

# **SPACs: Financial IPO Tool Gone Wrong – Awaiting SEC Recourse**

*A Study on the Resurgence of SPACs Following the M2 Money Supply Stimulus by the Federal Reserve in March 2020*

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## Abstract

In this thesis, we take a refreshed look at the SPAC market following the significant surge in SPAC popularity since 2020. We attribute the surge to an exogenous shock by the Federal Reserve's increase in M2 money supply in response to the Covid-19 pandemic.

Our dataset includes 328 de-SPACs in the United States between 2011 and 2021, with most SPAC mergers occurring after the exogenous shock. The data suggests that target companies that were acquired after the exogenous shock are more likely to be non-profit making and even non-revenue making, implying greater riskiness of the targets. Besides, after the exogenous shock, SPACs on average require 208 fewer days to announce an acquisition which indicates a significantly higher level of activity in the SPAC market. Our primary analysis includes studying de-SPACs' share price performance from different perspectives. First, we run an event study on merger announcements, followed by an analysis of longer-term BHAR and whether higher merger announcement return translates into higher longer-term BHAR.

Our findings indicate that SPACs on average have a 7.92% significant abnormal return following a merger announcement after the exogenous shock in March 2020, which is an increase of 6.58% compared to before the exogenous shock. We also find that BHAR is significantly lower after the exogenous shock. We argue that the significant change in merger announcement returns and BHAR is due to more short-term hype generated for each SPAC when the merger is announced, while the SPACs also compete for longer-term attention, making it challenging to maintain the hype over time.

## Key abbreviations and variable description

### Abbreviations

SPAC	Special Purpose Acquisition Company
PIPE	Private Investment in Public Equity
BHAR	Buy and Hold Abnormal Return (cumulative)
IPO	Initial Public Offering
SEC	U.S. Securities and Exchange Commission
JOBS	Jumpstart our Business Startups Act
PSTH	Pershing Square Tontine Holdings (Bill Ackman's SPAC)
PE	Private Equity
IRR	Internal Rate of Return
VIX	CBOE Volatility Index

### Variables and explanation of key abbreviations

Redemption ratio	The ratio of investors that redeem common shares to receive cash corresponding to NAV following a merger announcement
NAV	Net Asset Value of the cash proceeds placed in each SPAC's trustee funds.
De-SPAC	Special Purpose Acquisition Company that completed the merger with a private target company

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## 1. Introduction

Even though SPACs have been around since the 1990s, the investors' attention surged after March 2020 when we saw a substantial increase in SPAC IPOs and subsequently their merger announcements. Approximately half of the total IPO proceeds to the public market in the United States in 2020 and 2021 were from SPACs. So far in 2022, 72% of the total IPO proceeds stem from SPAC IPOs. In 2021 alone, there were 613 listings of SPACs, while there were 247 listings in 2020. This accounts for more than 65% of the total SPACs that have been listed since 2003. We argue that the main reason for the surge was the exogenous shock when the Federal Reserve increased the M2 money supply in response to the emergence of the Covid-19 pandemic in March 2020, which is the date since when the number of SPAC IPOs started to increase substantially. Federal Reserve's increase in money supply resulted in the stock of dollars surging 17.7% from the end of February through June 2020. This had a direct impact on the idle capital for investors, which is liquid assets ready to be invested. With an increasing stock of "dry powder", investors seek to obtain the highest possible return without facing the risks of losing a large portion of capital, making SPACs attractive.

A SPAC is a financial tool that aims to merge with private companies going public through a reverse merger methodology, being one of the three main methods of going public. Compared to a traditional IPO and a direct listing, going public through SPACs can remove the uncertainty of a successful IPO, if the company that decides to merge with the SPAC is flexible in terms of the proceeds it requires. After a merger between the SPAC and the target company is announced, the investors can decide to redeem their common shares. By redeeming the common shares in a SPAC post-announcement, the investor will receive risk-free interest as a return, in addition to free warrants in accordance with the fraction on the common share as a reward for locking the cash for up to 24 months. By redeeming the common shares, the investors will lower the available proceeds in the SPAC that the target company would receive on a merger. We argue that when the dry capital exceeds a certain threshold, investors are willing to park idle cash to receive return larger than risk-free without taking on additional risk. This is the reason we believe that the increase in M2 money supply had an impact on the SPAC market.

Previous research has concluded that SPACs on average underperform the market and should be considered a bad investment. The investors that allocate their capital into the SPACs have been concluded to face substantial losses, while the founders capture absurdly high gains in value. The conducted research has been done on limited data, as more than 65% of the total SPACs since 2003 were listed in 2020 and 2021 alone. In our analysis, we divide de-SPACs into two main groups, those before the exogenous shock in March 2020 and those who were completed after the exogenous shock. We aim to further investigate the SPAC market and explore whether the rapid rise of SPACs resulted in changes in various elements, such as merger announcement return, longer-term BHAR, maturity of the target companies, leverage of target firms and redemption ratio from investors on common shares. We conduct a data-driven methodology where we use a dataset of 328 observations that include SPACs that successfully merged with a target company. For our analysis, we use the same methodology on both the de-SPACs before the exogenous shock in March 2020 and the de-SPACs after the exogenous shock in March 2020 in accordance with the methodology presented in section 5.

We find that the de-SPACs after the exogenous shock in March 2020 are more likely to be in an introductory stage of a business lifecycle with a significant share of de-SPACs being in pre-revenue state. Following the emergence of SPACs, we find that the days required to find a target have decreased from 485 days on average to 277 days on average, which corresponds to a decline of 42.9%. Although not significant, we also find that the redemption ratio has decreased from 61% to 57% after the emergence of SPACs. Additionally, target companies became generally less leveraged than before March 2020.

Looking at the share price performance, we look at the merger announcement return and the 10-month BHARs. We find that the merger announcement abnormal return on the average transaction is 7.92% after the exogenous shock in March 2020, while it was 1.34% before the exogenous shock in March 2020. Further, we look at the 10-month BHAR, where the cumulative abnormal return after 10 months was 5.15% before March 2020, while the return over the period was negative 51.45% after March 2020. We also take a more detailed look at the returns and explore if there are differences in the 10-month BAHAR for de-SPACs that experience high initial merger announcement returns compared to de-SPACs that experience low merger announcement returns. Our findings show that a higher merger announcement return resulted in a higher 10-month BAHAR before the exogenous shock in March 2020, while a lower merger announcement return translated into a lower 10-month BAHAR in the

same period. After the exogenous shock in March 2020, we find the opposite, meaning that higher merger announcement return translates into a weaker 10-month BAHR, while a lower merger announcement return even outperforms those with high initial merger announcement returns.

By utilizing the returns we calculated from the 10-month BAHR and the merger announcement return, we take a renewed look at the return for various shareholders being the founders, redeeming shareholders, non-redeeming shareholders and post-announcement investors including PIPE investors. We illustrate that the founders face lower gain after the exogenous shock in March 2020, but that they still are paid absurdly well taking the risk into consideration. The redeeming shareholders and non-redeeming shareholders face a high initial return following the merger announcement, while the redeeming shareholders always will capture return above their initial investment with the whole downside protected, making the investment extremely attractive when an investor has idle cash. Additionally, the post-announcement investors and non-redeeming shareholders that keep their investment throughout the 10 months face substantial losses.

We argue that our main contribution to the existing research is looking at the share price performance following a surge in the SPAC market and evaluating whether the performance of SPACs have changed. Additionally, we also contribute with the newest available data. As the overall IPO market has cooled down in 2022, we argue that our dataset will be the most representative to capture the results from the heated market. Additionally, previous research has put its main emphasis on founders' return, while we also look at the redeeming shareholders and their return, in addition to the return to other shareholders.

The thesis is structured in a way where we present the existing research and findings on SPACs in section 2, before we explain the SPAC instrument in detail in section 3. In section 4, we will explain the recent emergence of SPACs and the main drivers behind the surge. We will present the empirical analysis in section 5, while we present our results and analysis in section 6. Limitations and suggestion for further research are presented in section 7, while we conclude in section 8.

## **2. Literature review**

### **2.1 Share price performance**

Although SPACs have grown dramatically in their popularity and received a fair amount of attention from the media and among the investors, we find that there is still limited academic research conducted on SPACs. Most of the literature we reviewed primarily focuses on SPAC share performance. Based on our review, short-term performance including underpricing is explored by Jog & Sun (2007), Boyer & Baigent (2008), Rodrigues & Stegemoller (2011), Lewellen (2009), Jenkinson & Sousa (2011) while more recent studies Kolb & Tykvová (2016), Dimitrova (2017) examined SPACs long-term share performance.

#### **2.1.1 Underpricing is non-existent among SPAC IPOs**

The paper by Jog & Sun (2007) was the first to explore various characteristics of SPACs as well as examine the price performance both in the short-term (underpricing) and longer-term using the sample of 62 SPACs from 2003-2006. The analysis found no significant underpricing effect with the average first-day return of 1.9%, which contradicts the usually observed underpricing of traditional IPOs. This is supported by later studies of Boyer & Baigent (2008), Rodrigues & Stegemoller (2011) and Cizmovic et al. (2013). Boyer & Baigent (2008) using a sample of 87 SPACs over 2003-2006 showed that the first day return for SPACs were 1.23% compared to the IPO average first day trading return of 26%. That is not very surprising since SPAC IPOs convey little information having no operating history and it is viewed as the cash instrument where the raised proceeds are put into a trust account. The findings of Cizmovic et al. (2013) based on SPAC IPOs between 2003-2012 also show that there is on average no significant underpricing on the first day of trading. However, the effect varies among SPACs and for some the underpricing or overpricing effect is significant. Interestingly, it was found that focus on the healthcare industry and the participation of private equity has a significant impact on underpricing. Nevertheless, academics agree that on average there is no significant SPAC underpricing. As the founder of SPACs are so important regarding generating hype for a transaction or negotiating the best deals, SPAC IPOs with the most popular could prove to have more underpricing, even though this is not researched.

### **2.1.2 Short-term price performance following the merger announcement**

SPAC mergers is the most important event in the SPAC lifecycle, turning the SPAC into a de-SPAC, that will start to experience movement in share price as the company transforms into an operational company. Jog & Sun (2007) used a subsample of 42 SPACs and found that investors experience a negative annual return of 3%, while SPAC founders earned around 1,900% annual return as they are awarded ~20% equity stake upon successful completion of the M&A. This indicates a conflict of interest between managers and shareholders since there is a significant incentive for SPAC managers to complete an acquisition rather than lose full initial investment in the company if the merger deal is not announced. Such SPAC structure might lead to more value-destroying deals, especially when the acquisition deadline approaches.

The announcement effect on the SPAC share price was later studied in more detail by Lewellen (2009). He was the first to suggest that SPACs should be considered as a separate asset class due to their unique structure and increased popularity in the market. The analysis included SPACs with merger announcements in the period of 2003-2008. Contrary to Jog & Sun (2007), the paper researched the return following the merger announcement until the completion of the merger. The paper found that SPACs generated an annual excess return of ~11%, while the share price performance declined and was reported at negative 36.5% annually after the completion of the acquisition. The share price development was partly explained by the effect of the dilution due to the exercise of warrants (Lewellen, 2009). The author concluded that SPACs exhibit a post-announcement four-factor alpha of more than 2% per month but a post-completion alpha of negative 2% per month.

Positive abnormal return after the merger announcement date is also researched by Dimitrova (2017). The share price return over a three-day event window following the merger announcement date exhibits a cumulative abnormal return of 1.5%. This is shown by using a sample of de-SPACs over the period from 2004 to 2010, while the performance of a sample using withdrawn mergers is close to zero. In comparison, our analysis of the merger announcement return over the three-day event window shows a similar return of 1.3% in the period from 2011-2020, however the announcement return becomes significantly higher after 2020.

### 2.1.3 Long-term performance

When it comes to medium to long-term performance, Kolb & Tykvová (2016) studied the share price return 6, 12, 24, and 60 months after the merger announcement using a sample of 127 de-SPACs in the period between 2004 and 2015. The findings indicate severe underperformance in comparison to the market, in which the Russel 2000 Index is used to compare. The return is also compared to the same industry, companies with similar size, firms with similar P/B ratios and firms listed through a traditional IPO. All the studied periods indicate negative alphas. However, the returns are shown to be weaker the longer the trading history is researched. The periods of 6, 12, 24 correspond to average negative returns of 29%, 46%, and 59% respectively.

The result is supported by Jenkinson & Sousa (2011) who found a six-month average cumulative return of negative 24% following the de-SPAC. The paper of Jenkinson & Sousa (2011) also found a further decline in share performance beyond that period, which might further indicate that the average de-SPAC approved by shareholders of a SPAC is value-destroying. Howe & O'Brien (2012) also conducted the same analysis, which found also found a negative six-month return, but slightly better at 14%.

Severe and deteriorating long-term underperformance is also found by Dimitrova (2017), who derives post-merger returns for 73 de-SPACs across 31 industries between 2004 and 2010. De-SPACs were found to have a negative share price return of 41% one year after the merger announcement, while the market index Russell 2000 had an average return of negative 1.3%. Two years following the merger announcement, the share price performance had declined to a negative 56%, while the Russell 2000 index faced an uplift of 1.4%. In comparison we found a negative six-month post-merger announcement return of 17% in the period after 2020 based on our dataset. However, for the period before 2020, we found positive six-month BHAR of 5% which we attribute to selection and survivorship bias.

One reason for decreasing long-term returns is post-merger dilution, which is explored in more detail by Klausner & Ohlrogge (2020) who state that there is a strong relationship between the de-SPAC share price performance and the amount of dilution in the SPAC. The authors show that SPAC shareholders acquiring shares at the time of the merger and holding them afterward bear most of the dilution costs which come through three sources being (1) founder promotion, (2) underwriting fees and (3) warrants & rights.

## 2.2 Factors impacting merger probability and its survival

Existing literature also focuses on SPAC characteristics including certain factors that are either related to better share price performance or/and increase in the likelihood of the merger survival Kim (2009), Howe & O'Brien (2012), Lakicevic et al., (2014), Cumming et al. (2014), Dimitrova (2017), Kolb & Tykvová (2016), Vulcanovic (2017).

On average, SPAC targets are most often small with low growth opportunities and usually more leveraged (Kolb & Tykvová, 2016). Looking across periods there are some findings that SPACs became even smaller in size following the financial crisis of 2008 (Lakicevic et al., 2014). There is also an indication that SPAC IPOs are increasingly active during volatile markets and in periods with low activity of traditional IPOs (Kolb & Tykvová, 2016). This is shown by looking at the data during the financial crisis in 2008 and 2009 where approximately 31% of all listed companies chose to list through SPACs (Kolb & Tykvová, 2016). The periods of higher volatility also resulted in an increased probability of listings through SPACs (Lakicevic et al., 2014). In contrast, Blomkvist & Vulcanovic (2020) study the wave patterns on the SPAC listings in the United States between 2003 and the end of 2019. The paper shows the negative impact of market uncertainty through VIX and variance risk premium on the SPAC share and volume.

Management characteristics in SPACs are also one of the most researched SPAC factors. Kim (2009) studied the market value of management experience and explores its relationship with SPAC IPO underpricing, the likelihood of SPAC merger and its success factors. Employing a sample of 158 SPACs between 2003 and 2008, the findings indicate that management in SPACs is more experienced compared to traditional IPO companies. The paper also found that more experience is reflected in the market through IPO underpricing and better share price performance following the merger announcement. Also, strong management experience increases the merger likelihood and shortens the period of finding the target. Further, the result from the analysis has an impact on the quantity and quality of institutional investors given better longer-term share price performance.

The importance of the reputation of SPAC founders and its value creation is also proved by Lakicevic et al. (2014). The paper extended the time period to 2012 and explored the impact of a broader set of SPAC characteristics on merger probability and its outcome. Sponsor experience in other SPACs is found to improve the merger probability. Also, a defined



SPAC merger focus on the target's country, industry, market etc. in the prospectus increases merger probability with a coefficient of 1.587, which is significant at a 5% significance level. Whenever SPAC specifies that its merger focus is on private companies from China, the merger probability is even higher with a coefficient of 1.707, which also is significant at a 5% significance level. The shorter the time to announce a merger, the higher is the chance to successfully complete the merger. This is significant at a 1% significance level.

Contrary to the findings of Lakicevic et al. (2014) and Kim, (2009), Cumming et al. (2014) finds that better management experience does not increase the probability of a merger. The study included 139 SPACs between 2003 and 2010 to ascertain which factors contribute the most to merger approval probability. The paper also finds that the merger approval is significantly higher in upward-trending markets and that younger SPAC management teams have both significant and positive effect on merger approval. Besides, the underwriters also play a role here, as the probability of a merger approval is higher when the underwriters are not considered to have an impressive track record, also when there is less syndication as multiple underwriters might indicate a greater risk. Finally, the higher share of available cash in the trust account relative to IPO proceeds has a positive impact.

Howe & O'Brien (2012) explores how board independence, managerial and institutional ownership impact short-term and long-term share price performance. The analysis was conducted for the period between 2003 and 2008 before some structural changes were implemented by some SPACs. The first one was to eliminate the shareholder voting requirement for acquisition approval. The second one is to reduce the amount of equity issued to the founders prior to the IPO to limit the dilution effect following the acquisition completion. The results show that there is a weak positive impact on share price performance from board independence where SPACs with high board independence experienced significantly less negative share price return in a three-year period after merger announcement. The analysis concludes with a negative 40% return for high board independence compared to a negative 67% for low board independence. As for managerial and institutional ownership, no significant effect was found on short and long-term share price performance.

Dimitrova (2017) also shows that there are differences in share price performance for SPACs and that the long-term performance is better for de-SPACs where the sponsor is involved in the company's board. On the other hand, the performance is worse when an acquisition was

announced closer to the SPACs' merger deadline, as the management is getting more desperate to find the target and is more likely to engage in value-destroying deals. Finally, the performance deterioration was observed for acquisitions where market value is closer to the required threshold of 80% as well as when the payment of IPO underwriting fees was delayed until completion of the merger which indicates the underwriters' strong interest to complete the deal despite its quality.

Vulanovic (2017) focuses on SPAC's institutional characteristics that increases the post-merger survival. The study is based on a period between 2007 and 2009 and concludes that the SPAC failure is 58.09%, which is higher than what is found in the literature of post-IPO survival. The analysis of institutional factors shows that the success of SPACs is positively affected by the number of founders and the number of warrants purchased by the management at the time of an IPO. This is known to decrease the information asymmetry and induce more "skin in the game" to find a better-quality target. Regarding share price performance as an indicator of merger survival, the study finds that SPACs with higher returns on a one-year basis following the merger have a higher probability of survival. However, one-month returns have a negative impact on survival likelihood, implying that the market is relatively slow to price the fair value of the merger. Interestingly, SPACs that choose to acquire a target from abroad are faced with a higher probability of failure. This is related to the asymmetric information and the SEC regulations in 2011 on Chinese companies listed in the United States.

### 3. SPAC characteristics, benefits and popularity

#### 3.1 Path of going public

When a private company decides to go public, it has three main possibilities of going public. Even though they all serve the same purpose, they are different in their structure, costs, and scope:

- **IPO** - Historically, it has been the preferred and most used way of going public. An underwriter supports the company in issuing new shares which are sold to investors. Because the underwriter does extensive work when supporting the company, the IPO is usually more expensive than the other options. Prior to taking the company public, the underwriter is also testing the market demand for acquiring the shares that are aimed to be issued to raise the proceeds when going public. When a firm decides to opt for the IPO process, it implies some uncertainty as there could be a low demand for acquiring shares in the company which is taken public. Successful IPOs usually consist of one or more cornerstone investors. These cornerstone investors have the purpose of building trust and de-risking the probability of low demand for the shares. Those cornerstone investors are often well-known investors that send a strong signal to the public.
- **Direct Listing** - While the company uses underwriters to issue new shares in a traditional IPO, there is no need for an underwriter to issue new shares in a direct listing. The way the direct listing works is that the company sells existing shares to investors instead of raising new equity. Since it does not hire an underwriter, this method is usually considered to be less expensive. Some of the main reasons to choose a direct listing over an IPO process could be that there is no dilution of existing shares and no hefty fee to underwriters. According to the London Stock Exchange, the direct listing also benefits from a low risk of mispricing since the price is set by demand, and investors can trade without restrictions such as lock-up. As the companies go public, there is an auction for the shares that are being sold. No need for an underwriter comes at an expense of less important support or promotions. Companies like Spotify and Slack have chosen to use this method when going public, which was arranged as an auction for shares that had unlimited price and supply.

- **Reverse merger** - In a reverse merger, the private company merges with a listed public company. Since the listed public company has gone through the IPO process already, going public through a reverse merger is considered to be less expensive and the process is less extensive on average. Usually, the private company has a substantially higher valuation than the publicly listed company and the transaction's sole purpose is to list a private company. The publicly listed company can have different types of histories. Some of the public companies have been operating companies that have been unsuccessful or those that use their firm as a shell company to list another one. However, the listed company can also be a SPAC, which is a blank check company. When listing a SPAC, the sole purpose is to acquire another private company, which does not want to go through an advanced process of going public. SEC defines the SPAC to be a company in a development stage that "has no specific business plan or purpose or has indicated its business plan is to engage in a merger or acquisition with an unidentified company or companies, other entity, or person" (SEC, n.d.-a). These companies are also classified as "penny stocks" or "microcap stocks", which are regularly considered to be riskier and more volatile. SPACs were first introduced in 1993 but their popularity has never been as high as post-2020.

Mature firms usually go for the traditional IPO and the direct listing, while we have seen a recent growth in direct listings (Farrell, 2021). Since the direct listing of Spotify in the United States in 2018, there have been 12 companies that went public through a direct listing, in which six of the companies went public in 2021 (Skadden, 2022). As the direct listings do not receive marketing support from underwriters, their firm should be well-known among investors, and the company should be confident that the demand for the shares will be high even without support. Companies like Roblox and Coinbase with a combined valuation of \$116 billion went public through a direct listing in 2021. Our master thesis is focused on SPACs. Therefore, we will not go into detail on the traditional IPOs and direct listings.

Dealmaker and former Investment Banking Chief in Citigroup Michael Klein has been one of the most popular SPAC founders through his series of Churchill Capital SPACs (Financial Times, 2022). As of date, he has gone public with seven SPACs in his Churchill Capital series. His most successful SPAC was the merger between Churchill Capital IV and Lucid Motors, which created substantial value for the shareholders. Throughout the thesis, we will

use Klein's SPACs as examples to illustrate the characteristics, as his SPACs are rather traditional.

## 3.2 Understanding SPACs

Rule 419 of the Securities Exchange Act of 1933 passed in 1992 lays the foundation for why SPACs are structured the way they are today (Feldman, 2018). Even though the reverse mergers saw light in the 1980s, SPACs were not introduced until 1993 by David Nussbaum in the investment banking firm EarlyBird Capital (Feldman, 2018). Nussbaum invented the SPACs by using an exemption from Section 2.1.2 under rule 419 (Feldman, 2018). The section states that companies that aim at raising \$5 million or have \$5 million in assets are exempted by rule 419. Nussbaum discovered that the market had a need of acquiring companies within private equity of substantial size and aimed to exceed the \$5 million threshold. As the rule 419 initially was created to avoid fraud committed by sponsors where the sponsors paid the proceeds as fees, the SPAC structure from Nussbaum would enable these types of frauds. However, Nussbaum determined that the fraud risk would not attract demand for the SPACs, so he decided to use the conditions as a tool to attract investors. The 419 rule states that the proceeds from net offerings in a company shall be deposited in a trust account, which is limited according to requirements under rule 419, and can only be withdrawn if the following conditions are met (SEC, n.d.-b):

- 1) The company has to make an acquisition that is valued at approximately 80% of the proceeds placed in the trust fund.
- 2) The company has to receive a confirmation from the investors where a sufficient number of the investors confirm the acquisition.
- 3) Conditions 1 and 2 have to be consummated.

## 3.3 Development in SPACs

Since the first beginning of SPACs, the structure has remained similar. However, Bill Ackman's PSTH SPAC from the first half of 2020 challenged the existing SPAC structure. While SPACs have been criticized for rewarding sponsors largely, PSTH has structured its SPAC so the return of the founders is aligned with the return of the investors (Klausner & Ohlrogge, 2020). The sponsors of PSTH are not receiving any promotion, but rather receive

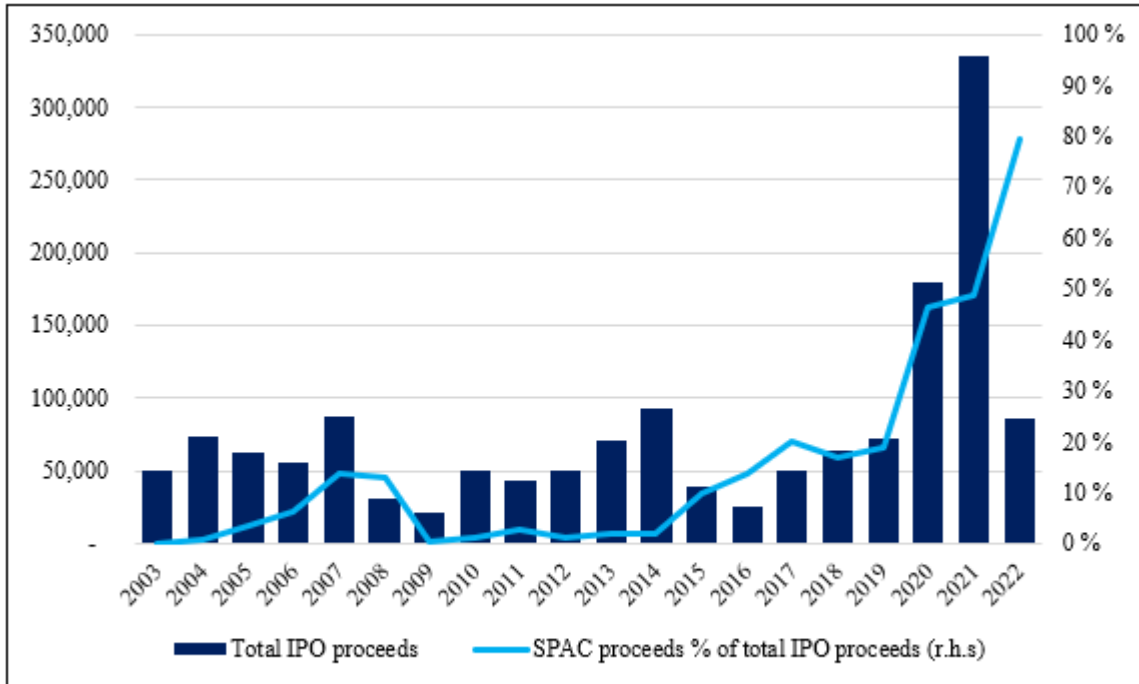
a return when the shareholders receive a return exceeding 20%. Additionally, the unit of PSTH initially consists of a lower portion of warrants, while the non-redeeming shareholders receive additional warrants. This means that the investors are incentivized to not redeem their shares to purely receive their cash back and keep their warrants. We deem this to be a healthy progress for SPACs, as it reduces the misalignment between shareholders and sponsors.

JOBS act was signed by Barack Obama in 2012. The act makes the regulations by SEC less strict on small businesses. The main purpose of the JOBS act was to support the smaller companies in raising capital. After the JOBS act was signed, investing in smaller companies was made easier for the average investor, while smaller companies had an easier route to going public. As the main intention of the JOBS act was to make it easier to go public, SPACs took advantage of the act (Rodrigues, 2012).

### **3.3.1 The rise of SPAC transactions**

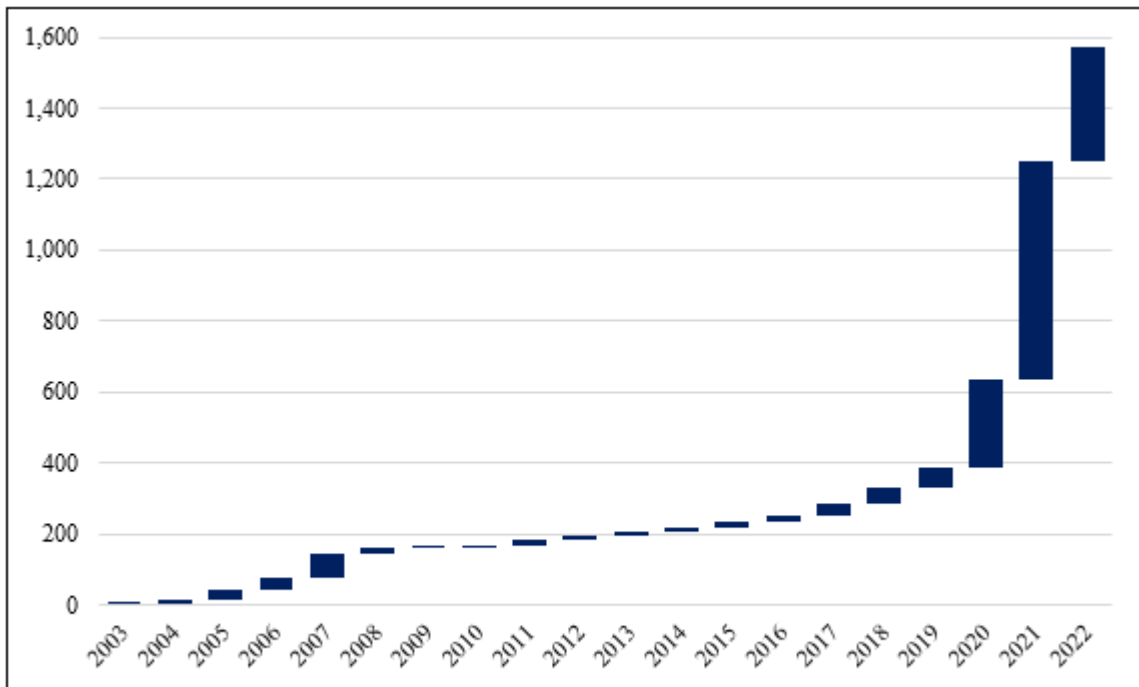
Traditional IPOs have dominated the IPO market in the United States historically. However, in the last couple of years, there has been a surge in non-traditional IPO methods and SPACs specifically. Spacanalytics.com monitors the SPAC market and shows statistics of financial “relevant” IPOs with proceeds exceeding \$40 million excluding direct listings. There have been 1,276 SPACs listed since 2003, raising \$320.7 billion in proceeds. With the average SPAC acquiring a target valued 4.4 times its proceeds on average (EY, 2021), the SPACs are expected to have done deals valued at \$1.4 trillion excluding PIPE and redemptions with the assumption that all of them find a target. Most of the capital raised has been in the last few years with 888 SPACs being listed since the beginning of 2020, raising \$251.6 billion in just over two years. In comparison, the total IPO activity in the United States has been 1,450 listings since the beginning of 2020, raising \$521.2 billion. While accounting for more than 62% of the recent listings, the SPACs have raised more than 48% of the total proceeds to listings. It is important to understand that these numbers also include SPACs failing to find a target, which means that the actual proceeds to targets are lower. However, it still proves a strong appetite for SPACs amongst investors. Based on our data as of February 2022, more than 80% of the de-SPACs occurred after 2020, while more than 25% have found a target to merge with since 2010.

**Figure 1 Overview of SPAC proceeds as a Ratio to Total IPO Proceeds in the US (USDm)**  
 Source: Spacanalytics.com



For illustration purposes, we annualize the data as of February 2 in to have an estimate of total IPO proceeds in 2022.

**Figure 2 Cumulative SPAC IPOs in Absolute Numbers**  
 Source: Spacanalytics.com

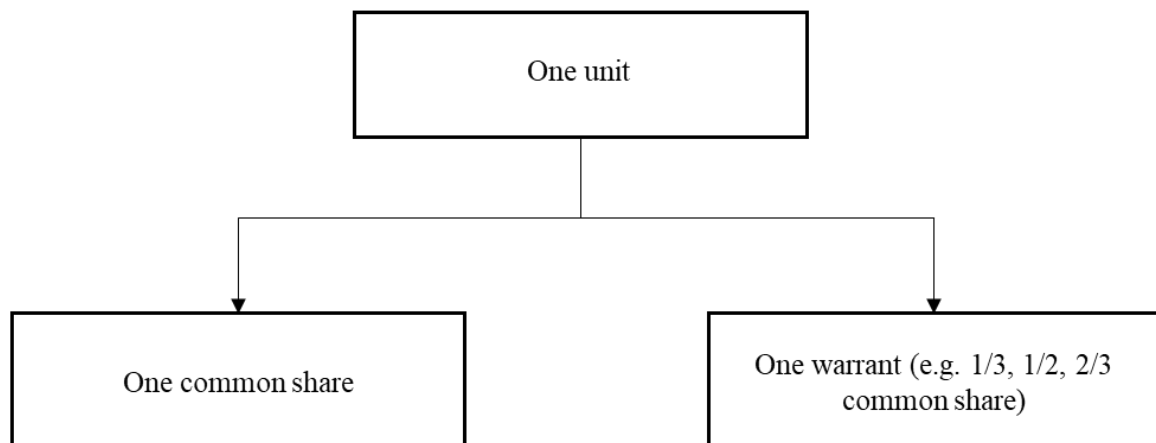


For illustration purposes, we annualize the data as of February 2 in to have an estimate of total IPO in 2022.

### 3.4 SPAC structure

The balance sheet of a SPAC consists of all equity and all cash placed in risk-free trust funds, serving the same purpose as the capital raised from an IPO process. Once the target merges with the SPAC, the merged company has access to the cash in the trust funds. The SPAC is often structured in a way that the NAV is the same as the IPO price to the public, which usually is \$10.00 per unit. When going public, the SPAC is structured as a unit where investors receive a common share in addition to a warrant that gives the right to buy common shares at a predetermined share price, often at \$11.5. The warrants are exercisable as a fraction of the share with the ratios being dependent on specific deals and could for instance be one-third, one-half or two-thirds. The warrants are usually available for redemption up to five years following the merger, while the company can force to redeem the warrants if the share price exceeds a certain threshold, for instance, \$20 (Smith, 2021). After 45-90 days the unit is split into a common share and a warrant corresponding to the warrant fraction ratio. Both the common share and the warrant are listed under its own ticker:

**Figure 3 SPAC's structure**



Looking at the Churchill Capital V (CCV) SPAC illustrates how the structure of a SPAC is constructed. The CCV SPAC is constructed as a unit where one unit gives the shareholder one common share and one-fourth of one redeemable warrant at a strike of \$11.5. As a result, the shareholders will receive a full warrant on one common share for every four units the shareholder owns, in addition to the four common shares. CCV does not target private



companies in any specific industry but aims for a target with long-term growth prospects. Each SPAC usually has different characteristics on its targets. Churchill Capital VII SPAC targets firms that aim to generate stable free cash flow, according to its IPO prospectus. Based on our collected data, we frequently see that SPACs also aim at certain industries such as clean-tech and e-commerce.

According to the IPO prospectus of CCV (SEC, n.d), the SPAC raised \$450 million through issuing 45 million units at a price per unit to the public of \$10. However, the underwriters are given the option to acquire 6.75 million additional units exercised at \$10 per unit, if there is any over-allotment. If the option is exercised, the SPAC will raise \$517.5 million in total, which means that the total units will be 51.75 million. Nonetheless, the cash placed in trustee funds will be the full amount raised, either \$450 million or \$517.5 million. For the purpose of the illustration, we will assume that 45 million units is the actual amount raised.

Additionally, the sponsor of the SPAC acquired one million warrants for \$1 each, which means that the SPAC will have an additional \$10 million in gross proceeds for the merged company. The warrants have a strike price of \$11.5 and came as an addition to the 12.94 million class B shares the sponsor held. The class B shares do not have any rights but will be transformed into class A shares after the business combination. If the SPAC successfully finds a target to merge with, the underwriter will receive a deferred commission amounting to \$0.35 per unit. Additionally, the SPAC also has to face a cost of \$0.20 per unit in underwriting discount. After the costs related to underwriting, the total proceeds available per unit is \$9.45, amounting to \$425.25 million without the option exercised.

The SPAC is estimated to have offering expenses amounting to \$10 million (excluding deferred commission to underwriter). The main cost goes to the underwriter, which receives a 2.0% commission of the proceeds raised from the units. The deferred commission amounts to 3.5% of the proceeds, which makes the total cost to underwrite 5.5%. Other costs are related to legal fees, travel and roadshows, accounting fees, and insurance premiums. Since the SPAC is expected to face costs of \$10 million, the actual proceeds to the business combination will be \$450 million. Therefore, the proceeds received from the sponsor acquiring his warrants go to the funding of the SPAC.

### 3.4.1 SPAC founders

SPACs are founded by managers, also called sponsors. These sponsors often receive founder shares, the sponsor promote, corresponding to 20% ownership of the post-IPO shares for “free” once the SPAC has merged with a target. As shareholders of the SPAC can redeem its common shares if they dislike the merger, the dilution from the sponsors will often result in a sponsor ownership of more than 20% depending on the amount redeemed. However, even though the ownership increases, the cash proceeds are lower, which means that the cost of sponsor remains approximately the same, but higher relative to size. If the transaction has PIPE investors supporting the deal if more cash is needed, the post-merger dilution could be brought back to 20% or even lower depending on the PIPE size. The sponsors invest into the SPAC as it goes public to cover underwriting fees and expenses related to finding a target, as we showed with the CCV SPAC. These costs are sunk costs but still act as a psychological loss in case of unsuccessful target searching. While the SPAC typically trades at \$10 after going public, these founder shares can come at a cost of \$0.002 per unit for the sponsors. The founder shares have similar characteristics as call options, where they have everything to gain financially without facing any significant financial costs. However, looking at the CCV SPAC, the sponsors also acquire warrants, so they also have something to lose in case of an unsuccessful merger or failure to find a target. This is still a low cost seen in context to the potential upside compared to the other shareholders.

According to short-term self-egoism, the sponsors should find a target that represents the highest risk and avoid liquidation. As the founders receive “free” shares similar to an option in the money, in addition to warrants, their expected value will be the highest the more risk the underlying asset represents. However, we argue that SPAC sponsors do not go for the highest risk initially. When the SPAC raises capital from investors, it is all based on reputation and trust of the sponsors, as they have it all in their hands. If the sponsors fail or abuse their position for their own personal gain, they will lose their reputation. Most of the SPACs are associated with well-known individuals in the financial industry, who are unwilling to risk their reputation. However, there are also some sponsors that are less known, and it is fair to assume that these SPACs represent a higher agency cost.

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### **3.4.2 SPAC proceeds – cash available to target**

While some companies merge with a SPAC with the sole purpose of being a publicly traded company, others do put emphasis on the proceeds available in a SPAC. Different SPACs have different amounts of proceeds available, so prior to a transaction, the SPAC foreshadows the available proceeds the target company will receive. Even though the proceeds available in a SPAC are given after going public, it is not necessarily the proceeds that the merged company is entitled to receive. Changes to the proceeds can come from (1) redemption of common shares, (2) redemption of warrants and (3) PIPE.

A transaction is typically not dependent on whether certain shareholders redeem their shares or not. In order for a transaction to go through, the cash proceeds from the SPAC have to satisfy the target company's capital needs, except for transactions that consist of clauses. As long as the proceeds post-redemption and additional funding from PIPE satisfy the target company, the SPAC can tank high redemption rates. As a result, SPAC transactions can still go through even though there are high redemption rates. The sponsors of the SPAC can also take preemptive caution to protect the SPAC against high redemption rates. A "bulldog provision" is when there is a cap on how large a portion of the shares that can be redeemed, typically up to 20%. In this case, no more than 20% of the cash proceeds can be taken out of a potential transaction. Additionally, the sponsor of the SPAC and the management team can waive the redemption rights corresponding to shares they acquire and receive through founder shares.

### **3.4.3 Redemption of common shares**

As pointed out earlier, the shareholders of a SPAC can decide to approve the transaction or disapprove. If a shareholder does not like the transaction, the shareholder can decide to redeem its common shares and receive their share of the cash placed in trust funds. The redemption is done for the common share and not the whole unit, so the redeeming shareholders will keep their warrants. Looking at the example of CCV, the company states that the shareholders of the SPAC are given the opportunity to redeem their desired amount of Class A shares when the merger of the company occurs. The cash received will be the funds initially placed in the trust "calculated as of two business days prior to the consummation of our initial business combination, including interest (net of amounts withdrawn to fund our working capital requirements, subject to an annual limit of

\$1,000,000, and/or to pay our taxes ('permitted withdrawals')), divided by the number of the outstanding public shares, subject to the limitation described herein", as written in CCV's IPO prospectus.

This means that the redeeming shareholders will receive their initial amount invested in addition to the interest and the warrant they originally received. As the shareholders can redeem their common shares at \$10 per share, the share return from the announcement until the deadline of redeeming will impact the decision to redeem the shares. This represents downside protection for the shareholders that initially invest in the SPAC, while also having the possible upside from the warrants or if the share price development prior to the last day of possibly redeeming exceeds the NAV. The more shareholders that decide to redeem their shares, the less proceeds will be available to the merged company. On average, it is usual to see redemption ratios between 60 and 70%. Looking at CCV, the company has \$425.25 million in available proceeds. If 65% of the shareholders redeem their shares, the available proceeds will be approx. \$275 million.

#### **3.4.4 Redemption of warrants**

The redemption of warrants will also impact the proceeds available to the merged company. When the warrants are redeemed, the investor will pay the strike price of the warrant to the company, which often is \$11.5 and will be given one common share. Redeeming a warrant is usually all or nothing, in the sense that an investor should redeem the warrant if the share price exceeds the strike price and should not redeem if the share price is under the strike price. Looking at CCV, the warrant fraction of the unit was one-fourth common share. With 45 million units and potentially 11.25 million more common shares if warrants are redeemed, the merged company will receive \$129.4 million in additional proceeds.

#### **3.4.5 Investments from PIPE**

PIPE investors often aid the transaction with capital to meet the target company's needs of additional capital beyond the SPAC's initial offer amount. When a SPAC sees a higher redemption ratio than anticipated, a PIPE can support in raising the required proceeds. Another reason to use PIPE investors is that these investors have access to non-public information before making the decision to invest. This way, the transaction has more credibility, which mitigates some of the issues with a SPAC where the public information is worse than that of traditional IPOs.

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## 3.5 Lifecycle of a SPAC – from listing to deSPAC

The lifecycle of a SPAC starts with the IPO listing and ends either when the SPAC finds a target to merge and the SPAC goes into the de-SPAC phase or when the deadline is reached and SPAC enters liquidation to return cash proceeds held in the trust to shareholders. The deadline for finding a target is normally up to 24 months, but some SPACs also operate with a deadline of 18 months or 12 months. Consequently, the lifecycle of a SPAC is normally up to 24 months, but not shorter than 12 months.

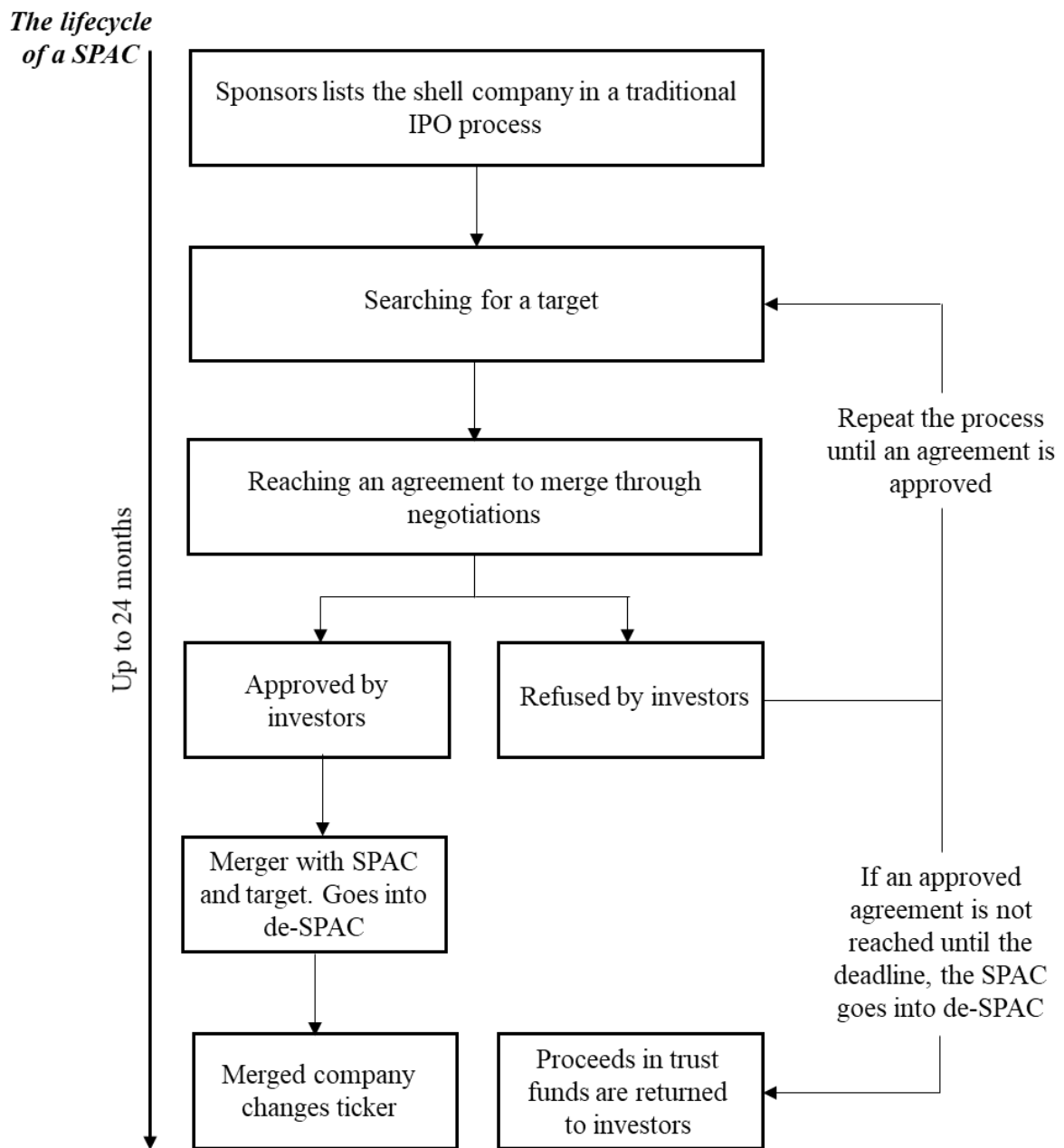
The first part of setting up a SPAC is the sponsors determining the offer amount based on an analysis of the targets they initially aim at. The founders usually specify the industry or country focus that characterizes a potential target in the prospectus when going public. After the sponsors have determined the characteristics and structure of the SPAC, they go through a traditional IPO phase, where they go on roadshows to present themselves to institutional investors to raise capital for their listing. While traditional IPO focus on the company, the strategy and market size, the SPACs have to solely focus on the sponsors' qualities and the characteristics of a potential target. As a result, the roadshows are mainly focused on building trust and maintaining relations. When the sponsors have raised the desired amount, the SPAC will eventually be listed as a publicly traded company. The SPAC initially trades as a unit containing a common share and a warrant. After a range of 45 to 90 days, the unit will split into a common share and a warrant corresponding to the warrant fraction, which will trade under its own tickers.

After the sponsors have received confirmation that the SPAC is authorised and confirmed, the search for a target begins. The sponsors of SPACs meet with potential targets and negotiate. This is usually the part of the lifecycle that takes up most of the time. When the sponsors and the target have reached an agreement, the transaction is proposed to the investors of the SPAC who vote whether to approve the transaction. The voting results will determine what happens next to the SPAC:

- 1) **Approval:** The SPAC and the target company will start the merging process and the target will receive the cash proceeds that the SPAC holds in its trustee account net of the redeemed amount and additional investments. The merged company will change its ticker name to a fitting ticker for the target company's name. The target company becomes public and continues trading, while the lifecycle of the SPAC ends. After

the transaction is complete, the ownership is usually split between the shareholders of the SPAC, the current owners of the target company and additional investors supporting the deal. The corresponding ownership depends on the negotiated deal and the number of shares and warrants redeemed. If the transaction is positively viewed by the public, the share price will increase, incentivizing the SPAC shareholders to redeem their warrants.

- 2) **Refusal:** The SPAC and the target company terminate the agreement and the sponsors go back to finding a target which they have to propose to the investors and receive a certain share of approval. If the sponsors fail to find a target that is approved by the shareholders within the predetermined deadline, the lifecycle ends and the proceeds placed in the trust funds are returned to the shareholders, while the warrants instantly become worthless. The threshold of shareholders required to approve a transaction is dependent on each SPAC.

**Figure 4 SPAC's lifecycle**

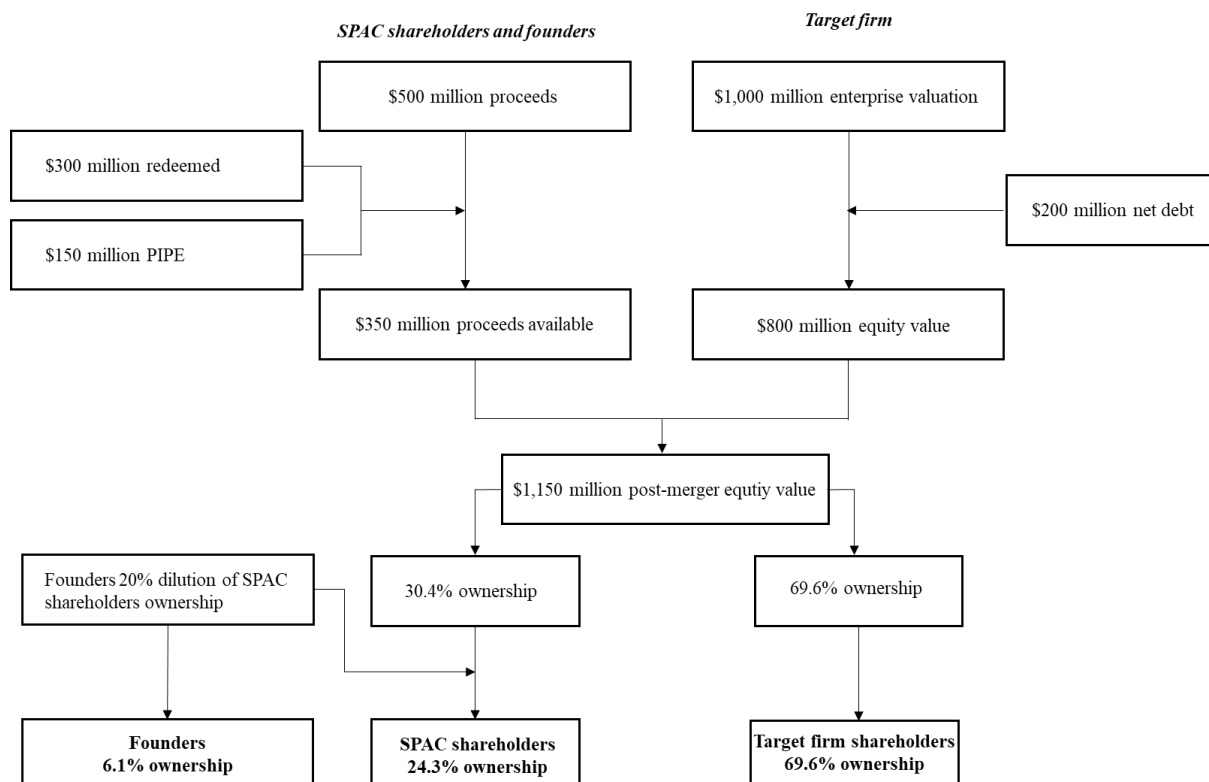
### 3.6 Ownership dilution

After the merger of the SPAC and target, the owners of the respective firms will be diluted. The dilution depends on the valuation of the target firm, the proceeds available in the SPAC, and the terms applicable to the founders. The shareholders post-merger can be split into the following three main groups (1) SPAC shareholders post-merger including PIPE, (2)

founders and (3) shareholders of the target firm pre-merger. This structure could lead to corporate governance issues, as the groups could have different goals for the merged company (Howe & O'Brien, 2012). The founders could be tilted towards targeting projects that have a higher risk, while the shareholders of the target firm pre-merger could be focused on short-term return if they aim to exit their position. SPAC shareholders could have a larger emphasis on the long-term than the other two groups. In turn, this could lead to the shareholders post-merger having a different vision of the firm.

The appropriate management of the merger company post-merger could also be difficult to determine given the different possible visions of the shareholders. Founders will usually act as an advisor to the merger company, whereas the management of the pre-merger target company usually will remain as executive management. The Figure 5 below shows an example of how the dilution of ownership can be look in a transaction.

**Figure 5 Potential dilution scheme**



The potential dilution from redeeming shareholders exercising warrants will be substantial for the shareholders. As we have explained thoroughly, the redeeming shareholders will receive a free warrant on the common share when redeeming its common shares. If the share



price performance in a SPAC turns out to be positive, the redeeming shareholders will exercise their warrants to dilute existing shareholders, limiting the value gain for existing shareholders. As a result, the upside will be lower for existing shareholders, which represents a substantial cost of dilution.

### 3.7 Rumours before merger announcement

Several SPACs experience rumors prior to finding a target to merge with, which influences the transaction. The rumors are often related to the target that eventually turns out to be the proposed transaction. For instance, the Churchill Capital IV SPAC (CCIV) that merged with Lucid Motors was a SPAC that initially went public at \$10.00 per share. Before the transaction was announced, the Churchill Capital IV SPAC traded at around \$30.00 per share as the market anticipated the merger announcement and considered it to be value accretive. The rumors were initiated by Bloomberg which published an article that stated that CCIV was in talks with Lucid and that there was about to be an agreement (Bloomberg, 2021). When the sponsors of the SPACs raised additional capital from the PIPE investors, the capital was raised at \$15.00 dollar per share, which was a huge discount to the trading price but a premium to the valuation without rumors. In comparison, the ROTH Acquisition II merger SPAC traded at \$10.00 dollar before the announcement of a transaction with Reservoir Media, where the PIPE investors contributed with additional capital at \$10.00 per share. What we typically see regarding the PIPE investors is that the discount is non-existing if the SPAC is trading at its NAV, while the discount exists if the SPAC is trading above its NAV prior to the merger announcement.

### 3.8 Private equity supporting SPACs

Private equity managers usually opt for three different exit strategies. The first one is selling their portfolio companies to other private equity managers, while the second one is fund-to-fund transactions where portfolio companies in one fund are sold to another fund within the same umbrella. The last one is to exit through IPOs, where the process can be to go public through a traditional IPO, direct listing or reverse merger. The main measurement of a private equity's performance is its IRR, which depends on both the time to exit and the valuation on exit. As the SPAC process is quicker than a traditional IPO, the PE managers can exit their investment earlier boosting their IRR. When public equity is trading at high

valuations compared to historically, SPACs serve as a great exit tool for private equity managers. After the surge of SPACs, the target companies have been owned by PE funds in 30% of the transactions (EY, 2021). At the same time. The private equity managers have also entered the SPAC sponsor ecosystem, and PE managers sponsored approx. 10% of the SPACs in 2020/2021(EY, 2021). Not only does private equity position themselves in SPACs being a sponsor and merging their portfolio companies with SPACs, the PE firms are also investing into SPACs. More than 16% of the SPACs in 2021 was backed by PE firms holding an ownership above 5% (S&P Global, 2021). As previously discussed, one of the main drivers behind the surge in SPACs has been the dry gunpowder in the market that is yet to be invested. As it is usual for PE funds to keep a lot of cash on its balance sheet, backing SPACs can serve as a great return for their dry powder ready to be invested. With interest rates being as low as they are, investing into SPACs with the goal of redeeming on the merger announcement, corresponds to an expected return above the risk-free return. PE firms can also position themselves in several aspects of the ecosystem. Apollo Global Management is an example of a private equity firm that is a large investor in other SPACs, but also sponsors their own SPACs to look for targets. Additionally, Apollo Global Management also has portfolio companies that are likely to evaluate merging with SPACs on a regular basis.

### 3.9 Regulatory issues and reforms

The Securities and Exchange Commission (SEC) regulates the stock market in the United States and thereby SPACs. While the same rules apply for listing a SPAC as in the traditional IPO process, the complexity is different. Being a blank-check company, the SPAC does have relevant projections to report on. SEC has different rules when it comes to a merger process, so the SPAC can take advantage of that by avoiding certain reporting requirements. SEC pursues that the dissemination of public information to the investors prior to voting on the transaction is of the same quality as in the traditional IPO. One of the biggest recent concerns raised by the SEC includes a regulatory loophole that allows SPAC to provide too rosy forecasts of target company to the investors.

A joint paper by two prominent professors at New York University School of Law and Stanford Law School Michael Klausner and Michael Ohlrogge (2020) points at regulative gaps between SPACs and traditional IPOs. Management in companies avoid being

financially liable for underdelivering on their projections as long as those expectations are accompanied by a cautionary warning from the company. The protection from liability is referred to as safe harbor and is regulated by The Private Securities Litigation Reform Act (PSLRA). Because of the safe harbor, the management can share information to the public and avoid risk despite high uncertainty to meet those promises. However, the safe harbor does not exist for IPOs, but rather investor presentations, company reports and other SEC filings. When going public through a traditional IPO, the management has to choose its projections with caution and not overestimate their ability to deliver. Since a SPAC transaction is protected by safe harbor provision, the projections from the management in a SPAC merger can be regarded as more optimistic than the projections of an IPO.

When a company goes public through a public offering, the underwriter, issuer, and management are liable and risk a lawsuit from investors if the information is omitted or statements are misleading. The law is regulated by the Securities Act of 1933 under sections 11 and 12. Approximately 15% of the companies going public through a traditional IPO have been a target of lawsuits by investors since 2015 through these sections, according to Klausner & Ohlrogge (2020). In approximately nine out of ten lawsuits, the issuer and underwriter are the defendants. The management and underwriters are less likely to be sued, as they are protected. When the SPAC goes public, there is substantially less important information that needs to be classified and less that can be omitted, as the SPAC is a non-operational company with its assets being cash placed in trust funds. Because of the characteristics of the SPAC, there is less risk of a lawsuit from the investors. With less risk on the underwriter and issuers, taking the SPAC public is a good source of fees without facing the risks. The underwriters and management are protected from lawsuits from extensive due diligence. After merging with a SPAC target, the management and financial advisors, such as the issuer, are exposed to risk in accordance with the section 11. However, they face close to no risk, according to Klausner & Ohlrogge (2020). They point at two factors with one of them being the fact that the SPACs have nothing to sue in case of omitted information or misleading statements. Nevertheless, investors become increasingly angry about multiple false or misleading claims made about SPAC target companies. As of April 6, 2022, there are currently 56 filled lawsuits alleging securities fraud with the first case filed on January 30th, 2019. So far, the number of total filings is similar to cryptocurrency litigations.

### 3.9.1 New regulatory rules

In 2021 SPACs accounted for around 60% of IPOs in absolute numbers in the US. Thus, not surprisingly, the SEC has been actively monitoring the booming SPAC market, investigating multiple companies that took the SPAC route to list on the stock market as well as repeatedly raising multiple issues concerning SPACs. This includes information asymmetries, fraud, conflicts of interest, all of which can put investors at a disadvantage and significantly raise the risks of incurring substantial losses compared to investing funds in the traditional IPO. More specifically, the SEC has highlighted that investors are provided with inconsistent disclosures from different parties involved in SPAC transactions and investors are not made fully aware of SPAC fees, projections and possible conflicts of interests. Additionally, there are concerns about whether responsible parties are properly acting as “gatekeepers” during the transaction (Bloomberg, 2021). The increased scrutiny over the SPACs gave the market first indications that tighter regulations might be soon introduced with SEC signaling that the reforms might come as soon as in April 2022.

On March 30, 2022, SEC voted in favor of a set of proposals that would raise the level of disclosures and introduce similar regulatory protections to SPACs as currently are in place for traditional IPOs (Bloomberg, 2021). SPACs will have to disclose full information about the potential conflicts of interests, the dilution effect, and targeted companies for the merger. Moreover, SPACs together with underwriters can be held liable over false and misleading financial projections regarding their target companies, erasing currently existent safe harbor provision. Also, the underwriters that were taking part in the SPAC IPO transaction would also have to be involved in the subsequent merger process. To address concerns that some SPACs might potentially be turning into investment funds, the SEC plans to limit the timeframe to find the target to 18 months and also complete the merger within two years after listing.

According to Financial Times, this new set of rules was probably stricter than the market had expected and could cool down the SPAC market, while also providing more protection for investors. There were already reports from Citigroup, one of the biggest underwriters in the SPAC market, that the company paused new IPOs of SPACs until there is more clarity regarding legal risks (Bloomberg, 2022). So far, banks participating in the de-SPAC process do not have the same level of due diligence as in the traditional IPO process. Nevertheless,

this reform plan is not yet finalized and is pending a second vote following a period for as long as 60 days to receive public comments (Bloomberg, 2022).

### 3.10 Characteristics of a target firm

As we have written earlier, the liability risk of an underwriter and managers is greater in a traditional IPO. This could be the reason why unpredictable firms would struggle in a traditional IPO, as the underwriters face risks of being responsible for missing targets. Looking at the characteristics of the SPACs' target firms, they are usually considered to be riskier, smaller, and in a growth phase (Bai et al., 2021.). The same sectors for SPAC targets are usually consistent over time with two dominating sectors. The largest one is the technology segment, which can be divided into biotechnology and general technology firms, such as software firms. SPACs also target firms within the social sector. This sector includes firms that have an impact on people, such as ESG, but is not limited to a certain industry. This could be due to the current market sentiment of ESG, but also that these firms usually are in their growth phase and are in need of capital, but face problems listing through a traditional IPO. In the first quarter of 2020, approximately 47% of the target firms were classified within the technology sector, while approximately 19% were classified within the social sector (*SPAC Acquisition Target Industries 2020-2021*, 2021). These sectors are usually considered to be more risky than other sectors with firms having an "all or nothing" mentality.

As previously explained, the structure of SPACs incentivizes the sponsors to look for more riskier firms. Therefore, the post-merger long-term returns have a larger range from top-performers and bottom-performers. Bai et. al. (2021) emphasizes that SPACs post-merger have less revenue, unpredictable cash flows and are less profitable in comparison to companies that listed through traditional IPO. Bai et. al. (2021) also argues that SPACs are a "lemon market" and point to how the insiders of the target firms are the ones who know the actual quality of the target, while the public does not have that information. This could on average lead to higher number of low-quality target firms being acquired, especially when the total number of SPACs searching for a target is exceptionally high.

## 3.11 Pros and cons of listing through SPAC

### 3.11.1 Quicker access to capital

An advantage of SPAC is that the private company receives a faster access to capital, which growth-oriented and start-up companies sometimes can abuse to achieve their targets quicker.

### 3.11.2 Lower cost of going public

Another advantage is lower cost of going public. Investment banks and other transaction costs are lower than in a traditional IPO because the process is less comprehensive. While SPACs have underwriting fees of approximately 5.5%, the IPO has approximately 7.0%. Usually, more than half of the underwriting fees for the SPAC occurs if a merger is completed. With a listing through SPAC, the costs of underpricing are also avoided. Nevertheless, even though the underwriting fees are lower than in a traditional IPO, going public can be more costly if the transaction receives high share redemptions. The reason is that fees on redeemed shares are paid prior to the redemption. The function of fees ratio to proceeds is a function of how many redeem their shares. Shareholders should invest into a SPAC because it represents a lower cost, as the lower cost is benefiting the enterprise, while the cost of shareholders from dilution is significantly higher.

### 3.11.3 Increased investment opportunities for investors

A third advantage is that the broader market can take part of a potential IPO that they believe in based on the sponsors and other descriptions in accordance with the SPAC. Normally taking a part of a traditional IPO is reserved to the largest institutional investors, while SPACs allow for retail investors to invest into IPO processes. SPACs also have a higher deal certainty, as taking a company public through a traditional IPO needs significant investor demand, without which the IPO would be hardly proceeded. Price certainty is also higher, as the merger valuation is agreed on prior to proposing the transaction, while the pricing in an IPO is not known until the day before it goes public.

### 3.11.4 Incentivizing more risk

As the founder shares act as an option, the sponsors are incentivized to take larger risk when merging with their targets, even though it is not in the investors' best interests. SPACs act as

options for the sponsors, which means that the incentives for the sponsors are to seek risky targets that represent a huge upside, which typically results in more risky targets. Therefore, shareholders should be aware that approving the transaction will result in the shares merging with a potentially risky firm. However, the SPACs giving the redemption option also give the shareholders substantial downside protection, which mitigates some of the agency costs.

### **3.11.5 Founders capturing value gain on upside**

Even though the enterprise faces lower costs, the founder shares are often 20% of the total share capital, which makes a SPAC costly for investors. The sponsors take a large portion of the shares when merging, and for the SPACs to be successful, the investors need to choose their investments in SPACs with caution. SPACs are a form of branded financial products where the sponsors differentiate them. To justify giving away such a large portion of the ownership for free, the shareholders have to believe that the sponsors will apply their competence and skills in a manner that makes the negotiated deals more favorable.

### **3.11.6 Less regulation and requirements**

Less regulations and requirements in auditing making the prospectus less informative for the public. The SPACs projections are typically more optimistic, as the founders and advisors are less likely to be financially liable.

### **3.11.7 Other**

In addition to the listed advantages and disadvantages, there are also aspects that could be both an advantage and disadvantage. The target companies for SPACs are typically lower market capitalizations with cash burn and short history of operations and financial statements. These types of companies are often less likely to go public through a traditional IPO process. This could be an advantage as companies are given a possibility of going public. However, there are often reasons why these types of companies struggle to go public. By decreasing the barrier of entry of going public, companies that should not be listed are given the possibility of listing.

When a SPAC suggests a merger, investors have the possibility of backing up and redeeming their common shares, which implies that investors have the choice of whether to invest into the long-term potential of a transaction. Even though this represents an advantage for

SPACs, this could also result in SPACs being unliquidated due to high redemption ratio making the deal more likely to not go through.

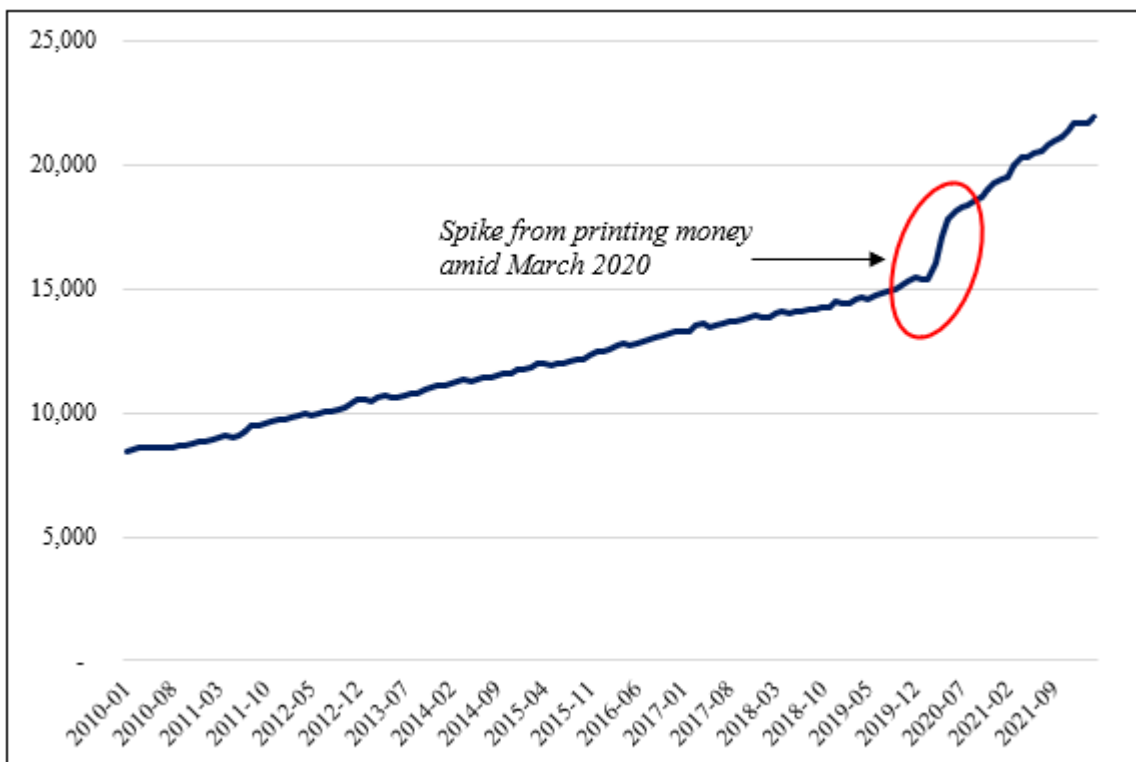


## 4. Emergence of SPACs

### 4.1 SPAC boom catalysator

In March 2020, Federal Reserve initiated a plan to increase the M2 money supply, which is typically referred to as “printing money” to avoid a deep recession following the outbreak of COVID-19. M2 money supply consists of cash, deposits, traveler’s checks and shares in retail money and market mutual funds (FED, n.d.-a). As a result of the outbreak of the COVID-19 virus globally, the S&P 500 index in the United States consisting of the 500 largest companies listed on New York Stock Exchange sank 30.9% from February 16, 2020, to March 15, 2020. The increase of M2 money supply of money accelerated during March and continued thereafter. From the end of February until the end of June, the stock of dollars in the United States had grown \$2.7 trillion, corresponding to a growth of 17.7% (FED, n.d.). Extending the period to March 2022, the growth has been \$6.5 trillion, corresponding to 42.5%. We argue that the printing of money acted as an exogenous shock to the economy, which was the main contributor to the boom in SPACs.

**Figure 6 Stock of Dollars (M2) in the US (USDbn)**  
**Source: Federal Reserve**

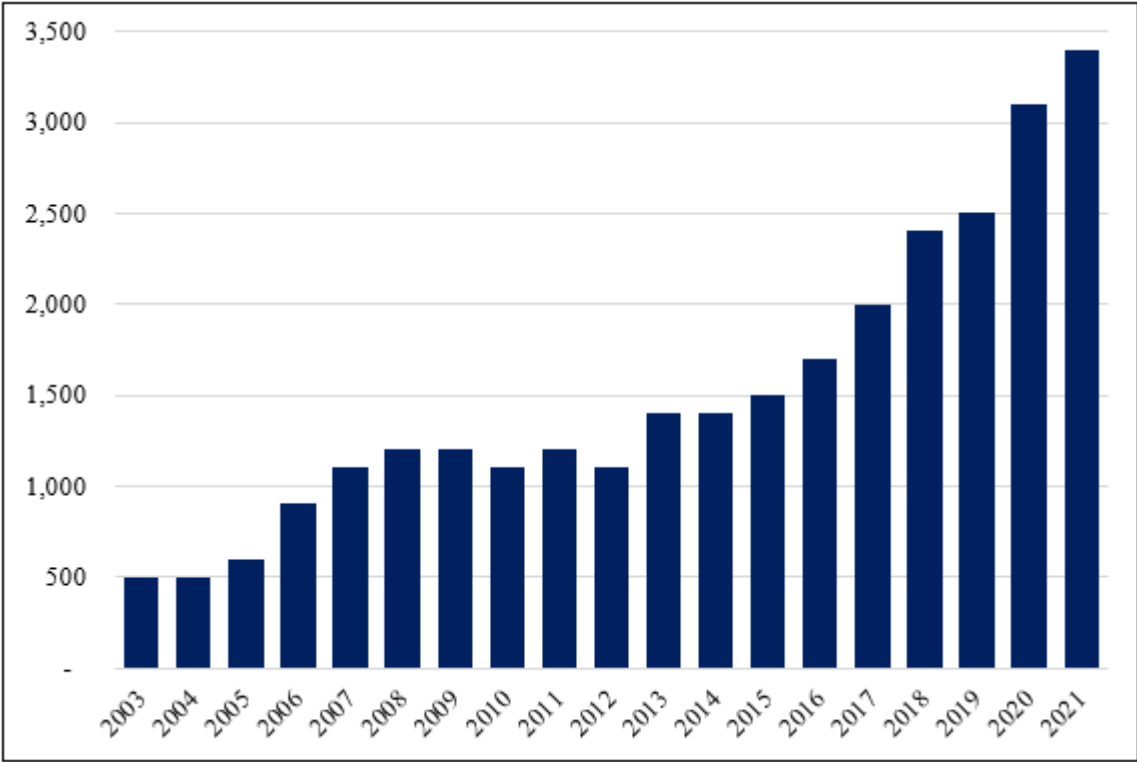


A consequence of the Federal Reserve’s M2 money supply stimulus was an increase in the dry powder available in the market. With dry powder, we refer to the amount of unspent capital that is not allocated towards any asset classes, but is rather idle waiting to be invested (Pitchbook, n.d.). SPACs serve as an excellent parking tool for unspent capital, as shares can be redeemed for cash plus interest, while keeping the warrant. Looking at the possibilities of the potential return of investor’s unspent capital, there are two main options:

- 1. Leaving your unspent capital in risk-free assets
- 2. Invest into SPACs to receive risk-free return in addition to a free warrant

The main downside of parking your unspent capital into a SPAC is that it is going to be locked and unavailable for up to two years depending on the time of finding a target to merge with. Consequently, the choice of parking the unspent capital into SPACs with the sole purpose of redeeming is likely to occur when the unspent capital has reached a threshold where an investor is certainly not going to invest all of the unspent capital during the next two years. As the dry capital has surged following the exogenous shock of M2 money supply stimulus (Statista, n.d.), we argue that it has contributed to the surge of SPACs, as the founders have easier access to backing by investors.

**Figure 7 Global dry powder in private equity (USDbn)**  
**Source: Bloomberg**



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Credit Suisse also points to additional factors to explain why the SPAC market has surged. There are four main factors (Credit Suisse, 2020):

1. SPACs reflect certainty in a time when the market could be viewed as uncertain. When going public through a traditional IPO, a company is exposed to market conditions and if the market is pessimistic, it is challenging to raise the capital a company is aimed for. If a company decides to go for a listing through the SPAC, the proceeds are certain, and the valuation is agreed on. However, we slightly disagree with this argument. As we will further discuss later, there is risk that a SPAC will face high redemption ratios which would decrease the proceeds to the company substantially. Even though PIPE investors compensate for the loss of proceeds, there could be situations where PIPE investors do not fully compensate with the same amount as expected.
2. Record high valuations on publicly traded companies incentivize private companies to go public. This makes sense as investors in private companies utilize the situation to maximize their return. This could be more of an explanatory factor to why SPACs are finding their targets with ease, rather than why we saw a lot of SPACs being listed. It could have large consequences for the SPACs if the investors in private equity decide to lower their willingness to exit investments and the market is left with a lot of SPACs competing to acquire the same targets.
3. Ratio of private companies has increased substantially with an increase in de-listing of publicly traded companies in the last 20 years.

We argue that these factors that made the surge following printing of money more probable with higher incentives for the private companies to go public.

## 4.2 Potential cooldown

After record-high IPO activity in 2020 and 2021, the activity has cooled down so far in 2022. The total IPO proceeds in the United States have been \$13.1 billion, while it was approximately \$111.5 billion at the same time in 2021 (Bloomberg, 2022). Even though the IPO market has cooled down, SPACs have retained the heat, as 75% of the IPO proceeds so far in 2022 has been from SPACs, compared to 49% and 46% in 2021 and 2020 respectively (SPAC Analytics, 2022). However, even though the ratio of proceeds is at all-time high, the

SPAC IPOs in absolute numbers is lower than in 2020 and 2021. Annualized listings so far in 2022 has been 161 SPAC IPOs, compared to 613 and 248 in 2021 and 2020 respectively. The cooldown in the SPAC market in absolute numbers is a positive sign, as it indicates that sponsors are going back to picking their targets with caution, which creates better alignment between shareholders and sponsors. In the beginning of 2022, there have been a higher abandonment of SPACs than there was in the whole 2021, according to Financial Times (2022). This is because sponsors have applied to publicly list a SPAC at the same time as searching for a target for its initial SPAC, because they have assumed that the heated market would enable them to find a target before the new SPAC was listed. As the search for targets has been more challenging than the sponsors anticipated, they have abandoned their IPO of their new SPAC to focus on its main SPAC.

## 5. Empirical analysis

### 5.1 Hypothesis

With a 1,195% rise in proceeds to SPACs from 2019 to 2021, the competition for the best targets has increased substantially. Several sponsors from different SPACs are more likely to compete for the same targets, which will worsen the negotiation position of the founders when initiating talks with target companies, who can choose among the best deals. As several founders fight for the same target companies, the negotiations on deal value for the best target companies could turn into a “bidding war” that drives valuations higher. Additionally, the sponsors that do not land a deal with their preferred initial target have to continue the process with other targets. If the sponsors are unsuccessful with a few targets, they might be pressured to find any target that fits the proper description to utilize their “free return”, even though the sponsors might not be as confident in the target company. This will affect the overall valuation and the quality of companies taken public, which will in turn result in worse share return over time as the merged company underperforms compared to the valuation used when it was taken public. As a result, we hypothesize that the return of SPACs after the merger has decreased because of the exogenous shock in March 2020 that surged the number of SPACs going public.

Also, we hypothesize that SPACs with higher merger announcement returns will also have higher long-term returns and vice versa. This we attribute to the momentum factor in the SPACs’ share performance.

Further we hypothesize that the risk of the target company has increased which could be identified by a higher share of target companies in the pre-revenue or pre-profit stage after March 2020. We hypothesize that the redemption ratio has also increased following the surge of SPACs. With SPACs rewarding early investors with warrants as payment for idling their cash, we believe that the ratio of investors investing in SPACs with the sole purpose of redeeming their shares to keep warrants has increased, in accordance with our previous discussion on SPACs.

## 5.2 Methodology

### 5.2.1 Announcement effect

To assess the announcement effect, we conduct the event study methodology for economics and finance presented by MacKinlay (1997), supported by the application of one of the models presented by Ritter (1991). The main purpose of an event study is to assess the impact from an event by calculating abnormal returns through an estimation window and event window. The event study will normally consist of an estimation window, in which abnormal returns are calculated prior to the event date. The estimation window is used to assess whether the results from the event window, which is the results in the period after the event date, are significantly different. To properly assess the impact from a given event, the abnormal return of assets has to be derived. Abnormal return can be viewed as the security return in an event study with the constant mean return model using a constant mean return with a disturbance term, while the market model links the return of a security with a market portfolio.

While the constant mean return model is simpler to derive, the market model is more frequently used in research. The market model uses a CAPM model with betas prior to the event window to conduct the returns.

**The market model:**

$$R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it} \quad (1)$$

$$E(\epsilon_{it}) = 0 \quad (2)$$

$$\text{var}(\epsilon_{it}) = \sigma^2_{\epsilon_i} \quad (3)$$

However, we will not opt to use the market model directly. More specifically, we will use a market-adjusted model to conduct the event study. Since the SPAC is a holding company with all cash, we run into problems assessing the beta prior to the event window. The share price will typically remain similar to its IPO price, which means that the pricing history is irrelevant. In cases where data availability limits the event study because of missing pre-

event, MacKinlay (1997) suggests a restricted market model, referred to as a market-adjusted model.

With the market-adjusted model, the alpha intercept is set to zero, while the beta is set to one. Because of the constraints, the model does not require an estimation period to obtain such parameters. We base our application of the model on the research paper The Long-Run Performance of Initial Public Offering by Ritter (1991), which is referred to by the paper of MacKinlay (1997). The application by Ritter is similar to our application, as the IPOs have no trading history while our data has irrelevant trading history. We will use the market-adjusted model on our SPAC data through four steps:

1. Calculate the abnormal return for each SPACs
2. Calculate the average abnormal return for every SPAC on each date
3. Derive the cumulative abnormal return
4. Calculate the average cumulative abnormal

The abnormal returns will be calculated based on the following formula:

$$a_{it} = r_{it} - r_{mt} \quad (4)$$

where  $r_{it}$  is the return of SPAC  $i$  for day  $t$ , and  $r_{mt}$  is the return of the market portfolio  $m$  for day  $t$ . Consequently, the abnormal return is calculated by the difference between each SPAC and the market portfolio. For the market returns, we use the Russell 2000 Index as a benchmark, as the companies opting for a SPAC merger usually are smaller and in a hyper-growth phase, similar to the companies in the Russell 2000 index. This is also consistent with the previous literature on SPACs: Kolb & Tykvová (2016), Dimitrova (2017), Lakicevic et al. (2014) and Jog & Sun (2007).

Further, we will calculate the average abnormal returns with the following formula:

$$AR_t = \frac{1}{n} \sum_{i=1}^n ar_{it} \quad (5)$$

To calculate the cumulative abnormal return, we will sum up the average abnormal returns over the period by using the following formula:

$$CAR_{q,t} = \sum_{i=q}^T AR_t \quad (6)$$

To calculate how much the average announcement effect is on each SPAC, we will apply the following formula:

$$CAAR = \left(\frac{1}{n}\right) \sum_{i=1}^n CAR \quad (7)$$

In our analysis, we opted to use a three-day event window where we calculate the CAAR on T-1 to T+1 with T being an announcement date.

### 5.2.2 Buy and hold abnormal return

To assess long-term price performance, we use buy and hold abnormal returns (BHARs), which is the methodology also utilized by previous studies of Dimitrova (2017) and Kolb & Tykvová (2016). Howe & O'Brien (2012) also use buy and hold returns. However, in the paper by Howe & O'Brien (2012), the buy and hold returns are not market adjusted. Alternatively, existing literature also uses the calendar-time approach by employing Fama-French or the Carhart four-factor model.

The buy and hold return methodology looks at the return of an asset as if the asset was acquired and held for a specified period. By looking at the difference between the return of the asset and an appropriate portfolio benchmark, we derive the abnormal return. For this analysis, we want to have the abnormal return on the merged SPAC, as we do not want our conclusion to be based on returns from market conditions. As explained when deriving the event study, we will use the Russell 2000 index as the relevant benchmark for the merged SPACs.

We use the following formula presented by Kolb & Tykvová (2016) to measure BHARs:

$$BHAR_{(t1,t2)} = \prod_{t=t_1}^{t_2} [(1 + R_a)] - \prod_{t=t_1}^{t_2} [(1 + R_{bt})] \quad (1)$$



where  $R_{it}$  is the SPAC's return in  $t$ , while  $R_{bt}$  is the return of a benchmark portfolio in  $t$ .

We calculate BHARs for periods of 1, 3, 6 and 12 months, where  $t_1$  is the merger announcement date, while  $t_2$  is the end date of our selected time period or the earlier date in case of delisting (merger or bankruptcy). When it comes to SPAC mergers after 2020, there is a narrow timeframe to measure long-term performance, especially for the most recent SPAC merger transactions. Therefore, our longest-term performance analysis is limited to 12 months. Although this reduces our sample size, we believe it still should provide valuable conclusions.

The BHARs are calculated using the full sample from 2011 to February 2022 and then also separately for mergers announced prior to March 2020 and after that. We then test the significance of the results using the standard t-test.

### 5.3 Data

For our sample selection and construction, we chose to focus on SPACs in the United States. This ensures consistency and better comparability in our sample in terms of the regulatory environment and other possible cross-country differences. We also point out that the SPAC market in the United States is the largest and most mature, which makes it easier to draw certain conclusions about SPACs characteristics and performance.

Our sample dataset is based on the de-merger transactions in the period between 2011 and February 2022. To reduce survivorship bias to some extent, we also include data on de-SPACs that went bankrupt after going public through a SPAC. To our knowledge, there is no well-developed de-SPAC merger dataset covering the whole period of our analysis, in addition to providing all the data required. Therefore, we collect the data ourselves by relying on different sources.

First, we use the Bloomberg terminal as our primary source of data where we access the Merger & Acquisitions screen with the filter for the de-SPACs, in addition to filtering the SPACs that are originated from in the United States. However, after taking a deeper look at the data and quickly cross-checking with other sources, we found that Bloomberg terminal does not include all the de-SPACs, especially the ones that took place in the last two years. Also, we noticed that the Bloomberg terminal adds ordinary M&A transactions where the

de-SPACs company took part. To correct our dataset, we cross-check the list with third-party sources such as [spacktrack.io](https://spacktrack.io), [spacresearch.com](https://spacresearch.com), and [spacinsider.com](https://spacinsider.com). This helps us to compile the full list of SPAC mergers but only after 2019, as the prior data is not available by the aforementioned sources. Therefore, to complete our list with the actual de-SPACs, we manually cross-check our initial list from Bloomberg terminal from 2011 to 2019 by looking at the SEC's Electronic Data Gathering and Retrieval (EDGAR) database and other various internet sources. We eliminate data points that are not de-SPACs. All in all, we end up with 328 de-SPACs in the period between 2011 and 2022. We split our dataset into two periods with the 59 de-SPACs being the first one before the exogenous shock in March 2020 and the second group being 269 de-SPACs after the exogenous shock until February 2022. Similar to what is expressed in other papers on SPACs, there might be some lack of data due to manual collection processes. Nevertheless, it should not have an impact on our conclusion.

Secondly, once we have the list of de-SPACs, we collect the required variables for our analysis. Most of the variables, including daily share prices, fundamental target company data, and merger transaction details are extracted from the Bloomberg terminal. The share prices are adjusted for splits, spin-offs, and cash dividends. Other specific variables such as redemption rate, SPAC IPO date, merger announcement date and some other key variables for a few companies that were not reported by Bloomberg are hand-collected from the EDGAR database or gathered from other various internet sources. We also extract price data from Bloomberg on Russell 2000 Index and match it with the announcement date of each merger transaction in our sample. We end up with two datasets:

- Share price data from the IPO date until February 28, 2022
- Cross-sectional data with the SPAC and its associated variables.

## 5.4 Data adjustments

### 5.4.1 Redemption ratio

As the SPACs surged recently, there were several SPACs that traded above its NAV before announcing. Mergers like Lucid and Churchill Capital Corp. IV experienced severe rumors prior to the announcement, which affected the surge in the share price. The SPAC Churchill Capital Corp. IV closed at \$30.8 February 21 with the NAV being around \$10.0. When the

deal was announced February 22, it was announced that PIPE invested at \$15.0. Therefore, the investors of the SPAC should be unwilling to redeem their shares, which makes the redemption ratio artificially low. We do not want these types of events to influence our analysis, so we adjust our dataset. We set a threshold of 1% redemption rate, which means that transactions which have a redemption ratio under 1% are excluded from our dataset. We find it too simplistic to only remove the transactions where the redemption ratio is 0%. Transactions who experience a surge in share price due to rumors or similar incidents still have some redemption, but substantially lower. The transactions that have unit price above NAV typically have some redemption, making the redemption ratios in the interval from approx. 0.001% to 1.0%. To fully adjust for these, we include the transactions with redemption ratios above 1%. On the other hand, we also adjust for transactions that have redemption ratios over 95%, as these transactions are likely to have some noise not making them relevant for the analysis. As a result, we are left with transactions that have redemption ratios in the interval 1% to 95%. All the transactions we have removed are manually analyzed to make sure that they are removed for a logical reason.

### **5.4.2 Deal value**

In our data, the *deal value* is going to be de-SPAC enterprise value as of when the data was collected.

As we want to make analysis on appropriate transactions, we adjust for deal values that are low and at levels we deem to be abnormal for a SPAC. We set the threshold at \$15.0 million, which means that only transactions with deal value greater than \$15.0 million are included. This removes five transactions from our dataset, with one being before 2020 and the remaining four being after 2020.

### **5.4.3 Enterprise value**

In our data, the *enterprise value* is going to be de-SPAC enterprise value as of when the data was collected.

We make similar adjustments to the enterprise value of the target company with the same logical reasons as the deal value. We set the enterprise value threshold at \$10.0 million. This omits 18 transactions from our dataset, with four being prior to the SPAC surge and the remaining 14 being after the surge.

## 6. Results and analysis

We start our analysis with an overview of the changes in some of the SPACs' key characteristics before and after the exogenous shock that accelerated the growth in the SPAC market since March 2020. By looking at the changes, it is easier to understand the current SPACs aspects and the structural changes that lay the foundation for further analysis and main conclusions. We present the changes in various variables before and after March 2020 in Table 1.

As shown in the two bottom rows in Table 1, target companies that were acquired after the exogenous shock in March 2020 are more likely to be non-profit making and even non-revenue making. Those differences between and after March 2020 are statistically significant at a 1% level. This could in turn mean that the general risk of target firms is larger, that is consistent with our hypothesis. While looking at the change in debt ratio in the second row in Table 1, we find that the target companies after March 2020 became somewhat less leveraged, although the difference is not statistically significant. Nevertheless, this could imply that more targets after 2020 are early-stage companies that do not have the availability to take on debt. As for a market valuation, the valuation in terms of price-to-book (P/B) ratio has substantially increased to an average P/B of 78.2 after March 2020 compared to a multiple of 3.4 before March 2020. This might indicate that target firms on average receive higher valuations compared to the period before March 2020, due to the tighter competition among sponsors and higher popularity among investors. However, we remain cautious drawing conclusions based on this multiple, as the sole explanation could be that growth firms typically have a higher P/B multiple compared to stable firms.

The fifth row of Table 1 shows that after March 2020 SPACs require less time to announce a merger following an IPO. Prior to March 2020 SPACs required 485 days on average to find a target, while they require 277 days to announce a target after March 2020. This is significant at a 1% significance level. We also find that the average announced deal value remains rather similar at approximately USD 550m. Also, the redemption ratio has come down a bit to 57%, but the difference in means is not significant enough to draw any conclusions. Additionally, contrary to our hypothesis, as long as our results show higher merger announcement returns on average, lower redemption ratios are to be expected since share price is more likely to exceed NAV at the time of the decision to redeem or not.

**Table 1: De-SPAC characteristics before and after 2020**

This table presents the differences in de-SPAC characteristics before and after 2020. Pre-revenue and pre-profit dummies refer to the target company being non-revenue or non-profit making, respectively. T-statistic is attributed using Welch two-sample t-test. T-statistics \*, \*\*, \*\*\* are significant at 10%, 5% and 1% level, respectively.

	Before 2020		After 2020		Difference	
	N	Mean	N	Mean	$\Delta$ Mean	T-statistic
Redemption ratio	20	0.61	122	0.57	-0.041	<b>0.647</b>
Debt ratio	56	0.35	238	0.27	-0.082	<b>-1.766</b>
Announced deal value (mill)	59	532.84	269	585.81	52.97	<b>0.706</b>
Enterprise value (mill)	57	1656.92	263	1671.56	14.64	<b>0.037</b>
Days to acquisition	59	485.12	269	277.14	207.98	<b>6.844***</b>
P/B	45	3.39	214	78.15	74.75	<b>2.193*</b>
Pre-revenue (1 if yes)	59	0.08	269	0.59	0.51	<b>10.700***</b>
Pre-profit (1 if yes)	59	0.61	269	0.88	0.27	<b>4.1018***</b>

## 6.1 Announcement effect

Our analysis of SPACs' merger announcement effect over the 3-day event period is statistically significant at a 1% significance level across the full period of analysis from 2011 to 2022. It is also significant when studying the two time periods separately before and after March 2020. The results are presented in Table 2 with 313 total observations, whereas observations before and after March 2020 amount to 54 and 259, respectively.

We find that SPACs experience an average announcement return of 6.78% during our full period of analysis from 2011 to 2022, as presented in Table 2. However, the returns differ when compared before and after March 2020. Prior to March 2020, SPACs had an average merger announcement return of 1.34%, which is relatively close to the findings of Dimitrova (2017) who found a CAR of 1.50% over a three-day event window. In contrast, we find the CAR of 7.92% in the period after March 2020. This indicates a substantial difference of 6.58% between the two periods which is statistically significant at 1% level using the Welch two sample t-test, as shown in Table 3.

Table 2 also showcases higher return volatility after March 2020 with a standard deviation of 19.47%, substantially higher than a standard deviation of 2.70% in the period prior to the surge in SPACs. Table 2 also shows that SPACs that announced their mergers after March 2020 had higher maximum returns over the event period, but also lower minimum returns. Higher volatility might be attributed to the general hype in SPACs which includes investors'

confidence and excitement over well-known sponsors and the perception of their ability to strike attractive merger deals (Schwab, 2022).

**Table 2: Cumulative abnormal return (CAR) during merger announcement event window**

The table shows cumulative abnormal return (adjusted for Russell 2000 index) over a 3-day event window for the full sample period and also separately for mergers announced before 2020 and after 2020. T-statistic is attributed using a one-sample t-test. T-statistics \*, \*\*, \*\*\* are significant at 10%, 5% and 1% level, respectively.

		N	Mean	St.Dev	Min	Max	T-statistic
Full period	CAR (-1,1)	313	6.78%	17.91%	-39.67%	110.70%	6.702***
Before 2020	CAR (-1,1)	54	1.34%	2.70%	-9.36%	7.57%	3.644***
After 2020	CAR (-1,1)	259	7.92%	19.47%	-39.67%	110.70%	6.548***

**Table 3: Difference in CAR during merger announcement before and after 2020**

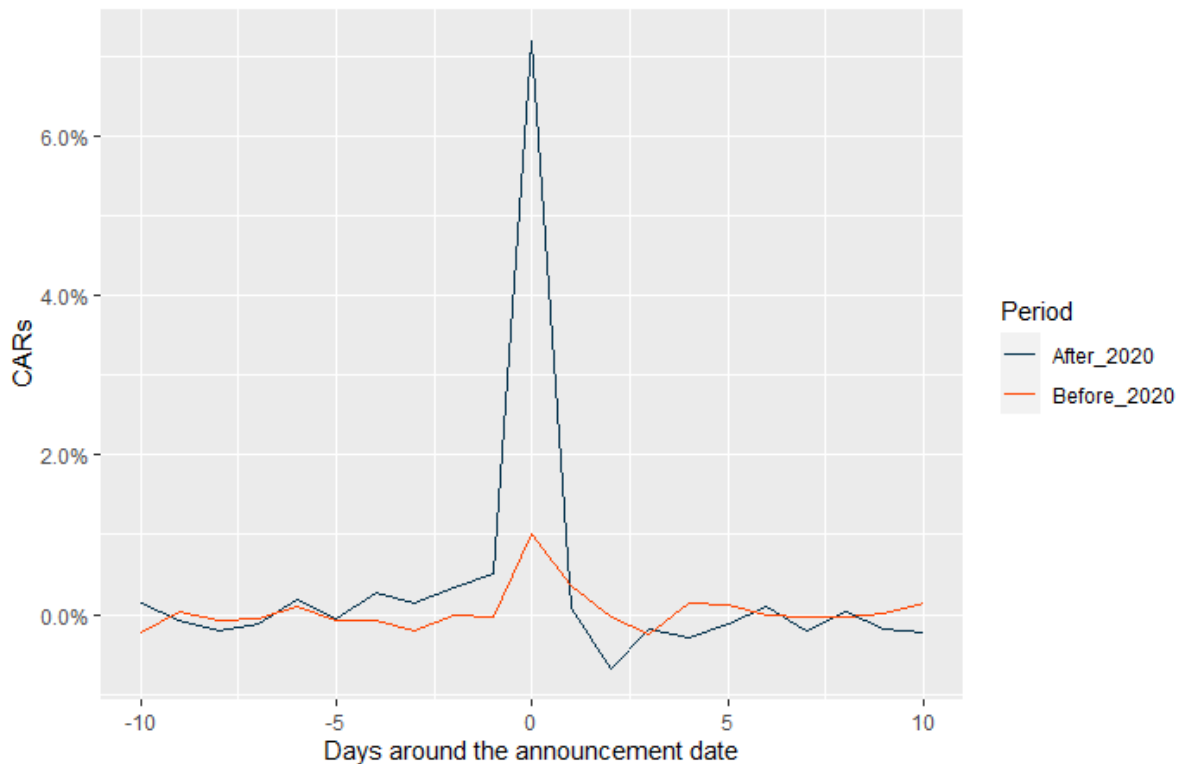
The table shows a difference in mean cumulative abnormal return (adjusted for Russell 2000 index) over a 3-day event window between SPACs with merger announcements before 2020 and after 2020. T-statistic is attributed using Welch two sample t-test. T-statistics \*, \*\*, \*\*\* are significant at 10%, 5% and 1% level, respectively.

		$\Delta$ Mean	T-statistic
Difference (before and after 2020)	CAR (-1,1)	6.58%	5.205***

Despite higher announcement return in SPACs after March 2020, we find that higher return generally only occurs on the announcement trading day while it normalizes thereafter and becomes statistically similar to the return patterns exhibited by SPACs with merger announcement before March 2020, as shown in Figure 8. Nevertheless, those observations only apply to the short-term up to 10 days, as our findings indicate statistical differences in returns once we look at the longer-term, which we will explain further in section 6.2.

Our analysis does not conclude on causality or which effect explains such development, but it shows what effect an exogenous shock has on the announcement return in the SPAC market. However, as we have previously discussed what variables are a likely reason for the surge in the SPAC market, those variables are likely to be the causality as well, even though we cannot statistically confirm.

**Figure 8 SPACs' share price development around the merger announcement date**



We draw three main conclusions based on these results:

1. SPACs will on average yield significant positive returns in the merger announcement event window.
2. The difference in merger announcement returns before and after March 2020 is significantly high, while return patterns following the announcement day from trading day 2 to day 10 are relatively similar both before and after March 2020.
3. The volatility of announcement returns across SPACs has increased after March 2020.

## 6.2 Buy and hold abnormal returns

To analyze the de-SPAC return patterns over a longer time frame we use the BHAR methodology. We look at the monthly abnormal return for the de-SPACs over a ten-month period to see the development over time. Table 4 below shows the average BHAR for completed transactions before and after March 2020. The table indicates that there is a significant transition in returns before and after March 2020, where the medium-term returns

have decreased substantially. For de-SPACs after 2020 the largest decline in returns occurs in month five, where the change in return is negative 19.34%. When compared to returns in SPACs before 2020, the difference in returns is at negative 24.39%.

Overall, Table 4 shows that the cumulative return at the end of 10-month period is positive 5.15% before March 2020, while it is negative 51.45% after March 2020. The T-statistics in the Table 4 show that the differences in BHARs are significant at a 1% level from month seven throughout month ten. Return differences in months one and six are significant at a 5% significance level, months two and five are significant at the 10% level, while returns in months three and four are not significant. Compared to previous research, our results of the de-SPACs after March 2020 are similar to the findings of Kolb & Tykvová (2016), which found that the longer the period the more severe is underperformance.

***Table 4: Buy-and-hold abnormal returns (BHARs) following merger announcement***

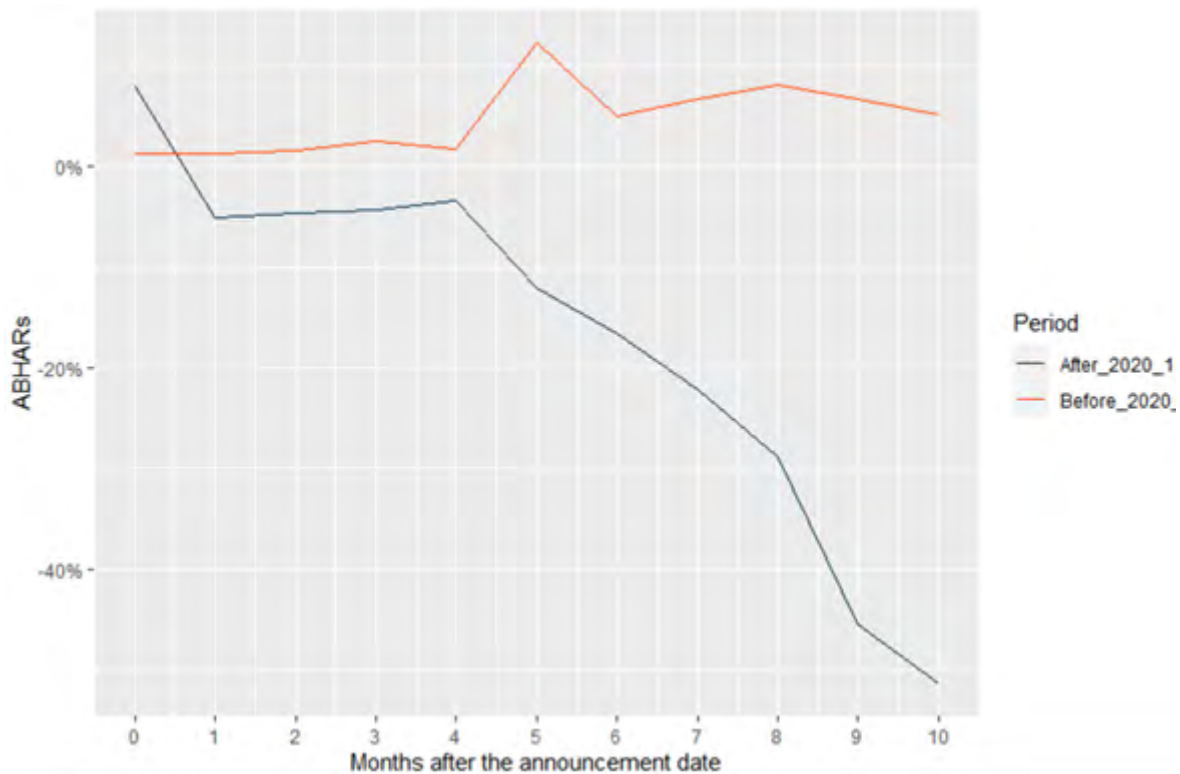
This table shows average buy-and-hold cumulative abnormal returns (adjusted for Russell 2000 index) following merger announcement. BHARs are computed monthly for up to ten months. The table presents BHARs for SPACs with mergers announcements before and after 2020. One month corresponds to 21 trading days. T-statistic is attributed using Welch two sample t-test. T-statistics \*,\*\*,\*\*\* are significant at 10%, 5% and 1% level, respectively.

	Before 2020		After 2020		Difference	
	Mean	St. Dev	Mean	St. Dev	$\Delta$ Mean	T-statistic
BHAR (0,1)	1.23%	6.29%	-5.08%	21.28%	-6.31%	<b>3.295**</b>
BHAR (0,2)	1.57%	10.22%	-4.62%	33.08%	-6.19%	<b>2.061*</b>
BHAR (0,3)	2.62%	17.87%	-4.29%	45.04%	-6.91%	<b>1.586</b>
BHAR (0,4)	1.74%	24.04%	-3.31%	67.67%	-5.05%	<b>0.796</b>
BHAR (0,5)	12.39%	72.13%	-12.00%	46.57%	-24.39%	<b>2.357*</b>
BHAR (0,6)	4.97%	44.75%	-16.62%	50.49%	-21.59%	<b>2.982**</b>
BHAR (0,7)	6.80%	46.99%	-22.18%	56.63%	-28.98%	<b>3.730***</b>
BHAR (0,8)	8.07%	50.31%	-28.87%	52.20%	-36.94%	<b>4.654***</b>
BHAR (0,9)	6.71%	73.42%	-45.51%	48.82%	-52.22%	<b>4.938***</b>
BHAR (0,10)	5.15%	81.21%	-51.45%	48.59%	-56.60%	<b>4.904***</b>

Looking at the standard deviation in Table 4, the distribution of share price performance before and after March 2020 indicates high volatility differences for the two groups for each month. The standard deviation of these groups is rather similar from month six throughout month eight, where the volatility in share return is the highest for de-SPACs before March 2020.



**Figure 9 Average BHARs post-merger announcement**



*Note: the graph starts with the return on the merger announcement date and then average BHARs follow*

As we have limited data of trading history exceeding 12 months on de-SPACs after March 2020, we do not opt for a longer period than ten months. Previous research by Jenkinson & Sousa (2011) and Kolb & Tykvová (2016) found that long-term BHAR for SPACs are substantially negative. In contrast, we find that SPACs before March 2020 in the medium-term represented a slightly positive return for the first 10 trading months after announcing the merger, as showcased in Table 4. This might be due to selection and survivorship bias in our dataset. As time goes on, the number of SPACs being delisted will increase. As a result, the de-SPACs that are still listed today will be those that were more successful in the dataset in previous research, while those that had weak stock returns are more likely to be delisted today. Although we have retrieved all the stock data from Bloomberg and included de-SPACs that later went through another merger or were delisted or liquidated, part of the SPACs from the earlier period simply were not available in the Bloomberg terminal. Still, we believe that our dataset remains representative of the period, and we can draw certain conclusions from it.

## 6.3 Short-term return impact on longer-term return

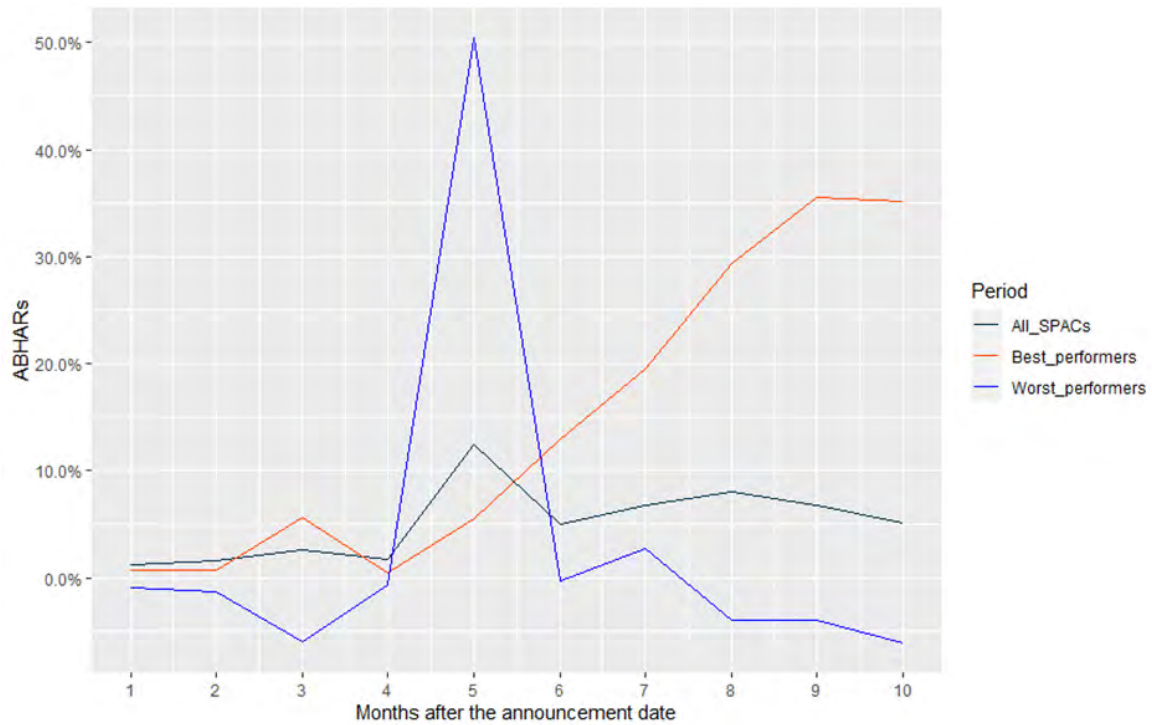
Our analysis will also explore if SPACs with the highest merger announcement return overperform in the period of up to 10 months, and whether there are any differences before and after March 2020. Looking at the financial theory, we argue that the Fama-French model and the momentum factor could explain the difference in returns. As the merger announcement return for certain SPACs is higher than average, we hypothesize that this could potentially create momentum in the SPACs' share prices, which will transition into higher longer-term returns for best performers compared to worst performers on the announcement date. We conduct our analysis by splitting the de-SPACs based on the highest and lowest quantile from the merger announcement return before and after March 2020.

### 6.3.1 Differences in BHARs before the exogenous shock

Looking at the differences in BHARs for SPACs with merger announcements before March 2020 showcased in Figure 10, we find that SPACs with the highest announcement return continue to yield positive and better returns compared to the full sample, especially from the fifth month following the merger announcement.

Regarding the de-SPACs in the lowest quantile of announcement returns, those continued to underperform the full sample of SPACs before March 2020 and on average showed negative returns after the merger announcement, as illustrated in Figure 10. The spike in month five is due to an outlier, which impacts our overall results due to limited data availability prior to March 2020. However, the difference between the SPACs with lowest and highest CARs is not significant in any of the studied periods up to 10 months, as shown in Table 5 in the Appendix. Table 5 and Figure 10 also show that the de-SPACs with the lowest merger announcement return had a cumulative abnormal return of negative 6.06% at month 10, while the de-SPACs with the highest merger announcement return had a cumulative abnormal return of 35.10%.

**Figure 10 Differences in average BHARs based on merger announcement return (Before 2020)**



### 6.3.2 Differences in BHARs after the exogenous shock

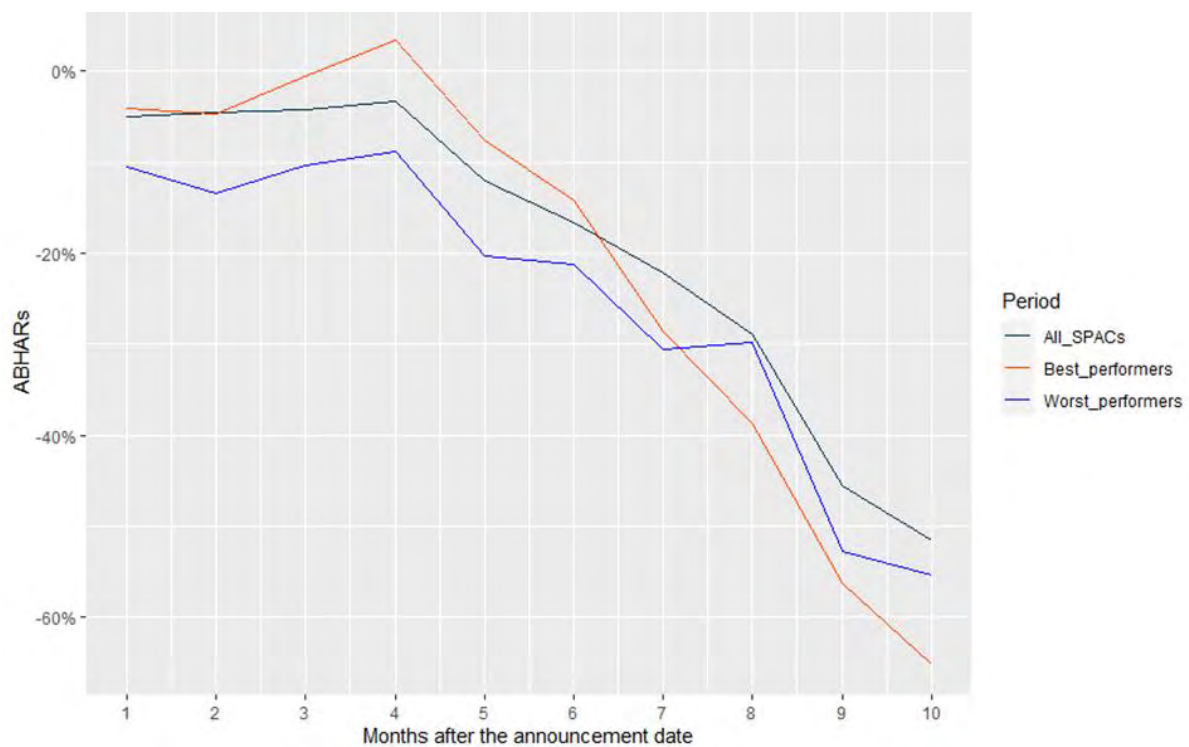
As for differences in BHARs among SPACs with best and worst CARs following the merger announcement after March 2020, we illustrate the differences in Figure 11. We find that there is a statistically significant difference in medium-term returns. Nevertheless, we see that both SPACs with the highest and lowest announcement returns tend to yield negative and decreasing returns over time and those are significantly different from the BHARs before March 2020.

SPACs that had the highest merger announcement returns underperformed the SPACs with the lowest merger announcement return, which is the opposite of before March 2020. At month ten, the de-SPACs with the lowest merger announcement return had a negative cumulative abnormal return of 55.27%, while the de-SPACs with the higher merger announcement return had a negative cumulative abnormal return of 65.07%, as shown in Table 6 in the Appendix.

Nevertheless, our findings indicate that the hype which is built up in the first days quickly dissipates with investors beginning to lose confidence in the de-SPACs investment case and that the higher the initial hype is, the bigger the disappointment afterward. As illustrated in

Figure 11 below, the upper quantile of merger announcement return surpasses the cumulative abnormal return of all quantiles until month six, while it lags the lowest quantile and the whole sample after month seven. Additionally, Figure 11 also illustrates that the whole sample overperforms the upper and lower quantile after month six in terms of cumulative abnormal return. This implies that the de-SPACs with merger announcement returns closer to the average, performed better compared to the initial losers and winners in the short-term merger announcement return.

**Figure 11 Differences in average BHARs based on merger announcement return (After 2020)**



Overall, we conclude that there are large, although not statistically significant differences in BHARs based on how the SPAC share price performed on the merger announcement return before March 2020. We find that the best performing SPACs in the short-term tend to outperform other SPACs on average, while it is vice versa for SPACs that had the lowest returns on the merger announcement. However, we find a different return pattern for SPACs that announced their mergers after March 2020. Despite the initial short-term returns, all of them had negative and decreasing returns, especially the SPACs which soared the most on the merger announcement. Although we find statistically significant differences in medium-term returns before and after the surge in March 2020, we cannot confirm that there are

statistically significant differences in returns among SPACs both before and after March 2020 based on the share price reaction on the merger announcement return.

## 6.4 Discussion of results

Seeing the redemption ratio somewhat decreasing does not come as a surprise when combined with the fact that the return on the merger announcement date has improved after March 2020. With the unit price increasing after a merger announcement, the shareholders have less incentives to redeem their shares. When the unit rises above its NAV value after a merger announcement, the value of each unit will be higher than what could be received if redeemed. The increase in the unit price, and thus the return of each unit, comes from two drivers:

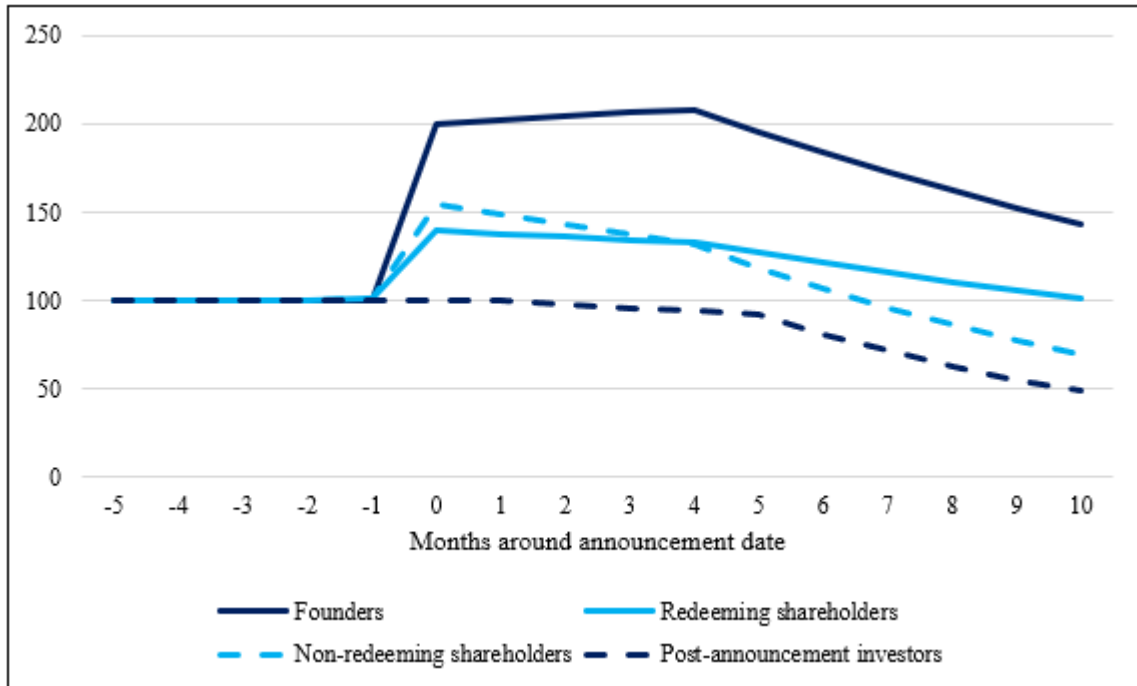
1. The common share in the merged company increases in value
2. The warrant approaches or exceeds its strike price, making the value of the warrant increase in value.

How much each of these variables impacts the total return on a unit depends on how much a warrant makes up of the unit.

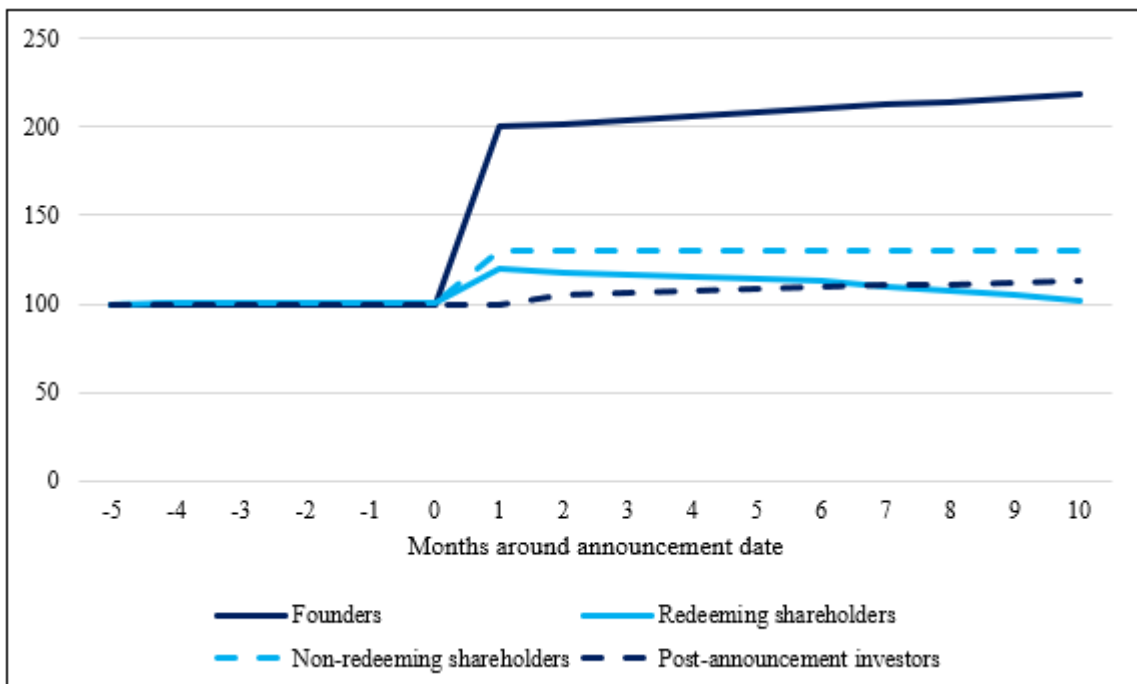
Looking at BHARs is interesting, as it tells us something about the returns the founders and redeeming shareholders receive, in addition to the other SPAC shareholders. As the founders receive common shares in the merged company, their return is solely based on the longer-term share price return. When a shareholder decides to redeem their shares, their gain is dependent on the medium-term share price development. That is because the warrants they receive after redeeming can be converted into shares when the share price is above the strike price. If the share price is above the strike price, the redeeming shareholders will exercise their warrant and sell their shares, if they do not believe in the long-term potential of the company. Previous research on SPACs has focused on how the founders are the only winners on SPACs, as they receive the main gain. However, we argue that the redeeming shareholders also capture a lot of the gain. They invest their available capital at risk-free interest rates without downside risk, as the SPAC funds are placed in trustee accounts. Further, shareholders redeem their common shares and receive their available cash in return, while also receiving the corresponding warrant. If the transaction is perceived as optimistic by the market the share price increases, the warrant is redeemed, and the shareholders net the profit. On the other hand, if the market is pessimistic regarding the transaction and that

decreases the share price, the redeeming shareholders have its downside protected. Looking at the return for all SPAC's shareholders in context with our findings, the implied payoff from the four different aspects of a SPAC is shown below in Figure 12 and Figure 13.

**Figure 12 Implied Return for SPAC Shareholders (After March 2020)**



**Figure 13 Implied Return for SPAC Shareholders (Before March 2020)**



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The reason that the redeeming shareholders have a jump in their return after the announcement is that the warrants increase in value as the acquisition target is found. However, as the months go by, we do not see that the average transaction yields a positive return surpassing the average strike price of \$11.5 of the warrants. As a result, the warrants do not have an influential value as time goes on. Regarding the non-redeeming shareholders, we keep the return flat, as the common shares increase slightly in value, while the warrants they receive decrease in value. We rank the different shareholders purely based on the return excluding the risk aspect prior to 2020 following:

1. **Founders** - the true winners of a SPAC transaction with the extreme return without significant downside risk.
2. **Non-redeeming shareholders** - the highest expected return following the founders, but the return comes with higher downside risk.
3. **Redeeming shareholders** - Does only receive the risk-free return with the sale of warrants representing an upside. The most attractive part about being a redeeming shareholder is the downside protection, while also having a potential upside.
4. **Post-announcement shareholders** - As the medium-term BHAR in our analysis has positive returns over the ten months, the post-announcement shareholders have lower initial return, but exceed the redeeming shareholders over time. However, these investors capture the main downside risk at the expense of “giving away” the upside to the founders and redeeming shareholders.

Now looking at the implied return after 2020, we can draw the same general conclusions as before 2020. However, we see that the founders, redeeming shareholders and non-redeeming shareholders face higher initial return the first months after the merger announcement. This is mainly due to the larger announcement effect we found. The merged company had weak returns in the months following the announcement. The post-announcement investors and non-redeeming shareholders are facing negative return, while the founders are still happy because they still gain their free money. Redeeming shareholders do not have any difference compared to before 2020 on the medium-term, but they can earn more if they are able to sell their warrants right after the announcement because of the return following the merger announcement. It is important to understand that the redeeming shareholders return is not necessarily as the average transaction implies. If an investor was to acquire shares in a portfolio of SPACs, most of the portfolio SPACs would only yield the risk-free rate. However, a portfolio of SPACs has a high probability of containing at least one outlier that

is successful and exceeds the average transaction by far. Additionally, a warrant can be exercised for up to five years following the merger announcement, whereas our implied return only looks at the 10 months. Based on our data, we find that 15.4 % of our total merged SPACs have a current share price above the strike price, while 19.1% have a current share price above the NAV at \$10. The data indicated that one-fifth of all SPACs will have a positive return for initial shareholders that did not redeem the common shares.

The shareholders can also sell their warrants in the open market if they do not believe that the merger will be successful. Therefore, the actual return of redeeming shareholders is exceeding the risk-free rate, without the redeeming shareholders facing downside risk. The premium return to the risk-free is dependent on how successful the investors are at picking the best SPACs. This is in our view why we are seeing a high appetite for SPACs and why they usually have high redemption ratios.

We do not identify one main reason that the longer-term returns of SPACs have decreased after the surge in 2020. However, we do see that SPAC transactions usually receive a lot of hype and momentum right after a merger is announced. This is supported by the announcement effect being larger compared to pre-surge, as the hype creates substantial support for the share price. However, for the majority of de-SPACs, it is challenging to keep up the promises to investors and deliver on-time and in-line with the rosy outlook, thus the hype soon dissipates, and the share prices fall back down, sometimes rather dramatically.

As our analysis is based on the completed SPACs showing weak long-term results, we question why investors become investors of common shares or rather keep their common shares from the beginning. What we generally see is that the SPACs have higher volatility in general, while the merged companies are usually in the start-up phase. Therefore, we argue that the investors are disagreeing on the value of the company to a larger extent, which is why some investors are confident and believe that certain companies are going to be the real “winner” in the long term. We also believe that shareholders put too much trust in the founders. Given that founders are well-known successful investors or businessmen, shareholders are likely to trust that they find target companies that will yield high returns in the long term.



## 7. Limitations and suggestions for further research

There are several limitations in our thesis we would like to note. First of all, our data on de-SPACs is collected from several sources including manual collection from EDGAR database as to our knowledge there is no complete database on de-SPACs covering an extensive period from 2010. Therefore, although we have thoroughly cross-checked our dataset with multiple reliable sources, there is a risk that human error has been made and some data entries are omitted or falsely included.

Secondly, the dataset of de-SPACs prior to March 2020 is likely affected by selection and survivorship bias, thus limiting the number of de-SPACs that have available share price data. This leads to somewhat different results of longer-term share price performance prior to March 2020 compared to the previous research. We extract the share price data from Bloomberg which probably omits some data for companies that have been delisted already some time ago and thus tilts the dataset of de-SPACs prior to 2020 to higher quality companies. Still, we acknowledge that our full dataset is much more extensive compared to previous research, while conclusions on the change in SPACs after 2020 are based not only on our findings but also cross-checked with previous research covering earlier periods.

Thirdly, our thesis covers de-SPACs in the US market. We understand that different regulatory environments and potential variability in SPACs structure across countries might not lead to similar results and should be analyzed separately.

Finally, the statistical significance of our findings is confirmed using basic t-tests, therefore our results should be viewed as rather indicative.

Based on our findings, we believe that further research could provide an analysis of the factors contributing to SPACs persistent underperformance and changes in structural variables after March 2020 contributing to even more negative returns. Also, it would be valuable to explore the effect of different macroeconomic factors on SPAC market development as we argue that the FED increase in M2 money supply paved the way for a rapid SPAC market expansion.

## 8. Conclusion

Although SPACs have been around for three decades, the significant increase in SPAC activity started only in March 2020. In our view, this was to most extent led by the Federal Reserve economic stimulus program in response to the Covid-19 pandemic in March 2020. We believe that this acted as a primary exogenous shock to the SPAC market among other supporting reasons. The aim of this thesis was to investigate and provide new insights on the booming de-SPAC market in the US by utilizing the most recent and extensive dataset of SPAC completed mergers.

First, we focus on the main de-SPAC characteristics that are related to the target, transaction, and the SPAC itself. Furthermore, we explore share price performance in the short and medium-term post-merger announcement and look for any significant changes in the de-SPAC market after the exogenous shock in March 2020. We finalize our analysis by looking at potential returns for various shareholders of the de-SPAC company. Our main hypothesis is that following March 2020 the de-SPAC market dynamics have changed substantially and we should see those changes reflected both in the key characteristics and share price performance of de-SPACs.

The dataset includes 328 completed SPAC mergers in the US between 2011 and 2021, with the majority of transactions occurring in the period after 2020. Our analysis of the de-SPAC characteristics suggests that target companies that were acquired after March 2020 are significantly more likely to be non-profit making and even non-revenue making, implying greater riskiness of the targets. Besides, after March 2020, SPACs on average require 208 fewer days to announce an acquisition which indicates a significantly higher level of activity in the SPAC market. Further, we conducted an event study to explore the SPAC merger announcement effect. Our findings indicate that SPACs with a merger announcement before the exogenous shock in March 2020 have an average CAAR of 1.34%, while those SPACs with merger announcements after the exogenous shock exhibit a CAAR of 7.92%. The difference of CAARs between those two periods shows a 6.58% significantly higher abnormal stock return in a three-day merger announcement event window after the exogenous shock in March 2020. We also note much higher variability across the returns since SPACs gained their popularity.

Next, we proceeded with an analysis of BHARs over a period of up to 10 months. The findings indicate that SPACs before the surge in March 2020 in the medium-term represented a slightly positive return for the first 10 trading months after announcing the merger. This is contradicting the results of earlier research which we argue might be due to selection and survivorship bias. As for the BHARs after the surge in March 2020, we find a significant transition in returns, where the medium-term returns have decreased substantially. The return one, six, and ten months following the merger announcement are at negative 5.1%, negative 16.6%, and negative 51.5% respectively. The difference in BHARs before and after March 2020 is statistically significant in all months at different significance thresholds, except for months three and four.

Our analysis also shows that the SPACs which had the highest merger announcement CARs before March 2020 continue to perform better in the months after the announcement, while those with the lowest merger announcement CARs continued to underperform both the best performers and the whole de-SPAC sample. However, we find a different situation for de-SPACs after March 2020. Despite the average CAR being higher than before March 2020 following the merger announcement, all SPACs in the medium term tend to yield negative and decreasing returns over time.

We argue that this is led by the hype generated by the market. As time goes on, investors are likely to find other newly announced mergers that appear more appealing. Since all the SPACs are somewhat dependent on marketing a transaction, they will struggle to maintain the hype over time. Additionally, the sponsors are encouraged to provide an optimistic and “rosy” business outlook due to current regulations on SPACs and safe harbor. Since the management can be too confident in the company’s outlook, the investor belief in the investment case eventually dissipates as most of the SPACs are not able to deliver on their overconfident outlook. Thus, coupled with the inherent SPAC dilution effect, the share price substantially declines as we move further in time.

We also take a broader look at the return for various shareholders of a de-SPAC and find that founders, in addition to redeeming shareholders, are the ones that receive the highest return, even when the risk aspect is considered. By investing in a SPAC, the redeeming shareholders will receive risk-free interest as a return, in addition to a free warrant on the completed merger as a reward for locking the cash for up to 24 months, making the asset investment attractive when the investor has substantial amounts of dry capital and excess cash. Since the

long-term abnormal return is negative, it indicates that the average transaction will result in no strike of warrants on completed mergers. However, we argue that there will be certain transactions that will be successful in contributing to “free” gains for the redeeming shareholders. Warrants will also have value once they start to trade. As a result, the redeeming shareholders will always have a return larger than risk-free without taking on more risk than investing in risk-free assets. We question why investors continue to invest into SPAC post-merger when the returns underperform the market by far. We hypothesize that it is due to investors’ overconfidence in the ability to outperform the market and pick the best shares, ignoring the data.

As we have concluded that higher activity in the SPAC market has resulted in worse medium-term returns, it could indicate that the whole SPAC market is better off with limited volumes. The lower number of SPACs, the less competition there is for the best target companies, which will result in better negotiated deals on average, instead of inflated valuations from founders closing the deal to earn free shares. Our hypothesis regarding the change in longer-term returns after March 2020 is proven to be correct. We have also proven that our hypothesis regarding the decline in longer-term return following March 2020 is correct. However, we were not able to prove that higher merger announcement return results in higher longer-term return, as our results show different patterns following March 2020.

Even though SPACs serve as a great potential tool in the financial market, the current structure and characteristics incentivize agency issues, as the financial return is not in favor of long-term investors, but rather founders and redeeming shareholders that capture the return on the upside while being protected on the downside. We deem it as likely that SEC will intervene to make the structure of SPACs fairer and more similar to an IPO process.

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## 10. Appendix

**Table 5: Difference in BHARs based on merger announcement return before 2020**

This table indicates average buy-and-hold abnormal returns (adjusted for Russell 2000 index) following merger announcement before 2020. We specifically look at BHARs for SPACs which had the lowest and highest CARs post merger announcement. Lowest and highest CARs correspond to top and bottom 20% of SPACs sorted by CARs in the three-event window. We also tabulate the difference between those return and test for the significance. One month corresponds to 21 trading days. T-statistic is attributed using Welch two sample t-test. T-statistics \*,\*\*,\*\*\* are significant at 10%, 5% and 1% level, respectively.

Mean BHAR based on	All SPACs Before 2020	1 <sup>st</sup> quantile (lowest CARs)	5 <sup>th</sup> quantile (highest CARs)	$\Delta$ Mean	<b>T-statistic</b>
BHAR (0,1)	1.23%	-0.98%	0.65%	1.63%	<b>0.947</b>
BHAR (0,2)	1.57%	-1.28%	0.74%	2.02%	<b>0.594</b>
BHAR (0,3)	2.62%	-6.03%	5.58%	11.61%	<b>1.251</b>
BHAR (0,4)	1.74%	-0.72%	0.45%	1.17%	<b>0.107</b>
BHAR (0,5)	12.39%	50.34%	5.45%	-44.91%	<b>-1.047</b>
BHAR (0,6)	4.97%	-0.36%	12.89%	13.25%	<b>0.868</b>
BHAR (0,7)	6.80%	2.67%	19.45%	16.79%	<b>1.020</b>
BHAR (0,8)	8.07%	-3.98%	29.29%	33.28%	<b>1.459</b>
BHAR (0,9)	6.71%	-4.03%	35.53%	39.56%	<b>1.213</b>
BHAR (0,10)	5.15%	-6.06%	35.10%	41.17%	<b>1.138</b>

**Table 6: Difference in BHARs based on merger announcement return after 2020**

This table indicates average buy-and-hold abnormal returns (adjusted for Russell 2000 index) following merger announcement after 2020. We specifically look at BHARs for SPACs which had the lowest and highest CARs post merger announcement. Lowest and highest CARs correspond to top and bottom 20% of SPACs sorted by CARs in the three-event window. We also tabulate the difference between those return and test for the significance. One month corresponds to 21 trading days. T-statistic is attributed using Welch two sample t-test. T-statistics \*,\*\*,\*\*\* are significant at 10%, 5% and 1% level, respectively.

Mean BHAR based on	All SPACs After 2020	1 <sup>st</sup> quantile (lowest CARs)	5 <sup>th</sup> quantile (highest CARs)	$\Delta$ Mean	<b>T-statistic</b>
BHAR (0,1)	-5.08%	-10.45%	-4.18%	6.39%	<b>1.220</b>
BHAR (0,2)	-4.62%	-13.41%	-4.68%	8.72%	<b>1.175</b>
BHAR (0,3)	-4.29%	-10.41%	-0.63%	9.78%	<b>0.977</b>
BHAR (0,4)	-3.31%	-8.79%	3.33%	12.12%	<b>0.742</b>
BHAR (0,5)	-12.00%	-21.29%	-7.59%	12.70%	<b>1.275</b>
BHAR (0,6)	-16.62%	-21.26%	-14.19%	7.07%	<b>0.612</b>
BHAR (0,7)	-22.18%	-30.59%	-28.58%	2.01%	<b>0.262</b>
BHAR (0,8)	-28.87%	-29.85%	-38.68%	-8.83%	<b>-1.064</b>
BHAR (0,9)	-45.51%	-52.67%	-56.31%	-3.64%	<b>-0.477</b>
BHAR (0,10)	-51.45%	-55.27%	-65.07%	-9.81%	<b>-1.396</b>