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THE NEW WAVE: PERFORMANCE OF MODERN US-LISTED SPACS

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ABSTRACT

Special Purpose Acquisition Company – SPAC – is a blank check company with the sole purpose to invest money raised during the IPO into a private company. SPACs gain popularity becoming a new investment tool for retail and institutional investors. This paper analyses SPAC's return to its shareholders in the short-term and the long-term perspective. We report controversial results of short-term return to acquirer shareholders in a SPAC deal, and find significant evidence of negative long-term return to acquirer shareholders. Furthermore, cross-border nature is the only significant value driver of SPAC return in our sample.

Keywords: Special Purpose Acquisition Companies (SPACs), Mergers and Acquisitions (M&A), Returns, Announcement date, Value Drivers

JEL Classification System: G12, G14, G34

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INTRODUCTION

In the constantly evolving world of finance, funding plays one of the biggest roles. Companies are usually in a great need of financing required for successful daily operations as well as growth and development. Some companies are capable of operating using only internal resources; others can function only with provision of outside funding. There are several ways to obtain additional resources. One of them that appeared recently is going public via a Special Purpose Acquisition Company.

Special Purpose Acquisition Company – or, simply put, SPAC – is a "blank check" company that is created as an investment vehicle. The special purpose of that entity is to invest funds obtained during its IPO event by buying the whole company or a share of it. SPACs usually target private companies; hence, they are often referred to as fast-track IPOs, but they are not limited to it. In any case, the sole purpose of the whole SPAC deal is to invest money of investors into some attractive entity and obtain returns.

SPAC starts its operation after the IPO during which it sells units usually at $10. A unique feature that differs SPACs from other forms of investment tools is the defined investment horizon. In particular, after the IPO date a SPAC has up to 24 month to identify the target and close the deal. However, investors are able to operate their SPAC's shares or shares of the newly combined company at their will.

Apart from the horizon, there are solid investor protection principals embedded into SPACs' structure. Firstly, almost all funds obtained during the IPO are held in an escrow account. In case of SPAC's failure, SPAC's organizers distribute money back to investors at pro rata level. Moreover, money is invested in a governmental coupon bond, thus, investment in a SPAC is similar to investment in a T-bill. It provides benefits of the two worlds: limited downside from extremely safe bonds, on the one hand, and unlimited potential from SPACs, on the other hand. Secondly, investors have several ways to invest in SPACs. Early investors take their position at or around the IPO date. Next, investors have an option to invest in a SPAC after the IPO. Since the entity goes though IPO, it is traded on a stock exchange as any other operating company. Therefore, its units are free-floating. In addition, after a while, units are decomposed into separate shares and warrants that make investment in SPACs even more flexible.

Another side that also benefits from a SPAC deal is sponsors. The sponsor team is usually comprised of individual experts or a team of managers assigned by the SPAC creating entity. Since SPACs initially have no operating assets, the sponsor team is the only driving force to success of a SPAC. For that reason, investment in a SPAC sometimes is called "betting on the jockey rather

than on the horse". Sponsors are offered on average 20% of the newly combined company in case of SPAC's success in exchange for their effort and experience applied to the deal organization.

SPACs are gaining momentum right now. For the last five years this investment tool has gone from the direct ban against SPACs in Goldman Sachs in 2017 to 83 billion dollars raised in SPACs' IPO in 2020 and to the almost 100 billion dollars raised during just the first quarter of 2021. Apart from the overall size of SPACs' market, there are separate cases of successful deals. For instance, one of the earliest SPACs within the new wave is Social Capital Hedosophia Holdings. Although its name does not tell too much, all people related to finance are aware of it. Social Capital Hedosophia Holdins bought 49% of private company Virgin Galactic for about 800 million dollars, while today its market capitalization is around 7.5 billion dollars. Another famous deal is Pershing Square Tontine Holdings by Bill Ackman. It raised 4 billion dollars in its IPO and became the largest SPAC in history. Furthermore, more prospective SPACs come into the market every day. For instance, there is a rumor that the premium electric carmaker Polestar car is going public via a SPAC. The Total Enterprise Value (TEV) of the newly combined entity may reach 25 billion dollars. Apart from corporate players, there are dozens of other famous people from financial field as well as celebrities forming SPACs in order to finance their enterprises.

Although SPACs are gaining popularity, there is obvious lack of research on modern SPACs. Past research literature mainly focuses on the first wave of SPACs from 2006 to 2009 onwards. They analyze both overall SPACs' performance and investigate behavior of separate parts of the unit (warrant, share price, unit itself) (Lakicevic and Vulanovic (2013); incentives of SPAC's sponsors (Dimitrova (2016)); and identify factors affecting the Initial Business Combination approval (Cumming et al. (2014)). However, only a small fraction tries to analyze SPACs in the modern reality. For example, Gahng, Ritter and Zhang (2021) provide SPAC analysis from four different angels, while Gounopoulos, Loukopoulos and Loukopoulos (2021) investigate the relationship between management's quality and reputation and different aspects of IPO and post-IPO performance of a company.

Findings of past research literature correspond to disputable conclusions. On the one hand, SPACs are found to bring positive short-term return to the shareholders (Lewellen (2009), Howe and O'Brien (2012)). On the other hand, other researchers report negative short-term return of SPACs. At the same time, there is a uniform finding of negative long-term return to SPAC's shareholders.

Given the disputable results of past research literature and contradictory to it growing popularity of modern SPACs, we try to find the answer to the main research question of this paper: Do SPACs bring positive returns to their shareholder? The aim of this paper is to analyze whether

SPAC's popularity is backed by solid returns. Moreover, the research question is twofold. One of the hypotheses analyzed in the paper tests whether SPACs bring positive returns. Other hypotheses test potential drivers of these returns. We hypothesize that the size of SPAC itself measured as amount of money raised in IPO, the relative size of the newly combined entity to SPAC's size proxied with Total Enterprise Value to IPO proceeds ratio (TEV/IPO), and cross-border nature of the deal significantly affect SPAC's returns.

We find no significant effect of the SPAC's size as well as the Relative Size of the newly combined company to the SPAC's size. Moreover, these factors do not significantly affect neither Cumulative Abnormal Return (CAR) not Buy-and-Hold Abnormal Return (BHAR) in any settings (1-day event window, 3-days event window, the live deal group, the closed deal group). At the same time, we report arguable results on cross-border factor effect. On the one hand, SPACs which seek for a target in the regions like Asia and EEMEA tend to bring lower CAR in comparison with domestic SPACs which combine with a company from US/Canada region. On the other hand, in some settings SPACs with European targets on average outperform domestic SPACs.

Although there are past research papers on the company level characteristics such as the structure of sponsor team, the quality and incentives of managers on the board, etc., there is almost no past research analyzing deal-specific variables. The paper fills in these gaps. This research contributes to the literature by introducing evidence on such deal-specific factors as the Size, the Relative size and cross-border nature. Current research provides evidence on modern SPACs which are poorly analyzed yet. It analyzes the "new" wave of SPACs which announced their intentions from 2016 to 2021. In addition, it lays the base for further research based on data and findings of this paper.

The remainder of this paper is structure as follows. Section 1.2 of chapter 1 introduces general concepts of going public, ways to go public with their advantages and disadvantages. Section 1.3 of chapter 1 describes the overall structure of SPACs and the development stages that SPAC deals go through, outlines historical facts as well as pros and cons for both investors and target companies of this type of investments. Chapter 2 provides evidence from past research literature and states hypotheses to be tested in the paper. Chapter 3 consists of two sections. Section 3.1 describes methodology. It provides details on how both dependent and independent variables are constructed and the model used in order to estimate stated hypotheses. Section 3.2 describes the procedure and criteria for the data sample selection. In addition, it provides data sample descriptive statistics. Chapter 4 contains discussion of empirical results. In other words, the results of the analysis and their implications are considered in this section. Finally, Chapter 5 consists of a conclusion and discusses the limitations of the research.

CHAPTER 1

1.1 Why to go public?

Capital is one of the most essential elements required for any business to operate. Funds are used for everyday operational needs for specific projects as well as for sustainable growth and expansion plans. For instance, purchase of new equipment, production increase or high R&D output are possible only in case of sufficient funding. Lack of it leads to inevitable business failure. Therefore, business owners are constantly searching for money. There are several sources of funds available for a private company that include Retained Earnings, Debt Capital and Equity Capital[1].

Retained Earnings is the most trivial source of funding. A company functions with the only goal of maximizing its profits. As a result of business activities, it obtains funds available for distribution at company owners' or management's will. They can decide to either distribute it in the form of dividends or put it back in business in order to enhance production and growth. The latter option is retained earnings financing that can be explained as reinvestment of company's profits back into business.

Debt financing corresponds to selling debt instruments to outside investors. In return for funding, they become creditors and receive the right to claim repayment of the principal and interest. It assumes more complex structures and existence of outside investors willing to lend their money to the entity. Moreover, there are several "layers" of loans different in terms of company's development stage, regulations, the level of disclosure, etc. Loans from friends and family and loans from directors or shareholders constitute a reliable source of funding at early development stages of a company. Such small loans may help the company to continue its operations, and at the same time do not require deep regulatory issues. Bank loans and loans from other credit organizations are suitable for mature companies as they contain many regulatory requirements such as a proof of a strong financial health of an entity.

Equity financing implies selling an ownership stake in the company. There are different ways of undertaking equity funding: selling newly issued shares, hence diluting existing ownership parts, or selling outstanding shares. In any case, outside investors become shareholders after purchasing securities and may claim a part of profits according to their stakes. Similar to debt financing, there are different types of equity financing corresponding to development stages of a company. Start-ups and growing small companies usually go to angel investors or venture capitalists. The main criterion for both is an exponential growth potential. By providing funds and

[1] https://corporatefinanceinstitute.com/resources/knowledge/finance/sources-of-funding/

advisory services as well as participating in the management of the company, those investors try to grow small companies into mature entities in the most efficient way. However, they also require an exit strategy, thus such way of funding is the most suitable for companies planning to become public[2].

Another way of equity financing for a private company is to go public. Apart from raising capital, companies go public for different reasons. Firstly, it gives early investors such as angel investors or venture capitalists an exit in their investment strategy. By making a private company public, they are able to cash out money on their investments and realize returns. Secondly, an Initial Public offering (IPO) process, the most traditional way of going public, assumes existence of an underwriter, for example, a bank. A new level of relationship between the company and the bank allows the former one to negotiate lower interest rate, thus lowering overall cost of capital[3]. Another reason why management decides to make the company a publicly held is diversification. Spreading risks over larger number of shareholders prevent existing ones from losing a lot of money, but still allow the company to operate efficiently[4]. Finally, potential reasons for a private company to go public are "increased access to capital-raising opportunities, expansion of investors base, liquidity for investors"[5] and use of publicly traded securities for other purposes such as transaction means or remuneration of employers. However, all of these benefits come at some cost. Underwriters' fees, legal, accounting and filing expenses undermine financial benefit from going public. For example, sometimes upfront costs of an IPO may reach up to 4%-7% of proceeds[6]. In addition, public status brings performance pressure in terms of revenue, growth and dividends because investors require returns. Last but not least, by selling ownership stakes in the company, the existing owners not only share profits, but allow outside investors to participate in decision making process. Along with higher public disclosure, it restricts company's transaction freedom and independence.

A traditional method to go public is an Initial Public Offering (IPO) process. The company issues new shares that are distributed through underwriters' network. An underwriter is an intermediary, usually a bank, that buys company's shares and then sells them to outside investors. Certainty of selling the shares is one of the main advantages of the IPO process. Underwriters also help the company with shares' fair value valuation, meeting regulatory requirements, etc. The

[2] https://www.investopedia.com/ask/answers/062315/what-type-funding-options-are-available-private-company.asp
[3] https://www.tonyrobbins.com/business/ipo-vs-private/
[4] https://www.investopedia.com/ask/answers/what-does-going-public-mean/
[5] https://www.torys.com/pages/trends/the-benefits-and-costs-of-going-public
[6] https://www.torys.com/pages/trends/the-benefits-and-costs-of-going-public

disadvantages of the IPO process include dilution of existing ownership stakes, high upfront paid underwriters' fees from 4% to 7%, and potential underpricing.

Another way of becoming a publicly traded company is direct listing. Essentially, the process ensues the same idea as IPO process. However, there are differences that make them two competitive methods. First of all, during a direct listing process the company sells existing or outstanding shares unlike during an IPO process where new shares are issued. It implies that no ownership rights are diluted, but they are transferred to other investors. It can be partly explained by the motivation behind direct listing: companies usually choose direct listing not for raising capital, but for other purposes described above. Secondly, direct listing does not require any intermediary. The company is able to put on exchange its shares without banks or other entities. Thus, it is much cheaper than any IPO as well as does not restrict the insiders from selling their shares. In other words, there is no lock-up period.

Last but not least, a private company may use a SPAC in order to become a public entity. Such a way is reasonably new, but it gains more and more popularity. It partly combines advantages of both IPO and direct listing and brings additional benefits to the investors.

1.2 Investing a SPAC?

Special Purpose Acquisition Company – SPAC – is a public blank check company that has no assets or business activity. Its main purpose is to use the proceeds raised during its IPO for acquiring or merging with an operating private company.

Every SPAC goes through several stages during its lifespan. Lewellen (2009) distinguishes 4 categories of a SPAC state: no target (NT), target found (TF), acquisition complete (AC) or acquisition withdrawn (AW). There is another category that can be called "stage zero". It comprises formation of a SPAC and its IPO event. At this stage sponsors form the SPAC by filling required forms to the SEC that reveals important information about sponsors themselves, their academic and professional background, governance principals, etc. The sponsors are usually business executives with good background in the field who have an investment idea but lack sufficient funding; companies willing to raise capital for their projects; and PE firms and mutual and hedge funds that consider a SPAC as another investment asset class[7]. The SPAC IPO is conducted by selling units that consist of a share and a warrant (or a part of a warrant) with the help from underwriters. After becoming public, the SPAC typically has 18-24 months in order to complete a business combination with an operating company.

The next stage is target search that develops through time from NT to TF categories suggested by Lewellen (2009). During this period the management of the SPAC has to find a target and negotiate deal terms. Otherwise, the SPAC is liquidated, and shareholders are paid at pro rata level from the escrow. It is important to note that sponsors do not receive their money back in case of SPAC liquidation. Such mechanics provoke sponsors' incentives to find a suitable target within the timeframe. The search process is similar to a typical M&A deal. After a suitable candidate is found, the shareholders' vote is conducted. This is the point where a SPAC transfers from NT to TF category. The candidate is usually a private company within the field of expertise of the sponsors team. Historically, SPACs focus on EBITDA-positive companies, however the year 2020 showed a different pattern when there were investments in pre-revenue companies[8]. An investor has the right to either decline the proposal and redeem her shares at pro rata level or vote in favor of the deal and become a shareholder of a newly combined public company. Due to the fact that not all funds held in the escrow would be available for acquisition, SPAC deals usually include pre-negotiated Private Investment in Public Equity (PIPE) investments, that is a private placement

[7] https://shandaconsult.com/spacs/spacs-potential-gains-and-returns-for-sponsors/
[8] https://www2.deloitte.com/content/dam/Deloitte/us/Documents/audit/us-private-company-CFO-considerations-for-SPAC-transactions.pdf

of shares of a publicly traded company to selected investors usually at price below the market price available to the public, upon deal completion.

Finally, when the deal is approved by the majority of shareholders and terms are negotiated, the de-SPAC process starts. Now the SPAC can be attributed to the AC category. By filling required documents to the Securities and Exchange Commission (SEC), the target company merges with the SPAC and becomes a publicly traded entity. Once de-SPAC process is complete, the SPAC changes its name, companies exchange tickers, so the shares can be publicly traded on the exchange. However, if the target is not approved by the majority of shareholders, the deal is withdrawn and the SPAC goes into AW category.

Current research focuses on two later categories: Target Found and Acquisition Complete. In other words, the periods analyzed in this research paper are around acquisition announcement date when the counterpart of the deal is determined. Given sweeping changes in the structure and attitude among investors across different stages of SPACs development from a shell company to merging with an operating company, we consider it to be the most suitable time period to analyze. The analysis of earlier stages of SPACs can be considered as a prospect for future research.

Going public via SPAC brings many benefits. First of all, it is a faster way to raise capital in comparison with traditional IPO. "A SPAC merger usually occurs within 3-6 months on average, while an IPO usually takes 12-18 months."[9] It means that investors are able to win more than a year by deviating from the traditional way. It may play a big role during periods of high uncertainty. Another advantage useful at times of high volatility that SPACs offer to the investors is upfront price certainty. Unlike a traditional IPO, the price that a SPAC bid for a target company is based on valuation techniques rather than on market conditions. In addition, by making a private company public earlier, SPACs allow to achieve more efficient?? What is efficient lower cost of capital by switching from private to public forms of financing.

Next, funding is not the only thing that a SPAC brings to the target firm. A diversified sponsors team of highly qualified specialists because of their knowledge, connections and market view may bring the target company to a reasonably higher level. Moreover, the level of expertise of sponsors directly affects successfulness of the SPAC as an investment project at the IPO stage and business combination process.

Finally, some marketing aspects of SPACs contribute to their popularity. For instance, the ability of SPAC's management to attract additional capital through Private Investment in Public Equity (PIPE) provokes strong interest among institutional investors. In addition, the future

[9] KPMG, SPAC insights, Why so many companies are choosing SPACs over IPOs

company's projections are translated directly to the public by filling proxy statements to the SEC, that attracts a wider universe of investors to participate in SPACs.

In contrast, some investors believe SPACs destroy their wealth. The concern is directly connected with the problem of shareholding dilution. Although common shareholders supply 100% of the SPAC's escrow, they own only 80% of the entity because 20% of the ownership rights go to sponsors as a finder's fee. Moreover, underwriting fees, operating and other expenses are also incurred at cost of common shareholders that also dilutes their share.

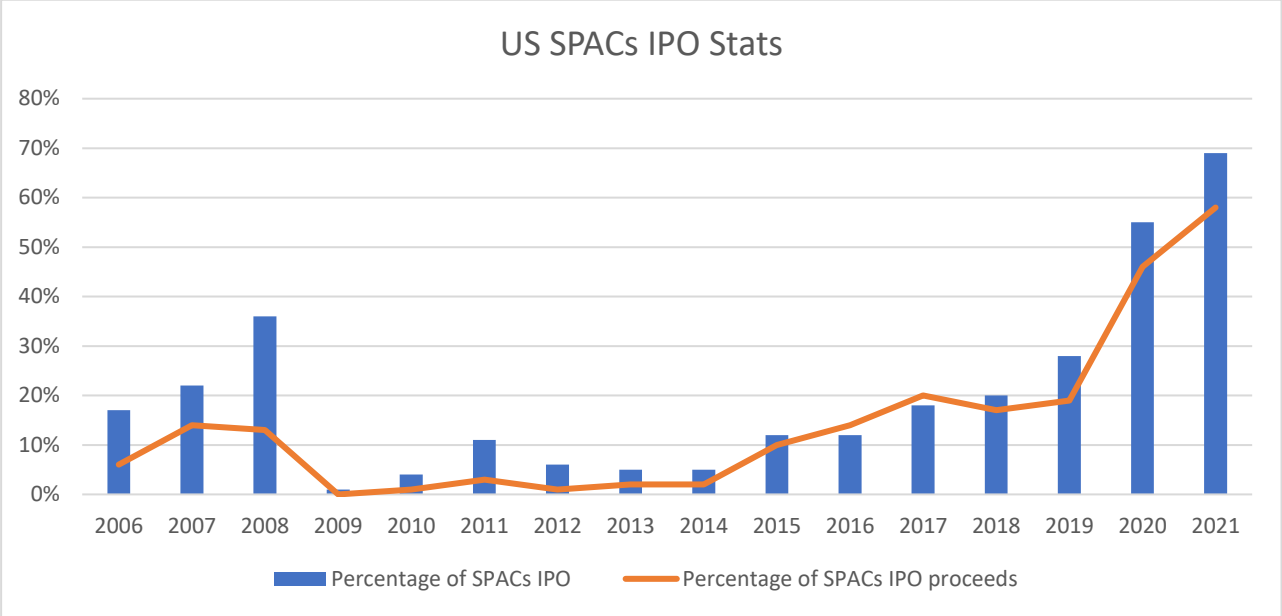
The history of SPACs goes back to 1980-1990s. Such type of investments cycled in and out of investments strategies. Initially it started with unregulated blank check companies, however, they were forgone because of many fraud cases. After new regulation was imposed, and SPACs became more investor-friendly, it has become a useful tool for investors again. Regulation affected almost every angle of SPACs. Change in sponsors promote improved sponsors' attitude towards public equity investors; decrease in acquisition timeframe; increased percentage of SPAC IPO proceeds held in trust reduced downside risks[10] led to higher level of investors' return protection and initial rise of SPACs.

Nowadays, SPACs' activity has been on the rise from 2018 onwards. As can be seen from the graph 1, the share of SPACs' IPO out of all IPOs on the US market increased from about 20% to 70% in 2021. In comparison, at the peak of the wave during 2006-2008, it constituted only 36% of the market when only 37 events happed. Similarly, the percentage of SPACs IPO proceeds showed a tenfold jump from $10,048 mln in 2017 to $108,192 mln in 2021YTD taking 58% of total US IPO proceeds.

Apart from increasing share of IPOs and overall gross proceeds, the completion rate among SPACs also increases that can be seen on the Graph 2. According to Duff&Phelps' Special Purpose Acquisition Companies market report from fall 2020, 100% of SPACs completed acquisition in 2020 as of 23 October. The rate has never reached more than 80% from 2010 to 2015, and showed approximately 95% in 2018. Combined together, these stats clearly show attractiveness of SPACs among investors as well as the strength SPACs gained over time.

[10] https://fuelventurecapital.medium.com/how-vcs-and-founders-are-riding-the-spac-wave-into-2021-1b2b36bb809f

Figure 1. US SPACs IPO Statistics



Source: https://www.spacanalytics.com/

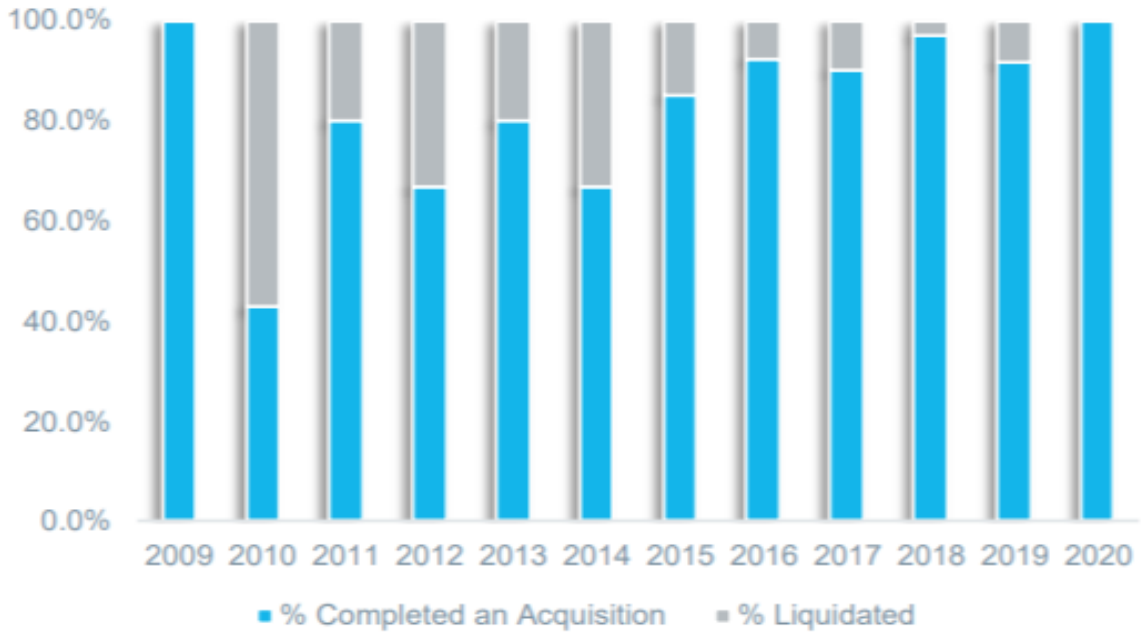
There are several reasons that explain increased activity of SPACs. The major reason outlined by many investors and experts is high uncertainty in the market caused by COVID pandemic, unstable geopolitical situation and other macro factors. SPACs' feature of providing upfront certainty in price independent from market conditions or public perception of the market makes them favorable in comparison with other ways to go public.[11] The similar pattern appeared the last time SPACs represented a large market share, however it ended up with crisis.

Another reason contributing to the popularity of SPACs is the so-called demand and supply mismatch in the private equity market[12]. The record high level of private capital investment ($1.8 trillion as of June 2020[13] of unspent private capital) meets with a declining number of exit strategies for investors. Together these two facts make SPACs one of the best alternatives to go public and realize returns on private equity investments.

Finally, there are some smaller factors that play a role in SPACs popularity. One is increased public market valuations. It incentivizes more private companies to become public in order to benefit from current favorable market conditions[14]. Second is involvement of the SEC in regulation of SPACs. Higher regulation emphasizes SPACs' reputation as a way to go public and attract new companies.

[11] https://www.credit-suisse.com/mx/en/investment-banking/ibcm/corporate-insights/making-waves.html
[12] https://www.excelsiorgp.com/resources/what-is-a-spac-and-why-are-they-suddenly-so-popular/
[13] https://www.credit-suisse.com/mx/en/investment-banking/ibcm/corporate-insights/making-waves.html
[14] https://www.credit-suisse.com/mx/en/investment-banking/ibcm/corporate-insights/making-waves.html

Figure 2. US SPACs Completion Rate



Source: Duff&Phelps' SPACs market report, fall 2020

CHAPTER 2

2.1 Literature Review

The statistics and news feed affirm SPACs is a hot topic right now. Surprisingly, the majority of research papers focuses on description of SPAC deals, factors affecting success and post-merger survival of combined entities, but only a portion of those papers look into SPACs' performance. Moreover, past literature analyzes the first wave of SPACs from 2000s. Current research aims to fill in the gap by providing a thorough analysis of short-term performance of modern SPACs.

The results of past research are controversial. Analysis of the returns around the acquisition announcement indicate positive returns to the shareholders. For instance, Lewellen (2009) shows that investors experience positive cumulative returns of 2%. Similarly, later works by Howe and O'Brien (2012) and Lakicevic and Vulanovic (2013) find positive short-term returns. In contrast, significant negative ten-day cumulative returns of -9.59% are reported in the same paper by Lakicevic and Vulanovic (2013). In addition, they find evidence of -28% returns for unit holders proving the value destroying nature of SPACs for ordinary shareholders. Since more past research papers find significant evidence of positive short-term return of SPACs, we hypothesize the following:

Hypothesis 1: SPACs bring positive short-term returns to acquirer shareholders at the announcement date.

Past research papers analyzing long-term performance of SPACs uniformly conclude towards negative performance of SPACs as well. The least bad performance for ordinary investors is found between -2% in annualized terms (Lewellen (2009)) and -3% (Jog and Sun (2007)). Worse results are found in works by Jenkinson and Sousa (2011) and Howe and O'Brien (2012) who showed average cumulative returns for six-months and one year period of -24% and -55% and -14% and -33%, respectively. Moreover, the latter work shows average cumulative three years returns of -54%. According to Jenkinson and Sousa's (2011) paper, such a poor performance of SPACs is driven by the "bad group", SPACs which were approved when the closing share price was below the trust value. In their sample, these deals showed average cumulative annual return of -79%, while investors in the "good group" experienced negative return of just 6.2% in annual

terms. Given significant evidence of negative long-term returns of SPACs, we hypothesize the following:

Hypothesis 2: SPACs bring negative long-term returns to acquirer shareholders.

Initially only US SPACs were the subject of research papers. However, with development of SPACs as investment tools they spread to other markets. Kim (2010) became one of the first papers analyzing SPACs' characteristics outside the US. He finds significant regulatory requirements and performance differences between Korean and US SPACs such as conditions applied to sponsors, larger volatility and significant underpricing at the IPO date. In contrast, Shachmurove and Vulanovic (2015) show close similarity between Chinese and US SPACs. The only factor that differs is the average size of deals. Finally, Ignatyeva, Rauch and Wahrenburg (2013) analyzed European SPACs that happen to share some institutional characteristics with the US counterpart.

Another direction of research analyzes separate factors affecting SPACs. Apart from pros described above, there are specific elements that proved to significantly affect overall success of SPACs and especially acquisition approval. Kim (2009) finds managerial quality to be one of such factors. He finds significant evidence that managers with solid experience and industry background attract more outside investors that allow SPACs to pursue higher market valuations and consequent increased offers' size. In addition, he concludes that better managerial quality positively affects probability of acquisition approval. In contrast, Cumming, Haß and Schweizer (2014) state a younger sponsors team positively affects acquisition approval while experience and number of sponsors do not affect the probability at all.

Not only sponsors characteristics influence SPACs. The specialization of underwriters positively contributes to the success of a SPAC. (Tran (2012)). Presence of institutional investors bring controversial effects. On the one hand, monitoring by big outside institutional investors increases SPAC's management efficiency (Tran (2012)), however, on the other hand, high presence of hedge funds and private equity funds among investors negatively affects acquisition approval. (Cumming, Haß and Schweizer (2014)) Cumming et al. (2014) and Lakicevic, Shachmurove and Vulanovic (2014) also underline focus on Chinese private companies, EarlyBirdCapital as an underwriter and timing of the merger announcement as important factors contributing to the successfulness of a SPAC deal. Other factors that are found to affect SPAC performance are commitment of the management team at early stages of SPAC development, transaction costs and focus on foreign targets (Vulanovic (2016)). Finally, Murray (2014) analyzes

the impact of the listing exchange, but finds no difference in SPACs performance on different exchanges.

Being an alternative route to go public, SPACs are often compared with traditional IPOs. In the field of underpricing at the IPO date, SPACs have a comparative advantage over the traditional way to go public and brings higher abnormal returns to investors (Rodrigues and Stegemoller (2014)), However, SPACs significantly underperform companies that went through a traditional IPO (Kolb and Tykvová (2016)). Moreover, SPACs on average are of smaller size, bring additional debt to the target company because of PIPE investors and have lower growth opportunity (Datar, Emm and Ince (2012)). All of it pushes SPACs' performance down even further.

Special Purpose Acquisition Companies are a relatively new topic in the academic research. There are not so many articles analyzing their performance, and even fewer analyzing factors affecting the performance. However, due to similarities in general principles, we can refer to the more investigated area of Mergers and Acquisitions (M&A). M&A deals have been analyzed from various aspects both in general and in depth. Research articles on M&A related topics cover history, performance, factors, etc. For instance, Das and Kapil (2012) conducted meta-analysis of M&A research and found as many as 125 unique dependent variables measuring M&A performance and 172 explanatory variables. Moreover, more than 80% of these independent variables are firm-level characteristics pointing at the thoroughness of the M&A research.

One of these variables that can be attributed to both SPACs and M&A deals is the acquirer's size. SPACs, similarly to acquirers from the M&A deals, show great heterogeneity in size. Evidence found in M&A related literature leads to controversial results. On the one hand, some researchers conclude towards a positive effect of the acquirer's size on deal performance. (Weiner and Mahoney (1981), Simerly and Li (2000), Francoeur (2006), Luypaert and Huyghebaert (2008)) In contrast, there are papers confirming that M&A deals with acquirers of a bigger size tend to destroy rather than create value for shareholders (Frohls et al. (1998), Bayazitova et al. (2010), Jansen et al. (2011)).

There is a series of research papers by Moeller, Stulz and co-authors that proves negative impact of M&A deals on acquirer's returns. Moeller et al. (2003) provide significant evidence that small firms outperform large acquirers in the US market. Moreover, the study shows even bigger gap if that target is a public firm. The results are confirmed in the paper by Moeller, Schlingemann and Stulz (2004). Similarly, Stulz et al. (2005) conclude poor profitability of M&A deals in the US market when an acquirer with large market capitalization is involved. Given such an evidence, we hypothesize the following:

Hypothesis 3: SPAC's size negatively affects returns to acquirer shareholders.

Some studies find that apart from acquirer's size target valuation also significantly affects deal performance. (Servaes (1991), Lang, Stulz and Walkling (1989)). Similarly to absolute size of the acquiring company, the conclusions regarding relative size a disputable. Travlos (1987) and Oler (2008) indicate a negative relationship between relative size and deal profitability, while Jarrell and Poulsen (1989) and Seth et al. (2002) prove a positive effect. Kusewitt (1985) finds significant influence of relative size, and suggests firms to avoid extremely small and extremely large acquisitions. In addition, Asquith et al. (1983) show evidence in favor of amplification effect of the relative size. In other words, the magnitude of abnormal returns for acquisitions, where relative size is more than 10%, is doubled in comparison with deals with relative size less than 10%.

There are several explanations for the negative effect of the relative size metric. Fuller, Netter and Stegemoller (2002) argue that it is more difficult to integrate larger targets into main business for acquirers. Moreover, they find significant a negative relation in case of public target unlike private targets. Kitching (1967) suggests bigger deals to positively affect performance. The paper argues that in case of a smaller target firm acquirer's management does not provide sufficient resources in order to integrate acquired business, hence, potential synergies are overlooked. In contrast, Kruse. Park, Park and Suzuki (2000) shows that the larger relative target size, the worse post-announcement performance of an M&A deal. The reason of poor performance of an M&A deal between relatively equal companies is internal "fight" of management that brings inefficiency and worsens performance of the new company. Given evidence of past research, we hypothesize the following:

Hypothesis 4: The relative size of the target firm compared to the SPAC negatively affects the returns to acquirer shareholders.

Another aspect of M&A deals that can be attributed to SPACs is geography or the cross-border component of the deals. Although the paper analyzes only US listed SPACs, it does not restrict target geography. It gives a rise to the so-called cross-border factor that may play a great role in performance of SPACs. For instance, Grigorieva and Grinchenko (2013) prove significant effect of differences in country specific characteristics on the value of the acquiring firm in M&A activity. Unlike acquirer's size and relative size factors literature, the majority of works suggests

a negative influence of cross-border deal on acquirer's value. Aybar and Ficici (2009) claim it to bring no benefits at all.

Similar results are obtained in the work André et al. (2004). Moeller and Schlingemann (2004) document a significant decrease in stock performance and operating efficiency of the acquiring company in case of cross-border deals. Similar results are also found in works Black, Carnes, and Jandik (2001) and Gugler, Mueller, Yurtoglu, and Zulehner (2003). In addition, there is evidence that domestic deals bring greater benefits in comparison with international counterparts. (Campa and Hernando (2004), Moeller and Schlingemann (2005)) Based on such evidence from M&A related literature, we hypothesize the following:

Hypothesis 5: Cross-border SPAC deals negatively affect the returns to the acquirer shareholders.

CHAPTER 3

3.1 Methodology

In order to test stated hypothesis 1, the event study approach will be implemented. As described in Kothari and Warner (2007), the event study approach is typically used in analyzing returns behavior among companies from a sample that go through some event such as an IPO, stock split or M&A activity. In order to analyze the short-term performance of SPACs, the concept of abnormal returns and cumulative abnormal returns will be implemented. The approach was first descried in the paper by Brown and Warner (1985) and explained further in Kothari and Warner (2007). The return of a security consists of two parts: the "normal" return that depicts the expected return of the security according to some model and a random term. The random term takes into account all unexpected or abnormal effects. In mathematical terms, the return of a security i at time t is defined as

$$R_{it} = K_{it} + e_{it} \tag{1}$$

where K_{it} is the "normal" part and e_{it} is the unexpected part. The first term K_{it}, the "normal return", is computed according to the CAPM model, where Russell 3000 index is used as the market portfolio and long-term T-bill rate as the risk-free rate[15]. This market-capitalization-weighted index includes 3000 US based stocks and provides exposure to approximately 98% of the US market, hence it is a good proxy for the market portfolio in the US. Thus, the estimated "normal" return for a security i at time period t is calculated as follows:

$$K_{it} = \hat{\alpha}_i + \hat{\beta}_i(Rm_t - rf_t) \tag{2}$$

where $\hat{\alpha}_i$ and $\hat{\beta}_i$ are OLS estimates. The parameter estimation window is 50 days before the event window similarly to the methodology applied by Lakicevic and Vulanovic (2013).

Given such a structure of returns, the abnormal return for a company i at time period t can be calculated as follows:

$$AR_{it} = e_{it} = R_{it} - K_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i(Rm_t - rf_t)) \tag{3}$$

The aim of this research paper is to analyze cross-sectional variation of abnormal returns among SPACs in the sample. Thus, we aggregate abnormal returns (ARs) into average abnormal return (AAR) of the sample by taking the average over the sample at time period t:

$$AAR_t = \frac{1}{N}\sum_1^N AR_{it} \tag{4}$$

where N is the number of SPACs in the sample.

[15] The rates are obtained from https://www.treasury.gov/ website

In order to analyze the performance of the sample over multi-period interval, Cumulative Abnormal Return (CAR (t_1, t_2)) is computed by summing the AAR of these periods:

$$\text{CAR}\,(t_1, t_2) = \sum_{t_1}^{t_2} AAR_t \tag{5}$$

The hypotheses will be tested in the form of significance test of CAR. In other words, testing the null hypothesis whether CAR significance is equivalent to testing the stated hypothesis with appropriate null hypothesis. The approach will be implemented for analyzing performance of SPACs around announcement date.

In order to analyze the long-term return that SPACs bring to their investors and test the Hypothesis 2, consequently, the Buy-and-Hold Abnormal Returns (BHAR) approach will be implemented. Mitchell and Stafford (2000) describe the idea of such an approach as "the average multiyear return from a strategy of investing in all firms that complete an event and selling at the end of a prespecified holding period". Two approaches – CAR and BHAR – should provide same results because they test similar hypothesis, however, BHAR method is easier to implement for long-term analysis. We will use 1 year period of BHAR because of data availability constraints. Given that SPACs have 24 months to complete the business combination, the sample of the long-term performance analysis will be smaller than for the short-term performance analysis:

$$BHAR_i = R_i - R_m \tag{6}$$

where R_i corresponds to the 1-year simple return on a SPAC and R_m corresponds to the 1-year simple return on the market index adjusted to the annualized risk-free rate.

Similarly to the CAR methodology, we aggregate calculated values of BHAR across all observations into Average Buy-and-Hold Abnormal Return (ABHAR) in order to test the significance of the long-term returns that SPACs potentially bring to acquirer's shareholders:

$$ABHAR = \frac{1}{N} \sum_1^N BHAR_i \tag{7}$$

In order to test hypotheses 3, 4, 5 we introduce the following variables. Acquirer's size effect is measured using SPAC's IPO proceeds. This is the direct measurement of SPAC's size. We neglect interest earned from IPO proceeds held in trust because it is usually used to cover IPO and other operational expenses.

$$Size_i = IPO\ proceeds\ of\ SPAC_i \tag{8}$$

A universal measure of relative size is the ratio of acquirer's size to the market capitalization of the target company. Since SPACs usually target private firms, we use TEV/IPO (Total Enterprise Value to IPO) ratio as a proxy for the relative size variable (Moeller,

Schlingemann and Stulz (2003)). Such a proxy should show the direction of the effect (if any) because of direct influence of target valuation on the measurement.

$$Relative\ size_i = \left(\frac{TEV}{IPO}\right)_i \quad (9)$$

In order to capture cross-border effect, we introduce a set of dummy variables that corresponds to geographical regions of SPACs' target firms. Since we analyze performance of the US listed SPACs, we use US/Canada region as the reference category, while variables Global, Europe, Asia, LatAm and EEMEA correspond to respective world regions and are used as explanatory variables in the model.

One more factor that is often used as a control variable is time measure as a dummy variable of event year. Since market shares of an entity is affected not only by its own activities, but also subject to overall market fluctuations and macro conditions, the time variable should capture different outside conditions from year to year. In our sample we analyze SPAC deals that announced their initial business combination intentions from 2016 to 2021. For the live deal group SPACs, we use 2021 as the base year because the majority of SPACs appeared exactly this year. The year 2021 is chosen as the reference category also because the new legal rules on SPACs come into the effect in 2021[16]. Therefore, the reference category should also capture the effect of new regulations. For the closed deal group SPACs, the reference category is 2020. In addition, we also introduce GAP variable that is found to significantly affect SPACs' returns (Dimitrova (2016)). For the live deal group, the GAP is measured as the difference between the announcement gate and the deadline of a SPAC measured in days. For the closed deal group, it is calculated as the time taken to complete the deal measured in days.

This study employs event study methodology. Since both dependent variables CAR and BHAR are continuous, we implement the ordinary least squares (OLS) regression. In order to avoid potential endogeneity problems, we suggest two model specifications for each dependent variable because we use IPO proceeds to compute both acquirer's size and relative size variables. One model specification includes size variable, while the other model specification analyzes the effect of the relative size measure. For each SPAC deal, we regression analysis according to the model specifications as follows:

$$Specification\ 1: Performance_i = \alpha + Size_i + GAP_i + \sum Geography\ dummy_j + \sum Year\ dummy_j + \varepsilon_i \quad (10)$$

[16] https://www.fca.org.uk/news/news-stories/fca-publishes-final-rules-to-strengthen-investor-protections-in-spacs

$$Specification\ 2: Performance_i = \alpha + Relative\ size_i + GAP_i + \sum Geography\ dummy_j + \sum Year\ dummy_j + \varepsilon_i \quad (11)$$

where performance is one of the dependent variables: either CAR or BHAR.

3.2 The sample

Given the fact that SPACs become more popular nowadays, but the past research shows poor performance, this research paper will investigate the performance of modern SPACs. The paper should greatly contribute to the literature by providing a thorough analysis of the new wave of SPACs and filling in the gap in the research of SPAC performance around Acquisition Announcement and Merger dates.

The sample includes US listed SPACs retrieved from Spacresearch.com database. It is one of the largest databases on SPACs. Spacresearch provides systematic coverage of key development stages of SPACs: pre-IPO filings such as S-1 filings; SPAC IPOs including strategy, team and terms description along with all necessary documentation; SPACs' merger announcements with summary statistics and filings in a timeline of de-SPAC process. Apart from that, the service offers industry level statistics with unique reports of Forward Purchase Agreements summary, level of Risk Capital investments, etc. All of these features make Spacresearch.com database the most suitable data source for our research. We analyze US listed SPACs, but we do not differentiate among exchanges; although, the metric can be used as a control variable in the analysis. Bloomberg and Datastream services are used in order to obtain share prices, market data, etc.

The sample is divided into two categories: live deal SPACs and closed deal SPACs. In terms of Lewellen (2009), we analyze categories: target found (TF) and acquisition complete (AC). In order to have enough data for the analysis, we exclude TF deals with announcement date and AC deals with closure date later than 30 June 2021. The live deal or TF group consists of 133 SPACs. The majority of them announced the business combination in the year 2021, and only 3 of them did it in the year 2020. The other group includes 185 SPACs which consummated the deal. We exclude SPACs with insufficient information. We also exclude SPACs that did not find a target company to merge with which fall into acquisition withdrawn (AW) category. (Lewellen (2009)) The AC category is much wider that the live deal group. Closed deal SPACs group includes deals from 2016 to 2021. The lists of SPAC deals analyzed in the paper are placed in the Appendix A.

Descriptive statistics of the sample can be found in Table 1. The table contains mean and median values, standard deviation and skewness of SPACs' size and Total Enterprise Value (TEV) in millions of dollars; TEV/IPO ratio in percentage terms that can be considered as a relative transaction size; and GAP metrics that is time gap between announcement date and SPAC's general deadline for live deal group and time gap between announcement date and the merger date for closed deal category measured in days.

For the live deal group, the average size of a SPAC is 332.46 millions dollars, while the total enterprise value of newly combined company is more than 8 times greater that is depicted both in absolute value terms in TEV and the relative value terms in TEV/IPO ratio. The mean value of the GAP variable is 483.10 meaning that on average a SPAC in the live deal group need more than a year to find an appropriate target. Skewness coefficients are positive for all variables except the GAP corresponding to the fact that there are more observations with values greater than the median of the corresponding variable.

Descriptive statistics of the closed deal group shows than on average SPACs raise 286.02 million dollars at the IPO. The average TEV value of the newly combined entity within the closed deal group is more than 1.5 billion dollars, that is more than 5 times greater than average IPO proceeds of a SPAC. The GAP variable shows that on average there are 136.81 days between the announcement and deal closure. Similarly to the live deal group, all variables show positive skewness. Another similarity lies in the median values. As can be seen, the median terms of SPACs from both the live deal and the closed deal groups are close to each other. It points to the fact that there are potentially some outliers. In order to receive consistent results, we winsorize outliers in the empirical results section.

Table 1. Descriptive statistics

Panel A. Live deal SPACs

N = 133	mean	median	st. dev	skewness	# obs.
Size ($ mln)	332.46	259.34	409.53	6.56	133
TEV ($ mln)	2 776.41	1 355	5051.34	5.28	133
TEV/IPO (%)	836	518	12.10	5.46	133
GAP[1]	483.10	556	163.52	-0.81	133

Panel B. Closed deal SPACs

N = 185	mean	median	st. dev	skewness	# obs.
Size ($ mln)	286,02	243.93	195.81	2.24	185
TEV ($ mln)	1551.45	982	1894.81	4.25	185
TEV/IPO (%)	527	416	5.17	4.58	185
GAP[2]	136.81	127	54.25	2.24	185

1. Time gap between announcement date and SPAC's general deadline

2. Time gap between announcement date and the merger date

Source: Author's calculations

It is important to note that the statistics depicted in the Table 1 describes the whole data set available for the research. There are several adjustments that we implement during the process of the research that should provide consistent results. For instance, big positive skewness coefficients of the variables in both groups suggest taking natural logarithm in order to normalize them. Hence, we will use the model specifications for the regression analysis as follows:

$$Specification\ 3: Performance_i = \alpha + \ln(Size_i) + \ln(GAP_i) + \sum Geography\ dummy_j + \sum Year\ dummy_j + \varepsilon_i \quad (12)$$

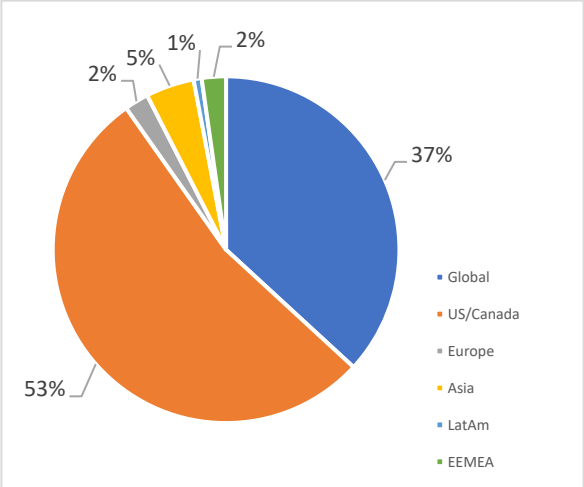
$$Specification\ 4: Performance_i = \alpha + Relative\ size_i + \ln(GAP_i) + \sum Geography\ dummy_j + \sum Year\ dummy_j + \varepsilon_i \quad (13)$$

where performance is one of the dependent variables: either CAR or BHAR.

In addition, during the process of the research we eliminate outliers which spoil the results. Therefore, we provide descriptive statistics of the final variables used in the research in the Appendix B.

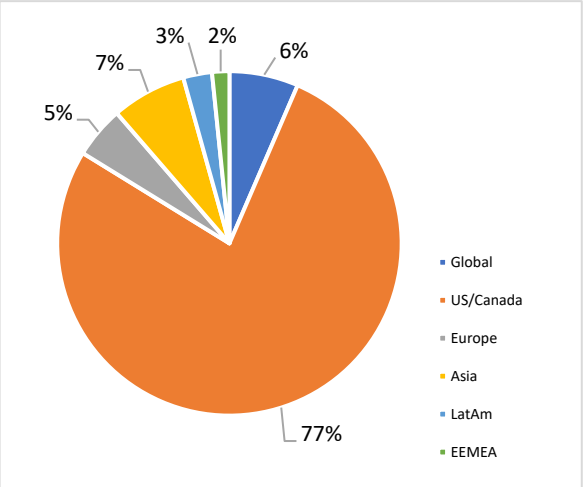
Figure 3 and Figure 4 show percentage of SPACs deals in the two categories by geography. Geography here means the region where SPACs' team search for a target. As can be seen, global direction and US/Canada markets are dominant regions for the US listed SPACs. However, the proportion of deals from these regions differs significantly between two groups. Increased percentage of global market direction among live deal SPACs points at increasing popularity of SPACs as a method to go public worldwide. Shares of Europe, Asia, Latin America and EEMEA regions are heterogeneous, but play a lesser role.

Figure 3. Percentage of live deal SPACs by geography



Source: Author's calculation

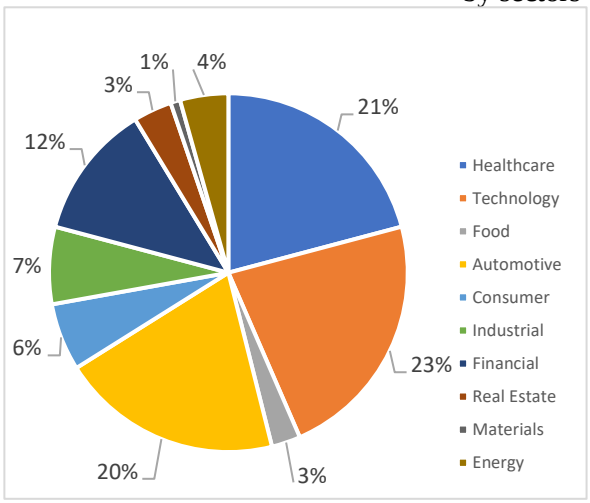
Figure 4. Percentage of closed deal SPACs by geography



Source: Author's calculation

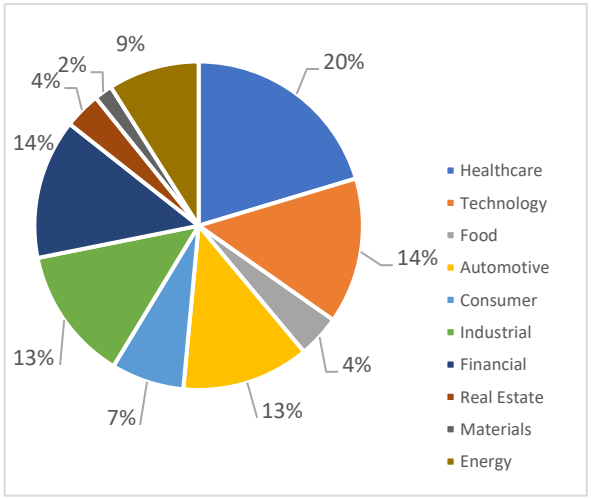
Unlike world regions where SPACs look for a target for business combination, sectors from which these targets come are similar for both TF and AC categories. Sector allocation is heterogeneous in both groups. There are 10 sectors present (Healthcare, Technology, Food, Automotive, Consumer, Industrial, Financial, Real Estate, Materials, Energy) with approximately similar proportions in live deal and closed deal groups of SPACs.

Figure 5. Percentage of live deal SPACs by sectors



Source: Author's calculations

Figure 6. Percentage of closed deal SPACs by sectors



Source: Author's calculations

CHAPTER 4

4.1 Empirical results

4.1.1 CAR analysis

The first stage of the analysis includes testing significance of Cumulative Abnormal Returns according to the methodology described above. In order to conduct the analysis, we utilize the "erer" package in R programming. In particular, we use the "evReturn" function. It allows to run an event analysis across firm in the time-series frame and retrieve the CAR with specification of the estimation window, event period, etc. In our analysis we use the following parameters: Russell 3000 index is used as the market index, the long-term T-bill rate is taken as the risk-free rate because we analyze the US based SPACs, estimation window is 50 days prior the event window. As for the event window, we use one-sided event window of length 1 and 3, therefore two sets of event windows are analyzed. Formally, we analyze event windows (0; +1) and (0; +3). Due to data availability issues, we eliminated a part of observations in order to provide consistent results. For the same reason, we cannot analyze event windows such as (0; +5), (0; +7) or (0; +10), so we put it as an avenue for further research. In addition, a part of observations is trimmed because it contains outliers which spoil the statistical significance of the research.

The descriptive statistics of Cumulative Abnormal Returns of the final samples used in the analysis can be found in the Table 2. As can be seen, there are 75 observations in the live deal group. These SPACs on average show 0.32% return within 1-day event window and 0.09% within 3-day event window. The median CAR in the live deal group is 0%. The CAR distribution of live deal SPACs is skewed to the left. In other words, there are more observation with CAR less than median of 0%. SPACs from the closed deal group show different results. Although the median of these deals is still 0%, the average CAR within both (0; +1) and (0; +3) is greater. Mean closed deal SPACs' CAR is 1.12% and 1.27 for 1-day and 3-day event windows, respectively. Furthermore, positive skewness corresponds to the fact that the sample contains more observation with CAR greater than the median.

Table 2. Descriptive statistics of dependent variable CAR

Panel A. Live deal SPACs

	mean	median	st. deviation	skewness	No obs.
CAR (0; +1), %	0.32	0	2.09	-0.14	75
CAR (0; +3), %	0.09	0	3.37	-0.34	75

Panel B. Closed deal SPACs

	mean	median	st. deviation	skewness	No obs.
CAR (0; +1), %	1.12	0	2.44	1.24	103
CAR (0; +3), %	1.27	0.01	3.66	0.91	103

Source: Authors' calculations

Significance testing is conducted via two-sided t-test. The results of significance tests can be found in the Table 3. As can be seen, the live group SPACs provide insignificant cumulative abnormal return results. In contrast, in both setting in the closed deal group CARs are significant. Therefore, we may reject the Hypothesis 1: "*SPACs bring positive short-term returns to acquirer shareholders at the announcement date."* for the live deal group SPACs, and fail to reject the Hypothesis 1 for the closed deal group SPACs. The results are consistent with past research findings as Lewellen (2009) Howe and O'Brien (2012) and Lakicevic and Vulanovic (2013) report positive short-term cumulative abnormal returns of SPACs, while Lakicevic and Vulanovic (2013) in the same work prove negative cumulative abnormal returns of SPACs.

Table 3. CAR significance test results

Panel A. Live deal SPACs

	t-stat	p-value
CAR (0; +1)	1.30	0.19
CAR (0; +3)	0.23	0.81

Panel B. Closed deal SPACs

	t-stat	p-value
CAR (0; +1), %	4.66	0.00
CAR (0; +3), %	3.58	0.00

*** at 0.01 significance level

Source: Authors' calculation

The final stage of the empirical analysis is the regression analysis of SPACs Cumulative Abnormal Return on explanatory variables defined in the methodology section. We implement regression analysis of the Cumulative Abnormal Returns tested above on the Size, Relative size, GAP, geography and time dummy variables with the US/Canada region and 2021 being the base categories. We use robust standard errors in order to avoid potential heteroscedasticity problem. It is also important to note that we do not include the size and the relative size variables at the same time in order to avoid potential heterogeneity problem.

In order to test Hypothesis 3: "*SPAC's size negatively affects returns to acquirer shareholders."* we use Specification 4 of the regression model:

$$Specification\ 3: Performance_i = \alpha + \ln(Size_i) + \ln(GAP_i) + \sum Geography\ dummy_j + \sum Year\ dummy_j + \varepsilon_i$$

where the performance variable is Cumulative Abnormal Return of SPACs. The regression analysis results can be found in the Table 4 (standard deviation in parentheses). The same results rounded up to 4 decimal points can be found in the Appendix C.

As can be seen from the Table 4, neither size factor nor the GAP measure significantly affects SPACs' Cumulative Abnormal Return. Hence, we reject the Hypothesis 3: *SPAC's size negatively affects returns to acquirer shareholders.,* and conclude that SPAC's size does not affect returns to acquirer shareholders. Moreover, there are insignificant intercept variable across all setting and groups that corresponds to absence of unexplained variation in CAR.

In contrast, as can be seen from the table, some of the geographical dummy variables are found to significantly influence SPAC's CAR. For instance, in the live deal group the Europe dummy is positive and significant meaning that US listed SPACs seeking target in the European region on average bring 1.54% and 5% of 1-day and 3-day cumulative abnormal return to acquirer shareholders, respectively. Similarly, SPAC deals with a target from the EEMEA region on average bring 2% CAR, and, at the same time, on average bring negative 1-day CAR to acquirer shareholders. In addition, a deal with Asian target company on average bring negative significant CAR of -1%. However, There is no evidence of cross-border effect in the closed deal group in any specification. Therefore, we reject Hypothesis 5: *Cross-border SPAC deals negatively affect the returns to the acquirer shareholders*., but still conclude that cross-border factor significantly influences SPACs' cumulative abnormal returns in the live deal group.

Table 4. Regression analysis results of CAR in the spec. 3

Variable	Live deal group CAR (0; +1)	Live deal group CAR (0; +3)	Closed deal group CAR (0; +1)	Closed deal group CAR (0; +3)
Intercept	0.02	0.02	0.00	0.05
	(0.02)	(0.04)	(0.0)	(0.053)
Ln(Size)	0.00	-0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Ln(GAP)	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Asia	-0.01***	-0.01	-0.00	-0.00
	(0.00)	(0.01)	(0.00)	(0.00)
EEMEA	-0.017*	0.02**	-0.00	-0.00
	(0.00)	(0.01)	(0.00)	(0.00)
Europe	0.0154**	0.05***	-0.00	-0.01
	(0.00)	(0.01)	(0.00)	(0.00)
Global	-0.00	-0.00	0.00	0.01
	(0.00)	(0.00)	(0.00)	(0.00)
LatAm	-0.00	-0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
2016	-	-	-0.00	-0.03
			(0.00)	(0.01)
2017	-	-	-0.00	-0.04
			(0.00)	(0.01)
2018	-	-	-0.00	-0.03
			(0.00)	(0.01)
2019	-	-	0.00	-0.02
			(0.00)	(0.01)
2020	-0.00	0.00	-0.00	-0.04
	(0.00)	(0.01)	(0.00)	(0.01)
No. of observations	71	71	104	104
R^2	0.05	0.05	0.07	0.07
F-statistics	0.43	0.48	0.61	0.61
(p-value)	(0.89)	(0.86)	(0.82)	(0.82)

*** 0.01 significance level, ** 0.05 significance level, * 0.1 significance level

Source: Authors' calculations

For testing Hypothesis 4*: The relative size of the target firm compared to the SPAC negatively affects the returns to acquirer shareholders.*, we utilize the model specification 4 that includes the Relative size factor instead of the Size variable:

$Specification\ 4: Performance_i = \alpha + Relative\ size_i + \ln(GAP_i) + \sum Geography\ dummy_j + \sum Year\ dummy_j + \varepsilon_i$

where the performance variable is Cumulative Abnormal Return of SPACs. The regression analysis results can be found in the Table 5 (standard deviation in parentheses). The same results rounded up to 4 decimal points can be found in the Appendix C.

Table 5. Regression analysis results of CAR in the spec. 4

Variable	Live deal group CAR (0; +1)	Live deal group CAR (0; +3)	Closed deal group CAR (0; +1)	Closed deal group CAR (0; +3)
Intercept	0.00	0.00	0.04	0.0944**
	(0.00)	(0.00)	(0.03)	(0.0415)
Relative size	0.00	0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Ln(GAP)	-0.00	-0.00	-0.005	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Asia	-0.00**	-0.00	-0.01**	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
EEMEA	-0.00*	-0.00**	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Europe	0.00***	0.00***	-0.00	-0.01**
	(0.00)	(0.00)	(0.00)	(0.00)
Global	-0.00	-0.00	0.00	0.01
	(0.00)	(0.00)	(0.01)	(0.00)
LatAm	-0.00	-0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)
2016	-	-	-0.00	-0.04**
			(0.01)	(0.01)
2017	-	-	-0.01	-0.04***
			(0.01)	(0.01)
2018	-	-	-0.00	-0.03**
			(0.01)	(0.01)
2019	-	-	-0.00	-0.03*
			(0.01)	(0.01)
2020	-0.00	0.00	-0.01	-0.047***
	(0.00)	(0.00)	(0.01)	(0.01)
No. of observations	75	75	108	108
R^2	0.05	0.05	0.06	0.14
F-statistics	0.45	0.46	0.49	1.33
(p-value)	(0.88)	(0.87)	(0.91)	(0.21)

*** 0.01 significance level, ** 0.05 significance level, * 0.1 significance level

Source: Authors' calculations

As can be seen, similarly to testing Hypothesis 3, there is no evidence of significant effect of the Relative size and the GAP measure on SPACs' cumulative abnormal return in every setting. Hence, we reject Hypothesis 4: *The relative size of the target firm compared to the SPAC negatively affects the returns to acquirer shareholders.*

Similarly to the specification 4, there are several significant geographical dummy variables. The positive significant Europe coefficient corresponds states that SPACs searching for the target in the European region on average outperform SPACs with targets from the US/Canada area. They on average earn 0.16% and 0.47% more of 1-day and 3-day CAR, respectively. In contrast, there is evidence of significant negative effect of the Europe dummy factor in the closed deal group. In addition, SPACs with targets from the Asian and EEMEA regions tend to bring lower cumulative abnormal returns in comparison with SPACs seeking targets in the US/Canada area. Thus, we reject Hypothesis 5: *Cross-border SPAC deals negatively affect the returns to the acquirer shareholders*., but still conclude that cross-border factor significantly influences SPACs' cumulative abnormal returns.

The main difference between the specification 3 and specification 4 lies in the time factors within the closed deal group. As can be seen, all of the dummy variables are negative and significant. It means that on average US listed SPACs which announced their combination in 2021 outperform SPACs which announced it in previous years.

4.1.2 BHAR analysis

In order to analyze the long-term performance of SPACs, we compute Buy-and-Hold Abnormal Returns (BHARs). It is constructed as the abnormal return during the period of 252 trading days. The descriptive statistics of Buy-and-Hold Abnormal Returns of the final samples used in the analysis can be found in the Table 5. It is important to note that due to the nature of the analyzed data, the BHAR analysis is conducted within the closed deal group only. As can be seen, there are 63 observations used for the analysis. On average, the closed deal SPACs show -15.92% BHAR. The median BHAR of the group is -18.56%. The distribution of BHAR is skewed to the right that is depicted in the positive value of skewness coefficient. In other words, there are more observation with CAR greater than median. SPACs from the closed deal group show different results.

Table 6. Descriptive statistics of dependent variable BHAR

	mean,	median	st. deviation	skewness	No obs.
BHAR	-15.92%	-18.56%	103.36%	3.04	63

Source: Authors' calculations

The next stage of the analysis includes significance testing. In other words, next we test the Hypothesis 2: "*SPACs bring negative long-term returns to acquirer shareholders*". We take BHAR corresponding to each observation at the announcement date, then we construct the average the sample. As a result, we obtain t-statistics of -2.78 with corresponding p-value of 0.004. It means that we reject the null hypothesis of average BHAR being equal to zero in favor of the alternative hypothesis stating that average SPACs' BHAR equals to zero. Moreover, by conducting one-sided t-test with alternative hypothesis stating that average BHAR is less than zero, we obtain t-statistics of -2.78 and corresponding 0.004. Therefore, we may conclude that SPACs' BHARs are negative, hence, SPACs do not bring any positive returns to its shareholders in the long term. We fail to reject the Hypothesis 2.

The result is consistent with findings of past research papers. There is a uniform agreement across all papers that SPACs bring negative long-term returns to acquirer shareholders. For instance, Jog and Sun (2007) and Lewellen (2009) find moderate negative returns, while Jenkinson and Sousa (2001) and Howe and O'Brien (2012) report extreme cases. Our result attests that SPACs bring negative long-term returns to acquirer shareholders, however we find negative returns of a medium scale.

In order to test the Hypothesis 3: *SPAC's size negatively affects returns to acquirer shareholders.*, the Hypothesis 4: *The relative size of the target firm compared to the SPAC negatively affects the returns to acquirer shareholders*, and the Hypothesis 5*: Cross-border SPAC deals negatively affect the returns to the acquirer shareholders*. regarding long-term returns, we implement the specification 3:

$Specification\ 3: Performance_i = \alpha + \ln(Size_i) + \ln(GAP_i) + \sum Geography\ dummy_j + \sum Year\ dummy_j + \varepsilon_i$

and the specification 4:

The relative size of the target firm compared to the SPAC negatively affects the returns to acquirer shareholders.

models separately with the dependent variable being BHAR.

The results of the regression analysis of BHAR are stored in the Table 6 (standard deviation in parentheses). Therefore, we reject both the Hypothesis 3 and the Hypothesis 4. As can be seen, there is the only factor that is found to have significant effect on SPACs BHAR. In the specification 3, where we use the Size variable, the Asia coefficient is negative and significant. In other words, on average US listed SPACs which search for a target in the Asian region bring 82% lower BHAR to acquirer shareholders. Hence, we fail to reject the Hypothesis 5 analyzing long-term returns of acquirer shareholders. The result is consistent with past literature findings (Moeller and Schlingemann (2004), Black, Carnes, and Jandik (2001), Gugler, Mueller, Yurtoglu, and Zulehner (2003)).

Table 7. Regression analysis results of BHAR in specs. 3 and 4

Variable	BHAR	BHAR
Intercept	-0.22	-1.22
	(2.24)	(2.42)
Ln(Size)	-0.07	-
	(0.20)	
Relative size	-	0.03
		(0.02)
Ln(GAP)	0.22	0.3
	(0.47)	(0.51)
Asia	-0.82**	-0.8***
	(0.35)	(0.24)
EEMEA	-0.35	-0.35
	(0.29)	(0.27)
Europe	0.25	0.34
	(0.35)	(0.31)
Global	-	-
LatAm	-0.16	-0.13
	(0.28)	(0.21)
2016	0.02	0.04
	(0.35)	(0.35)
2017	-0.47	-0.47
	(0.3)	(0.31)
2018	-0.45	-0.45
	(0.3)	(0.31)
2019	-0.06	-0.05
	(0.39)	(0.38)
No. of observations	67	67
R^2	0.11	0.12
F-statistics	0.73	0.81
(p-value)	(0.68)	(0.61)

** 0.05 significance level

Source: Authors' calculations

CHAPTER 5

5.1 Limitations and Further Research

Although this research paper provides a thorough analysis of performance of Special Purpose Acquisition Companies, there are several limitations and avenues for further research. By overcoming these limiting factors, a researcher may obtain even more fundamental and significant results.

First of all, the paper analyzes only US-listed SPACs. By extending the range of geographical coverage, a researcher will be able to identify market-specific factors affecting SPACs performance. In addition, increased geographical coverage should provide a bigger sample for the analysis. It would allow to obtain more robust results. In addition, extension of event windows to (0; +5), (0; +7), (0; +10) or any other setting will give broader set of the evidence whether SPACs bring return to acquirer shareholder.

Secondly, there are factors analyzed in past literature research on SPACs that are mainly connected to the internal structure of SPACs. By introducing more deal related factors that depend only on SPAC's structure, but also on market conditions or relationship between the SPAC and target entities, one should obtain more application-oriented results. It will provide market players with a powerful tool to predict market reaction to the initial business combination announcement as well as provide the base for making a uniform SPACs valuation model.

Finally, one of the further research avenues lies in the direction of connecting M&A and SPAC deals. Due to the nature of SPACs, they incorporate elements of both IPO events and M&A aspects. A proved evidence of connection between M&A and SPACs would introduce many new factors for the analysis. For instance, the meta-analysis by Das and Kapil (2012) revealed at least 125 unique dependent variables measuring M&A performance and 172 explanatory variables. If there is a strong relationship between M&A and SPACs, then researchers would get a new broad field to study.

5.2 Conclusion

This research paper analyzes whether SPACs bring positive returns to acquirer shareholders. Furthermore, we analyze whether specific factors and deal characteristics significantly affect returns to acquirer shareholders. The research is conducted by testing corresponding hypotheses.

Testing of the Hypothesis 1: *SPACs bring positive short-term returns to acquirer shareholders at the announcement date* provides the answer to the research question in the short-term. We analyze the short-term returns using cumulative abnormal returns (CARs). We reject the hypothesis because the results of the analysis are controversial. In particular, SPACs from the live deal group do not bring any significant cumulative abnormal return to acquirer shareholders, while SPACs from the closed deal group bring positive significant short-term CAR. The result is consistent with past research finding that provides disputable evidence.

Next, we test the Hypothesis 2: *SPACs bring negative long-term returns to acquirer shareholders* in order to analyze the long-term SPACs' return to acquirer shareholders. The test is based on the Buy-and-Hold Abnormal Return (BHAR) metric that is the simple excess return of a SPAC over the market index for 1 year period. We find evidence of significant negative BHAR of -15.92% to acquirer shareholders if an investor buys SPAC's share and hold it for 1 year against return on the Russell 3000 index. Thus, we fail to reject the hypothesis. The result is consistent with findings of past research papers as the majority of them state negative long-term return to acquirer shareholders.

The analysis of Hypothesis 3, Hypothesis 4 and Hypothesis 5 reveals some value drivers of SPAC returns to acquirer shareholders. In order to avoid potential endogeneity problem, we introduce two separate model specification which include the Size variable analyzed in the Hypothesis 3 testing, and the Relative size variable analyzed in the Hypothesis 4 testing.

We reject both the Hypothesis 3: *SPAC's size negatively affects returns to acquirer shareholders* and the Hypothesis 4: *The relative size of the target firm compared to the SPAC negatively affects the returns to acquirer shareholders.* We find not significant evidence in favor of significant effect of the Size nor of significant effect of the Relative Size.

Finally, we test the Hypothesis 5: *Cross-border SPAC deals negatively affect the returns to the acquirer shareholders* in order to understand whether combination with a target from another region bring higher return to acquirer shareholders that a domestic deal. We fail to reject the hypothesis when analyzing the effect on the long-term returns. There is significant evidence that SPACs that combine with a target from the Asian region bring lower returns to acquirer shareholders than SPACs with domestic target. In contrast, we also find controversial results in

the short-term period. While some target regions on average bring higher returns, other regions either bring lower returns than domestic SPACs or do not significantly differ from domestic SPACs.

Although the research has some limitations, the results of the paper may be of a great use to both practitioners and scholars. Current research provides useful indicators on potential SPAC return to shareholders as well as lay the basement in term of avenues for further research. The paper contributes to the literature by providing new evidence on return of SPACs to their shareholders. First of all, the paper analyzes the "new" wave of SPACs which announced their Initial Business Combination deals from 2016 to the first half of 2021. Secondly, the paper introduces new evidence on value drivers of SPACs' return to shareholders in the short-term and the long-term periods. In particular, we report no influence of the SPAC's size and the relative size of the deal to the size of SPAC, while proving significant negative effect of cross-border nature of SPAC deals. In addition, we discuss arguable results on the cross-border SPACs since not all regions tend to bring lower returns in comparison with domestic SPACs. We conclude that SPACs bring negative long-term returns to its shareholders, while brining positive returns in the short term.

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APPENDIX A

Table A1. The closed deal SPACs

SPAC	Newco	Announced date	Closed date	TEV ($M)	TEV/IPO	Size ($M)`	Sector	Geography
Thoma Bravo Adv	ironSource	22.03.2021	28.06.2021	10 334	1033%	1000	Technology	Global
Research Alliance I	POINT Biopharma	15.03.2021	30.06.2021	639	471%	136	Healthcare	Global
Fortress Value Acquisition II	ATI Physical Therapy	22.02.2021	17.06.2021	2 450	710%	345	Healthcare	US/Canada
HighCape Capital Acquisition	Quantum-Si	18.02.2021	10.06.2021	946	823%	115	Healthcare	US/Canada
Artius Acquisition	Origin Materials	17.02.2021	24.06.2021	999	138%	724	Materials	Global
Forest Road Acquisition	Beachbody	10.02.2021	25.06.2021	2 970	990%	300	Consumer	US/Canada
ARYA Sciences III	Nautilus Biotechnology	08.02.2021	09.06.2021	905	606%	149	Healthcare	US/Canada
VG Acq	23andMe	04.02.2021	16.06.2021	3 463	681%	509	Healthcare	US/Canada
FTAC Olympus Acq	Payoneer	03.02.2021	25.06.2021	3 270	433%	755	Financial	Global
Holicity Inc.	Astra	02.02.2021	30.06.2021	2 100	700%	300	Industrial	US/Canada
Acies Acquisition	PLAYSTUDIOS	01.02.2021	18.06.2021	1 100	550%	200	Media & Entertainment	Global
Leisure Acq	Ensysce Biosciences	01.02.2021	30.06.2021	267	134%	199	Healthcare	US/Canada
ION Acq 1	Taboola	25.01.2021	29.06.2021	2 030	785%	259	Technology	Global
TS Innovation Acq	Latch	25.01.2021	04.06.2021	1 053	351%	300	Real Estate	US/Canada
Crescent Acq	LiveVox	14.01.2021	18.06.2021	840	336%	250	Technology	US/Canada
Hudson Executive	Talkspace	13.01.2021	22.06.2021	1 400	338%	414	Healthcare	Global
ArcLight Clean	Proterra	12.01.2021	14.06.2021	1 600	577%	277	Automotive	US/Canada
Social Capital V	SoFi	07.01.2021	28.05.2021	7 208	895%	805	Financial	US/Canada
FinTech IV	Perella Weinberg Partners	30.12.2020	24.06.2021	962	418%	230	Financial	US/Canada

Altimar Acquisition	Owl Rock Capital Group, Dyal Capital Partners	23.12.2020	19.05.2021	12 702	4619%	275	Financial	US/Canada
Juniper Industrial	Janus International Group	22.12.2020	07.06.2021	1 930	559%	345	Industrial	Global
Colonnade Acquisition	Ouster	22.12.2020	11.03.2021	1 570	785%	200	Industrial	US/Canada
FinServ Acq	Katapult	18.12.2020	09.06.2021	993	397%	250	Financial	US/Canada
Deerfield Healthcare	CareMax Medical Group, IMC Medical Group Holdings	18.12.2020	08.06.2021	692	481%	144	Healthcare	US/Canada
Northern Star	BARK	17.12.2020	01.06.2021	1 642	646%	254	Consumer	US/Canada
New Providence Acq	AST SpaceMobile	16.12.2020	06.04.2021	1 392	605%	230	Technology	US/Canada
Thunder Bridge 2	indie Semiconductor	15.12.2020	10.06.2021	982	285%	345	Automotive	US/Canada
Experience Investment	Blade	15.12.2020	07.05.2021	450	164%	274	Automotive	US/Canada
Big Rock Partners	NeuroRx	14.12.2020	24.05.2021	525	761%	69	Healthcare	US/Canada
Forum Merger III	Electric Last Mile	11.12.2020	25.06.2021	1 196	478%	250	Automotive	US/Canada
Collective Growth	Innoviz Technologies	11.12.2020	05.04.2021	1 033	689%	150	Automotive	Europe
Silver Spike	Weedmaps	10.12.2020	15.06.2021	1 398	559%	250	Cannabis	US/Canada
GigCapital 3	Lightning eMotors	10.12.2020	06.05.2021	651	322%	202	Automotive	US/Canada
Vesper Healthcare Acq	HydraFacial	09.12.2020	05.05.2021	1 140	248%	460	Healthcare	US/Canada
Foley Trasimene II	Paysafe	07.12.2020	30.03.2021	9 000	613%	1468	Financial	US/Canada
Star Peak Energy Transition	Stem, Inc.	04.12.2020	28.04.2021	829	216%	384	Energy	US/Canada
CF Finance II	View	30.11.2020	08.03.2021	1 628	326%	499	Industrial	US/Canada
Northern Genesis Acquisition	Lion Electric	30.11.2020	06.05.2021	1 505	471%	320	Automotive	US/Canada
INSU Acq II	Metromile	24.11.2020	09.02.2021	956	416%	230	Financial	US/Canada
Longview Acq	Butterfly Network	20.11.2020	12.02.2021	1 457	352%	414	Healthcare	US/Canada

CIIG Merger	Arrival	18.11.2020	24.03.2021	5 400	2087%	259	Automotive	Europe
Roth CH	PureCycle Technologies	16.11.2020	17.03.2021	826	1080%	76	Industrial	US/Canada
Jaws Acq	Cano Health	12.11.2020	03.06.2021	4 400	638%	690	Healthcare	US/Canada
Newborn Acq	Nuvve	12.11.2020	22.03.2021	132	230%	57	Automotive	Global
InterPrivate Acq	Aeva	02.11.2020	12.03.2021	1 803	747%	241	Industrial	US/Canada
dMY Technology II	Genius Sports	27.10.2020	20.04.2021	1 500	543%	276	Media & Entertainment	Europe
Acamar Partners	CarLotz	22.10.2020	21.01.2021	827	271%	305	Automotive	US/Canada
Longevity Acq	4D Pharma	22.10.2020	19.03.2021	184	461%	40	Healthcare	Asia
Panacea	Nuvation Bio	21.10.2020	10.02.2021	1 319	918%	144	Healthcare	US/Canada
South Mountain	Billtrust	19.10.2020	12.01.2021	1 293	517%	250	Financial	US/Canada
FS Development	Gemini Therapeutics	15.10.2020	05.02.2021	265	220%	120	Healthcare	US/Canada
CC Neuberger	E2open	14.10.2020	04.02.2021	2 570	621%	414	Technology	US/Canada
Replay Acq	Finance of America	13.10.2020	01.04.2021	2 012	700%	287	Financial	US/Canada
AMCI Acquisition	Advent Technologies	13.10.2020	04.02.2021	358	162%	221	Energy	Global
Social Capital III	Clover Health	06.10.2020	07.01.2021	3 702	447%	828	Healthcare	US/Canada
RMG Acquisition	Romeo Power	05.10.2020	29.12.2020	993	432%	230	Energy	US/Canada
Live Oak Acq	Danimer Scientific	05.10.2020	29.12.2020	525	263%	200	Industrial	US/Canada
Oaktree Acq	Hims	01.10.2020	20.01.2021	1 600	795%	201	Healthcare	US/Canada
Mountain Crest	Playboy	01.10.2020	10.02.2021	381	650%	59	Media & Entertainment	US/Canada
Novus Capital	AppHarvest	29.09.2020	29.01.2021	549	550%	100	Food	US/Canada
LifeSci	Vincera Pharma	29.09.2020	23.12.2020	77	117%	66	Healthcare	US/Canada
Gores IV	United Wholesale Mortgage	23.09.2020	21.01.2021	15 125	3559%	425	Financial	US/Canada
Legacy Acq	Onyx Enterprises	21.09.2020	20.11.2020	331	110%	301	Consumer	US/Canada
Social Capital II	Opendoor	15.09.2020	18.12.2020	4 800	1159%	414	Real Estate	US/Canada

Haymaker II	ARKO Holdings	09.09.2020	22.12.2020	2 000	500%	400	Consumer	US/Canada
Conyers Park II	Advantage Solutions	08.09.2020	28.10.2020	5 200	1156%	450	Consumer	US/Canada
B. Riley Merger II	Eos Energy Storage	08.09.2020	16.11.2020	550	311%	177	Energy	US/Canada
Kensington Capital	QuantumScape	03.09.2020	25.11.2020	3 321	1444%	230	Automotive	US/Canada
Flying Eagle	Skillz	02.09.2020	16.12.2020	3 250	471%	690	Consumer	US/Canada
Tottenham Acq	Clene Nanomedicines	02.09.2020	30.12.2020	542	1179%	46	Healthcare	US/Canada
LF Capital Acq	Landsea Homes	31.08.2020	07.01.2021	630	398%	158	Industrial	US/Canada
Trine Acq	Desktop Metal	26.08.2020	09.12.2020	1 800	600%	300	Technology	US/Canada
Gores Metropoulos	Luminar	24.08.2020	02.12.2020	2 900	725%	400	Automotive	US/Canada
Hennessy IV	Canoo	18.08.2020	21.12.2020	1 841	607%	303	Automotive	US/Canada
Software Acq	CuriosityStream	11.08.2020	14.10.2020	331	221%	150	Technology	US/Canada
Megalith Financial	BankMobile	06.08.2020	04.01.2021	140	82%	171	Financial	US/Canada
CF Finance	GCM Grosvenor	03.08.2020	17.11.2020	2 175	762%	285	Financial	US/Canada
FinTech III	Paya	03.08.2020	16.10.2020	1 300	377%	345	Financial	US/Canada
DiamondPeak	Lordstown Motors	03.08.2020	23.10.2020	965	345%	280	Automotive	US/Canada
PropTech Acq	Porch.com	31.07.2020	23.12.2020	523	303%	173	Real Estate	US/Canada
ARYA Sciences II	Cerevel Therapeutics	30.07.2020	27.10.2020	847	567%	149	Healthcare	US/Canada
Healthcare Merger	SOC Telemed	29.07.2020	30.10.2020	721	288%	250	Healthcare	US/Canada
Netfin Acq	Triterras Fintech	29.07.2020	10.11.2020	674	266%	253	Financial	Asia
dMY Technology	Rush Street Interactive	27.07.2020	29.12.2020	1 780	774%	230	Media & Entertainment	US/Canada
Schultze Acq	Clever Leaves	27.07.2020	18.12.2020	206	158%	130	Cannabis	LatAm
Tenzing Acq	Reviva Pharma	21.07.2020	14.12.2020	119	188%	63	Healthcare	US/Canada
Fortress Value	MP Materials	15.07.2020	18.11.2020	1 043	303%	344	Materials	US/Canada
Spartan Energy	Fisker	13.07.2020	29.10.2020	1 900	344%	552	Automotive	US/Canada
Churchill III	MultiPlan	12.07.2020	08.10.2020	11 138	1013%	1100	Healthcare	US/Canada

Pure Acq	HighPeak Energy	07.07.2020	21.08.2020	845	204%	414	Energy	US/Canada
Orisun Acq	Ucommune	06.07.2020	17.11.2020	765	1723%	44	Real Estate	Asia
Graf Industrial	Velodyne Lidar	02.07.2020	29.09.2020	1 566	642%	244	Automotive	US/Canada
Opes Acquisition	BurgerFi	30.06.2020	16.12.2020	143	123%	116	Food	US/Canada
Landcadia II	Golden Nugget Online Gaming	29.06.2020	29.12.2020	745	236%	316	Media & Entertainment	US/Canada
Insurance Acq	Shift	29.06.2020	13.10.2020	415	276%	150	Financial	US/Canada
Tortoise Acq	Hyliion	19.06.2020	01.10.2020	1 097	471%	233	Automotive	US/Canada
Forum II	Tattooed Chef	12.06.2020	15.10.2020	482	241%	200	Food	US/Canada
HL Acquisitions	Fusion Fuel	08.06.2020	09.12.2020	96	176%	55	Energy	Europe
Collier Creek	Utz	05.06.2020	28.08.2020	1 560	355%	439	Food	US/Canada
Leo Holdings	Digital Media Solutions	23.04.2020	15.07.2020	757	379%	200	Media & Entertainment	US/Canada
ARYA Sciences	Immatics Biotech	17.03.2020	01.07.2020	314	219%	143	Healthcare	Europe
Proficient Alpha	Lion Financial	11.03.2020	16.06.2020	125	109%	115	Financial	Asia
VectoIQ Acq	Nikola	03.03.2020	03.06.2020	3 324	1431%	232	Automotive	US/Canada
Far Point Acq	Global Blue	16.01.2020	28.08.2020	2 461	389%	633	Technology	US/Canada
Mudrick Capital	Hycroft Mining	14.01.2020	29.05.2020	615	293%	210	Materials	US/Canada
Nebula Acq	Open Lending	06.01.2020	10.06.2020	1 300	473%	275	Real Estate	US/Canada
Diamond Eagle	DraftKings	23.12.2019	23.04.2020	2 700	675%	400	Media & Entertainment	US/Canada
EdtechX Holdings	Meten	12.12.2019	30.03.2020	614	956%	64	Consumer	Asia
GS Acquisition	Vertiv	10.12.2019	07.02.2020	5 318	771%	690	Industrial	US/Canada
Monocle Acq	AerSale	09.12.2019	22.12.2020	370	213%	174	Industrial	US/Canada
ChaSerg Tech	Grid Dynamics	13.11.2019	05.03.2020	407	185%	220	Technology	US/Canada
Gores III	PAE	01.11.2019	10.02.2020	1 550	388%	399	Industrial	US/Canada

Wealthbridge	Scienjoy	01.11.2019	07.05.2020	186	325%	57	Technology	Asia
Tiberius Acq	IGI	10.10.2019	17.03.2020	550	316%	174	Financial	EEMEA
Health Sciences	Immunovant	02.10.2019	18.12.2019	555	483%	115	Healthcare	US/Canada
Mosaic Acq	Vivint	16.09.2019	17.01.2020	4 197	1217%	345	Consumer	US/Canada
Boxwood Merger	Atlas Technical Consultants	13.08.2019	14.02.2020	654	327%	200	Industrial	US/Canada
Trinity Merger	Broadmark	12.08.2019	14.11.2019	1 162	330%	352	Real Estate	US/Canada
DD3 Acquisition	Betterware	05.08.2019	12.03.2020	367	659%	56	Consumer	LatAm
New Frontier	United Family Healthcare	30.07.2019	19.12.2019	1 440	501%	287	Healthcare	Asia
KBL Merger IV	180 Life Sciences	26.07.2019	06.11.2020	242	208%	116	Healthcare	US/Canada
Pensare Acq	Stratos Management Systems	25.07.2019	07.04.2020	65	21%	310	Technology	US/Canada
DFB Healthcare	AdaptHealth	08.07.2019	08.11.2019	1 041	416%	250	Healthcare	US/Canada
TPG Pace Holdings	Accel Entertainment	13.06.2019	20.11.2019	884	196%	451	Media & Entertainment	US/Canada
Constellation Alpha	DermTech	29.05.2019	29.08.2019	61	42%	145	Healthcare	US/Canada
Pivotal Acq	KLDiscovery	20.05.2019	20.12.2019	799	347%	230	Technology	US/Canada
Capitol IV	Nesco	08.04.2019	31.07.2019	1 086	270%	402	Industrial	US/Canada
Jensyn Acq	Peck Electric	27.02.2019	19.06.2019	53	132%	40	Industrial	US/Canada
GigCapital	Kaleyra	26.02.2019	25.11.2019	192	134%	143	Technology	Europe
Modern Media	Akazoo	24.01.2019	11.09.2019	469	224%	209	Media & Entertainment	Europe
Thunder Bridge	Repay	22.01.2019	11.07.2019	580	223%	260	Financial	US/Canada
Churchill Capital	Clarivate	14.01.2019	13.05.2019	4 200	609%	690	Technology	US/Canada
Black Ridge Acq	Allied Esports	19.12.2018	09.08.2019	213	154%	138	Media & Entertainment	US/Canada
One Madison	Ranpak	13.12.2018	03.06.2019	1 003	334%	300	Industrial	US/Canada
Platinum Eagle	Target Hospitality	13.11.2018	15.03.2019	1 397	430%	325	Travel & Hospitality	US/Canada

Union Acq	Bioceres	09.11.2018	14.03.2019	456	393%	116	Food	LatAm
CM Seven Star	Kaixin Auto Group	06.11.2018	30.04.2019	454	220%	206	Automotive	Asia
Haymaker Acq	OneSpaWorld	01.11.2018	19.03.2019	850	258%	329	Consumer	Europe
MTech Acq	Akerna	11.10.2018	17.06.2019	81	142%	57	Cannabis	US/Canada
Hunter Maritime	NCF Wealth Holdings	05.10.2018	21.03.2019	2 000	1318%	152	Financial	Asia
Hennessy III	NRC Group	21.09.2018	17.10.2018	748	289%	259	Industrial	Europe
Bison Capital	Xynomic	13.09.2018	14.05.2019	391	632%	62	Healthcare	Asia
GTY Technology	GovTech	12.09.2018	19.02.2019	560	101%	554	Technology	US/Canada
Industrea Acq	CPH	07.09.2018	06.12.2018	695	297%	234	Industrial	US/Canada
Draper Oakwood	Reebonz	04.09.2018	19.12.2018	252	438%	58	Consumer	Asia
Avista Healthcare	Organogenesis	17.08.2018	11.12.2018	673	217%	310	Healthcare	US/Canada
Federal Street	Agiliti	13.08.2018	04.01.2019	1 740	378%	460	Healthcare	US/Canada
Kayne Anderson	Altus Midstream	08.08.2018	09.11.2018	2 624	695%	378	Energy	US/Canada
Matlin & Partners	U.S. Well Services	16.07.2018	09.11.2018	588	181%	325	Energy	US/Canada
Easterly Acq	Sirius	25.06.2018	05.11.2018	2 200	1100%	200	Financial	US/Canada
Gores II	Verra Mobility	21.06.2018	17.10.2018	2 404	601%	400	Technology	US/Canada
Osprey Energy	Falcon Minerals	04.06.2018	23.08.2018	894	325%	275	Energy	US/Canada
I-AM Capital	SMAAASH	08.05.2018	21.11.2018	264	501%	53	Media & Entertainment	US/Canada
Atlantic Acq	HF Group	28.03.2018	22.08.2018	231	513%	45	Food	US/Canada
TPG Pace Energy	EnerVest	20.03.2018	31.07.2018	2 793	430%	650	Energy	US/Canada
Stellar III	Phunware	28.02.2018	26.12.2018	333	474%	70	Technology	US/Canada
M I Acquisitions	Priority	27.02.2018	25.07.2018	1 000	1828%	55	Technology	US/Canada
FinTech II	Intermex	19.12.2017	26.07.2018	364	208%	175	Financial	US/Canada
NESR	NPS	13.11.2017	18.05.2018	1 082	472%	229	Energy	EEMEA
Global Partner Acq	Purple Innovation	03.11.2017	22.02.2018	485	313%	155	Consumer	US/Canada
M III Acq	IEA	03.11.2017	26.03.2018	293	195%	150	Industrial	US/Canada
Andina II	Lazydays	27.10.2017	15.03.2018	209	515%	41	Travel & Hospitality	US/Canada

JM Global	China Sunlong	28.08.2017	06.02.2018	92	184%	50	Industrial	Asia
Double Eagle	Williams Scotsman	21.08.2017	29.11.2017	1 100	220%	500	Industrial	US/Canada
Silver Run II	Alta Mesa & Kingfisher Midstream	16.08.2017	09.02.2018	3 800	367%	1035	Energy	US/Canada
Boulevard II	Estre Ambiental S.A	16.08.2017	21.12.2017	1 100	297%	370	Industrial	LatAm
GP Investments	Rimini Street	16.05.2017	10.10.2017	838	486%	172	Technology	US/Canada
Harmony Merger	NextDecade	18.04.2017	24.07.2017	1 010	879%	115	Technology	US/Canada
Capitol III	Cision	20.03.2017	30.06.2017	2 400	738%	325	Technology	US/Canada
Quinpario II	SourceHOV and Novitex	22.02.2017	12.07.2017	2 700	771%	350	Technology	US/Canada
Pacific Special	Borqs	27.12.2016	18.08.2017	303	507%	60	Technology	Asia
KLR Energy	Rosehill	20.12.2016	27.04.2017	438	515%	85	Energy	US/Canada
Pace Holdings	Playa	13.12.2016	13.03.2017	1 750	389%	450	Travel & Hospitality	LatAm
Arowana	VivoPower	11.08.2016	28.12.2016	53	63%	84	Energy	Global
E-Compass Acq	iFresh	27.07.2016	13.02.2017	148	363%	41	Food	US/Canada
Silver Run I	Centennial Resource Dev	22.07.2016	11.10.2016	1 735	347%	500	Energy	US/Canada
FinTech I	CardConnect	07.03.2016	29.07.2016	437	438%	100	Financial	US/Canada

Source: SPACresearch.com

Table A2. The live group SPACs

SPAC	Target	Announced date	Deadline date	TEV ($M)	TEV/IPO	Size ($M)	Sector	Geography
Thayer Ventures	Inspirato	30.06.2021	15.06.2022	1 111	631%	176	Travel & Hospitality	Global
Trebia Acq	System1	29.06.2021	19.06.2022	1 435	277%	518	Technology	US/Canada
FS Development II	Pardes Biosciences	29.06.2021	19.02.2023	339	169%	201	Healthcare	Global
DFP Healthcare	The Oncology Institute	28.06.2021	13.03.2022	842	366%	230	Healthcare	US/Canada
890 5th Avenue Partners	BuzzFeed	24.06.2021	14.01.2023	1 530	532%	288	Media & Entertainment	Global
ION Acq 2	Innovid	24.06.2021	16.02.2023	1 310	518%	253	Media & Entertainment	Global
Northern Genesis II	Embark Trucks	23.06.2021	15.01.2023	4 545	1098%	414	Automotive	US/Canada
Thimble Point Acq	Pear Therapuetics	22.06.2021	04.02.2023	1 201	435%	276	Healthcare	US/Canada
CITIC Capital	Quanergy Systems	22.06.2021	13.02.2022	1 077	390%	276	Automotive	Global
Big Cypress Acquisition	SAB Biotherapeutics	22.06.2021	14.04.2022	325	280%	116	Healthcare	US/Canada
DD3 Acquisition II	Codere Online	21.06.2021	10.12.2022	353	282%	125	Media & Entertainment	Global
Pershing Square Tontine	Universal Music Group	20.06.2021	24.07.2022	41 000	1025%	4000	Media & Entertainment	Global
Leo Holdings III	Local Bounti	18.06.2021	02.03.2023	757	275%	275	Food	US/Canada
GS II	Mirion Technologies	17.06.2021	02.07.2022	2 560	341%	751	Industrial	Global
Roth CH Acq III Co.	QualTek	16.06.2021	05.03.2023	828	721%	115	Technology	US/Canada
Decarbonization Plus III	Solid Power	15.06.2021	26.03.2023	1 246	356%	350	Automotive	US/Canada
Seven Oaks Acquisition	Boxed	14.06.2021	22.12.2022	640	247%	259	Consumer	US/Canada
Yucaipa Acquisition	SIGNA Sports United	11.06.2021	06.08.2022	3 230	936%	345	Media & Entertainment	Global
Broadstone Acquisition	Vertical Aerospace	10.06.2021	15.09.2022	1 845	604%	305	Automotive	Global
Spartacus Acq	NextNav	10.06.2021	19.04.2022	897	442%	203	Technology	Global
Venus Acq	VIYI Algorithm	10.06.2021	11.02.2022	400	861%	46	Technology	Asia
Khosla Ventures I	Valo Health	09.06.2021	08.03.2023	2 322	673%	345	Healthcare	US/Canada
Kensington Capital II	Wallbox	09.06.2021	02.03.2023	1 477	642%	230	Automotive	US/Canada

VPC Impact Acq III	Dave	07.06.2021	09.03.2023	3 563	1404%	254	Financial	US/Canada
GigCapital4, Inc.	BigBear.ai	04.06.2021	11.02.2023	1 570	438%	358	Technology	US/Canada
Alkuri Global Acq	Babylon	03.06.2021	09.02.2023	3 623	1050%	345	Healthcare	Global
Virtuoso Acquisition	Wejo	28.05.2021	26.01.2023	800	348%	230	Automotive	Global
Pioneer Merger	Acorns	27.05.2021	12.01.2023	1 603	398%	403	Financial	US/Canada
Locust Walk Acq	eFFECTOR Therapeutics	27.05.2021	12.01.2023	419	239%	175	Healthcare	US/Canada
Decarbonization Plus II	Tritium	26.05.2021	08.02.2023	1 404	349%	402	Automotive	Global
Foresight Acquisition	P3 Health Partners	25.05.2021	12.02.2023	2 336	739%	316	Healthcare	US/Canada
PTK Acq	Valens	25.05.2021	15.01.2022	894	777%	115	Technology	Global
Legato Merger Corp.	Algoma Steel	24.05.2021	22.07.2022	1 706	724%	236	Industrial	US/Canada
DPCM Capital	Jam City	20.05.2021	23.10.2022	1 200	400%	300	Media & Entertainment	Global
Yunhong	Giga Energy	17.05.2021	18.08.2021	7 354	10658%	69	Energy	Asia
SCVX	Bright Machines	17.05.2021	28.01.2022	1 100	478%	230	Technology	Global
Seaport Global Acq	Redbox	17.05.2021	02.06.2022	693	477%	145	Media & Entertainment	Global
Switchback II	Bird	12.05.2021	12.01.2023	2 277	720%	316	Automotive	Global
Centricus Acquisition	Arqit	12.05.2021	08.02.2023	1 026	297%	345	Technology	Europe
Soaring Eagle Acq	Ginkgo Bioworks	11.05.2021	26.02.2023	15 164	879%	1725	Healthcare	Global
Aurora Acq	Better	11.05.2021	08.03.2023	6 732	2770%	243	Financial	US/Canada
Austerlitz Acquisition I	Wynn Interactive	10.05.2021	02.03.2023	3 200	464%	690	Media & Entertainment	US/Canada
Hennessy V	Plus	10.05.2021	20.01.2023	2 473	717%	345	Automotive	Global
Star Peak II	Benson Hill	10.05.2021	08.01.2023	1 351	336%	402	Food	Global
LIV Capital	AgileThought	10.05.2021	13.09.2021	482	599%	80	Technology	Global
ACON S2	ESS Tech	07.05.2021	21.09.2022	1 072	429%	250	Technology	US/Canada
LifeSci Acquisition II	Science 37	07.05.2021	24.11.2022	1 050	1311%	80	Healthcare	US/Canada
Live Oak Acq II	Navitas Semiconductor	07.05.2021	07.12.2022	1 042	412%	253	Technology	US/Canada
Amplitude Health	Jasper Therapeutics	06.05.2021	22.11.2021	290	290%	100	Healthcare	Global
Montes Archimedes Acq	Roivant Sciences	03.05.2021	09.10.2022	5 000	1217%	411	Healthcare	Global
Gores Metropoulos II	Sonder	30.04.2021	22.01.2023	2 200	489%	450	Real Estate	Global

Marquee Raine Acq	Enjoy Technology Inc	28.04.2021	17.12.2022	1 180	316%	373	Consumer	Global
Galileo	Shapeways, Inc.	28.04.2021	22.10.2021	410	297%	138	Industrial	Global
Blue Water Acquisition	Clarus Therapeutics	27.04.2021	17.12.2021	215	368%	58	Healthcare	US/Canada
Sports Entertainment Acq	Super Group	26.04.2021	06.10.2022	4 640	1031%	450	Media & Entertainment	Global
Horizon Acq	Vivid Seats	22.04.2021	25.08.2022	2 059	379%	543	Media & Entertainment	US/Canada
Fifth Wall I	SmartRent	22.04.2021	09.02.2023	1 660	481%	345	Real Estate	Global
Roman DBDR Tech Acq	CompoSecure	19.04.2021	10.05.2022	1 206	511%	236	Financial	Global
D8 Holdings	Vicarious Surgical	15.04.2021	17.07.2022	1 119	324%	345	Healthcare	US/Canada
Consonance-HFW Acq	Surrozen	15.04.2021	23.11.2022	203	221%	92	Healthcare	US/Canada
Roth CH II	Reservoir Holdings, Inc.	14.04.2021	15.12.2022	788	686%	115	Media & Entertainment	Global
BCTG Acquisition	Tango Therapeutics	14.04.2021	08.09.2022	352	212%	166	Healthcare	US/Canada
Altimeter Growth	Grab	13.04.2021	05.10.2022	31 265	6253%	500	Technology	Asia
TWC Tech Holdings II	Cellebrite	08.04.2021	15.09.2022	1 811	302%	600	Technology	Global
Rice Acquisition	Archaea Energy, Aria Energy	08.04.2021	26.10.2022	1 148	484%	237	Energy	US/Canada
CA Healthcare Acq	LumiraDx	07.04.2021	29.01.2023	5 033	4377%	115	Healthcare	US/Canada
Mountain Crest II	Better Therapeutics	07.04.2021	12.10.2021	184	320%	58	Healthcare	US/Canada
Mudrick Capital Acq II	The Topps Company	06.04.2021	10.09.2022	1 548	482%	321	Consumer	US/Canada
Rotor Acq	Sarcos Robotics	06.04.2021	20.07.2022	1 314	476%	276	Industrial	US/Canada
Union II	Procaps Group	31.03.2021	22.10.2021	1 125	563%	200	Healthcare	LatAm
Qell Acq	Lilium	30.03.2021	02.10.2022	2 374	626%	379	Automotive	Global
Ajax I	Cazoo	29.03.2021	30.10.2022	7 000	870%	805	Consumer	Europe
CM Life Sciences II	SomaLogic	29.03.2021	25.02.2023	1 230	513%	240	Healthcare	US/Canada
BowX Acquisition	WeWork	26.03.2021	07.08.2022	8 966	1856%	483	Real Estate	Global
Spring Valley Acq	AeroFarms	26.03.2021	27.05.2022	856	368%	233	Industrial	US/Canada
Genesis Park Acq	Redwire	25.03.2021	27.05.2022	615	370%	166	Industrial	US/Canada
Jaws Spitfire Acq	Velo3D	23.03.2021	07.12.2022	1 614	468%	345	Technology	Global
Chardan Healthcare 2	Renovacor Inc	23.03.2021	28.04.2022	84	98%	86	Healthcare	US/Canada

Malacca Straits Acquisition	Asia Vision Network	22.03.2021	17.01.2022	573	399%	144	Media & Entertainment	Asia
SC Health	Rockley Photonics	19.03.2021	16.08.2021	1 215	704%	173	Technology	Global
Supernova Partners Acq	Offerpad	18.03.2021	23.10.2022	2 368	588%	403	Real Estate	US/Canada
Industrial Tech Acq	Arbe Robotics	18.03.2021	11.12.2021	573	744%	77	Automotive	EEMEA
FinTech Acq. V	eToro	16.03.2021	08.12.2022	9 595	3838%	250	Financial	Global
LGL Systems	IronNet Cybersecurity	15.03.2021	12.11.2021	926	537%	172	Technology	Global
Greenrose Acq	Shango Holdings, Futureworks, Theraplant and True Harvest	15.03.2021	13.08.2021	296	172%	172	Cannabis	US/Canada
Cerberus Telecom Acq	KORE Wireless	12.03.2021	26.10.2022	1 014	391%	259	Technology	US/Canada
Motion Acq	DocGo	09.03.2021	19.10.2022	900	783%	115	Healthcare	Global
dMY Technology III	IonQ	08.03.2021	17.11.2022	1 377	459%	300	Technology	US/Canada
New Beginnings	Airspan Networks	08.03.2021	03.11.2021	822	708%	116	Technology	Global
Good Works Acq	Cipher Mining Inc.	05.03.2021	22.07.2022	2 000	1176%	170	Financial	US/Canada
Reinvent Tech Partners Z	Hippo Insurance Services	04.03.2021	23.11.2022	5 057	2199%	230	Financial	US/Canada
Vistas Media Acquisition	Anghami	03.03.2021	07.08.2021	219	220%	100	Media & Entertainment	EEMEA
Capitol V	Doma	02.03.2021	04.12.2022	3 030	878%	345	Financial	US/Canada
Ascendant Digital Acquisition	MarketWise (Beacon Street Group)	02.03.2021	28.07.2022	3 024	730%	414	Consumer	US/Canada
Vector Acq	Rocket Lab USA	01.03.2021	29.09.2022	4 082	1276%	320	Industrial	US/Canada
NavSight	Spire Global	01.03.2021	14.09.2022	1 230	535%	230	Technology	Global
Tailwind Acquisition	QOMPLX	01.03.2021	09.09.2022	1 173	351%	334	Technology	US/Canada
RMG Acquisition II	ReNew Power	24.02.2021	14.12.2022	8 000	2667%	300	Energy	Asia
Reinvent Technology	Joby Aviation	24.02.2021	21.09.2022	4 629	671%	690	Automotive	US/Canada
Gores V	Ardagh Metal Packaging	23.02.2021	10.08.2022	8 522	1623%	525	Industrial	Global
Churchill IV	Lucid Motors	22.02.2021	03.08.2022	19 591	946%	2071	Automotive	US/Canada
Starboard Value Acq	Cyxtera	22.02.2021	14.09.2022	3 425	847%	404	Technology	Global
NextGen Acquisition Corp	Xos Trucks	22.02.2021	09.10.2022	1 450	387%	375	Automotive	US/Canada
Trident Acq	Lottery.com	22.02.2021	01.09.2021	526	256%	205	Media & Entertainment	US/Canada

Osprey Tech	BlackSky	18.02.2021	05.11.2021	1 106	350%	316	Technology	Global
East Stone Acq	JHD Holdings	18.02.2021	24.08.2021	480	348%	138	Financial	Asia
CF Finance III	AEye	17.02.2021	17.09.2021	1 638	712%	230	Automotive	US/Canada
Alpha Healthcare	Humacyte	17.02.2021	22.09.2022	849	849%	100	Healthcare	US/Canada
Peridot Acquisition	Li-Cycle	16.02.2021	28.09.2022	1 099	366%	300	Energy	US/Canada
Fusion Acq	Moneylion	12.02.2021	30.12.2021	2 362	675%	350	Financial	US/Canada
Nebula Caravel Acq	Rover	11.02.2021	11.12.2022	1 355	493%	275	Consumer	US/Canada
Atlas Crest	Archer	10.02.2021	30.10.2022	2 713	543%	500	Automotive	US/Canada
CM Life Sciences	Sema4	10.02.2021	04.09.2022	2 071	468%	443	Healthcare	US/Canada
FG New America Acq	Opportunity Financial	10.02.2021	02.10.2022	909	373%	244	Financial	US/Canada
Gores Holdings VI	Matterport	08.02.2021	15.12.2022	2 260	655%	345	Technology	US/Canada
Tortoise Acq II	Volta Industries	08.02.2021	15.09.2022	1 400	406%	345	Automotive	US/Canada
GreenVision	Helbiz	08.02.2021	19.08.2021	320	557%	57	Automotive	Global
Dragoneer Growth Opportunities	CCC Information Services	03.02.2021	18.08.2022	7 049	1022%	690	Financial	US/Canada
10X Capital Venture Acq	REE Automotive	03.02.2021	27.05.2022	3 100	1540%	201	Automotive	EEMEA
FAST Acquisition	Fertitta Entertainment	01.02.2021	25.08.2022	8 600	4300%	200	Media & Entertainment	US/Canada
Tuscan Holdings	Microvast	01.02.2021	31.07.2021	3 000	1087%	276	Automotive	Global
Kismet Acquisition One	Nexters Global	01.02.2021	10.08.2022	1 900	760%	250	Media & Entertainment	Global
Software Acq II	Otonomo Technologies	01.02.2021	17.03.2022	1 100	638%	172	Automotive	Global
TPG Pace Tech Opportunities	Nerdy	29.01.2021	09.10.2022	1 405	312%	450	Consumer	US/Canada
Property Solutions Acquisition	Faraday Future	28.01.2021	24.04.2022	2 622	1141%	230	Automotive	US/Canada
Andina III	Stryve Foods	28.01.2021	31.07.2021	168	156%	108	Food	US/Canada
VPC Impact Acq	Bakkt	11.01.2021	25.09.2022	2 100	1013%	207	Financial	US/Canada
TPG Pace Beneficial Finance	EVBox	10.12.2020	09.10.2022	969	277%	350	Automotive	Europe
Alberton Acq	SolarMax Technology	28.10.2020	26.10.2021	300	261%	115	Energy	US/Canada
Stable Road	Momentus	07.10.2020	13.08.2021	566	328%	173	Technology	US/Canada

Source: SPACresearch.com

APPENDIX B

Table B1. Descriptive statistics of variables used in the research

Panel A. Live deal SPACs CAR (0; +1) spec 3

	mean	median	st. dev	skewness	# obs.
Ln(Size)	5.44	5.52	0.68	0.79	71
Ln(GAP[1)]	6	6.22	0.48	-1.15	71

Panel B. Live deal SPACs CAR (0; +3) spec 3

	mean	median	st. dev	skewness	# obs.
Ln(Size)	5.46	5.52	0.67	0.75	75
Ln(GAP[1)]	6.02	6.24	0.47	-1.23	75

Panel C. Live deal SPACs CAR (0; +1) spec 4

	mean	median	st. dev	skewness	# obs.
TEV/IPO	8.19	4.78	14.63	5.41	71
Ln(GAP[1)]	6	6.22	0.48	-1.15	71

Panel D. Live deal SPACs CAR (0; +3) spec 4

	mean	median	st. dev	skewness	# obs.
TEV/IPO	8.09	4.78	14.23	5.56	75
Ln(GAP[1)]	6.02	6.24	0.47	-1.23	75

Panel E. Closed deal SPACs CAR (0; +1) spec 3

	mean	median	st. dev	skewness	# obs.
Ln(Size)	5.31	5.5	0.73	-0.58	104
Ln(GAP[2])	4.89	4.87	0.39	0.23	104

Panel F. Closed deal SPACs CAR (0; +3) spec 3

	mean	median	st. dev	skewness	# obs.
Ln(Size)	5.32	5.52	0.73	-0.56	108
Ln(GAP[2])	4.88	4.85	0.38	0.27	108

Panel G. Closed deal SPACs CAR (0; +1) spec 4

	mean	median	st. dev	skewness	# obs.
TEV/IPO	4.42	3.37	3.23	1.96	104
Ln(GAP^2)	4.89	4.87	0.39	0.23	104

Panel H. Closed deal SPACs CAR (0; +3) spec 4

	mean	median	st. dev	skewness	# obs.
TEV/IPO	4.68	3.45	4.37	4.02	108
Ln(GAP^2)	4.88	4.85	0.38	0.27	108

Panel I. Closed deal SPACs BHAR spec 3

	mean	median	st. dev	skewness	# obs.
Ln(Size)	5.28	5.43	0.78	-0.4	67
Ln(GAP^2)	4.95	4.91	0.38	0.79	67

Panel J. Closed deal SPACs BHAR spec 4

	mean	median	st. dev	skewness	# obs.
TEV/IPO	4.33	3.47	3.27	2.14	67
Ln(GAP^2)	4.95	4.91	0.38	0.79	67

1. Time gap between announcement date and SPAC's general deadline

2. Time gap between announcement date and the merger date

Source: Authors' calculations

APPENDIX C

Table C1. Regression analysis results of CAR in the spec. 3

Variable	Live deal group CAR (0; +1)	Live deal group CAR (0; +3)	Closed deal group CAR (0; +1)	Closed deal group CAR (0; +3)
Intercept	0.0289	0.023	0.0002	0.0533
	(0.0298)	(0.0482)	(0.005)	(0.0535)
Ln(Size)	0.0008	-0.003	0.0005	0.0046
	(0.0036)	(0.008)	(0.0003)	(0.0046)
Ln(GAP)	-0.0046	-0.0004	-0.0003	-0.006
	(0.0055)	(0.0095)	(0.0007)	(0.008)
Asia	-0.0175***	-0.0173	-0.0005	-0.004
	(0.006)	(0.0114)	(0.0005)	(0.0057)
EEMEA	-0.0176*	0.0268**	-0.0000	-0.0022
	(0.0095)	(0.0112)	(0.0005)	(0.0065)
Europe	0.0154**	0.0505***	-0.0001	-0.0154
	(0.0069)	(0.0114)	(0.001)	(0.0056)
Global	-0.0013	-0.0035	0.0003	0.016
	(0.0058)	(0.0087)	(0.0014)	(0.0088)
LatAm	-0.0082	-0.0042	0.0004	-0.0013
	(0.0059)	(0.0092)	(0.0007)	(0.009)
2016	-	-	-0.0001	-0.0346
			(0.0016)	(0.0158)
2017	-	-	-0.0012	-0.042
			(0.0015)	(0.0145)
2018	-	-	-0.0005	-0.033
			(0.0015)	(0.0143)
2019	-	-	0.0000	-0.0267
			(0.0015)	(0.0155)
2020	-0.0007	0.0048	-0.0006	-0.0438
	(0.0051)	(0.01)	(0.0015)	(0.0138)
No. of observations	71	71	108	108
R^2	0.0528	0.0555	0.0752	0.0752
F-statistics	0.4323	0.4853	0.6168	0.6168
(p-value)	(0.8972)	(0.8624)	(0.8229)	(0.8229)

*** 0.01 significance level, ** 0.05 significance level, * 0.1 significance level

Source: Authors' calculations

Table C2. Regression analysis results of CAR in the spec. 4

Variable	Live deal group CAR (0; +1)	Live deal group CAR (0; +3)	Closed deal group CAR (0; +1)	Closed deal group CAR (0; +3)
Intercept	0.0028	0.0019	0.0417	0.0944**
	(0.003)	(0.0049)	(0.0379)	(0.0415)
Relative size	0.0000	0.0000	0.0006	-0.0005
	(0.0000)	(0.0000)	(0.0007)	(0.0008)
Ln(GAP)	-0.0003	-0.0002	-0.005	-0.008
	(0.0004)	(0.0008)	(0.0071)	(0.0079)
Asia	-0.0021**	-0.0019	-0.0115**	-0.0073
	(0.001)	(0.0015)	(0.0049)	(0.0058)
EEMEA	-0.0017*	-0.0025**	-0.0007	-0.0026
	(0.0009)	(0.0011)	(0.0052)	(0.0071)
Europe	0.0016***	0.0047***	-0.0009	-0.0171**
	(0.0004)	(0.0006)	(0.0093)	(0.007)
Global	-0.0001	-0.0004	0.0037	0.0149
	(0.0005)	(0.0008)	(0.0149)	(0.0097)
LatAm	-0.0007	-0.0005	0.0018	-0.0034
	(0.0005)	(0.0009)	(0.0073)	(0.0085)
2016	-	-	-0.0063	-0.0404**
			(0.0154)	(0.0158)
2017	-	-	-0.014	-0.0454***
			(0.0148)	(0.0153)
2018	-	-	-0.0087	-0.038**
			(0.0148)	(0.015)
2019	-	-	-0.0015	-0.0308*
			(0.0152)	(0.016)
2020	-0.0000	0.0005	-0.01	-0.0475***
	(0.0005)	(0.0009)	(0.0146)	(0.0143)
No. of observations	75	75	108	108
R^2	0.0553	0.0532	0.0608	0.1439
F-statistics	0.4537	0.4639	0.4915	1.331
(p-value)	(0.8835)	(0.8771)	(0.9149)	(0.2141)

*** 0.01 significance level, ** 0.05 significance level, * 0.1 significance level

Source: Authors' calculations