related to both SPACs exclusively but also IPOs in general. In combination with a record-high retail interest this has created short-term market anomalies which Schwert (2003) find usually are eliminated or reversed in the long term as an equilibrium is established. The lifecycle of the SPAC and the returns of the main events attributed to the structure of the SPAC have been studied historically (Klausner and Ohlrogge, 2020; Rodrigues and Stegemoller, 2013) but the recency of the latest development implies that its extent is yet to be explored.

Although the current SPAC market is yet to be documented in empirical research, there are several parallels to be drawn between its events and prerequisites, and other empirical results and models. To begin with, as the SPAC announces a proposed deal with a target company, returns on the markets generally have answered the ambition positively even though the deal was expected. This hypothesis is related to Schwert's (2003) studies who find that several market anomalies have existed historically to profit on. Schwert, however, demonstrates that these opportunities disappear, are reversed or attenuated as they are documented and analysed. In contrast, Fama (1970) suggests that markets are efficient and that asset prices reflect all available information to the extent that it is not possible to consistently achieve higher returns than the market portfolio. Furthermore, as the SPAC reaches its merger, and the dilutive extent is disclosed there are interesting results related to empirical research on post-earnings announcement drift. Ball and Brown (1989), and more notably Bernard and Thomas (1990) find that due to inaccuracy to process information, returns tend to drift abnormally for a prolonged period of time after an earnings surprise.

In addition, our work and the boom of the SPAC space can also be related to previous IPO booms and the consequences of their eventual busts (Aggarwal et al, 2009; Oesterle 2004). From an investors point of view, our study provides that historical market inefficiencies (Schwert, 2002; Ball and Brown 1968) can be used as evidence that trading strategies based on the structure of the SPAC can be profitable in the short term (Dasgupta et al, 2010; Fink 2020). From a wider perspective, our findings on the performance of the SPAC suggests a lack of long-term focus in favour of short-term opportunistic behaviour, as emphasized by Klausner and Ohlrogge (2020).

## 1.2 Purpose

This paper evaluates the performance of SPACs, in aggregate, during 2015 to March of 2021. The study assesses the SPAC structure and IPO process' impact on the recent SPAC mania. Similar to Klausner and Ohlrogge (2020) we demonstrate these features importance both as a catalyst to the upturn of SPAC activity but also as the main contributing factor to its long-term negative performance and implications.

More specifically this paper analyses the SPACs returns surrounding the crucial events; definitive agreement and merger completion, while demonstrating the contributing factors to

the returns. Furthermore, we investigate how the returns differ between SPACs with regards to certain criteria such as timing in terms of year of the events, the size of the SPAC, the industry of the target company, and the institutional ownership of the SPAC during the events. This set of problems leads us to our main research question: were the returns of SPACs in line with the efficient market hypothesis, during the years 2015–2021?

The remainder of the paper is outlined as follows. Section 2 provides a historical background on SPACs, an overview of the process of a SPAC, and a demonstration of the differences between a SPAC IPO and traditional IPO. Section 3 provides a theoretical framework and an overview of prior studies related to market anomalies, SPAC performance, and IPO activity. Section 4 presents the data and method. Section 5 contains the empirical results and discussion, and section 6 concludes the findings.

## 2. Special Purpose Acquisition Company

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### 2.1 History of the SPAC

Historically, SPACs have had a bad reputation due to inadequate regulation which was said to open the door to more fraudulent companies entering the markets (Rodrigues and Stegemoller, 2013). In the 1990s there was a trend of SPACs merging with small and insolvent companies in exchange for fees (The Globe and Mail, 2016). The SPAC route during these first years was considered a shortcut to get listed, aiming to berich the sponsors via “pump and dump” schemes. As discussed by William and Sjostrom (2007), the house of representatives described the structure as providing the basis for the sponsor to engineer an upward manipulation in the price of the stock benefitting business associates, relatives, and friends.

After the first decade regulatory changes were adopted by the SEC as a response to sponsors and companies essentially using the SPAC vehicle to commit fraud by abusing loopholes in the regulation (Layne and Lenehan, 2018). The second SPAC-wave began in 2003 as EarlyBirdCapital filed for a SPAC called Millstream Acquisition Corp. EarlyBirdCapital was founded by David Nussbaum, the creator of the SPAC. Following Millstream's acquisition of a company called NationsHealth the number of SPACs grew rapidly during the years leading up to the financial crisis, amounting to 25 percent of all IPOs during 2007 (Rodrigues and Stegemoller, 2013). During and in the aftermath of the financial crisis of 2008, equity markets fell, and overall IPO activity declined sharply. Adding insult to injury, with falling prices of SPACs there was no reason for hedge funds and other investors to not vote against the proposed deals to retain the value attributed to their shares. With a looming threat of being voted down by its investors, SPAC IPOs fell drastically, declining from 66 in 2007 to 17 in 2008 and merely 1 during 2009.

Once again, SPACs changed as the previous structure was improved upon in the wake of the financial crisis. Also, coinciding with the crisis, the SEC approved changes to its listing rules which allowed SPACs to get listed on the New York Stock Exchange (NYSE) and the NASDAQ (Bloomberg, 2010). Slowly SPAC IPOs started to return to the markets with an increase in companies using the alternative route. Leading up to the Covid-19 pandemic the number of SPAC IPOs amounted to 59 in 2019. However, sparked by the V-shaped return of the markets following the deep fall in the spring of 2020, SPAC IPOs rose drastically, totalling 248 in 2020 (Statista, 2021). So far in 2021 SPAC IPOs amount to more than 300 in just four

months. Reasons for the comeback of SPACs are disputed but likely it is a combination of multiple factors.

Firstly, to combat the economic downturn caused by the Covid-19 pandemic, the U.S. government passed the largest stimulus legislation in history. As the stock market started to recoil prior to the summer of 2020, many Americans chose to invest their newly printed money (CNBC, 2020a). The inflow of new customers and new money has led to records in both market volatility and retail investor trading volume and is the centrepiece of increased risk appetite (CNBC, 2020b). The structure of the SPAC with its low floor and high potential reward, and the fact that it often targets high-growth companies has been proven to be alluring for risk willing investors (Luttig, 2020).

Another consequence of the pandemic was that the Federal Reserve, as well as other central banks, lowered its interest rates to zero. According to the U.S. central bank the rates will stay at these low levels until at least the end of 2023 (Financial Times, 2020a). With these low interest rates for the foreseeable future, higher stock prices are justified if future earnings can be expected. Most SPAC targets have this allure to them, namely that the case is driven by hope for a future scenario where their technology or idea will generate large profits (Financial Times, 2020b). Three SPAC targets, Faraday Future, Arrival Group and Fisker are all projecting 10 billion dollars in sales within three years of launching sales, something that took current record holder Google eight years to achieve (The Wall Street Journal, 2021a).

Furthermore, the growth-oriented target companies have been increasingly willing to go public this last year. Firstly, due to the pandemic many businesses have been put under stress, causing a target-rich environment where many companies might be increasingly willing to team up with a sponsor to sustain financial liquidity (IR Magazine, 2020). Secondly, following the election of President Joe Biden, the global markets have seen a large increase in interest in sustainability and so-called green investments, as expectations are that the democrats will try to combat climate change (Reuters, 2020). With the SPAC IPO being a quicker route to the markets than the traditional IPO, this method has been favoured by companies trying to capitalize on the green wave (Financial Times, 2020c).

Finally, as the SPAC is becoming widely accepted as an alternative route to the stock market, more and more companies choose this method in favour of the traditional IPO (Nasdaq, 2020a).

The last couple of years a high number of profiled sponsors have launched their own SPACs including hedge fund manager Bill Ackman, Michael Klein, and Chamath Palihapitiya (Financial Times, 2020d). This interest from the top tier of businesspeople has created a snowball effect and has legitimized the process for higher quality companies which earlier may have found this route inappropriate (Luttig, 2020). Following the comeback of the SPAC, other markets are now looking at regulators expecting this alternative route to be launched. In Europe, Amsterdam has been the first market to implement SPACs, with similar structures as the U.S., due to their flexible listing rules. In the beginning of 2021, Mustier, former UniCredit chief, and Arnault, LVMH founder, announced that they have joined together to launch a SPAC on the Dutch markets (Financial Times, 2021). In Sweden, the first SPAC, ACQ Bure, was launched in March with high interest from both institutional and retail investors (Börsvärlden, 2021). The historical context with an amounting interest in the last years (from both sponsors and investors) emphasizes the relevance to study the prerequisites and the potential consequences further.

## 2.2 Process of a SPAC

### 2.2.1 Pre IPO

The process of a SPAC begins in the hands of a sponsor who theoretically can be anyone but in practice is most typically a private equity fund, former managers and executives of well-known corporations or simply individuals with large amounts of capital. To create a SPAC, the sponsor forms a corporation and collaborates with an underwriter leading up to the public offering. The corporation consists of a SPAC board, which includes the management (e.g. CEO, CFO) and chairman, and plays a key role in finding and acquiring a target company. The underwriter in the SPAC process serves as an intermediary between the sponsors' formed corporation and investors on the market, helping the company to prepare for the upcoming IPO. After an agreement is reached between the two parties, the sponsor acquires shares that most often represent 25 percent of the IPO equity proceeds which serves as compensation for their work (Spacconsultants, 2021a). Additionally, the sponsor usually purchases stock or warrants in conjunction with the IPO. These funds are used to fund the IPO and the costs associated with the operation leading to the finding of a suitable acquisition target. The value raised for SPACs varies but has historically ranged between 40M\$ and as much as 4B\$ in the case of Pershing Square Tontine run by hedge fund manager Bill Ackman (Klausner and Ohlrogge, 2020).

The underwriters and the company start forming the SPAC prospectus with the help of auditors and legal counselling. The SPAC prospectus, also referred to as S1, is an extensive description of the corporation including information about the management, shareholders, size of IPO, cost structure, acquisition target industry, risk factors and other statutory information. The arrangement of the prospectus is unrestricted in its constitution but generally rather standardized across most SPACs. With the prospectus, the company applies for approval from the Securities and Exchanges Commission (SEC) and listing confirmation from the stock exchange (Spacconsultants, 2021b).

### 2.2.2 IPO

In its IPO a SPAC usually sells units which contain common stock, typically a fraction of a warrant and in some cases a right (Rodrigues and Stegemoller, 2013). The warrants in most cases give the investor the right to purchase the share for \$11.50 at some point in the future, typically between two and five years. The rights are commonly tradable for a fraction of a share by the time of the merger. The units are split into the stock and warrant, usually 52 trading days after the listing of the units and thus the common and warrant trades on the exchange separately. The purpose of the warrants is to compensate the IPO investors for investing in the SPAC as the management searches for an acquisition. The capital raised in the IPO is placed in a trust account which is invested in low-risk assets such as short-dated Treasury Bills. These funds are earmarked for the acquisition but can also be used to (a) contribute capital to the company that is being acquired, (b) distributed to shareholders if the SPAC is liquidated due to merger failing, or (c) if investors redeem their shares. Whilst a traditional IPO typically follows a road show and media appearances intended to build an interest in the company, a SPAC IPO is rather anonymous since the listing is of a blank check company (Klausner and Ohlrogge, 2020). The initial investors in the SPACs IPO are mainly large funds that buy units and hold no further than its merger, commonly referred to within the industry as the “SPAC Mafia” (Financial Times, 2020e).

### 2.2.3 Post IPO

When the SPAC is listed on the stock exchange the sponsors have a period of two years to search for an acquisition. With a theoretical limited downside (usually \$10) SPACs, in recent times, often trade at a premium because one can redeem at this level come merger vote. However, in times of market volatility some SPACs have historically traded below \$10 as was

the case in March 2020 (Nasdaq, 2020b). Market participants scrutinize the SPAC IPOs, looking for potential opportunities while listening to rumours prior to the announcement of a deal. With no underlying value in the blank check company, investors turn to the information in the S1 prospectus to retrieve critical information. One of the most interesting components is the target industry that the SPAC is pursuing. Disclosing the industry that the SPAC is pursuing is voluntary and not binding, but generally praxis (Spacconsultants, 2021c). Furthermore, another piece of important information available to investors is the SPACs management team and the SPAC board. The composition of the SPAC board is vital to identify and convince the target company, but also in terms of attractiveness for institutional investors in the IPO. The board members should preferably have considerable expertise, knowledge, and experience in the target industry (Spacconsultants, 2021d).

As the management team of the SPAC finds a potential acquisition target, due diligence, audit and negotiations begin. It is important to add that SPACs only can acquire private companies. With an agreement closing in between the parties there are three combinations that the management can use as payment method for the shares in the acquiring company: 1) issue new SPAC shares as payment, 2) use the cash from the IPO proceeds, or 3) asset-backed financing where the target company posts collateral. Note that a combination of the three methods is also possible. Once these conditions are met, a merger deal of the proposed business combination is announced to the market. A date is now set as to when the SPAC shareholders will vote for approval of the proposed merger (Klausner and Ohlrogge, 2020).

Regarding size of the target company there is no maximum size that the SPAC must fulfil, but in fact a minimum size of roughly 80 percent of the funds in the SPAC trust. Typically, the SPAC merges with a company that is substantially larger than the value of the IPO proceeds. According to Klausner and Ohlrogge (2020), the median contribution of public investors amounted to 64 percent in 2019–2020. Another way to compensate for the lack of funding by the SPAC trust, is through PIPE (private investments in public equities) deals after the proposed deal is announced. In PIPE deals some investors get an opportunity to invest in the SPAC under agreements with the management, and thus do not have to commit to the price of the SPAC on the market. Klausner and Ohlrogge find the median contribution from PIPE deals to have been 25 percent during 2019–2020. Finally, if the sponsor fails to find an acquisition target, the shareholders are allowed to vote for an extension of the search period. If not extended, the

SPAC distributes the funds in the trust to the shareholders and is liquidated (Rodrigues and Stegemoller, 2013).

#### 2.2.4 Merger Completion

After potential approval the acquisition is confirmed and the acquired company merges with the SPAC and becomes a listed corporation as the SPAC is renamed to the target company's name. If the shareholders were to disagree they can redeem their shares, keep their warrants if they so please, and are entitled to the portion of the trust attributed to their shares, usually being \$10 per share plus additional interest earned by the trust. This investment strategy is frequently utilized by hedge funds (Klausner & Ohlrogge, 2020). With the SPAC now transformed into a public company it must abide fully to the same regulation as all other public companies.

### 2.3 Traditional IPOs versus SPAC IPOs

Historically, going public via a SPAC has been stigmatized and frowned upon by market participants which inevitably has reduced the number of SPAC IPOs. During the last few years this alternative IPO method has gained lots of momentum with an increasing number of companies weighing the benefits of a SPAC IPO compared to a traditional IPO. To start, a SPAC acquisition is the result of negotiations between the acquired company's shareholders and the sponsors of the SPAC. These negotiations are based more on data and forward projections, which is not the case with the traditional IPO where the IPO price is based on the underwriter's judgement and institutional knowledge. Also, the traditional IPO route often leads to a post-IPO price pop which could be evidence of a wrongful set price of the company (Lowry and Schwert, 2002).

Furthermore, the SPAC IPO process arguably allows a company to make a market entry a lot quicker than the traditional IPO because the SPAC operates according to merger regulation which implies less requirements. Therefore, after announcement of the proposed merger the company can enter the market in just a matter of weeks and seize favourable market conditions (Bridgepoint Capital, 2020).

Finally, in contrast to traditional IPOs, the SPAC process is classified as a merger and therefore regulated according to merger rules and not public offering rules. Firstly, SPAC mergers include a safe harbour in terms of forward-looking statements which implies that at the time of

deal announcement the targeted company can add these in their proxy statements according to the Private Securities Litigation Reform Act (Congress, 1995). This more lenient regulation leads to a larger number of high-growth companies choosing this alternative as they more freely can communicate the future financial potential of the business. Secondly, the parties in a SPAC IPO face much lower liability risk than a traditional IPO. Nearly 15 percent of traditional IPOs since 2015 have been targeted by shareholder suits due to misstatements and omissions in disclosures. With SPAC IPOs not being covered by the same regulations, the lower risk could be another factor for companies choosing the alternative IPO method (Stanford, 2021).

### 3. Theoretical Framework

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#### 3.1 Efficient and Inefficient Markets

The efficient market hypothesis is a financial hypothesis contributed to the work of Eugene Fama (1970). Shortly, it states that asset prices reflect all available information. According to the hypothesis it is not possible to consistently get a higher return than the market portfolio since market prices reflect the available information and should only react to new information. In other words, there are no under- or overvalued assets in an efficient market. The semi-strong form of market efficiency, described by Fama (1970), implies that past movement of prices cannot be used to predict future prices because the present price already has all relevant information incorporated, including historic prices and publicly available information. With this in mind, strategies based on momentum or technical analysis should not be expected to consistently gain above average returns.

In contrast to the findings of Fama, Schwert (2003) study several market anomalies related to inefficiency in the markets. He finds that most of the profit opportunities studied have existed in the past but have disappeared, reversed, or attenuated due to documentation and analysis in academic literature. Schwert's findings therefore contradict the efficient market hypothesis, as the study provides evidence that markets can be inefficient in the short term. Market anomalies seem to consistently appear over prolonged periods and participants can beat the market by utilizing these opportunities. However, as concluded by Schwert, it is the implementation of strategies to take advantage of the anomalies that causes the anomalies to disappear in the long term.

One such market anomaly that has been repeatedly studied is the post-earnings announcement drift (PEAD). First academic observers include Ball and Brown (1968), and Bernard and Thomas (1989, 1990). PEAD is the tendency for stock returns to abnormally drift in the direction of a surprising earnings announcement for weeks or even months following the surprise. While other market anomalies tend to appear, disappear, or at least attenuate, PEAD is still observable and prominent on the global financial markets, as recently examined by Fink (2020). According to Fink, the main contributions to this market inefficiency are inaccuracy to process information, attention constraints, and behavioural biases by investors and analysts.

## 3.2 Literature Review

### 3.2.1 Literature related to IPOs

There are large amounts of empirical research on variations in IPO volume. Although the past studies focus mainly on traditional IPOs, we find several of the motives and prerequisites for taking a company public to be applicable to SPACs as well.

Lowry (2003) and Choe et al. (1993) provide evidence that GDP growth and IPO volume were positively correlated as firms tend to IPO in promising periods with less uncertainty about future prices. Likewise, Pastor and Veronesi (2005) find that company insiders tend to go public after observing improving market conditions as they seize the opportunity for a larger reward. To draw further connections to the markets, Loughran et al. (1994) demonstrated significant positive correlation between stock market indices and IPO volume. Their evidence presents that companies successfully time their offerings for periods where valuations are high, as capitalizing on a hot market increases investor returns. Similarly, Lowry and Schwert (2002), studied IPO motivations as a function of previous IPOs. They suggest that an increasing number of firms choose to go public after periods of high underpricing in offerings as they are enticed by the positive outcomes from previous IPOs. Exacerbated by periods of higher willingness to take risks, Maksimovic and Pichler (2001) provide evidence that technological and competitive risks may affect the firm's desire to capitalize on the favourable market conditions if the company operates in an emerging industry. They find that firms may choose to go public to capture a first-mover advantage since the publicity and reputation associated with the IPO gives them a favoured position in their niche. Aggarwal et al. (2009) studied the impact of company fundamentals on their valuation at their IPO, mainly at the Dot-com bubble, highlighting some problematic issues related to signalling (Leland and Pyle, 1977). They report that the firms with more negative earnings were valued higher than firms with less negative earnings, suggesting that investors view negative earnings as a proxy for growth and therefore rewards these companies with a valuation premium. If the valuation premium is proven to be unjustifiable in the long term, there are negative implications for the individual company and the economy in general. Oesterle (2004) studied these exaggerated and unwarranted valuations during the Dot-com bubble. Not only did he find that many of the newly public companies had gone bankrupt, but also equity losses of \$2 trillion dollars and half a million of job losses in the telecom industry. Our study relates the findings on IPO activity to the recent increase in SPAC IPOs and the performance of these entities surrounding their deal announcement. We propose

that the performance of the SPACs surrounding this event is caused by features related to market sentiment.

### 3.2.2 Literature related to SPAC Mergers and Dilution

Studying the ownership of the SPAC entity, Klausner and Ohlrogge (2020) find that the merger and IPO participants were largely independent from one another. Their results show that the mean and median SPAC divestment rate after announcement of a deal were 90 percent and 98 percent. This implies that a large part of the shareholders that benefit from the SPAC structure and a potential announcement pop, e.g. the SPAC Mafia, do not play a role in taking the target company public. The non-involvement of the larger funds who participated in the IPO may therefore influence the share price following the merger. Dasgupta et al. (2010) found that institutional sell-herding, as in the case of SPACs, is followed by negative short-term returns. This finding emphasizes the SPAC Mafia's role in the negative performance surrounding the merger. Additionally, the role of institutional ownership in performance is further emphasized by Osagie and Osho (2005) who find that a high institutional ownership is correlated with positive stock returns.

Another potentially impactful element that a SPAC has on the new public entity is related to incomplete information. Firstly, the incomplete information is connected to the dilution in a SPAC arrangement which mainly stems from redemptions of warrants and rights. An increasing number of redemptions have a negative effect on the cash delivered from the SPAC and reduce the total value of the post-merger. Furthermore, many SPACs include rights in their IPO unit which generally are tradable for 1/10 of a share by the time of the merger. This creates even more dilution on the post-merger shares as well as reduces the amount of cash delivered by the SPAC (Klausner and Ohlrogge, 2020). The information of the extent of the dilutive effects on the post-merger company are available first after the shareholder vote on the merger, when the shares tendered for redemption are reported. By this, we have a case where the lack of information causes uncertainty about the value leading up to the merger and may cause volatility as the dilutive costs are made public following the merger. Other sources of incomplete information are that the target company is private, implying that the value might be disputed and therefore the surplus created is unclear, and the uncertainty of the sponsors' involvement in the post-merger company (Klausner and Ohlrogge, 2020).

Klausner and Ohlrogge (2020) conducts research on the performance of SPACs post-merger during the period 2019–2020. They find that the mean return of a SPAC three months post its merger was -2.9 percent and the median return -14.5 percent. Looking further, the performance of the SPACs was even worse with a mean return of -12.3 percent after six months and -34.9 percent after twelve months. Moreover, they analyse the relationship between the amount of dilution in a SPAC and its sixth month returns post-merger. The results showed that SPAC dilution was highly correlated with the post-merger performance, leading them to conclude that the structure of the SPAC, with its dilutive features, is the main cause of the poor returns after the conclusion of the merger.

Furthermore, they provide evidence that the quality<sup>1</sup> of the sponsor had a strong effect on the short-term post-merger return of the SPAC. After three months the high-quality sponsored SPACs had a return of 31.5 percent compared to -39 percent of those with no high-quality sponsor. Klausner and Ohlrogge find two potential reasons for the discrepancy between the groups during the shorter period of observation. Firstly, connected to dilution, the high-quality sponsor may have better opportunities to find a target company that the shareholders find attractive. In this case, as the attractive proposed merger is appreciated by the market, fewer shareholders choose to redeem their shares as they can sell them on the market for a higher price. Also, the high-quality sponsors in combination with an attractive target company may be more likely to attract more PIPE deals. Both these factors can reduce the amount of dilution at the time of merger. Secondly, the high-quality sponsors' other engagements can potentially lead to value creating opportunities for the post-merger company. This could also help reduce the dilution caused by the SPACs structure. Whilst the previous literature on the lacking structure of the SPAC explains long-term negative performance following the merger, our study tests the performance of the SPAC surrounding the merger day to assess abnormalities in the SPAC market. We propose that the SPAC structure influences the returns surrounding the merger.

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<sup>1</sup> Klausner and Ohlrogge define a high-quality sponsor which had at least a successful run at one SPAC in the past.

## 4. Data and Method

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### 4.1 Data Gathering and Sample

To test our predictions, we analyze a sample of SPACs that went public on the U.S. exchanges during a period 2015–2020 and successfully merged prior to March 2021. The two most important dates for our analysis have been what we call the date of the definitive agreement and merger completion date, labelled respectively as event 1 and event 2. In the absence of compiled data available, from popular outlets such as Bloomberg and Reuters, we had to manually collect data from SEC filings. The date of the definitive agreement is somewhat difficult to retrieve but is most often found in one of the following filings: current report (8-k), merger prospectus/communication (425) or preliminary proxy statements relating to merger or acquisition (PREM14A). Furthermore, the website spacktrack.net has been used to further attest the information found in the SEC filings. The yearly distribution of the definitive agreement can be seen in the following table:<sup>2</sup>

<i>Year</i>	<i>2016-2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>
Mergers	22	18	58	15

*Table 1. Number of mergers.*

The merger completion date generally is easily retrieved from the “25-NSE” filing for delisting, and is distributed as follows:

<i>Year</i>	<i>2016-2017</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>
DA	13	15	28	57

*Table 2. Number of definitive agreements.*

The dates of the data gathered from the filings were subsequently altered so that they would coincide with the event day. In other words, if a filing was sent after hours the date was shifted to the next trading day. Due to data unavailability of intraday price data, our study is conducted using daily price data with the percentage change based on closing prices. The price data is retrieved via the Bloomberg Terminal.

For the supplementary analysis, we divided our dataset in groups of years, industry, IPO size, and institutional ownership. Due to the opaque nature of, in particular, SPACs prior to 2015 we

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<sup>2</sup> 2016-2017 are grouped together for further analysis in supplementary studies.

suffered from data unavailability. In order to ensure the validity of our results we decided to limit our research to SPACs that had their IPO during 2015 and onwards. Years are divided in tranches of 2016–2017, 2018, 2019 and 2020 in the case of event one. For event two the group of years are 2016–2018, 2019, 2020 and 2021. In various cases our main analysis of the events shows results that are strongly influenced by the performance of the SPACs in 2020 and 2021. Therefore, a yearly analysis is conducted which addresses this issue.

IPO size is divided into three tranches based on the data. Companies with an IPO smaller than \$150M is categorized as small. Between \$150M and \$300M is categorized as medium whilst an IPO larger than \$300M is considered large. Data of IPO size is available in the SPAC prospectus, our sample is distributed as follows.

<i>Size</i>	<i>Small</i>	<i>Medium</i>	<i>Large</i>
Companies	34	49	31

Table 3. Number of companies in each category.

The four industries which we have chosen to investigate are tech, industrials, health, and finance. These were chosen due to their prevalence amongst the listed SPACs. Examples of company types in the tech sector are autonomous vehicles, electric vehicles, e-learning platforms, and data management. Examples of industrials are manufacturing companies and, oil and gas companies. Finance includes, amongst others, insurance, and online banking. Finally, health includes biotech companies and pharmaceuticals. Industry of the target company is based on the company’s descriptions on their individual investor relation pages, and the distribution can be seen below.

<i>Industry</i>	<i>Tech</i>	<i>Finance</i>	<i>Industrials</i>	<i>Health</i>
Companies	28	17	18	17

Table 4. Number of definitive agreements.

For the analysis of institutional ownership, the sample was divided into two groups labelled low and high. Low institutional ownership was everything below the median and high institutional ownership everything above. We obtained the level of institutional ownership for each SPAC at the two separate events from the Bloomberg Terminal.

In order to not get skewed results, we conducted winsorizing removing the extreme outliers which were connected to corporate events that were not related to the SPAC events of our study. Since our study examines SPACs on two specific events it is a requirement that both of these events took place, which implies that our sample does not consist of any SPACs that were liquidated at the second event due to a disapproval by the shareholders of the proposed merger. During the time frame of our study there were seven SPACs that were liquidated and consequently excluded entirely from our sample (Spacinsider, 2021). This procedure inevitably causes some survivorship bias but is necessary for the comparison between the events.

By examining our dataset, we saw that in some cases it took as little as two months for the SPAC to propose a merger. In order to ensure availability of price data with no overlapping we chose a buffer size of 21 days. Additionally, we used an estimation window of 5 days prior ranging to 5 days after the events to study the movement of the SPACs in a time period surrounding the events. This window allows us to analyse SPAC returns caused by potential rumours, market inability to process information and drift-effects.

In addition to the Market Model, we tested the robustness of the event study with the Fama-French Factor Model and the Constant Mean Return Model. To conduct the Fama-French Factor Model, we collected the three Fama French factors from the Kenneth data library (Kenneth Data Library).

#### 4.2 Descriptive Statistics

The final dataset consists of 113 different SPACs which went public between 2015 and 2020.

The following table contains statistics of the returns during the event period.

Day	Mean	Std	Min	1%	25%	50%	75%	99%	Max
-5	0.0016	0.0180	-0.0553	-0.0370	-0.0009	0.0000	0.0010	0.0699	0.1363
-4	0.0031	0.0327	-0.0638	-0.0477	-0.0009	0.0000	0.0017	0.1341	0.2953
-3	0.0028	0.0150	-0.0323	-0.0310	0.0000	0.0000	0.0020	0.0409	0.1153
-2	0.0026	0.0410	-0.1692	-0.0524	-0.0007	0.0000	0.0020	0.0579	0.3867
-1	0.0023	0.0211	-0.0869	-0.0713	-0.0010	0.0000	0.0039	0.0759	0.1140
0	0.0420	0.1173	-0.1349	-0.0983	-0.0010	0.0084	0.0372	0.4682	0.8740
1	0.0061	0.0537	-0.0945	-0.0623	-0.0050	0.0000	0.0015	0.2688	0.3023
2	-0.0025	0.0316	-0.1539	-0.1080	-0.0048	0.0000	0.0020	0.0114	0.1629
3	-0.0019	0.0238	-0.0801	-0.0736	-0.0033	0.0000	0.0021	0.0696	0.0793
4	0.0019	0.0328	-0.1441	-0.0914	-0.0037	0.0000	0.0042	0.1240	0.1775
5	0.0062	0.0468	-0.0537	-0.0499	-0.0029	0.0000	0.0029	0.1861	0.4121

Table 5. Event 1 Descriptive statistics of raw data. Sample consists of 113 companies.

The mean stock price movement of the ‘event day’ (of the deal announcement), labelled “Day 0”, was 4.2 percent with a standard deviation of 11.72 percent. Notably, there is a large discrepancy between the stocks that had a negative reaction and the stocks that saw a price increase on the event day. The worst performing stock declined 13.48 percent whilst the strongest performer increased 87.4 percent.

Despite winsorizing, there is still quite the difference between the highest stock movement and the 99 percentile in some cases surrounding the event. For example, on the “event day” one stock increased by 87.4 percent, but it was deemed accurate since the stock, QuantumScope, initially rallied following the announcement, thus a SPAC related event. The stock price later topped out six months later at north of 130\$.

Day	Mean	Std	Min	1%	25%	50%	75%	99%	Max
-5	-0.0008	0.0420	-0.1670	-0.1513	-0.0087	0.0000	0.0102	0.1037	0.1822
-4	0.0077	0.0452	-0.1375	-0.0967	-0.0097	0.0021	0.0182	0.1586	0.2004
-3	0.0053	0.0621	-0.2809	-0.1686	-0.0139	0.0028	0.0228	0.1663	0.1945
-2	0.0015	0.0586	-0.1373	-0.1003	-0.0163	0.0000	0.0326	0.1892	0.1955
-1	-0.0092	0.1136	-0.6386	-0.4124	-0.0334	-0.0009	0.0186	0.2651	0.4977
0	-0.0001	0.1183	-0.4368	-0.3737	-0.0269	0.0000	0.0216	0.4218	0.5744
1	0.0108	0.1180	-0.2575	-0.2414	-0.0308	-0.0016	0.0336	0.2896	0.8602
2	-0.0141	0.0885	-0.3800	-0.2351	-0.0493	-0.0121	0.0096	0.3016	0.3664
3	-0.0036	0.1242	-0.1949	-0.1525	-0.0508	-0.0013	0.0088	0.3954	1.0396
4	-0.0063	0.1076	-0.2314	-0.2007	-0.0443	-0.0090	0.0155	0.2313	0.8706
5	0.0031	0.1172	-0.2705	-0.1786	-0.0320	-0.0028	0.0210	0.2005	1.0265

Table 6. Event 2 Descriptive statistics of raw data. Sample consists of 113 companies.

The mean stock price movement of the ‘event day’ (of the merger), labelled “Day 0”, was -0.0081 percent with a standard deviation of 11.83 percent. Notably, there is a large discrepancy between the stocks which had a negative reaction and the stocks which saw a price increase on the event day. The worst performing stock declined -43.68 percent whilst the strongest performer increased 57.44 percent.

### 4.3 Event Study

The concept of the “Event Study” was invented by Ball and Brown in 1968. The purpose of the event study is to quantify a chosen events’ effect on the stock price in terms of abnormal returns.

#### 4.3.1 Constant Mean Return Model

The constant mean return model is perhaps the most straightforward approach to conduct an event study. Despite its simplistic nature, Brown and Warner (1985) finds that it often yields similar results to that of more complicated models. Given that  $\mu_i$  denotes the mean return for the asset, the model  $i$  is specified by:

$$R_{it} = \mu_i + \zeta_{it} \quad (1)$$

$$Var(\zeta_{it}) = \sigma_{\zeta_i}^2 \quad (2)$$

$$E(\zeta_{it}) = 0 \quad (3)$$

where  $R_{it}$  denotes the return and  $\zeta_{it}$  is the time period disturbance term of the security. As pointed out by MacKinlay (1997) the similarity in returns between the constant mean return model and the more complex models is attributed to the fact that the variance of the abnormal return is not usually reduced by choosing a model with more parameters.

#### 4.3.2 Market Model

This paper mainly utilizes the “market model”, as proposed by MacKinlay in 1997. The market model relates the returns of a specific stock to the return of the market portfolio, which in our case is the S&P500 index. The model is formally explained by:

$$R_{it} = \alpha_i + \beta R_{mt} + \varepsilon_{it} \quad (4)$$

$$E[\varepsilon_{it}] = 0 \quad (5)$$

$$Var[\varepsilon_{it}] = \sigma_{\varepsilon_{it}}^2 \quad (6)$$

where  $R_{it}$  and  $R_{mt}$  denotes the returns of the chosen security and the market portfolio respectively, and  $\varepsilon_{it}$  denotes the zero mean disturbance term,  $\alpha$ ,  $\beta$ , and  $\sigma_{\varepsilon_{it}}^2$  are the parameters of the market model.

The formula for abnormal return is as follows:

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt} \quad (7)$$

where  $AR_{it}$  denotes abnormal return,  $R_{it}$  is the stock return,  $R_{mt}$  equals the market return,  $\hat{\alpha}_i$  and  $\hat{\beta}_i$  explains the typical relationship of the stock and the reference index obtained via regression analysis.

The abnormal return is the disturbance term of the market model calculated on an out of sample basis. In order to measure the aggregated impact of the share price one adds the abnormal returns to achieve the cumulative abnormal returns (CAR):

$$CAR_i(\tau_1\tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AR_{it} \quad (8)$$

To study the effect of the same type of event on multiple stocks we calculate the cumulative average abnormal return or CAAR as such:

$$CAAR = \frac{1}{n} \sum_{i=1}^n CAR(\tau_1\tau_2) \quad (9)$$

Furthermore, the formula of the t-statistic is based on the standard deviation of the abnormal returns in the estimation window. The formula for calculating standard deviation is the following:

$$S_{AR_i}^2 = \frac{1}{M_i - 2} \sum_{t=T_0}^{T_1} (AR_{i,t})^2 \quad (10)$$

where  $M_i$  refers to the number of non-missing returns. In order to find the t-statistics of  $AR_{i,t}$  and  $CAR_i$  we use the following formulas:

$$t_{AR_{i,t}} = \frac{AR_{i,t}}{S_{AR_i}} \quad (11)$$

$$t_{CAR} = \frac{CAR_i}{S_{CAR}} \quad (12)$$

#### 4.3.3 Fama French Three Factor Model

The famous Fama French Three Factor Model was first proposed by Fama and French in 1992. The model stems from the capital asset pricing model with the goal of expanding the analysis by accounting for the fact that small-cap and value stocks tend to outperform the market. The original model builds on the following three factors: small minus big, high minus low and portfolio excess return. Small minus big accounts for the discrepancy in return of stocks with small and large market capitalizations. High minus low controls for the outperformance of values stocks with high book-to-market ratios. The formula for the Fama-French Model is:

$$R_{it} - R_{ft} = \alpha_{it} + \beta_1(R_{Mt} - R_{ft}) + \beta_2SMB_t + \beta_3HML_t + \varepsilon_{it} \quad (13)$$

where  $R_{it}$  denotes the total return of a stock or portfolio  $i$  at time  $t$ ,  $R_{ft}$  denotes the risk free rate of return at time  $t$ ,  $R_{Mt}$  denotes total market portfolio return at time  $t$ ,  $R_{it} - R_{ft}$  thus denotes the expected excess return whilst  $R_{Mt} - R_{ft}$  denotes the excess return on the market portfolio. Additionally,  $\varepsilon_{it}$  denotes the error term at time  $t$ . Finally,  $SMB_t$  and  $HML_t$  is the size premium and the value premium.

## 5. Results and Discussion

### 5.1 Event 1 – Deal Announcement

The results presented are the performance of the study's SPAC sample surrounding the filing of an intention to merge with a target company. The data indicates significant cumulative abnormal average returns of 5.4 percent during the timeframe.

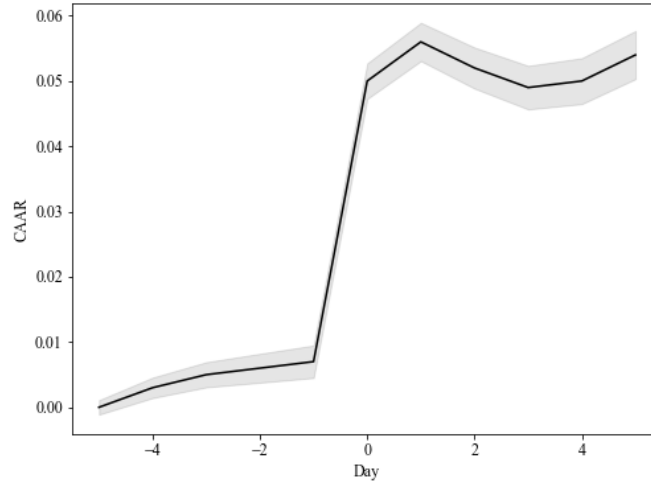


Figure 1

Day	AAR	CAAR	T-stat
-5	0.000	0.000	0.41
-4	0.003	0.003	1.97
-3	0.002	0.005	2.52
-2	0.001	0.006	2.83
-1	0.001	0.007	2.97
0	0.043	0.050	18.93
1	0.007	0.056	19.84
2	-0.005	0.052	17.07
3	-0.003	0.049	15.23
4	0.001	0.050	14.80
5	0.004	0.054	15.24

Table 7. Event 1 full sample. T-statistic refers to CAAR.

With the exception of 5 days prior to the event, all of the results are significant at the 5 percent level. As observable, the days leading up to the event show positive, albeit small, cumulative average abnormal returns of 0.7 percent. Most importantly, the average abnormal return of the event day, at 4.3 percent, indicates an increase in the share price when the SPAC announces their intention of merging with a specific target company. The returns of the days following the event are somewhat mixed but rather small with returns between -0.5 and 0.7 percent. In total

these five days generate an aggregated excess return of 0.4 percent. Due to the small size and irregularity of these returns, we draw no conclusions from these findings. In total the event window of five days following the announcement exhibits a cumulative average abnormal return of 5.4 percent significant at the 1 percent level.

At the core of our analysis is the event day. The average abnormal return of 4.3 percent clearly indicates that, during the years covered by our analysis, investing in pre definitive agreement SPACs has been a profitable strategy. The results suggest that on an aggregated level the SPAC market has been trading at a discount to what value that the market attributes to the target companies that the deals are announced with. These results are in line with our hypothesis that market sentiment influences the return at the announcement. Furthermore, the SPAC structure offers limited downside as an investor can redeem their shares to receive their part of the trust. This possibility implies that if a SPAC is trading close to the net asset value at the announcement of a deal, it has a favourable reward relative to risk, with its limited downside and an unlimited upside. According to the efficient market hypothesis, introduced by Fama (1970), a profitable strategy where one buys all SPACs pre-announcement, should be impossible since the market should reflect all available information, including historical prices and public available information. If the SPAC market were efficient, the average premium to net asset value would reflect the average return following the announcement, removing the possibility to profit on the strategy. Our analysis indicates that contrary to the semi-strong form of the EMH, the prices of the SPAC market did not have all the relevant information incorporated even though the SPACs merger intentions were clear, and the historical returns were available.

An issue with the SPAC structure that is evident at the time of the deal announcement is related to the accuracy of the financial information and projections that are disclosed about the target company. If unrealistically positive, these statements might give a short-term unjustifiable effect on the return associated with the deal announcement. As stated earlier, nearly 15 percent of traditional IPOs since 2015 have been targeted by shareholder lawsuits due to misstatements and omissions in disclosures. Compared to the traditional IPO, the SPAC structure has more lenient regulations regarding disclosure of information, which gives room for more speculative data to try to persuade investors about the prospects of the target company (Stanford, 2021). Everyone involved in preparing the information has clear incentives to portray the company in the best possible ways as a higher stock price increases their own wealth.

## 5.1.1 Timing Effect

Moreover, we divided the SPAC deal announcements into groups sorted by the period of the events. This study enables investigating the impact of change in demand from investors, supply of SPACs, and media attention during the last years and whether it has generated different SPAC returns.

Day	2016–2017 (13)			2018 (15)			2019 (28)			2020 (57)		
	AAR	CAAR	T-stat	AAR	CAAR	T-stat	AAR	CAAR	T-stat	AAR	CAAR	T-stat
-5	-0.002	-0.002	-1.22	0.000	0.000	0.31	0.000	0.000	-0.91	0.003	0.003	1.43
-4	-0.001	-0.004	-1.37	0.001	0.001	0.74	0.000	0.000	-0.60	0.005	0.008	2.88
-3	0.002	-0.001	-0.41	0.000	0.001	0.72	0.000	-0.001	-0.73	0.003	0.011	3.26
-2	0.001	0.000	-0.03	0.001	0.002	1.09	0.000	0.000	-0.28	0.002	0.013	3.48
-1	0.001	0.001	0.29	-0.001	0.002	0.68	-0.002	0.001	1.26	0.002	0.015	3.57
0	0.016	0.017	3.56	0.015	0.016	6.75	0.013	0.014	11.99	0.070	0.085	18.40
1	0.002	0.019	3.63	0.001	0.017	6.45	0.001	0.015	11.84	0.010	0.095	19.04
2	0.007	0.026	4.57	0.000	0.017	6.07	0.000	0.015	10.97	-0.007	0.089	16.58
3	0.002	0.028	4.66	0.000	0.017	5.76	0.000	0.015	10.32	-0.006	0.082	14.51
4	0.000	0.028	4.48	-0.001	0.016	5.10	0.001	0.015	10.24	0.002	0.084	14.02
5	0.002	0.030	4.54	0.001	0.017	5.10	0.000	0.015	9.54	0.010	0.093	14.89

Table 8. Event 1 timing effect, number of observations in parenthesis. T-statistic refers to CAAR.

Notably, the difference in T-statistics prior to the deal announcement is interesting to analyse further across the different periods. The following matrix shows the T-statistic of the difference in average abnormal returns of the event day.

Year	2016-2017	2018	2019	2020
2016-2017		0.16	0.48	-2.30
2018	-0.16		0.41	-2.48
2019	-0.48	-0.41		-2.63
2020	2.30	2.48	2.63	

Matrix 1. T-Statistic of the difference in average abnormal return of the event day for event 1.

From the matrix it is clear that the average abnormal return in 2020 is higher than in the other observed time periods. The significant and positive average returns, in table 8, prior to the event in 2020 can possibly be explained by an increasing amount of leakage of information during this period. In some SPACs, information about the target or an impending definitive agreement, is rumoured in the media or speculated on by investors in the days prior to the announcement. In several cases, the media, primarily Bloomberg, have reported that target companies and

SPACs are having discussions about potential mergers. To exemplify, in March 2021, Bloomberg had released 43 articles of SPAC rumours, where 31 have followed to announce a deal in line with the reports. In five cases Bloomberg's reports were inaccurate and in the remaining seven a deal was not yet announced. The data does not only suggest that Bloomberg is accurate in their rumours but also that there is a large leakage of information prior to the official announcement on the markets. This would explain why the abnormal average returns are skewed to the upside, between day -4 to -1, before the company has made their intentions public (SPAC Rumour Database). Another aspect to why we have seen such an increase in rumours reported by the media is that SPACs during the previous years were generally uninteresting to large parts of the public. During 2020 and 2021 the market has had a large appetite for these stories which explains the media's large upturn in reporting on these rumours.

Furthermore, the results suggest that the SPACs returns on the event day and the days following the deal announcements in 2020 were superior in comparison to the years of 2016–2017, 2018, and 2019. The improved returns in 2020 surrounding the announcement of the definitive agreement indicates that it is of interest to analyse the underlying prerequisites.

As we see it, there have been several market settings that have aligned following the pandemic to create favourable SPAC conditions. Lowry (2003) and Choe et al. (1993) demonstrate that GDP growth and IPO volume were positively correlated. We can draw parallels to these findings and last year's events as market participants started projecting GDP growth to come back very strong after the crisis. To support the economic resurgence, the Federal Reserve decided to lower interest rates which created a market that is willing to pay a large premium for future earnings as capital is cheap and accessible (Financial Times, 2020a). This implies that tech-companies with future prospects are valued at high multiples (Aggarwal et al, 2009). In addition, Biden has promised to re-join the Paris Agreement and is expected to pay large attention to sustainable politics, which has benefitted companies with sustainable business solutions following the election (Reuters, 2020). Therefore, the target companies in the SPAC arrangement might at this moment be of particular interest to market participants in search for the next big thing (Maksimovic and Pichler, 2001). Furthermore, with the stock market rising and as capital is cheap, there are larger incentives to go public. Pastor and Veronesi (2005) find that company insiders tend to go public after observing improving market conditions. This is also in line with Loughran et al. (1994) who displayed significant positive correlation between stock market indices and IPO volume. After the short but steep market correction in March

2020 we have seen extremely rapid improvements of market conditions. By this, the target companies might be more prone to consider a listing as they are persuaded to partner up with the sponsors' SPAC. On this topic, Lowry and Schwert (2002) demonstrated that more firms choose to go public after periods of high underpricing as they are enticed by the positive outcomes from previous IPOs to believe that they can make more money than earlier expected. These factors have urged a large number of companies to choose the SPAC route as it is seen as the quickest way to capitalize as the market is hot. The consequence is an accelerating supply of SPACs to earlier unseen amounts of IPOs.

Additionally, on the demand side, there has been an enormous interest following the drop in March 2020. Stock market and retail interest at all-time-high, stimulus checks, convenient investment applications (such as RobinHood), and lock-down have all played their part in the SPAC demand (Fortune, 2021). Moreover, as the SPAC route is becoming increasingly accepted and legitimized the sponsors have started to secure merger deals with more impressive companies, which is causing the returns to skyrocket at the announcement (Financial Times, 2020c). The potential of being rewarded with one of these massive deal announcements is causing retail investors to park their money in the pre-announcement SPAC (Luttig, 2021). The interest has created a willingness to buy the SPAC as investors want in on the favourable risk/reward opportunity. With an increasingly strong demand from investors and a supply trying to catch up, we have a mix of circumstances that causes the prices to increase with abnormal returns.

### 5.1.2 Size Effect

Furthermore, we divide the SPAC sample into subgroups depending on the size of the trust. This distinction allows test of the hypothesis that size of the IPO determines the performance of the SPAC surrounding the deal announcement.

*Return of the SPAC*

<i>Day</i>	<i>Small (34)</i>			<i>Medium (49)</i>			<i>Large (31)</i>		
	<i>AAR</i>	<i>CAAR</i>	<i>T-stat</i>	<i>AAR</i>	<i>CAAR</i>	<i>T-stat</i>	<i>AAR</i>	<i>CAAR</i>	<i>T-stat</i>
-5	-0.004	-0.004	-2.04	0.004	0.004	2.89	0.000	0.000	0.06
-4	-0.002	-0.006	-2.10	0.009	0.013	6.35	-0.002	-0.002	-0.67
-3	-0.001	-0.007	-1.89	0.001	0.015	5.78	0.004	0.001	0.34
-2	0.000	-0.007	-1.76	-0.004	0.011	3.60	0.015	0.016	3.22
-1	0.002	-0.005	-1.14	-0.001	0.009	2.83	0.004	0.020	3.57
0	0.018	0.013	2.46	0.064	0.073	20.47	0.030	0.050	8.27
1	-0.009	0.004	0.66	0.022	0.095	24.69	-0.006	0.045	6.80
2	-0.001	0.003	0.45	-0.006	0.089	21.68	-0.001	0.044	6.22
3	-0.001	0.001	0.22	-0.006	0.084	19.11	0.000	0.044	5.92
4	-0.005	-0.004	-0.60	-0.001	0.082	17.88	0.012	0.056	7.21
5	-0.002	-0.006	-0.88	0.009	0.092	18.99	0.006	0.063	7.66

*Table 9. Event 1 size, number of observations in parenthesis. T-statistic refers to CAAR.*

The results primarily reveal that the subgroup with the smaller SPACs generated smaller, yet positive, returns in comparison to the medium- and large sized SPACs. However, the difference is only significant in the case of small and medium companies.

	<i>Small</i>	<i>Medium</i>	<i>Large</i>
<i>Small</i>		-1.97	-0.68
<i>Medium</i>	1.97		1.19
<i>Large</i>	0.68	-1.19	

*Matrix 2. T-Statistic of the difference in average abnormal return of the event day for event 1.*

An explanation to the difference is that the smaller SPACs cannot attract as qualitative companies as the two other subgroups. Another possible explanation is that deal announcements of smaller companies may also be viewed upon by investors as more speculative and therefore receive a lower return on and following the event day. Furthermore, larger SPACs are more widely covered by media outlets and thus rumours regarding the merger candidate can to a larger extent leak causing a run-up effect. Additionally, the larger size of the trust enables the SPACs to find more well-known private entities for acquisitions, further increasing the likelihood that the companies are more closely observed by both media and market participants. Finally, we are cautious in our interpretation of these results as the findings may be coincidental i.e., there could very well be an omitted variable which correlates with size.

## 5.1.3 Industry Effect

Furthermore, we examined whether the industry of the target company had an effect on the return at the deal announcement. This analysis tests the hypothesis that the industry of the company going public affects the performance in the short-term (Aggarwal et al., 2009).

Day	Tech (28)			Finance (17)			Industrials (18)			Health (17)		
	AAR	CAAR	T-stat	AAR	CAAR	T-stat	AAR	CAAR	T-stat	AAR	CAAR	T-stat
-5	0.003	0.003	1.49	0.000	0.000	-0.16	0.000	0.000	-0.23	-0.003	-0.003	-0.80
-4	0.009	0.012	3.87	0.000	0.000	-0.26	0.000	0.000	-0.19	-0.002	-0.006	-0.95
-3	0.001	0.014	3.54	0.002	0.001	0.43	0.001	0.001	0.23	0.003	-0.003	-0.37
-2	0.007	0.021	4.58	-0.002	-0.001	-0.29	0.001	0.001	0.43	0.003	0.000	0.05
-1	0.003	0.024	4.73	-0.002	-0.002	-0.75	0.001	0.002	0.58	0.000	0.000	0.02
0	0.082	0.106	19.29	0.029	0.027	7.98	0.018	0.020	5.53	0.006	0.006	0.59
1	0.032	0.139	23.30	0.009	0.036	9.91	0.002	0.022	5.60	-0.016	-0.009	-0.83
2	-0.010	0.129	20.25	0.000	0.036	9.38	0.001	0.023	5.43	-0.007	-0.017	-1.38
3	-0.012	0.117	17.35	-0.001	0.035	8.55	0.003	0.026	5.71	0.003	0.014	-1.06
4	0.008	0.125	17.53	-0.006	0.029	6.67	0.006	0.031	6.64	0.002	-0.012	-0.86
5	0.017	0.142	18.98	0.001	0.030	6.51	0.012	0.044	8.82	0.003	-0.009	-0.63

Table 10. Event 1 industry, number of observations in parenthesis. T-statistic refers to CAAR.

We find significant results that the SPACs who have announced a deal with a tech-company generated far stronger returns compared to the other groups before, at the time, and on the days following the announcement. Further attested by statistically significant differences between the industries as portrayed in the following matrix.

Industry	Tech	Health	Finance	Industrials
Tech		2.62	1.93	2.43
Health	-2.62		-1.46	-0.86
Finance	-1.93	1.46		1.12
Industrials	-2.43	0.86	-1.12	

Matrix 3. T-Statistic of the difference in average abnormal return of the event day for event 1.

A possible explanation to the strong returns of tech-targets is that following the drop in March 2020, the tech industry has been in the forefront of the market resurgence (Financial Times, 2020b). Low interest rates and high valuation multiples in tech might therefore explain the high appetite for these companies in the SPAC space. The lucrative market conditions and the strong track records of the tech SPACs has also created a snowball effect which entices more tech companies to consider capitalizing on the hot market. Loughran et al. (1994) finds that stock market indices and IPO volume are correlated. This could explain the coinciding of the high

IPO activity during the last year and the NASDAQ index return of 42.58 percent in 2020. Finally, Maksimovic and Pichler (2001) demonstrates that firms may choose to go public to capture a first-mover advantage where the publicity and reputation associated with an IPO gives them a more favourable position in their niche.

Another potential aspect is that tech-companies are more likely to not have significant profits to communicate but instead rely on more speculative forward projections with “blue sky scenarios” thanks to the lenient regulation under PSLRA. To exemplify, three companies that merged with SPACs during the last years, Faraday Future, Arrival Group and Fisker, all projected \$10B in sales within three years of launching sales. To put this into perspective, the current record holder Google took eight years to achieve these sales figures (The Wall Street Journal, 2021b). These estimates should thus be associated with great uncertainty, but the market often underestimates the risks and overestimates the opportunities (The Motley Fool, 2021). Aggarwal et al (2009) study this valuation difficulty as they examined the impact of fundamentals on IPO valuation during different periods in time, with emphasis on the Dot-com bubble. They found that the firms with more negative earnings were valued higher than firms with less negative earnings. The results suggest that investors view negative earnings as a proxy for growth, rewarding these companies with a valuation premium.

#### 5.1.4 Ownership Effect

Finally, we sorted the SPACs into two groups depending on the extent of institutional ownership at the time of the events to test the hypothesis that return during the deal announcement was affected by the nature of the shareholders at that moment. As seen in table 9 we found significant evidence that there was no clear difference between the two groups at the deal announcement and during the days following the news.

*Return of the SPAC*

<i>Day</i>	<i>Low (57)</i>			<i>High (56)</i>		
	<i>AAR</i>	<i>CAAR</i>	<i>T-stat</i>	<i>AAR</i>	<i>CAAR</i>	<i>T-stat</i>
-5	0.003	0.003	1.44	-0.001	-0.001	-1.00
-4	0.005	0.007	2.90	0.000	-0.001	-0.49
-3	0.003	0.011	3.39	0.000	-0.001	-0.46
-2	-0.004	0.007	1.97	0.007	0.006	2.34
-1	-0.002	0.006	1.40	0.004	0.010	3.28
0	0.044	0.049	11.08	0.039	0.048	14.94
1	0.008	0.058	11.96	0.003	0.051	14.59
2	-0.006	0.051	9.98	0.000	0.051	13.59
3	-0.004	0.048	8.74	-0.002	0.049	12.32
4	0.000	0.048	8.35	0.002	0.051	12.22
5	0.009	0.057	9.44	0.002	0.053	12.02

*Table 11. Event 1 ownership, number of observations in parenthesis. T-statistic refers to CAAR.*

### 5.1.5 Robustness

From our findings in 5.1.3, we concluded that tech SPACs generally showcased stronger returns when the target company was announced. To test whether the return of the tech SPACs was due to the strong performance by the tech sector in the overall market the reference index was altered from S&P500 to NASDAQ. That is, when conducting the event study, the return of the market is based on NASDAQ rather than S&P500 as it were previously. The results were almost identical in the two studies which confirms that the significant returns of the tech SPACs were not due to tech strength in general, but rather the outperformance of these SPACs.

<i>Day</i>	<i>AAR</i>	<i>CAAR</i>	<i>T-stat</i>
-5	0.003	0.003	1.50
-4	0.009	0.013	3.95
-3	0.002	0.014	3.62
-2	0.007	0.021	4.63
-1	0.003	0.024	4.78
0	0.083	0.107	19.39
1	0.032	0.139	23.37
2	-0.009	0.129	20.37
3	-0.012	0.118	17.48
4	0.007	0.125	17.64
5	0.017	0.142	19.12

*Table 12. Event 1 Nasdaq robustness tech. T-statistic refers to CAAR.*

Furthermore, we tested the robustness of our results by applying the constant mean return model and the Fama French three factor model. From the results we can conclude that our findings were not due to the choice of model as the results from the three models are very similar.

Day	Fama French			Constant Mean			Market Model		
	AAR	CAAR	T-stat	AAR	CAAR	T-stat	AAR	CAAR	T-stat
-5	0.000	0.000	0.25	0.001	0.001	0.27	0.000	0.000	0.41
-4	0.003	0.003	1.93	0.002	0.003	0.77	0.003	0.003	1.95
-3	0.001	0.004	2.40	0.002	0.005	1.02	0.002	0.005	2.52
-2	0.001	0.006	2.79	0.002	0.007	1.18	0.001	0.006	2.83
-1	0.001	0.006	2.74	0.001	0.008	1.28	0.001	0.007	2.97
0	0.041	0.047	18.81	0.041	0.049	7.29	0.043	0.050	18.93
1	0.004	0.052	19.01	0.005	0.054	7.46	0.007	0.056	19.84
2	-0.004	0.048	16.58	-0.003	0.051	6.53	-0.005	0.052	17.07
3	-0.003	0.046	14.76	-0.003	0.048	5.81	-0.003	0.049	15.23
4	0.001	0.047	14.34	0.001	0.049	5.62	0.001	0.050	14.80
5	0.005	0.051	15.04	0.005	0.054	5.94	0.004	0.054	15.24

Table 13. Event 1 FF Robustness/Constant Mean. T-statistic refers to CAAR.

### 5.2 Event 2 – Merger Completion

The results presented are the performance of the SPACs surrounding the merger with the previously announced target company. Our results in the days leading up to, and during, the event are insignificant. However, two days following the merger indicates clear results in the average abnormal returns where each day posted a negative return. Furthermore, the cumulative average abnormal returns, five days following the merger of -6.3 percent, depicts a trend where the SPAC shareholders are negatively compensated for holding through the merger.

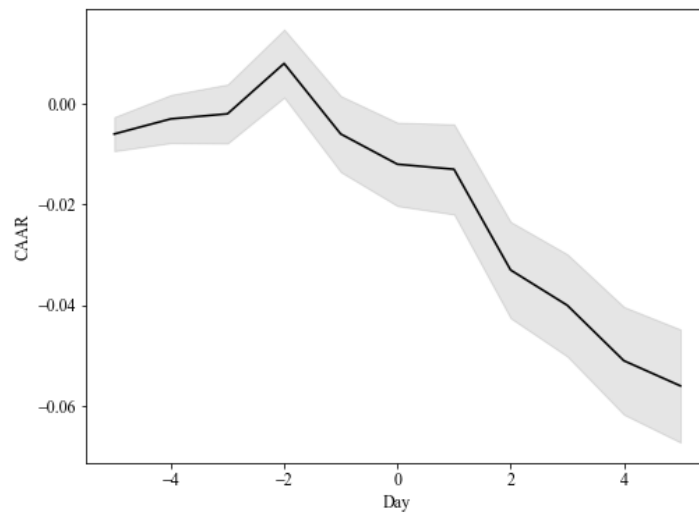


Figure 2

*Return of the SPAC*

<i>Day</i>	<i>AAR</i>	<i>CAAR</i>	<i>T-stat</i>
-5	-0.005	-0.005	-1.57
-4	0.006	0.000	0.06
-3	0.000	0.001	0.09
-2	0.010	0.011	1.64
-1	-0.015	-0.004	-0.58
0	-0.007	-0.012	-1.43
1	-0.002	-0.014	-1.57
2	-0.023	-0.037	-3.91
3	-0.009	-0.046	-4.63
4	-0.011	-0.057	-5.40
5	-0.006	-0.063	-5.68

*Table 14. Event 2 full sample. T-statistic refers to CAAR.*

This negative trend following the merger can potentially be explained by the SPAC structure. Firstly, and most importantly, the extent of the dilution is made public at the time of the merger. In cases where the SPAC has traded close to its net asset value, there are no incentives for the shareholders to hold or sell the share in favour of redeeming them. Therefore, SPACs trading close to their net asset value prior to the merger will likely have far more redemptions and accordingly the shareholders will be diluted to a greater extent in the eventual merger. Also, the redemptions of shares are compensated by the SPAC which implies that a highly diluted SPAC leaves far less cash delivered to the post-merger company. In combination with the incompleteness of information regarding sponsor commitment and the true value of the target company, the dilutive structure causes a harmful mix of elements from the unaware shareholders perspective. Additionally, Klausner and Ohlrogge (2020) find the amount of dilution and six-month return following the merger to be correlated, which, although on a different time frame, further emphasizes the argument for not holding shares of a SPAC through its merger.

Moreover, the completed merger implies that the SPAC now is a listed public entity for the first time, meaning that there is no possibility for the shareholders to redeem their shares. Thus, after having a support at the net asset value level for a long period, the stock now has an unlimited downside for the first time as a drop below the earlier redemption price can suddenly be rationally explained. The previous favourable risk/reward opportunity is therefore diminished.

Furthermore, the negative trend with an exacerbating downfall for several days following the merger is interesting related to market anomalies and potential evidence of inconsistency within

Fama's efficient market hypothesis. Similar to the documented post-earnings announcement drift, described by Ball and Brown (1968), Bernard and Thomas (1989, 1990), and more recently Fink (2020), the post-merger returns of the SPACs are perhaps evidence of market inefficiency. The inability to process the information accurately at the merger could potentially explain the negative drift of the SPAC following the event and is evidence in contrast to Fama's study of semi-strong efficient market tests. Remember, if the SPAC market were efficient, the returns following the merger would not drift for several days but instead drop instantly as the information at the event is made public.

To summarize the findings of event 2, the results in our study suggest that the SPAC shareholders bear the cost of the structure. The dilutive features causing the unfavourable conditions for the SPAC shareholders has recently been the subject of lawsuits. The potential claims investigate possible breaches of fiduciary duty by the board of directors to its shareholders by failing to conduct a fair process, which is mainly attributed to the dilution of the SPAC shareholders following the merger (Brodsky Smith). The attempt to penalize the board of directors of the SPAC highlights the problematic structure of the arrangement and questions whether it really is sustainable. Furthermore, at the end of March 2021, reports revealed that the US Securities and Exchange Commissions (SEC) enforcement division had sent out letters to Wall Street banks underwriters of the SPACs on how they are managing the risks (Reuters, 2021). Also, earlier this year the SEC communicated warnings to investors "not to make investment decisions related to SPACs solely based on celebrity involvement" (SEC). To emphasize the urgency of the message, a few days later, heavily criticized and non-profitable company WeWork, which shelved their IPO a couple of years ago due to critique of its financial strength, reported that it is merging with a SPAC named BowX Acquisition. Among the advisors in the SPAC, we find former basketball professional Shaquille O'Neal. The return following the announcement was 20 percent (NY Times, 2021). The abrupt and diligent involvement of the SEC is yet another sign of the amounting scepticism of the SPAC route and the needs of change on the structure of the arrangements.

Hopefully, as awareness, scrutiny and critique of the SPAC structure increases, the pressure on the sponsors increases and the SPAC vehicle becomes more impartial, and the dilutive features weaken. However, it must be emphasized that the structure of the SPAC is optional as the sponsor chooses the terms of the arrangement, to what degree they invest in the deal and to what length their commitment is. An example of where the sponsor uses non-standardized terms

is Bill Ackmann's SPAC Pershing Square Tontine Holdings (PSTH). The terms differ in many considerable ways but are all encouraging a more long-term view from both the sponsor itself but also for the investors of the SPAC. For example, Pershing Square is not taking any founder shares which usually is the main incentive for a sponsor of a SPAC. Also, two thirds of the warrants in the arrangement are not detachable which intimidates the SPAC Mafia and supports the long-term investors (CNBC, 2020c). On a similar note, four SPACs with amending IPOs, filed for the SEC to remove the warrants and only offer the common shares, which could be a sign of SPACs recognizing the critique (Renaissance Capital). Similar initiatives to PSTH are seen in Sweden's first SPAC, ACQ Bure, where the owners (sponsor), Bure Equity, have designed the terms to support long-term investors. To exemplify, Bure Equity has decided to completely ignore warrants and rights (ACQ Bure). Perhaps the terms of Pershing Square Tontine Holdings and ACQ Bure is where the long-term SPAC space should be heading. Or else, the short term and opportunistic view might lead it to fall out of favour once again.

SPAC IPOs amount to 315 so far in 2021. This enormous increase in SPAC IPOs, triggered by the opportunistic sponsors, is undoubtedly not sustainable and is already creating an excessive supply which is having strong effects on the SPAC markets and the long-term consequences of the target companies. At the moment, there are 302 public SPACs searching for a target company. The large supply of SPACs implies a very tough competition in securing a deal with a target company since these suddenly find themselves in a strong bargaining situation. With several potential SPACs willing to find a deal with the same target, the SPACs have to compete with the price of the deal as a decisive component. A higher price for the deal implies a higher reward for the target company but also worse conditions for the SPAC shareholders who find themselves diluted to a greater extent. Accordingly, the inflated deals affect the SPAC returns negatively at the deal announcement as the details of the deal are disclosed.

Furthermore, the numerous SPACs in search of a target company to merge with has led to a scenario where the supply vastly outweighs the demand on the market (CNBC, 2021). The shift in supply and demand dynamics is the main contributor to that SPAC prices now trade close to or even below the net asset value. If this development persists shareholders will be less incentivized to hold their shares in favour of redeeming them. Consequently, the dilution of the remaining shareholders is intensified to a greater degree by the merger, which likely will generate even worse negative returns in these forthcoming SPACs following their merger.

Finally, the escalation of SPAC IPOs might have long term consequences on the target companies. As stated by Ross Mayfield, investment strategy analyst at Baird, “They (SPACs) are bringing lower and lower quality companies public” (CNBC, 2021). With a deadline approaching many SPACs may find themselves having to settle with a merger with a less ideal target which would not seek to go public under normal circumstances. This trend could have negative implications for the economy in the long term if the target faces financial distress or even bankruptcy (Forbes, 2019). On this topic, Oesterle (2004) studied the Dot-com bubble during the turn of the century and its implications on the economy. He found that after the bubble burst in 2002, many of the companies which had recently gone public had now declared bankruptcy. Additionally, equity investors had lost \$2T of capital value and half a million of telecom workers had lost their jobs. A great example of a potentially premature listing in this era is WeWork which gave up their ongoing IPO a couple of years ago but are now taking the SPAC route to the markets (NY Times, 2021). Furthermore, recently, some SPACs have announced deals with target companies that do not operate in the target industry that they communicated to pursue in their prospectus (CNBC, 2021).

### 5.2.1 Timing Effect

Moreover, we divided the SPACs into groups sorted by the year of their merger to observe the difference in returns. This study tests the hypothesis that the changing market sentiment and supply of SPACs (which the sample distribution displays) influenced the performance surrounding the merger.

Day	2016–2018 (22)			2019 (18)			2020 (58)			2021 (16)		
	AAR	CAAR	T-stat	AAR	CAAR	T-stat	AAR	CAAR	T-stat	AAR	CAAR	T-stat
-5	-0.007	-0.007	-1.57	0.000	0.000	-0.02	-0.009	-0.009	-1.54	-0.002	-0.002	-0.26
-4	0.000	-0.007	-1.13	0.013	0.012	1.46	0.000	-0.008	-1.07	0.006	0.004	0.27
-3	-0.004	-0.011	-1.46	0.005	0.017	1.66	0.007	-0.001	-0.13	-0.018	-0.014	-0.89
-2	0.001	-0.01	-1.14	-0.008	0.009	0.76	0.022	0.021	1.85	0.002	-0.013	-0.71
-1	0.006	-0.004	-0.39	-0.030	-0.021	-1.57	-0.017	0.003	0.27	-0.010	-0.023	-1.13
0	-0.008	-0.012	-1.12	-0.009	-0.030	-2.01	-0.011	-0.008	-0.59	0.015	-0.009	-0.38
1	0.021	0.009	0.76	-0.016	-0.045	-2.83	0.002	-0.006	-0.42	-0.022	-0.030	-1.25
2	0.001	0.010	0.79	0.000	-0.046	-2.67	-0.029	-0.035	-2.19	-0.038	-0.068	-2.62
3	-0.001	0.009	0.66	0.001	-0.044	-2.44	-0.008	-0.043	-2.55	-0.026	-0.094	-3.43
4	0.016	0.025	1.79	-0.022	-0.066	-3.45	-0.021	-0.064	-3.59	0.003	-0.092	-3.16
5	0.057	0.082	5.65	-0.008	-0.074	-3.70	-0.023	-0.087	-4.65	-0.020	-0.111	-3.66

Table 15. Event 2 timing effect, number of observations in parenthesis. T-statistic refers to CAAR.

Firstly, the results from the period of 2016–2018 were insignificant, which entails that one cannot draw any clear conclusion on the direction of returns during these years. The other three groups, however, all demonstrated significant negative returns during the days following the merger. More specifically, the negative returns accelerated throughout the three groups, with CAARs of -7.4 percent, -8.7 percent, and -11.1 percent respectively from 2019 through 2021.

A potential reason for the declining returns in the data is associated with the change of demand and supply of SPACs during the periods. What we have seen from 2019 to 2021 is a sharp increase of institutional and retail demand in trading SPACs with a supply not keeping up with the interest from the market participants. The lucrative characteristics of the SPAC IPOs followed by the appeal of holding the SPAC during the deal announcement implies that there is a large participation in the stock leading up to the merger. With the demand increase in the latter part of 2020 and 2021, the interest and participation pre-merger has certainly escalated. This engagement during the intensified period leading up to the merger suggests that it may be crowded if the majority of the shareholders decide to sell their shares at once as the merger is completed. Another possible explanation caused by the increase in demand is that a large number of SPACs have been trading far above the net asset value leading up to the merger. Thereafter, once the merger is completed the net asset value becomes irrelevant and the inflated valuation faces reality as the target company now trades under the same conditions as all other public securities.

From an investors perspective the results from the yearly studies of the two events highlights a lucrative trading opportunity but also the problem associated with SPACs. Firstly, during the recent period one could have capitalized on the expected abnormal return at the deal announcement by buying all pre-deal SPACs. The opportunist would then sell their shares, or even take short positions, as the merger of the SPACs approaches (The Wall Street Journal, 2021b). This method is commonly utilized by institutions. Klausner and Ohlrogge (2020) found that a large part of the funds who are required to file 13F filings divested their shares after the announcement and did not play a role in the merger of the company. These institutions are widely known as the SPAC Mafia. On this topic, Dasgupta et al. (2010) found that institutional sell-herding is followed by negative short-term returns. This would explain the weak trend of these SPACs by the time of the merger as the institutional investors recently have sold their shares. Furthermore, what we have seen in the beginning of 2020 is that there has been a large increase in short interest from investors (The Wall Street Journal, 2021b). This includes not

only positions prior to the merger to bet against the dilutive structures' effects, but also following the merger to wager against the new public entity. Finally, the lucrative trading strategy also may have long term negative effects as it creates a large change in ownership of the SPAC. Accordingly, the intense exchange of ownership might leave the merged company with fewer owners with long term interests in the company. To combat this development, we have recently seen Swedish SPAC, ACQ Bure, which has attempted to add incentives in the structure of the SPAC to increase the long-term commitments of the shareholders (ACQ Bure).

### 5.2.2 Size Effect

Moreover, we analysed if the size of the SPAC affected the returns surrounding the merger. Sorting the SPACs by the size of the trust allows testing the hypothesis that size is a determining factor in performance through the merger.

Day	Small (34)			Medium (49)			Large (31)		
	AAR	CAAR	T-stat	AAR	CAAR	T-stat	AAR	CAAR	T-stat
-5	-0.017	-0.017	-2.94	-0.005	-0.005	-0.81	0.004	0.004	0.82
-4	-0.007	-0.024	-2.97	0.007	0.002	0.22	0.008	0.012	1.73
-3	-0.005	-0.030	-2.96	0.002	0.004	0.42	0.006	0.018	2.13
-2	0.011	-0.019	-1.62	0.018	0.022	1.88	-0.003	0.016	1.57
-1	-0.038	-0.057	-4.38	0.000	0.022	1.65	-0.008	0.007	0.66
0	0.006	-0.052	-3.62	-0.018	0.004	0.30	-0.003	0.004	0.36
1	-0.019	-0.071	-4.60	-0.013	-0.009	-0.55	0.040	0.044	3.36
2	-0.031	-0.110	-6.68	-0.021	-0.030	-1.75	0.003	0.048	3.38
3	-0.012	-0.122	-6.96	-0.001	-0.030	-1.70	-0.015	0.033	2.19
4	0.006	-0.116	-6.29	-0.016	-0.046	-2.46	-0.019	0.013	0.85
5	0.013	-0.103	-5.34	-0.012	-0.058	-2.95	-0.012	0.001	0.07

Table 16. Event 2 size, number of observations in parenthesis. T-statistic refers to CAAR.

The results suggest that the group of smaller SPACs performed significantly worse during the days after the merger completion compared to the mid- and large sized SPACs. A probable explanation for this is connected to the dilutive features. As explained earlier, smaller SPACs may not be able to attract as qualitative targets as the medium- and large sized SPACs which leads to lower returns at the deal announcement. During the period between the two events, these SPACs will likely be trading closer to the net asset value, and therefore shareholders have no incentives to sell the share on the market in favour of redeeming them. Consequently, an increasing amount of redemptions leads to an increasing amount of dilution of the shareholders, which thereafter is reflected in the SPACs negative performance in the days following the

release of the information on the extent of dilution. Furthermore, as the medium and large sized SPACs may be more likely to attract more qualitative targets, they are consequently more likely to receive funding from private investments in public equity (PIPE). Increasing PIPE-investments in the deal leads to more cash delivered to the merged company which reduces the dilution of the shareholders, thus explaining why these SPACs outperform the smaller SPACs after the merger completion (Klausner and Ohlrogge, 2020). Additionally, the expectation of high dilution could affect the price of the SPACs prior to the merger. In the small SPACs, which for above reasons most likely would suffer from more dilutions, the CAAR leading up to the event is -5.70 percent.

### 5.2.3 Industry Effect

Moreover, we analysed the returns associated with the different industries to test the hypothesis that the target company's industry affects the returns through the merger (Klausner and Ohlrogge, 2020).

Day	Tech (28)			Finance (17)			Industrials (18)			Health (17)		
	AAR	CAAR	T-stat	AAR	CAAR	T-stat	AAR	CAAR	T-stat	AAR	CAAR	T-stat
-5	-0.006	-0.006	-0.70	-0.009	-0.009	-0.97	0.006	0.006	1.36	-0.006	-0.006	-0.72
-4	0.004	-0.003	-0.21	0.007	-0.002	-0.16	0.006	0.013	1.94	-0.006	-0.012	-1.04
-3	0.005	0.002	0.15	-0.014	-0.016	-1.01	0.012	0.024	3.08	-0.002	-0.014	-0.96
-2	0.025	0.028	1.53	0.017	0.001	0.03	-0.005	0.019	2.12	0.005	-0.008	-0.51
-1	0.016	0.043	2.14	-0.057	-0.057	-2.76	0.008	0.027	2.63	-0.038	-0.046	-2.54
0	0.004	0.048	2.15	-0.010	-0.067	-2.98	-0.016	0.011	0.99	-0.022	-0.068	-3.43
1	0.018	0.066	2.76	-0.017	-0.084	-3.46	0.018	0.029	2.39	-0.030	-0.098	-4.58
2	-0.012	0.054	2.11	-0.021	-0.105	-4.05	-0.014	0.015	1.17	-0.012	-0.110	-4.79
3	0.027	0.081	2.97	-0.019	-0.124	-4.51	0.011	0.026	1.89	-0.019	-0.129	-5.29
4	0.001	0.082	2.85	0.001	-0.123	-4.23	-0.026	0.000	-0.03	-0.024	-0.153	-5.95
5	0.016	0.098	3.25	0.007	-0.116	-3.82	0.000	-0.001	-0.04	-0.034	-0.187	-6.92

Table 17. Event 2 industry, number of observations in parenthesis. T-statistic refers to CAAR.

The return in the days leading up to, and during the event are mainly insignificant. However, in the days following the merger completion, the results are primarily significant. The table shows that the tech industry generated superior returns following the merger in comparison to the three other industries. Additionally, tech performed slightly better on the event day.

Potential less dilution in tech SPACs, leading to positive returns, would be in line with Klausner and Ohlrogge who find that there was a correlation between extent of dilution and negative performance after the merger. Klausner and Ohlrogge additionally find that high-quality

sponsors had an effect on the returns post-merger. By applying this to our findings we see a causal link from the first initiative of the SPAC all the way to the post-merger company. A high-quality sponsor may be more likely to achieve a deal with a notable tech target company which demonstrates stronger returns following the deal announcement compared to the other industries. This would cause the tech SPACs to trade higher above the net asset value than the rest of the SPACs, reducing the incentives for shareholders to redeem their shares in favour of selling them on the market. Also, another important aspect is that a high-quality target company (tech companies in particular) is far more likely to attract PIPE-investments prior to the merger which raises the value added to the new company (Klausner and Ohlrogge, 2020). If this holds, the shareholders of the tech SPACs would be diluted to a lesser extent. Therefore, as the favourable (low) extent of the dilution is made public at the time of the merger, there is a relief amongst shareholders which causes the strong returns in the days after.

#### 5.2.4 Ownership Effect

Finally, we studied whether the extent of institutional ownership at the merger had any effect on the return at the event by dividing the SPACs into low ownership and high ownership. Most of the output from this study showed no significance. If anything, the results point to that a low institutional ownership level is negative for the returns post-merger. These results make intuitive sense since institutions tend to be a long-term owner of the stock and are thus less likely to sell their shares immediately following the merger. This result is in line with Osagie and Osho (2005) which find that high institutional ownership is correlated with positive stock returns.

Day	Low (57)			High (56)		
	AAR	CAAR	T-stat	AAR	CAAR	T-stat
-5	-0.009	-0.009	-1.69	-0.003	-0.003	-0.79
-4	-0.003	-0.012	-1.64	0.009	0.005	0.85
-3	0.004	-0.009	-0.94	-0.001	0.004	0.54
-2	0.006	-0.003	-0.28	0.015	0.019	2.18
-1	-0.025	-0.027	-2.33	-0.004	0.015	1.53
0	0.007	-0.021	-1.61	-0.019	-0.004	-0.42
1	-0.002	-0.023	-1.64	0.001	-0.004	-0.31
2	-0.029	-0.052	-3.46	-0.011	-0.015	-1.21
3	-0.012	-0.064	-4.02	-0.004	-0.019	-1.46
4	-0.024	-0.087	-5.24	0.002	-0.017	-1.26
5	-0.016	-0.103	-5.90	0.006	-0.011	-0.80

Table 18. Event 2 ownership, number of observations in parenthesis. T-statistic refers to CAAR.

## 5.2.5 Robustness

In our analysis of industry specific returns in part 5.2.3 we found that tech outperformed the other observed industries. To test if the return of the tech SPACs was not caused by the choice of reference index, we changed from S&P500 to NASDAQ. The results were very similar in the two studies which confirm that the returns of the tech SPACs were not due to tech strength in general, but rather the outperformance of these SPAC.

<i>Day</i>	<i>AAR</i>	<i>CAAR</i>	<i>T-stat</i>
-5	-0.006	-0.006	-0.67
-4	0.002	-0.004	-0.32
-3	0.007	0.003	0.19
-2	0.026	0.029	1.57
-1	0.016	0.044	2.18
0	0.004	0.048	2.14
1	0.018	0.066	2.73
2	-0.012	0.054	2.11
3	0.028	0.083	3.03
4	0.001	0.084	2.90
5	0.019	0.102	3.39

Table 19. Event 2 Nasdaq robustness tech. T-statistic refers to CAAR.

Furthermore, we tested the robustness of our results to conclude that our findings surrounding the merger were not due to the choice of model. The results from the three models are very similar (although the market model exhibits marginally stronger returns) which gives us confidence that the Market Model yields accurate results.

<i>Day</i>	<i>Fama French</i>			<i>Constant Mean</i>			<i>Market Model</i>		
	<i>AAR</i>	<i>CAAR</i>	<i>T-stat</i>	<i>AAR</i>	<i>CAAR</i>	<i>T-stat</i>	<i>AAR</i>	<i>CAAR</i>	<i>T-stat</i>
-5	-0.005	-0.005	-1.65	-0.005	-0.005	-0.83	-0.005	-0.005	-1.57
-4	0.002	-0.003	-0.76	0.003	-0.002	-0.19	0.006	0.000	0.06
-3	0.002	-0.001	-0.23	0.001	-0.001	-0.07	0.000	0.001	0.09
-2	0.011	0.010	1.48	0.012	0.011	0.93	0.010	0.011	1.64
-1	-0.014	-0.004	-0.58	-0.015	-0.004	-0.31	-0.015	-0.004	-0.58
0	-0.007	-0.011	-1.39	-0.007	-0.011	-0.79	-0.007	-0.012	-1.43
1	0.000	-0.011	-1.26	0.000	-0.011	-0.72	-0.002	-0.014	-1.57
2	-0.019	-0.030	-3.26	-0.019	-0.030	-1.83	-0.023	-0.037	-3.91
3	-0.005	-0.035	-3.61	-0.009	-0.039	-2.23	-0.009	-0.046	-4.63
4	-0.011	-0.046	-4.51	-0.011	-0.050	-2.71	-0.011	-0.057	-5.40
5	-0.007	-0.053	-4.97	-0.003	-0.053	-2.74	-0.006	-0.063	-5.68

Table 19. Event 2 FF Robustness/Constant Mean. T-statistic refers to CAAR.

## 6. Conclusion

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This paper links past research on IPO activity with observations on market inefficiency and anomalies. More specifically, we examine the SPAC structure and IPO process' impact on these features and to what extent they affect the SPACs return surrounding 1) the deal announcement of a proposed target company, and 2) the merger completion with the target company.

In summary, we find the features associated with the SPAC structure as the main contributing factor to the returns surrounding the events. First, at the deal announcement SPACs demonstrate abnormal positive returns, confirming the hypothesis that investors have been able to profit on a market anomaly (Schwert, 2003). Second, at the merger completion the SPACs demonstrate exacerbating abnormal negative returns. This result provides yet another example of a lucrative trading opportunity and exemplifies a cumulative return in line with findings on post-earnings announcement drift (Ball and Brown, 1989; Bernard and Thomas, 1990). Collectively, our results imply that the structure of SPACs is the main determining factor of the recent upturn in the SPACs and the observed market anomalies, but also the detriment to the negative returns as the merged company enters the market. From the sponsors perspective our findings emphasize a large part of short-term opportunism rather than a long-term focus, as sponsors want to capitalize on a hot IPO market (Lowry and Schwert, 2002). The opportunism is specifically evident at the merger as the incomplete information (primarily dilution) highlights severe flaws in the standardized SPAC structure that does not support long-term investments (Klausner and Ohlrogge, 2020). Optimistically, as awareness and criticism on SPACs amounts and negative returns intensifies, we will see new structures and regulations to support long-term investors. Otherwise, we consider it likely that the SPAC route will fall out of favour again.

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