MASTER THESIS

The influence of experienced intermediaries on the performance of SPACs

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Abstract

In this study, the effect of experienced intermediaries on SPAC performance is examined. Intermediaries play an important role in various SPAC processes such as the IPO, deal brokering with potential targets, preparation and filing of financial statements and the registration of securities after a successful business acquisition. Three intermediary types are examined: underwriters, legal firms, and auditors. Experienced intermediaries are defined as intermediaries that have worked on numerous prior SPAC deals and possess significant market share of the total SPAC market for intermediaries. SPAC performance is examined on acquisition approval probability and investor returns during the SPAC lifecycle. The sample used in this study consisted of US listed SPACs that either successfully acquired a company or have been liquidated over the period 2015-2021. The results show that the experience of intermediaries has mixed effects on the acquisition approval probability and investor returns. Underwriters and auditors with a higher deal count, but a lower market share, improve acquisition approval probability. Legal firms with a lower deal count, but a higher market share, improve acquisition approval probability. Results regarding investor returns show that underwriters negatively affect investor returns surrounding the announcement date and over the lifecycle of the SPAC. Legal firms with a low number of prior deals, but a high market share, positively affect the investor returns. Auditing firms with a higher number of prior deals have a low positive effect on the returns surrounding the announcement date. The results are highly statistically significant and robust. This study contributes to the existing literature because variables regarding legal firms and auditors have not been analyzed in prior research. In addition, the performance of SPACs in the period 2015-2011 has not been research previously.

Keywords: *SPAC performance, SPAC intermediaries, acquisition approval, special purpose acquisition company, SPAC announcement, SPAC acquisition, US listed SPACs, underwriters, legal firms, auditors.*

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Legend of abbreviations

SPAC	Special purpose acquisition company
IPO	Initial public offering
NAV	Net asset value
US	United States
SEC	Security and Exchange Commission
CAR	Cumulative abnormal returns
BHAR	Buy-and-hold returns
NASD	National Association of Securities Dealers
PIPE	Private investment in public equity
VIX	Volatility index
VRP	Variance risk premium
OLS	Ordinary least squares

1. Introduction

The IPO market is red hot in 2021. The majority of companies that have filed for IPO in 2021 has been Special Purpose Acquisition Companies, or SPACs. The popularity of SPACs has never been this high and SPAC sponsors list multiple SPACs simultaneously in order to raise as much capital as possible for private acquisitions. However, not everyone is benefitting from SPACs being the new favorite for private companies to go public. During 2020 and early 2021 many SPACs that were listed on the US stock exchanges traded above their Net Asset Value, or NAV, before any announcement of a potential target was made. Aside from reputation or experience in the parties involved with the SPAC, there is no reason for SPAC shares to trade above NAV aside speculation. Many retail investors have invested in SPACs above NAV due to promotion of social media influencers or even the management team itself. The historical performance of SPACs is far below average market returns and many SPACs post acquisition announcement trade below NAV. The way SPACs are advertised is not beneficial for the private companies that are being acquired, nor for retail investors. People that are benefitting the most from the rise in popularity of SPACs are management teams and intermediaries. Prior research has tried to identify what qualities of the management team results in better SPAC performance. This research focusses on the experience of intermediaries and the influence on SPAC performance.

1.1. Background information

SPACs have grown into one of the largest segments of the U.S. IPO market, raising over U.S. $80 billion in gross proceeds in just 2020. SPACs accounted for 46 percent of the total US IPO proceeds in 2020. The IPO market was red hot in 2020 with total gross proceeds over U.S. $179 billion compared to U.S. $72 billion the year prior. In table 1 the SPAC and US IPO activity data from the past seven years is reported.[1] Many well-known and respected investors have raised SPACs within the recent years such as Bill Ackman, Mark Cuban and Chamath Palihapitiya.

Table 1. SPAC and US IPO activity

Year	SPAC IPOs	Total IPOs	%	SPAC proceeds $M	Total US IPO proceeds $M	%
2021	311	425	73%	100,846	136,081	62%
2020	248	450	55%	83,353	179,356	46%
2019	59	213	28%	13,600	72,200	19%
2018	46	225	20%	10,750	63,890	17%
2017	34	189	18%	10,048	50,268	20%
2016	13	111	12%	3,499	25,779	13%
2015	20	173	12%	3,902	39,232	10%

The Security and Exchange Commission (SEC) classifies SPAC as a blank check company that is characterized as "a development stage company that has no specific business plan, or purpose, or has indicated in its business plan is to engage in a merger or acquisition with an unidentified company, other entity, or person. These companies typically involve speculative investments and often fall within the SEC's definition of "penny stocks" or are considered "microcap stocks"[2].

A SPAC is a clean shell company that acquires public status through the IPO process and is specifically formed to purchase one or more operating businesses over a certain amount of time, usually two years. Proceeds raised through the IPO are placed in escrow accounts and are kept there until SPAC

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[1] Data retrieved from: spacanalytics.com

[2] https://www.sec.gov/answers/blankcheck.htm

founders are able to close the deal with potential targets. If an appropriate target is not found within the two-year period after the IPO, the SPAC is liquidated and funds from the escrow accounts are returned to investors (Lakicevic & Vulanovic, 2013). A SPAC investor basically owns a riskless zero-coupon bond with an option of future acquisition. SPAC shareholders also benefit from the liquidity and price discovery offered by public equity markets (Lewellen, 2009).

The popularity of SPACs in the past two years can be partially attributed to the fact that a worldwide pandemic was causing liquidity problems in many sectors. Public restrictions and lockdowns resulted in financial distress for many companies. Private companies that faced financial problems were looking for a fast way to take their company public with low costs. SPACs offer a less costly and faster route to public financing of private companies (Boyer & Baigent, 2008). Typically, the SPAC identifies a sector in which the acquisition most likely will be made, prior to the SPAC IPO and raising of funds. SPACs typically acquire private companies within industries or geographies in which the management team has (often substantial) expertise. The cash reserves that were raised during the SPAC IPO provide the acquisition targets with the opportunity to restructure their balance sheet and fund future growth opportunities (Lewellen, 2009). The explosive growth in the number of SPACs raised in the past two years have raised questions in the financial industry. Are SPACs just a method for wealthy investors to raise cash, quickly identify a low-quality target and cash out as fast as possible with a massive premium? According to the research by Jog & Sun (2007) SPAC founders earned 1900 percent annualized abnormal returns, while investors earned minus 3 percent annualized abnormal returns. What aspect of a SPAC can help you identify the best opportunity for a positive return? Dimitrova (2017) states that SPACs exhibit poor performance across the board and significantly underperform benchmarks based on accounting measures.

1.2. Research objective and contributions

The academic literature covering SPACs is very limited. Most papers in the SPAC literature focus on the previous SPAC wave between 2003 and 2008. This paper contributes to the academic literature by using a recent dataset which has not yet been covered in the SPAC literature. Another contribution is the fact that new variables are introduced to analyze the approval rate and excess returns of SPACs. To the best of my knowledge no research has been conducted on the role of intermediaries, such as legal teams and auditors, on SPAC approval rate and excess returns. The main objective of this paper can be formulated in the following research question:

Do experienced intermediaries positively influence the approval rate and investor returns of SPACs during their lifecycle?

In order to create a systematic approach for the literature review and theoretical framework sub question have been formulated. These questions will be answered prior to the hypothesis development in section 2.4.

What stages exist in the SPAC lifecycle?
What intermediaries are involved with a SPAC deal and what is their role in the process?
In what way can experience of intermediaries be measured?
What factors influence the approval probability of SPAC acquisitions?
What factors influence the investor returns?

In order to obtain meaningful results, the research in this paper will be split into two parts. First, the effect of intermediaries on the approval variable will be analyzed. Second, the effect of intermediaries on stock market performance variables is examined. The following performance variables will be investigated: the cumulative abnormal return (CAR) of the SPAC surrounding the two main events, target announcement and acquisition, and annualized realized returns during the SPAC's lifecycle.

This research provides practical contributions for future SPAC managers[3], private companies and investors. Based on the results in this research, SPAC managers can identify the importance of experienced intermediaries that may result in better chances for a positive return. Similarly, private companies that are looking to go public through a SPAC acquisition will have an indication for the approval probability. Finally, investors are able to use metrics related to intermediaries to identify possible winners within the available SPACs to ensure a future acquisition with potentially higher returns.

1.3.   Outline

This research has been structured in the following way. Chapter two contains the theoretical framework including a literature review, an analysis of the research on SPAC acquisition approval rates, and an analysis of the research on financial performance of SPACs. In chapter three the methodology of this research is explained. An overview of the dependent and independent variables used in the models is presented. The fourth chapter discusses the data collection method and a description of the sample used in this research. In chapter five the results of the regression analyses of various models and the results of the robustness checks are discussed. Lastly, chapter six contains the conclusions regarding the results of the analyses. Additionally, the limitations of the research are discussed and recommendations for future research are provided.

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[3] The terms "manager", "sponsor", and "founder" are used interchangeable in this paper. Typically, a small group of individuals serve all three roles.

2. Theoretical framework

This chapter will provide a theoretical framework based on SPAC related literature. First, the characteristics of SPACs will be discussed. Second, the literature covering research regarding the approval rate of SPAC acquisitions will be reviewed. Third, the academic literature covering the excess returns of SPACs will be reviewed. Finally, the sub questions will be answered and the hypotheses for this research are discussed.

2.1.   Description of a SPAC

A SPAC is formed by sponsors and raises capital through a regular IPO with the unique purpose of acquiring one or multiple companies in a specific sector or geography. Generally, a reputable investor, investment bank, hedge fund or other financial institution is one of the sponsors when a SPAC is being formed. The formation of a SPAC is announced by filing an S-1 registration form with the SEC. The S-1 form covers all the important information regarding the SPAC's structure and intended target industry. The form also specifies all the compensations the sponsors receive during the various lifecycles of the SPAC. The qualifications of the sponsors are also covered to show prior experience and expertise in the intended industry. SPAC sponsors fulfil a mentoring role for the acquired company and therefore the success of the SPAC can be influenced by the experience of the sponsors (Lakicevic & Vulanovic, 2013). The companies acquired by SPACs are almost exclusively private. Sjostrom (2008) states that private companies acquired by a SPAC are taken public without having to supply the detailed financial statements and other disclosures that accompany a traditional IPO. There are various phases in the lifecycle of a SPAC. The flowchart in figure 1 shows what paths a SPAC can follow during its lifecycle. The four main phases that can be identified are: IPO, target seeking, target announcement and acquisition or liquidation. In this chapter the various stages of the lifecycle of a SPAC will be discussed.
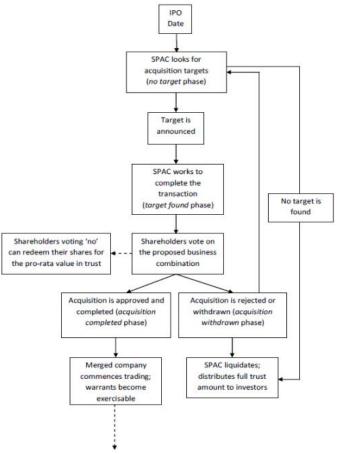
Figure 1. SPAC lifecycle stages, retrieved from Lewellen (2009).

2.1.1. History of blank check companies

During the 1980s, blank check companies were frequently involved in fraudulent activities that involved overemphasizing the liquidity and value creation potential of acquisitions to mislead unsophisticated investors. The typical behavior of a blank check management team at the time was to exercise its warrants following the announced acquisition of a private company expecting that the market would respond favorably to the announcement (Riemer, 2007). As a response, the SEC introduced Rule 419 Blank Check Offering Terms in 1992. Heyman (2007) specifies the following six conditions that were adopted by the SEC Rule 419:

1. The requirement that the IPO proceeds less expenses need to be kept in an escrow account until an acquisition is made.
2. A post-effective amendment, including all deal-related financial details, is required when a company is identified as probable acquisition target.
3. Another post-effective amendment must be filed when the company executes its acquisition agreement. The purchasers must be sent the prospectus and are given 45 business days to notify the registrant whether they intend to remain an investor.
4. If a purchaser chooses not to remain, he or she is given rescission rights as to purchaser's investment, plus interest, less certain expenses.
5. The proposed acquisition must account for at least 80 percent of the total value held in the escrow accounts.
6. The period in which an acquisition should be completed is limited to 18 months, after which the funds held in the escrow accounts need to be returned to the shareholders if no acquisition is completed.

These conditions provide investors with substantial protections against practices similar to those in the 1980s. Modern SPACs have adopted similar conditions in order to comply with regulations and improve the level of trust from investors. Appendix B includes the main differences between a SPAC and a Rule 419 firm. The new regulations brought order to the market. Heyman (2007) estimates that 2,700 blank check companies were issued in the period 1987-1990. In the early 1990s only 15 blank check companies entered the market. Shachmurove and Vulanovic (2018) state that this distant cousin of modern SPACs failed because access to capital markets was easier via IPO and the National Association of Securities Dealers (NASD) revoked licenses of 29 brokers and the chief executive officer of GKN Securities Corporation. GKN was the main promoter of blank checks at the time. The NASD decision states that GKN dominated the market, charged excessive fees and hindered competition. After the NASD ruling, activities in the blank check market completely ceased until 2003. In 2003, the first modern SPAC entered the market through IPO. The small investment bank EarlyBirdCapital, employing many of former GKN Securities Corporation employees, was the lead underwriter of the first modern SPAC. The new SPAC complied with all the new regulations imposed by the SEC and this IPO signaled the start of the first SPAC wave.

2.1.2. SPAC management team

The management team of a SPAC consists of the sponsors and sometimes includes some advisory roles. Generally, the management team consists of persons with qualifications in the intended target industry or with valuable connections in the intended geography (Lewellen, 2009). Kim (2009) reports that SPACs, on average, have managers with longer industry experience compared to traditional IPOs. Furthermore, higher managerial experience results in higher market valuations. The management experience signals quality, which attracts more funding from outside investors. Additionally, the experience of SPAC management teams positively increases the possibility of an acquisition. Lakicevic and Vulanovic (2013) state that, on average, a management team consists of five members.

Cumming et al. (2014) state that SPAC managers generally do not receive a salary for their efforts prior to an acquisition. Instead, they purchase warrants for a nominal value of about 3 percent of the IPO volume ("at-risk capital"). The reason for placing the sponsors' capital at risk is to strengthen their

incentives to look for promising targets (Kolb & Tykvová, 2016). SPAC managers can also receive an average of 20 percent of the SPAC's equity for a nominal fee of U.S. $25,000 in a private placement before the SPAC goes public (Lakicevic et al., 2014). The management team cannot participate in the liquidation of the escrow accounts in case the proposed acquisition is disapproved or the 24-month time period expired. Given the above described compensation and the fact that the SPAC management team will lose most of their money in case the SPAC fails, the management team is highly incentivized to complete a business acquisition before the deadline.

2.1.3. Stage 1: SPAC IPO

After the S-1 form is filed with the SEC the SPAC sponsors will promote their SPAC in order to attract investors. The underwriter syndicate gauges the interest of investors and determine whether they will make use of the over-allotment option. This option provides underwriters with additional units that can be sold in case of high interest for the SPAC IPO. A typical SPAC conducts an IPO by selling units. Schultz (1993) states that risky companies should choose units during the IPO. According to the paper unit IPOs are well positioned to solve information asymmetry problems and enable companies that are considered risky, to signal their true value. A unit is defined as a composite security that consists of a certain number of shares and a certain number of warrants exercisable at some future date. During the first SPAC wave between 2003 and 2008 the unit would usually consist of one share and one in the money warrant to buy either 1 or 2 shares. More recently SPAC units consist of one share and either one half or one third out of the money warrant (Shachmurove & Vulanovic, 2018). Another interesting feature mentioned by Shachmurove & Vulanovic (2018) is the fact that SPACs purposely choose for a unit price above U.S. $5 in order to avoid SEC rules regulating penny stocks and other blank check offerings. A price above U.S. $5 enables underwriters to make a market in SPAC's units immediately after the IPO and similarly for shares and warrants after filing the required post-IPO forms. This feature enables investors to freely participate in the price discovery process. Most SPACs price their units at U.S. $10. The cash proceeds raised through the IPO are placed in an escrow account where the funds earn a T-bill rate until they are used in acquisition. Typically, about 5 percent of the raised funds is used to pay for underwriters' fees, administrative and legal expenses and other operational expenses (Lakicevic & Vulanovic, 2013).

2.1.4. Stage 2: Seeking a target

After the IPO the management team is tasked with identifying potential acquisition targets. The management team only has limited time to complete an acquisition. Form 424-b[4] specifies the length of time within which the acquisition has to be executed. The limit for most modern SPACs is set at two years, however most SPACs allow a six-month extension if the acquisition is already announced. This time limit signals to shareholders that SPAC sponsors have the intention to create value through acquisition in a reasonable time period. The SPAC's intentions regarding the characteristics of potential targets are made clear in the prospectus forms. Generally, potential acquisition targets are aligned with the expertise of the management team.

2.1.5. Stage 3: Negotiation and target announcement

Once a target is identified negotiations start. The negotiations are typically held under non-disclosure restrictions. Once negotiations are at an advanced stage, the SPAC may file an 8-K form[4] that includes either a letter of intent or the definitive agreement that announces the business combination. Once the definitive agreement is announced the details are shared with the shareholders of the SPAC and a proxy vote in the final shareholder meeting will determine whether the acquisition will proceed. The announcement of the target usually results in high volatility in the price of the SPAC units, shares and warrants.

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[4] https://www.sec.gov/forms

2.1.6. Stage 4: Proxy vote, acquisition or liquidation

Once the acquisition is announced, all efforts shift to secure approval during the final shareholders meeting. All shareholders have the right to cast a vote in favor or against the proposed business combination. The threshold to disapprove a merger in the period between 2003 and 2006, was typically set at 20 percent. After 2006, the threshold was on average 30 percent (Shachmurove & Vulanovic, 2018). The exact threshold required for each SPAC is specified in the prospectus forms. In the case that the required approval threshold is not met, the deal will be rejected and the SPAC will be liquidated. All shareholders will receive a share of the funds held in the escrow accounts based on the number of shares they possess. Once SPAC shareholders approve a business combination, SPAC managers and the SPAC intermediaries file the required forms and notify the SEC of the issuance of securities related to the new business combination. The following business day trading commences under the new ticker representing the business combination.

2.1.7. SPAC acquisition advantages and disadvantages

There are multiple methods a private company can use to take the company public. The most common method to take a private company public is through an IPO. SPACs offer an alternative route to go public for private firms. SPAC acquisitions are often compared to reverse mergers since both methods make use of a shell company. For the purpose of this research the advantages and disadvantages of taking the SPAC route compared to the other two alternatives will briefly be discussed.

For private firms that target a public listing, SPACs offer numerous advantages over IPOs. A traditional IPO is a costly and lengthy process due to the SEC registration process (Kolb & Tykvová, 2016). SPAC firms do not have to organize road shows and usually face lower underpricing (Rodrigues & Stegemoller, 2014). Owners of private target firms who seek to be paid in cash may prefer a SPAC acquisition due to the large cash reserves of the SPAC which will be acquired in case of an acquisition. Lewellen (2009) states that many private companies in financial distress may see SPACs as an appealing acquiror. A logical explanation for the large increase of number of SPAC IPOs during the past two years may be the fact that many companies faced financial distress due to the worldwide COVID-19 pandemic. Lewellen (2009) further states that target companies can also benefit from the experience of the SPAC management team and the SPAC's clean structure. The structure of a SPAC acquisition reduces the threat of regulatory or legislative interference in the acquisition process. SPAC IPOs do not experience underwriting since all uncertainty about price movement is taken away constructing the SPAC as an entity that deposits all its cash proceeds in escrow accounts (Lakicevic & Vulanovic, 2013). Boyer and Baigent (2008) analyzed the average one-day return for 87 SPACs and reported an average return of 1.23 percent, which is relatively small as compared with the average first day IPO returns of 26 percent for benchmark companies. Rodrigues and Stegemoller (2014) argue that valuation of a SPAC is much easier compared to that of a typical IPO and this lower-than-usual underpricing in SPACs is intuitive and consistent with the valuation process.

At first sight, SPACs seem very similar to reverse mergers. However, the process of a reverse merger is different compared to a SPAC acquisition. Sjostrom (2008) states that reverse merger transactions are often structured as a 'reverse triangular merger'. In this structure, a public company, often a natural-shell company, first creates a new, wholly-owned subsidiary. This subsidiary then merges with the private company. After the completion of the merger, the former private company is a wholly-owned subsidiary of the natural-shell company and the former private company's shareholders own a majority stake of the public natural-shell company. Lewellen (2009) proposed that SPACs should be seen as a separate entity and increased interest in capital markets warrant for their examination. In a reverse merger, a private company merges with a publicly traded company similar to a SPAC acquisition. Gleason et al. (2005) note that reverse mergers experience similar advantages over IPOs compared to SPACs. The merger fees equal only 2.7 percent of the transaction value on average compared to 7.2 percent on average for a regular IPO. Kolb and Tykvová (2016) state that SPACs are

more transparent vehicles than natural-shell companies used in reverse mergers. Natural-shell companies typically arise from firms that have gone bankrupt or firms without assets. New generation SPACs are more transparent, experience improved shareholder protection and have improved the alignment of interests between shareholders and SPAC sponsors due to the introduction of the Rule 419 Blank Check Offering Terms (Cumming et al., 2014). Floros and Sapp (2011) examine the market performance of SPAC acquisitions compared to traditional reverse mergers. They conclude that SPACs perform worse than reverse mergers and investors have limited upside post acquisition.

2.1.8. PIPE investments

In the case that the funds in the escrow accounts of the SPAC do not meet the capital requirements to acquire a target firm, additional capital can be raised through PIPE investments. Private Investment in Public Equity (PIPE) is the buying of shares of publicly traded shares at a discount (Sjostrom, 2008). The SPAC issues additional shares that are directly sold to investment banks or other large investors. In 2020, such PIPE investments generated U.S. $12.4 billion in supplemental capital to help fund 46 SPAC acquisitions according to Morgan Stanley.[5] Capital raised from PIPE deals eclipses the amount of funds coming from the SPAC itself. For every U.S. $100 million raised through a SPAC, a corresponding PIPE added another U.S. $167 million.[6] Many investors consider these PIPE investments an unfair advantage only available to institutional investors. Typically, PIPE investors must hold the securities issued in a private placement for at least one year. However, because the company registers the resale of PIPE shares, investors are free to sell them as soon as the SEC declares the resale registration statement effective, which is typically within a few months (Sjostrom, 2008). PIPE financing is generally considered expensive. However, in the case of SPACs, the management team is incentivized to take on PIPE deals in order to acquire a potential target and secure their initial investment.

2.1.9. Value creation through SPAC acquisition

Value creation through a SPAC acquisition can be the result of two types of synergies; financial synergies and managerial synergies. Financial synergies can be achieved by restructuring the firms' capital structure. The large amount of cash that becomes available to the acquired firm after being acquired by a SPAC can be used to pay off debt or to make strategic investments. Especially in firms that experience financial distress, the cash injection from a SPAC acquisition can be the difference between failure and success of the firm. Most private firms acquired by SPACs in the recent years have been high growth firms that require substantial amounts of capital for R&D investments. The financial synergies offered by a SPAC acquisition are highly attractive for such high growth firms. Additionally, if a SPAC acquisition is financed by PIPE investors, more readily available financing sources may be available in the future.

Managerial synergies are those synergies related to the expertise and skills of the management team. SPAC sponsors often are highly skilled in the industry that is targeted (Lewellen, 2009). If a SPAC acquires a firm with weak management, the expertise and skill of the SPAC management team may positively influence the performance of the firm.

2.1.10. SPAC waves and market conditions

Like regular IPOs, the total volume of SPAC IPOs fluctuates over time. Evidence of this behavior can be found in table 1 in section 1.1. Rodrigues and Stegemoller (2012) argue that SPAC IPOs are less transparent compared to regular IPOs due to the lack of reputation and "one-shot deal" structure of SPACs. SPAC sponsors can overcome this information problem by increasing their at-risk capital by

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[5] https://www.cnbc.com/2021/01/25/how-financing-spac-takeovers-became-wall-streets-new-favorite-trade.html

[6] https://pitchbook.com/news/articles/for-companies-courted-by-spacs-the-deal-doesnt-always-go-to-the-highest-bidder

purchasing additional warrants of their own SPAC (Blomkvist & Vulanovic, 2020). The first period that is labelled as the first SPAC wave occurred between 2003 and 2008. A total of 161 SPAC IPOs were issued in this period. Following this period, the number of SPACs that were issued fell significantly. Since 2017 SPACs gained popularity again and the number of SPAC IPOs increased again (see appendix C). Many investors have labelled the period since 2017 the second SPAC wave. Blomkvist and Vulanovic (2020) state that the volume of SPAC IPOs is negatively related to the volatility index (VIX) and variance risk premium (VRP). This observation is in line with regular IPO behavior and can be contributed to the risk averse behavior of investors during times of uncertainty. The data presented in appendix C and figure 2 below show conflicting evidence with the conclusions made in the paper. Based on the timing of the so-called SPAC waves, another argument can be made. As mentioned previously, SPACs are appealing to private firms in financial distress. During the financial crisis, in the period 2007-2008, SPACs were very popular. Similarly, the total volume of SPAC IPOs during the stock market crash, in 2020, reached record levels. Further research is required in order to confirm this potential relationship.
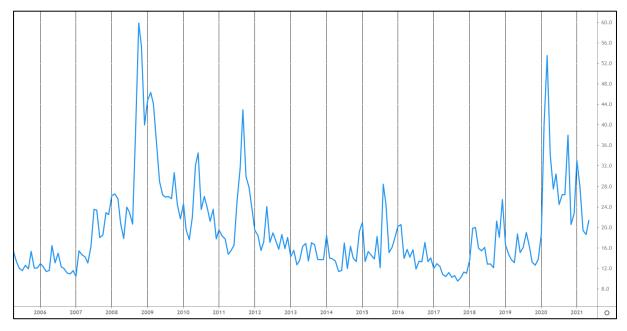
Figure 2. Volatility index (VIX) during the period 2006-2021.

2.1.11. Intermediaries involved in SPAC acquisitions

SPAC IPOs and acquisitions involve a multitude of intermediaries in order to successfully comply with all the regulations. Underwriters are involved in both the IPO and the acquisition. Most SPACs offer underwriters the option to purchase additional units during the IPO. This is called the overallotment option. SPAC IPOs in which this option is exercised can be considered more popular among investors since the demand for units is greater than previously anticipated. Underwriters are also involved in filing the prospectus and other forms required by the SEC. Furthermore, underwriters valuate the business acquisition together with the underwriters of the private firm that will be acquired. SPAC underwriters can play an important role in brokering a good deal for SPAC investors.

Legal counselors are an intermediary involved in many aspects of SPACs. They ensure correct filing of all the required material for the IPO filing, issuance of securities and business combination. Law firms also have an advisory role for the management team. SPACs experience an increase in SPAC-related commercial and securities litigation. These lawsuits typically seek both money damages and injunctive

relief to prevent the closing of the transaction.[7] Many law firms refrain from taking on SPAC deals due to a lack of experience.

Audit firms play an important role in both regular IPOs, as well as SPAC IPOs. For years, the Big Four accounting firms dominated the audits of companies that were looking to go public. The surge of SPAC IPOs in 2020 was enough to nudge the Big Four firms out of the top IPO auditor spots for the first time ever. Smaller upcoming accounting firms quickly realized there was an opportunity to specialize in SPAC firms. The vice chairman of Marcum states: "There are certain account nuances to the process and there has to be a speed associated with it, in getting it right the first time."[8] SPACs are also required to file regular quarterly and annual financial statement forms with the SEC.

Prestigious underwriters, law firms and audit firms, or experienced intermediaries can not only be a big advantage to the SPAC due to experience, they also can signal quality to investors. Do these intermediaries influence the success of SPACs?

2.2.   Factors influencing SPAC acquisition approval

Investors ultimately decide whether a SPAC acquisition is approved or rejected. However, various papers in the academic literature have tried to identify what underlying factors influence the probability of a SPAC acquisition approval. In order to provide structure, four overarching topics can be identified: management team characteristics, ownership structure, underwriters, and other factors. Approval probability in this section is defined as the overall probability of the SPAC successfully acquiring a company before liquidation.

2.2.1.   Management team characteristics

An issue that remains in SPACs is the conflict of interest between SPAC sponsors and investors. SPAC sponsors are highly motivated to identify a target and acquire a company in order to protect their initial investment and in most cases guarantee positive returns. Between 2003 and 2005 SPAC sponsors issued new SPACs with very low initial capital commitments. Since 2005, increased pressure from other stakeholders, primarily investors and uncertainty about acquisition approval caused by low level of disapproval threshold, forced SPAC sponsors to increase their monetary commitment (Rodrigues & Stegemoller, 2012). Thompson (2010) states that the two-year deadline and the proxy vote help mitigate the agency problems between investors and management teams. In order to achieve approval for acquisition in majority of such deals, management members purchase warrants before the IPO and, in some cases, also acquire additional units (Shachmurove & Vulanovic, 2018). Lakicevic and Vulanovic (2013) report that for the period 2003-2009, approximately 2.76 percent of funds deposited in the escrow accounts originated from these up-front purchases by the SPAC sponsors. After 2009, for almost every SPAC, sponsors purchased warrants or units in excess of U.S. $5 million to guarantee the SPAC would not be dissolved, if the initial investors would disapprove a proposed acquisition. Additionally, they argue that any post acquisition price higher than U.S. $1 would mean a positive return to the SPAC sponsors. Therefore, in most acquisitions, there is a conflict of interest and the management has strong incentives to acquire a target at all costs. The SPAC literature almost uniformly supports the conclusion that, on average, many value-destroying acquisitions are approved and that the primary reason for the approval are incentives aligned in favor of the SPAC sponsors (Jog & Sun, 2007; Jenkinson & Sousa, 2011; Howe & O'Brien, 2012; Lakicevic & Vulanovic, 2013; Kolb & Tykvová, 2016; Dimitrova, 2017).

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[7] https://abovethelaw.com/2021/04/all-about-spacs-and-their-implications-for-law-firms-and-the-lawyer-job-market/

[8] https://news.bloombergtax.com/financial-accounting/spac-ipo-audits-dominated-by-niche-firms-as-big-four-stand-aside

Cumming et al. (2014) report that younger management teams have a higher degree of acquisition approvals. Generally, age is positively correlated with experience and more experience is often valued by investors when it comes to management. They argue that younger management possess higher motivation to find a target in order to gain reputation and increase one's private wealth. Furthermore, younger managers tend to have a more hands-on approach, have a better feeling for trends and are better to recognize investor needs. However, the economic effect is small. An increase in average team age by one year lowers approval probability by 1.20 percent. The descriptive statistics in the research show numerous management team characteristics. However, most of these variables have been used to instrumentalize the threshold variable and are not included separately in the regression results. Interesting observations in the descriptive statistics are the fact that over 50 percent of the managers followed business education and almost 50 percent is classified as a former top executive. Lakicevic et al. (2014) also report a negative sign between the relationship of the average age of the management team and the approval probability. However, these results are not statistically significant. Furthermore, they report that increasing the management team size by one member increases the approval probability by 6.9 percent.

2.2.2. Ownership structure

The ownership structure of SPACs can be difficult to analyze due to the fact that disclosure of ownership is only required for positions bigger than 5 percent of the float. Lewellen (2009) found that institutions, on average, own approximately 35 percent of all SPAC shares. However, the total fraction of institutional ownership is estimated to be between 75 and 90 percent due to disclosure regulations. Anecdotal evidence suggests that many small hedge funds are also SPAC investors. Cumming et al. (2014) states that block-holders with ownership holdings greater than 5 percent are in a favorable position with respect to bargaining power and strategic voting. Furthermore, ownership structure becomes increasingly concentrated over the lifetime of the SPAC. Active investors, such as hedge funds and private equity funds, are primarily responsible for this increase. Both SPAC management teams and active investors increase their holdings between the IPO and announcement date by 4.5 percentage points and 28.6 percentage points respectively.

Cumming et al. (2014) report a negative relationship between the ownership concentration by active investors and the resulting probability of an acquisition approval. The results confirm the hypothesis that large blockholdings by hedge funds and private equity funds is associated with a lower approval probability. A one percent point increase in active investor holdings prior to the announcement decreases the approval probability by 0.45 percent. Furthermore, they report that higher ownership by the SPAC management results in higher approval probability. SPAC management teams have the highest incentive in a deal approval and therefore are most likely to vote in favor of the deal (Jog and Sun, 2007). Management team ownership prior to the proxy voting has the strongest effect on the deal approval probability. A one percent point increase in management team ownership increases deal approval probability by 2.48 percent (Cumming et al., 2014).

2.2.3. Underwriters

Underwriters often serve as company advisors during acquisition negotiations. Dimitrova (2017) reports that 47 percent of SPAC IPO underwriters also act as the company's acquisition advisors. Since investors pressured SPACs in 2005, which resulted in better alignment of interests between SPAC management teams and investors, SPAC underwriters have adopted a unique structure. Approximately half of the SPAC IPO underwriting fees are stored in the escrow accounts alongside investors' capital (Lewellen, 2009). The deferred part of the underwriters' compensation aligns underwriter interest with the interests of the SPAC management team and the investors. On average, the underwriter's fee is 7 percent of the gross proceeds. The fee is divided into 3.94 percent, which is paid at the moment of IPO, and 3.06 percent, which is deferred and is paid conditionally on the successful acquisition (Lakicevic & Vulanovic, 2013). Surprisingly, Dimitrova (2017) states that

underwriters are four times more likely to become the SPAC's acquisition advisors when underwriting fees are being deferred.

Cumming et al. (2014) report that the composition of the underwriter syndicate affects the probability of acquisition approval. Deal approval probability is higher when the lead underwriters are not considered as underwriters with impressive track records. Contrary, Lakicevic et al. (2014) state that deals underwritten by EarlyBirdCapital, which had underwritten the highest volume of SPACs at that time, increases acquisition approval. Approval probability also decreases as the number of underwriters in the underwriter syndicate increases, because this can indicate a "riskier" deal or coalition problems (Cumming et al., 2104).

2.2.4. Other factors

Other factors that may influence the approval probability can be related to target characteristics or market conditions. SPACs with a defined target focus, on either an industry or geography, experience increased approval probability (Tran, 2010; Lakicevic et al., 2014). SPACs must acquire a company within 24 months post IPO. Lakicevic et al. (2014) report that the timing of announcement is statistically significant and that the further the announcement date is from the IPO date the lower the approval probability. Furthermore, they report that market volatility (VIX) has a positive impact on approval probability. They argue that this observation is due to the fact that investors see SPACs as a risk-free treasury note with a call option on SPAC shares with an expiry date two years out. Lewellen (2009) states that SPACs exhibit low volatility of returns. Given their risk-free properties when purchased at net asset value (NAV), investors in financial markets consider SPACs a substitute for financial assets that underperform in volatile markets. Finally, it is also important to note that, from both a statistical and economic standpoint, deal approval probability tends to be substantially higher in an upward-trending market environment. (Cumming et al, 2014)

2.3. Market performance of SPACs

This section will discuss the cumulative abnormal returns of SPACs around the announcement date and the acquisition date. Furthermore, the literature covering stock market performance of SPACs during their lifecycle will be analyzed. Finally, the post-acquisition performance of SPACs will be reviewed.

2.3.1. Cumulative abnormal returns around the announcement date

The announcement of an acquisition is a key event in the lifecycle of a SPAC. This event reduces the information asymmetry between the management team and investors. Financial information regarding the company that is taken public will be released. Such information was previously not accessible to investors and the capital market. Investors price in what qualities the company that is acquired may possess. The estimated valuation of the business combination, made by the underwriters of both parties, is announced.

Floros and Sapp (2011) report that the 5-day CAR surrounding the announcement date is significant and 2.97 percent. Howe and O'Brien (2012) report a positive return of 1.7 percent at the announcement date. Lakicevic and Vulanovic (2013) analyze the returns surrounding the announcement date of each security type, shares, units and warrants. Shares experience 1.2 percent return, units 2.42 percent, and warrants 10.4 percent. The returns on the announcement date are the highest for warrants, which makes sense since warrants basically are OTM call options. Additionally, their results show that the CAR in the days following the announcement date increase for the units, but decrease for shares. Dimitrova (2017) reports a statistically significant 3-day CAR surrounding the announcement date of 1.5 percent. Factors that had a significant effect on the 3-day CAR surrounding the announcement date are: time to acquisition, deferred underwriter fees, and the market cap of the

SPAC. The results suggest that, the longer the time between IPO and acquisition announcement, the lower the returns surrounding the announcement date. Deferred underwriter fees also negatively affect the 3-day CAR. Furthermore, returns surrounding the announcement date are positively affected by the market cap of the SPAC. Kim et al. (2020) report positive announcement 3- day CAR returns. They research the announcement date returns based on the time to liquidation. The time to liquidation is measured as the number of days from the announcement date to expected liquidation date if merger is not successful. If the deals are announced with time to liquidation of more than 2 years, the mean CAR is about 3.0 percent. In case the time to liquidation is less than two years, the mean CAR drops to 0.6 percent. This indicates that investors may be aware of the SPAC sponsor incentives to get a deal approved.

2.3.2. Cumulative abnormal returns around the acquisition date

Another key event in the lifecycle of a SPAC is the acquisition date. At this date, the newly formed business combination starts trading on the exchange, sometimes under a new ticker. From this point onwards, investors are fully exposed to market reactions on the behavior of the acquired company. Research regarding returns of securities of SPAC surrounding the acquisition date is scarce.

Floros and Sapp (2011) report a statistically insignificant return of 1.56 percent in the 5-day CAR surrounding the acquisition date. Lakicevic and Vulanovic (2013) report negative returns surrounding the acquisition date. SPAC shareholders experience a negative return of 3.81 percent on the day of the acquisition. In the following seven days shareholders experience a negative abnormal return on every day. The 7-day CAR following the acquisition date is negative 9.59 percent. They argue that this price reaction can be the result of the premium paid by parties in favor of the acquisition prior to the voting day. No independent variables have been tested in the literature that may have impacted these returns.

2.3.3. Excess returns during the lifecycle of SPACs

The lifecycle of a SPAC is considered the time between the IPO date and the acquisition or liquidation date. Stock market returns of SPAC securities vary significantly in each phase of the lifecycle. Research regarding performance between IPO and acquisition announcement is limited, since generally these returns are equal to treasury bond rates.

Jog and Sun (2007) analyze the differences between the returns for the management team and regular investors. They report that the annual return to investors is negative 3 percent. Contrary, members of the SPAC's management team earn, on average, a return of investment of 1,900 percent. Lewellen (2009) states that SPACs experience no significant average monthly excess returns before a target is announced. The average monthly excess returns become significantly positive in the magnitude of 2.4 percent once a target is announced. Dimitrova (2017) observes the excess returns between the announcement date and the acquisition date. She reports that there is no significant difference in the general market performance and the performance of SPACs between the announcement and the acquisition date. The average returns for SPACs in between those dates were 4.4 percent, compared with the Russell 2000 index return of 2.2 percent for the same period. Kim et al. (2020) investigate the SPAC investors' returns for SPACs that successfully acquire a company. They assume that investors buy one share of SPAC stock at the IPO date and sell the stock the day after the acquisition date. They calculate the returns without considering the holding period. The mean SPAC acquisition return is approximately 5.0 percent. The only significant variable that affects the returns of investors is the time to liquidation. Size of securities firms, relative SPAC size and controlling shareholders' ownership do not affect the returns.

2.3.4. Post-acquisition excess returns

By far the most research has been done on the post-acquisition returns of SPACs. As mentioned previously, many researchers find that many value-destroying SPAC acquisition are approved. This statement is in line with the findings regarding post-acquisition returns.

Lewellen (2009) reports significant average monthly returns post-acquisition of negative 1.9 percent for value-weighted portfolios. When regressed against the Fama-French four-factor model the average monthly returns drop to negative 2.2 percent. Floros and Sapp (2011) examine the long-term performance of firms that are successfully acquired by a SPAC. The buy-and-hold return for an 18-month window are significant and negative 75.7 percent. On average, SPAC firms experience abysmal performance, similar to long-run returns of surviving shell reverse merger firms. Jenkinson and Sousa (2011) report an average cumulative return of negative 24 percent after six months post-acquisition. The poor performance persists, the average cumulative return one year post-acquisition is negative 55 percent. Furthermore, they split their sample in 'Good' and 'Bad' SPACs based on whether their relative market cap is above respectively below the trust value on the acquisition date. They report that Bad SPACs immediately perform poorly after the proxy vote and continue to fall in the first six months post-acquisition. The average cumulative return of Bad SPACs is negative 39 percent after six months, and the cumulative returns are statistically significant from the second week after the acquisition. After one year, the average cumulative return of Bad SPACs is negative 79 percent. In contrast, the average cumulative return of Good SPACs is negative 6.2 percent for the first six months post-acquisition. However, these results are not statistically significant. Howe and O'Brien (2012) find that the average six-month excess return is negative 14 percent, one-year return is negative 33 percent, and three-year return is negative 54 percent. Datar et al. (2012) report buy-and-hold returns for SPACs which completed acquisition for the period 2003-2008. They report one-month post-acquisition returns of negative 5.37 percent, six-month returns of negative 20.93 percent, and one-year returns of negative 38.32 percent.

Kolb and Tykvová (2016) investigate post-acquisition returns of SPACs compared to IPOs and the market. They report buy-and-hold returns for periods of 6, 12, 24 and 60 months post-acquisition. The results show that SPACs experience significant negative alphas in all periods under consideration. Similarly, all normal and matched IPO firms underperform for all periods. However, the underperformance of SPACs is significantly larger in all periods. Dimitrova (2017) observes the performance of SPACs after the acquisition for multiple time periods. Mean returns of the new business combination are negative in all subsequent periods and always significantly less than the market returns. One-year post-acquisition return data show mean returns of negative 41 percent, compared with market returns of negative 1.3 percent. The performance for the two-year period is even worse, with an average buy-and-hold return of negative 56.3 percent compared with a 1.4 percent return of the market. Additionally, she examines what variables have an influence on the four-year buy-and-hold returns of SPACs. The results show that, the longer the time of acquisition, the lower the subsequent four-year returns of the SPAC. She mentions that evidence of an inverted U-shape relationship is present between the time to acquisition and the long-term returns of the SPAC. She argues that acquisitions that are announced too quickly or too late are perceived by the market as less valuable and have worse performance. Similar to the results of her research surrounding the acquisition date, deferred underwriter fees negatively influence the four-year returns. Additionally, when the underwriter is an advisor, returns are even more negatively affected. If the target of the SPAC was a private company, four-year returns are also negatively affected. Furthermore, the number of outside block-holders also experiences a negative relationship with the four-year returns of the SPAC. For every 10 percent increase in institutional ownership, the returns are on average 8.3 to 9.6 percentage points lower.

2.4. Hypothesis development

This section summarizes what will be investigated in this research compared to the existing literature. First, the sub questions are answered. Next, the contribution of this research in relation to the existing literature is discussed. Finally, the hypotheses are formulated.

2.4.1. Sub question discussion

What stages exist in the SPAC lifecycle?
The SPAC lifecycle consists of four main stages: the IPO, target seeking, negotiation and target announcement, and acquisition or liquidation. The most impactful events during the lifecycle are the IPO, target announcement, and acquisition or liquidation. Generally, the literature considers two main time frames: pre-announcement and post-announcement. The reason for this is the fact that information asymmetry is reduced significantly post-announcement since details on the private target are disclosed.

What intermediaries are involved with a SPAC deal and what is their role in the process?
In a typical SPAC deal, three types of intermediaries are involved: underwriters, legal firms and auditors. Underwriters are involved with all stages of the SPAC lifecycle. They underwrite the IPO and build the book in order to sell the units on the open market. Underwriters provide liquidity in the early stages of trading of the SPAC units. Furthermore, underwriters are heavily involved with brokering the deal with the private company that is presented to the SPAC shareholders on the announcement date. Underwriters may be more involved with this process in case of deferred underwriter fees. This means that only part of the underwriter fees has to be paid during the IPO and the remaining part will be paid upon a successful acquisition by the SPAC.

Legal firms are involved with the operations of the SPAC from IPO till the acquisition or liquidation date. They ensure correct filing of all the required material for the IPO filling, issuance of SPAC securities and the issuance of new securities of the post-acquisition company. Furthermore, legal firms fulfill an advisory role regarding the deal between the private company and the SPAC. Another role that legal firms take on is the defense regarding commercial and securities litigation.

Auditors are involved with the filing of the quarterly and annual financial statements with the SEC. In addition, they are also involved with the valuation of the private company and checking the legitimacy of the financial documents provided by the private company. Speed and precision are key characteristics of auditors that are involved with SPAC deals.

In what way can experience of intermediaries be measured?
Not many researchers included variables related to the experience of intermediaries in their research. Cumming et al. (2014) included the variables average underwriter reputation and highest underwriter reputation. Furthermore, they included a Herfindahl index variable to assess competitiveness between underwriters. They did not measure specific underwriter experience, but rather focused on the perception of experience through reputation. Lakicevic et al. (2014) included variables that assessed if the underwriters involved with the SPAC deal had experience with prior SPAC deals. They used binary dummy variables to identify whether the underwriters belonged to the category of underwriters that had prior SPAC deal experience and market share. Based on these observations the best way to measure experience of the intermediaries is to include variables related to the number of prior SPAC deals, or deal count, and the relative market share compared to competitors. Important to note is, that these variables should not be a static measure, but rather a dynamic variable that is adjusted either after each deal or annually.

What factors influence the approval probability of SPAC acquisitions?
Many factors are mentioned in the literature that have an influence on the SPAC acquisition approval probability. The most prominent factors mentioned are the quality of the SPAC management team, institutional ownership, venture capital involvement, management team ownership, underwriter reputation, underwriter fee structure, target focus, time to announcement, time to acquisition and overall market trend. It is important to be aware of these factors because the effects can be controlled for through control variables.

What factors influence the investor returns?
Investor returns have been analyzed over various time frames. The most researched time frames are cumulative abnormal returns surrounding the announcement date and post-acquisition returns. Not much research has been done on time frames such as the cumulative abnormal returns surrounding the acquisition date or the investor returns over the SPAC lifecycle. Factors that influenced returns surrounding the announcement are: time to acquisition, deferred underwriter fees, SPAC size. Factors mentioned in the literature that influenced the post-acquisition returns are: time to acquisition, deferred underwriter fees, ownership structure.

2.4.2. Contribution related to existing literature
Based on the findings in the literature review, various gaps can be identified in the research around SPAC acquisition probability and the market performance of SPACs. Kolb & Tykvova (2016) suggest in their conclusion that the role of intermediaries on the performance of SPACs could be an interesting research topic. The lack of research regarding intermediaries such as legal firms or auditors provides a focus for this research. Since both legal firms and auditors are involved with multiple processes during the SPAC lifecycle, it is reasonable to think there might be a relationship between the qualities of these intermediaries with respect to the performance of the SPAC. Since prior research has been conducted on the effect of reputable and experienced underwriters on SPAC acquisition approval and investors returns, it is a logical step to adopt a similar approach when it comes to new research focused on the role of other intermediaries. In this way research can be compared. So far, no research has been done on the role of legal firms or auditors on SPAC performance. Furthermore, no research has been done on the period between 2015 and 2021. Comparing the results between various periods can be very insightful. Since most research on SPACs has been done on samples that covered the period between 2003 and 2008, covering a new research period adds to the existing literature. In addition, the between 2015 and 2021 is very similar to the period 2003-2008 because popularity of SPACs has been on the rise again since 2015. Furthermore, VIX levels and the overall market trends have been quite similar to the 2003-2008 period.

In order to answer the research question in this paper three hypotheses have been developed. As mentioned previously, two aspects of SPACs will be analyzed. First, the relationship of experienced intermediaries on SPAC acquisition approval. Second, the effect experienced intermediaries may have on market performance of SPACs. As mentioned in section 2.4.1., experience of underwriters is measured in various ways in the literature. The definition of experienced intermediaries in this research is as follows: *Experienced intermediaries are intermediaries that have worked on numerous prior SPAC deals and possess significant market share of the total SPAC market for intermediaries.* Following Lakicevic et al. (2014) the experience of intermediaries will be measured through two scale variables: deal count and market share. The higher the deal count and the greater the market share, the more experienced the intermediary. These variables will be discussed in section 3.3.

2.4.3. Hypothesis 1: The effect of intermediaries on SPAC acquisition approval
Underwriters, legal firms and auditors play significant roles in the SPAC process during various phases in the lifecycle of the SPAC. Value creation theories suggests that SPAC acquisitions create value due to financial and managerial synergies. However, multiple papers have found evidence that

management teams and intermediaries try to get value-destroying deals approved for their own gain. Information asymmetry theory suggest that the investors have little information regarding potential SPAC acquisition targets until the target is announced through 8-K filings. Besides experience and skills of the management team, investors may find clues in other readily available information. As mentioned previously, Cumming et al. (2014) found a negative relationship between the number of underwriters and the SPAC acquisition probability. Furthermore, they reported that the reputation of underwriters can signal quality and positively affect the acquisition probability. Lakicevic et al. (2014) found that the underwriter with the highest market share positively affected the acquisition probability.

Based on the empirical findings and the theories, it might be that experienced legal firms and auditors also have a positive effect on the SPAC acquisition approval probability. As described previously, both these intermediaries play a significant role in the SPAC lifecycle. As mentioned in section 2.4.2., the experience of intermediaries will be measured through deal count and market share. In order to test this theory, the following hypothesis has been developed:

> *H1. The more experienced the intermediary, the higher the probability of the SPAC acquiring a target.*

2.4.4. Hypothesis 2 & 3: The effect of intermediaries on market performance of SPACs

Not much research has been done on variables that may affect market performance of SPACs during its lifecycle. The reason for this might be that SPACs can be seen as speculative investment since a great amount of information asymmetry is present in the target seeking phase. Additionally, one could argue that SPAC performance post acquisition announcement is more dependent on qualities of the firm that is being acquired. Floros & Sapp (2011), Lakicevic & Vulanovic (2013), Dimitrova (2017) and Kim et al. (2020) examine the CAR returns surrounding the acquisition date. All researchers report significantly positive returns in this time window. Only Dimitrova (2017) incorporates variables that may have an influence on the magnitude of the returns. Research regarding CAR returns surrounding the acquisition date is limited. Floros & Sapp (2011) and Lakicevic & Vulanovic (2013) report negative returns surrounding the acquisition date. However, no variables have been included that may explain these negative returns. Based on the theory and the empirical observations, the experience of intermediaries may reduce information asymmetry and affect market performance of the SPAC. The following hypotheses have been developed in order to test this theory:

> *H2a. The more experienced the intermediary, the higher the CAR returns surrounding the announcement date.*

> *H2b. The more experienced the intermediary, the higher the CAR returns surrounding the acquisition date.*

Lewellen (2009), Dimitrova (2017) and Kim et al. (2020) have analyzed the performance of SPACs between the various lifecycle phases. However, no variables have been tested for a potential influence on the performance. In order to grasp the market performance of the SPAC during its entire lifecycle, and the role of intermediary experience regarding this performance, a final hypothesis has been developed:

> *H3. The more experienced the intermediary, the higher the annualized realized returns of SPACs during their lifecycle.*

3. Research method

In this chapter, the research method will be described. First, the most common used methods in the SPAC literature will be explained. Next, the research method used in this research will be discussed. Finally, the measurements of the variables are presented.

Table 2. Research methods used in the SPAC literature.

A. SPAC acquisition approval

Source	Methods
Floros and Sapp (2011)	Logistic regression
Cumming et al. (2014)	Logistic regression, probit regression
Lakicevic et al. (2014)	Logistic regression, probit regression, OLS regression
Kolb and Tykvová (2016)	Logistic regression
Vulanovic (2016)	Multinomial logistic regression, probit regression
Kim et al. (2020)	Logistic regression, probit regression

B. Stock market performance

Source	Methods
Lewellen (2009)	OLS regression
Floros and Sapp (2011)	OLS regression
Jenkinson and Sousa (2011)	OLS regression
Lakicevic and Vulanovic (2013)	OLS regression
Rodrigues and Stegemoller (2014)	OLS regression
Kolb and Tykvová (2016)	Factor regression, OLS regression, cross-sectional regression
Smachmurove and Vulanovic (2016)	OLS regression
Dimitrova (2017)	OLS regression, cross-sectional regression
Kim et al. (2020)	OLS regression, cross-sectional regression

3.1. Methodology

The first focus of this paper is the SPAC acquisition approval probability. SPAC acquisition approval probability has been studied by a handful of researchers. The most common research method used in these papers is the logistic regression model. The second focus of this paper is the stock market performance of SPACs. Typical return models are based on market model regressions which use ordinary least squares regression. The most common models used to measure stock market returns of SPACs in the literature are the CAPM model, three-factor model, cumulative abnormal return (CAR) and buy and hold average returns (BHAR). Table 2 presents an overview of all the research methods used in the SPAC literature on topics related to this research. In the following section the most commonly used models will be discussed.

3.1.1. Logistic regression

Logistic regression (logit model) is the standard procedure used in the finance literature when the dependent variable is a binary choice. Multinomial logistic regression is used when the dependent variable is nominal with more than two levels. SPAC acquisition approval is a binary variable in the

sense that the SPAC either acquires a target or liquidates. Various assumptions are made when applying logistic regression. Logistic regression requires the observations to be independent of each other. There should be no outliers in the data. No high correlation should exist among the predicting variables. This can be assessed by a correlation matrix. Finally, logistic regression typically requires a large sample size (Hair et al., 2014).

3.1.2. Probit regression

Probit regression is similar to logistic regression in the sense that the dependent variable is also binary. The difference between logit and profit models is the function they use to estimate the outcomes. Both methods yield similar inferences, although not identical. Probit models can be generalized to account for non-constant error variances in more advanced models. The assumptions made in order to apply a probit model are similar to the assumptions made when using a logit model. The SPAC literature apply probit regression models as robustness check for their logistic regression models (Cumming et al., 2014; Lakicevic et al., 2014; Vulanovic, 2016; Kim et al., 2016).

3.1.3. OLS regression

Ordinary least squares (OLS) regression is one of the most common methods used in academic literature that explores all types of dependence relationships. Regression analysis investigates the relationship between one dependent variable and one or more independent variables. If only one independent variable is included in the research model, it is called simple regression. When researchers include multiple independent variables, it is called multiple regression analysis. Regression analysis can be seen as the foundation of forecasting models in businesses (Hair et al., 2014). OLS regression is used when a linear effect of one or more independent variables is expected on the dependent variable. Table 2 shows that many papers in the SPAC literature have applied this model to test hypotheses related to stock market performance. Several assumptions need to be met in order to apply multiple regression. The first assumption states that both the dependent variable and the independent variables need to be metric variables. In case variables are non-metric, they can be transformed into metric variables by constructing dummy variables. Second, the sample size used in multiple regression is required to include at least 50 observations in order to maintain statistical power. Furthermore, assumptions regarding linearity, normality, and homoscedasticity need to be met. These assumptions will be checked by making use of univariate analysis. (Henseler, 2019). Descriptive statistics provide an overview of the data and can be used to check the previously mentioned assumptions. In case assumptions are not met, the data will be adjusted. For example, by removing outliers or transforming variables with logarithms. Additionally, multicollinearity needs to be checked.

3.1.4. Survivorship bias

Since this research includes data regarding SPACs that have been liquidated and no longer exist, survivorship bias may exist. Lewellen (2009) states that the relative youth of the SPAC market largely eliminates survivorship bias. This research uses data between 2015 and 2021 because most data prior to 2015 is incomplete. Cumming et al. (2014) state that the requirement to file comprehensive and audited documentation with the SEC reduces survivorship bias since data on failed SPACs is also available. Survivor ship bias usually affects datasets where the availability of data depends on self-reporting.

3.1.5. Endogeneity problems

Section 3.1.3. discussed various assumptions that need to be met in order to apply multiple regression analysis. However, another possible problem can limit the interpretation of the regression results. Endogeneity addresses the probability of reversed causality. Cumming et al. (2014) state that the variable vote threshold is endogenous. This is solved by instrumentalizing this variable by using over

twenty human capital characteristics variables. This data is extracted from private databases and therefore will not be included in this research. No additional endogeneity issues have been mentioned in the previous SPAC literature.

3.2. Research model

The following two sections will discuss which regression methods will be used to answer the hypotheses. Two models are presented in order to test both the hypotheses mentioned in section 2.4.

3.2.1. SPAC approval

In order to test the effect of experienced intermediaries on the SPAC acquisition approval probability a logistic model will be used, which is in line with previous research by Floros and Sapp (2011), Cumming et al. (2014), Lakicevic et al. (2014), Vulanovic (2016) and Kim et al. (2020). The dependent variable is binary and can take on values of 1 and 0. A value of 1 represents a successful acquisition and a value of 0 represent a liquidation. The independent variables are: underwriter deal count, underwriter market share, legal deal count, legal market share, auditor deal count and auditor market share.

$$\text{Log}[P(ACQ)/1\text{-}P(ACQ)] = \beta_0 + \beta_1(UNDDC)_i + \beta_2(UNDMKT)_i + \beta_3(LGLDC)_i + \beta_4(LGLMKT)_i + \beta_5(AUDDC)_i + \beta_6(AUDMKT)_i + \beta_x(CONTR)_{it} + \varepsilon_{it}$$

$P(ACQ)_i$	= binary dependent variable where 1 equals acquisition and 0 equals liquidation of firm i
$UNDDC_i$	= underwriter deal count of firm i
$UNDMKT_i$	= underwriter market share of firm i
$LGLDC_i$	= legal advisor deal count of firm i
$LGLMKT_i$	= level advisor market share of firm i
$AUDDC_i$	= auditor deal count of firm i
$AUDMKT_i$	= auditor market share of firm i
$CONTR_{it}$	= Various control variables of firm i in year t will be included in this model. Control variables will be discussed in depth in section 3.3.3.
ε_{it}	= Measurement error

3.2.2. SPAC stock market performance

The second model will be used to test hypotheses 2a, 2b, and 3. A multiple regression model is constructed, similar to Lakicevic & Vulanovic (2013), Rodrigues & Stegemoller (2014), Kolb & Tykvová (2016), Smachmurove & Vulanovic (2016), Dimitrova (2017) and Kim et al. (2020). The dependent variable in the model will be stock market returns, which will be measured in CAR surrounding the announcement and acquisition date, and annualized realized returns during the SPAC lifecycle. These measurements will be discussed in depth in section 3.3.1. The independent variables are: underwriter deal count, underwriter market share, legal deal count, legal market share, auditor deal count and auditor market share. The model will be tested in separate specifications per intermediary, as well as complete.

$$SMP_{it} = \beta_0 + \beta_1(UNDDC)_i + \beta_2(UNDMKT)_i + \beta_3(LGLDC)_i + \beta_4(LGLMKT)_i + \beta_5(AUDDC)_i + \beta_6(AUDMKT)_i + \beta_x(CONTR)_{it} + \varepsilon_{it}$$

SMP_{it}	= Stock market performance of firm i in year t
$UNDDC_i$	= underwriter deal count of firm i
$UNDMKT_i$	= underwriter market share of firm i
$LGLDC_i$	= legal advisor deal count of firm i

LGLMKT$_i$	= level advisor market share of firm i
AUDDC$_i$	= auditor deal count of firm i
AUDMKT$_i$	= auditor market share of firm i
CONTR$_{it}$	= Various control variables of firm i in year t will be included in this model. Control variables will be discussed in depth in section 3.3.3.
ε$_{it}$	= Measurement error

3.3.   Measurement of variables

This section will discuss all the variables that will be used in the models described above. First, the measurements of the dependent variables will be discussed. Second, the independent variables that are expected to have an effect on the dependent variables are described. Third, the control variables such as fixed effects are explained. Finally, the robustness tests are discussed.

3.3.1   Dependent variables

The dependent variable used in the first model is SPAC acquisition approval. Following Floros & Sapp (2011), Cumming et al. (2014), Lakicevic et al. (2014), Vulanovic (2016) and Kim et al. (2020), this dependent variable is binary and will take on a value of 1 if the SPAC successfully acquires a company, and a value of 0 if the SPAC is liquidated. The variable will not be influenced by the outcome of a proxy vote, since some firms in the research sample have gone through multiple proxy votes before an acquisition or liquidation.

The dependent variable used in the second model is stock market performance of the SPAC. This variable will be measured in various ways. The first measurement is the CAR surrounding the announcement date. Following Cumming et al. (2014), Dimitrova (2017) and Kim et al. (2020), the CAR is calculated over seven days (from day -3 to day 3) around the announcement date of the proposed acquisition. CARs measure the effects on shareholder value of an acquisition, as assessed by the market, relative to prior expectations. A positive CAR does not necessarily indicate that the proposed acquisition is a good one (Dimitrova, 2017). Abnormal returns are calculated as market adjusted returns using the Russell 2000 as market benchmark, similar to Dimitrova (2017). The second measurement of the independent variable will be similar to the first measurement except that the seven-day CAR will be calculated around the acquisition date.

The third measurement of the dependent variable in the second model will be the annualized realized returns. Jog and Sun (2007) report that SPAC investors realize a negative annual return of 3 percent in their sample period 2003-2006. Following Kim et al. (2020), annualized realized returns will be calculated between the first day trading of SPAC shares becomes available and the acquisition date. The closing price on the first trading day will be used as initial cost basis. The closing price of the last day pre-acquisition will be used as sell price. The reason these measurements are used is the fact that the splitting of SPAC units can be incredibly costly for retail investors. Additionally, the costs vary significantly across brokers, which makes the measurement with units inaccurate.

3.3.2   Independent variables

The independent variables in this research represent the experience of the intermediaries involved with SPAC deals. Experienced intermediaries are intermediaries that have worked on numerous prior SPAC deals and possess significant market share of the total SPAC market for intermediaries. These characteristics will be measured with two separate variables, deal count (DC) and market share (MKT). For each intermediary these variables are constructed. The higher the deal count and the greater the market share, the more experienced the intermediary. The calculation of the variable is slightly different for the first set of independent variables regarding underwriters, since multiple underwriters can be involved with a single SPAC deal.

The first set of independent variables will cover underwriter characteristics of the SPAC. The underwriter deal count variable will be constructed as the average total deals of the underwriters in the syndicate. Regardless of whether the underwriter was the lead underwriter of the deal, any association with the sale of units during the IPO will be considered as an additional deal. The total number of deals of each underwriter in the syndicate is summed up and divided by the number of underwriters in the syndicate. Cumming et al. (2014) used Ritter ranking scores to determine the experience and reputation of underwriters. However, modern SPAC underwriters are not covered in this ranking system. Finally, the variable underwriter market share is constructed. This variable is calculated as the sum of total deal value of the underwriters in the syndicate divided by the overall SPAC market deal value. However, it would be misleading to use data regarding deal count and total deal value based on the data at the end of the sample period. A dynamic system is deployed that considers deal count and deal value at the start of start of each year in order to account for this aspect.

Since no prior research has included variables related to the experience or reputation of the legal advisor of the SPAC, the variables will be constructed similar to the variables used for the underwriter characteristics. The legal advisor deal count variable is measured as the number of SPAC deals the legal advisor has been involved in. Since only one legal advisor is involved with a SPAC deal, there is no need to average this variable. The second variable related to the legal advisor is the legal advisor market share. This variable is calculated as the sum of total deal value the legal advisor has been involved in divided by the overall SPAC market deal value. Similar to the underwriter variables, the measurements are dynamic and the variables will be recalculated every year.

The last set of independent variables is related to the auditor of the SPAC. No prior research has been done on the role of auditors regarding SPAC approval or returns. The auditor variables will be constructed in the same way the legal advisor variables have been constructed. The auditor deal count variable is measured as the number of SPAC deals the auditor has been involved in. Since only one auditor is involved with a SPAC deal, there is no need to average this variable. The second variable related to the auditor is the auditor market share. This variable is calculated as the sum of total deal value the auditor has been involved in divided by the overall SPAC market deal value. Similar to the underwriter variables, the measurements are dynamic and the variables will be recalculated every year.

3.3.3. Control variables

Besides the relationship between the dependent and independent variables, other variables may have an influence on the dependent variable. In order to control for these expected effects, multiple control variables have been added to the model.

The first control variable is SPAC IPO size. Following Cumming et al. (2014), Kolb & Tykvová (2016) and Dimitrova (2017), this variable is measured as the market capitalization of the SPAC at the time of IPO. The size of the SPAC IPO has a direct effect on the possible targets the SPAC can acquire, as mentioned in chapter 2. Overallotment units are included in the total market capitalization at the time of IPO.

The second control variable used in this research is a binary variable that takes on a value of 1 in case overallotment is exercised during the IPO and a value of 0 if this is not the case. Cumming et al. (2014) do not include this control variable. However, overallotment can signal quality due to high investor demand.

The third control variable is days to announcement, which represents the number of days between IPO and publication of the first 8-K acquisition announcement. Lakicevic et al. (2014) state that the

further the announcement date is from the IPO date, the lower the approval probability. Cumming et al. (2014) include this control variable in their model as well.

The fourth control variable is days between announcement and acquisition. Based on the data in the sample, the time between announcement and acquisition can vary significantly and this may have an impact on the approval probability. This variable is also included in the model by Cumming et al. (2014).

The fifth control variable is the number of managers in the management team. Lakicevic et al. (2014) report that an increase in size of the management team positively influences approval probability and therefore the model in this research needs to be controlled for this factor.

The sixth control variable is the number of underwriters in the underwriter syndicate. Cumming et al. (2014), Lakicevic et al. (2014), Vulanovic (2016) and Dimitrova (2017) report significant relationships between the number of underwriters in the underwriter syndicate and the approval probability. To control for any effect, this variable is introduced as a control variable.

The seventh control variable is target focus. Kim (2009), Tran (2010) and Lakicevic et al. (2014) report that SPACs with focused acquisition targets have a higher approval probability. Management teams with a specific target focus likely have more experience or connections in that industry or country that could benefit the acquired company. The construction of the variable follows Lakicevic et al. (2014) and Cumming et al. (2014) that include similar variables. The variable is defined as two dummy variables that equal 1 if a respective industry or country is targeted and 0 if no specific industry or geographic area is specified in the prospectus.

Additionally, control variables are introduced that control for the region fixed effects and year fixed effects. Region fixed effects are included to control for potential unobservable differences in market- and deal-specific variables. Following Kolb and Tykvová (2016), the region effects variable will be defined as a series of dummy variables to differentiate between three main geographical areas, namely Asia, Europe and North-America. South America is not included because no SPAC in the research sample is registered in that area. Year effect is included as year dummies to control for temporary market or macro-economic conditions.

3.4. Robustness checks

In order to validate results of the regression analysis in both models, several robustness checks will be conducted. The aim of these robustness checks is to test whether the results of the regression analyses are robust and remain the same under different conditions. In the main regression results various robustness checks will be included, such as separate testing of the three main categories of independent variables: underwriters, legal advisors, auditors. Additionally, two more robustness checks will be conducted.

The first robustness check that will be conducted in order to validate the first hypothesis is transforming the logit model to a probit model. The formula of the model does not change, but the way the test is executed varies slightly. This is in line with the research conducted by Cumming et al. (2014), Lakicevic (2014), Vulanovic (2016) and Kim et al. (2020). As second robustness check, the three-day CAR and five-day CAR will be used as dependent variables to test the robustness of the results for hypothesis 2a and 2b. This is in line with prior research by Cumming et al. (2014) and Dimitrova (2017). Finally, to test the robustness of hypothesis 2a, 2b, and 3 sub-samples will be created based on the country of registration. It is important to include a sufficient amount of observations per sample in order to generate meaningful results.

Table 3. Overview measurement of variables.

Panel A: Dependent variables

Variable	Measure	Source(s)
P(ACQ)	Binary variable that takes on a value of 1 in case the SPAC successfully acquires a company and a value of 0 if the SPAC is liquidated.	Floros & Sapp (2011); Cumming et al. (2014); Lakicevic et al. (2014); Vulanovic (2016); Kim et al. (2020)
CAR_AN	Cumulative abnormal returns surrounding the announcement date.	Cumming et al. (2014); Dimitrova (2017); Kim et al. (2020)
CAR_ACQ	Cumulative abnormal returns surrounding the acquisition date.	Cumming et al. (2014); Dimitrova (2017); Kim et al. (2020)
ARR	Annualized realized returns of the SPAC shares between the first day of trading and the announcement- and acquisition date.	Jog and Sun (2007); Kim et al. (2020)

Panel B: Independent variables

Variable	Measure	Source(s)
UND_DC	$\dfrac{\text{Sum of total number of deals}}{\text{Number of underwriters}}$	Cumming et al. (2014); Lakicevic et al. (2014)
UND_MKT	$\dfrac{\text{Sum of total deal value of the underwriters}}{\text{Total SPAC market deal value}}$	Cumming et al. (2014); Lakicevic et al. (2014)
LGL_DC	Number of SPAC deals the SPAC's legal advisor has been involved with	
LGL_MKT	$\dfrac{\text{Sum of total deal value of the legal advisor}}{\text{Total SPAC market deal value}}$	
AUD_DC	Number of SPAC deals the SPAC's auditor has been involved with	
AUD_MKT	$\dfrac{\text{Sum of total deal value of the auditor}}{\text{Total SPAC market deal value}}$	

Panel C: Control variables

Variable	Measure	Source(s)
SPAC_size	This variable represents the total value of funds that have been raised during IPO, including the overallotment option.	Cumming et al. (2014); Lakicevic et al. (2014); Vulanovic (2016); Dimitrova (2017)
Overallotment	Binary variable that takes on a value of 1 in case overallotment is exercised during the IPO and a value of 0 if this is not the case.	
Days_to_AN	The number of days between IPO and publication of the first 8-K acquisition announcement.	Cumming et al. (2014); Lakicevic et al. (2014)
Days_to_ACQ	The number of days between the first announcement and the acquisition.	Cumming et al. (2014)
Nr_of_UND	The number of underwriters in the underwriter syndicate involved with the SPAC IPO.	Cumming et al. (2014); Lakicevic et al. (2014); Vulanovic (2016); Dimitrova (2017)
Nr_of_MAN	The number of managers in the SPAC management team.	Cumming et al. (2014); Lakicevic et al. (2014)

Target_Focus	Two dummy variables that equal 1 if a respective industry or country is targeted and 0 if no specific industry or geographic area is specified in the prospectus.	Kim (2009); Tran (2010); Cumming et al. (2014); Lakicevic et al. (2014)
Region_dummies	The region fixed effects variable will be defined as a series of dummy variables to differentiate between three main geographical areas, namely Asia, Europe and North-America.	Cumming et al. (2014); Lakicevic et al. (2014); Kolb & Tykvová (2016)
Year_dummies	Dummy variable to control year fixed effects.	Cumming et al. (2014); Lakicevic et al. (2014); Kolb & Tykvová (2016)

4. Sample and data

In this chapter, the data that is used during the regression analyses is described. First, the sample size and sample selection are described. Following, the data collection method is elaborated.

4.1.   Sample size

This study examines the effect of experienced intermediaries on the success of U.S. listed SPACs. Therefore, all SPACs that issued an IPO in the U.S. in the period 2015-2021 have been used as the initial sample. On 23 January 2021, a list of all SPACs that registered in the U.S. during the sample period has been compiled from data available on Spacresearch, Spactrax and Spacinsider[9]. The list consisted of 420 SPACs for the sample period 2015-2021. Additionally, a full list of SPACs available on the Thompson Reuters EIKON database was used as cross-reference. This procedure did not result in any additional samples. Several adjustments had to be made in order to reach the final sample.

First, all SPACs that have not completed an acquisition or have not been liquidated are excluded. In order to test the SPAC approval probability these firms could not be classified as either of the binary option. This resulted in excluding 274 SPACs from the initial sample. Next, all SPACs with missing information regarding intermediaries have been excluded. As a result, 12 SPACs are excluded. In case any outliers are found during the research, additional SPACs can be excluded from the sample. In conclusion, the final sample consists of 134 SPACs. The results of the selection criteria are presented in table 4.

Table 4. Sample selection

Sample size	Reason for exclusion	Number of excluded firms
Initial sample	All U.S. listed SPACs	
420	No acquisition made/not liquidated	274
146	Missing information	12
134	Outliers	0
134	**Final sample**	

No industry classification will be made for this sample since the SPACs all belong to blank check companies. Additionally, the intended target industry or geography is not binding and often is not adhered to. The descriptive statistics regarding country of registered headquarters and year of IPO will be presented in the next section.

4.2.   Sample characteristics

Table 5 shows the characteristics of the sample used in this research. Panel A reports the frequency of events for each year that is included in the final sample. Since this research focusses on the entire lifecycle of SPACs, prior SPACs that announced an acquisition or acquired a company in the years 2015-2016 are not included. Similarly, SPACs that held their IPO in the more recent years and have not yet acquired a company are not included in the sample.

Panel B reports the geographic segmentation of the sample. Since all SPACs in the sample are listed on the U.S. stock market, this classification is based on the information provided in the prospectus filing. In total, 15 SPACs registered for an IPO with headquarters located outside of the United States. All these SPACs have been classified in one of the three regions specified in chapter 3.

Panel C reports stock market characteristics of the final sample. The data shows that the mean closing price on the announcement date is lower than the mean closing price on the acquisition date.

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[9] Data available on: spacresearch.com; spactrax.com; spacinsider.com

Surprisingly, both the minimum and maximum value on the announcement date show higher values than the minimum and maximum value on the acquisition date. Another observation that is important to discuss is the behavior of the betas in the sample during various stages in the SPAC lifecycle. The mean beta between the IPO and the announcement date is close to zero, which should be expected since the funds in the escrow accounts earn the risk-free rate and should not be correlated to the benchmark index. The mean beta between the IPO and the acquisition date is slightly more positive due to the fact that investors can access additional information regarding the company that is being acquired. The mean beta post acquisition is close to 1 which indicates that the overall sample moves in line with the benchmark index post acquisition.

Table 5. Sample overview

Panel A: Event frequency

Year	SPAC IPO	Announcement	Acquisition	Liquidation
2015	12	0	0	0
2016	8	1	0	0
2017	31	14	7	0
2018	42	25	25	2
2019	29	36	29	3
2020	12	51	66	2
2021	0	0	7	0
sum	**134**	**127**	**127**	**7**

Panel B: Geographic segmentation

Country	Region classification	Count
China	Asia	8
Greece	EU	1
Mexico	North America	2
Singapore	Asia	1
United Kingdom	EU	3
United States	North America	119

Panel C: Stock market performance statistics

Variable	N	Mean	Median	Std. Dev.	Minimum	Maximum
ClosePrice_AN	103	11.8723	10.3000	7.7437	4.9999	84.1776
ClosePrice_ACQ	103	13.7919	10.9900	8.9023	2.6800	70.8800
Beta_till_AN	103	0.0334	0.0160	0.0829	-0.0953	0.4518
Beta_till_ACQ	103	0.0556	0.0287	0.1792	-0.5549	0.8924
Beta_post_ACQ	103	0.9445	0.8822	0.5523	-0.2465	2.4243

4.3. Data collection

Once the final sample is structured, the required data for the variables is collected. Data for all SPACs is collected in the period 2015-2021. The data is acquired from a combination of sources. First, the SPAC size, target focus, acquired company, IPO date, announcement date and acquisition or liquidation date is collected from Spacresearch. Next, this data is checked with the data available on Spactrax and Spacinsider. In case any IPO, announcement, acquisition or liquidation date vary between the sources, the EDGAR[10] database is checked.

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[10] https://www.sec.gov/edgar/searchedgar/companysearch.html

Second, the data regarding intermediaries is collected from Spacresearch. The data is hand collected from the SPAC database and is presented per SPAC. The underwriters involved in the IPO, the legal firm and the auditor data is acquired. The list of underwriters is once again compared with the data available on Thompson Reuters EIKON. Additionally, the number of managers, the overallotment exercise and the registration of headquarters is collected from the individual SPAC info page.

Third, the league tables presented on Spacresearch provide all data per year for the intermediaries regarding deal count, deal value and market share. The data is collected for each year individually in order to structure the variables in a dynamic way to represent the fair value as described in section 3.3.2.

Fourth, all price data of each SPAC during their respective lifecycle is collected from Thompson Reuters EIKON database. The data required for the model in this research is limited to date, open price, and close price. Any missing price data will be acquired from Yahoo Finance[11]. In case data is not available on either of the sources, the data will be imported from TradingView[12]. Additionally, the price data of the Russell 2000 index is collected to use as a benchmark.

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[11] https://finance.yahoo.com/
[12] https://www.tradingview.com/

5. Results

In this chapter the results of the statistical analyses are presented. First, the outlier detection and handling are discussed. Second, the descriptive statistics of the variables included in this research are described. Third, the bivariate analysis is presented by using the Pearson correlation matrix. Fourth, the results of the logistic regression that is used to test hypothesis I and the complimentary robustness checks are discussed. Finally, the results of the OLS regressions used to test hypotheses 2 and 3 are presented.

5.1. Outliers

The presence of outliers may affect the results in a multivariate analysis. Therefore, it is necessary to identify outliers before conducting the statistical analysis. For this study, box plots and histograms have been analyzed in order to identify outliers within the data. Similar to Dimitrova (2017), some variables have been winsorized at the 5 percent level in order to deal with extreme outliers. In this research, all variables related to returns have been winsorized. Winsorization at the 5 percent level is the process of replacing values below the 2.5^{th} percentile and setting these values to the 2.5^{th} percentile, and replacing values above the 97.5^{th} percentile with the value of the 97.5^{th} percentile. Floros and Sapp (2011) mention that SPACs experience significant return skewness. They compare the returns to out-of-the-money call options. Considering similar extreme observations in the data of the sample in this research, winsorization of the return variables at the 5 percent level is justified. No outliers have been removed due to the legitimacy of the observations.

5.2. Descriptive statistics

Table 6 presents the descriptive statistics of all the variables that have been used in the regression models. The dependent variables used in the OLS regression model show the descriptive statistics of the winsorized data. The descriptive statistics of the data used to calculate the return values will not be discussed in this table since this data already has been discussed in section 4.2.

Panel A consists of all the dependent variables that have been used in the logit, probit and OLS regression models. The mean P(ACQ) is close to the maximum value, which indicates that the amount of acquisitions is far greater than the amount of liquidations. The means of the CAR_AN and CAR_ACQ data show divergence from the medians. This shows that the CAR_AN data is skewed to the right and the CAR_ACQ data is skewed to the left. As mentioned previously, Floros and Sapp (2011) observed similar skewness in their return data. Based on the means of the CAR_AN and CAR_ACQ data the assumption can be made that, on average, the returns surrounding the announcement data are positive, and the returns surrounding the acquisition data are negative. These observations are in line with prior research by Lakicevic and Vulanovic (2013). The descriptive statistics of the ARR data show that, on average, investors earn a positive annualized realized return between both the first day of trading and announcement date, and between the first day of trading and the acquisition date.

The descriptive statistics of the independent variables are reported in Panel B. Naturally, the mean of UND_DC is higher compared to prior research by Cumming et al. (2014) since the dataset used in this research is more recent, and more SPACs were issued over the years. The minimum and maximum value of UND_MKT show a wide divergence between the market share of the underwriter syndicate involved with SPAC deals. This variable has not been included in any prior research, so no reference can be made to previous samples. During the period 2015-2017 underwriter market share experienced wider divergence due to a lower amount of total SPAC deals. Similarly, variables related to legal firms and auditors has not been covered in prior literature. The divergence in legal firm deal count and auditor deal count is far greater compared to underwriter deal count. These observations can be attributed to the fact that many smaller legal firms and auditors have entered the SPAC market in order to establish presence and potentially be assigned more deals in the future. Furthermore, the

legal firm with the highest deal count is often involved with smaller SPAC deals based on the average size of the SPAC deals in dollar value. The variable LGL_MKT shows there is less divergence in the market share of legal firms. Contrary, the divergence in the variable AUD_MKT is far greater compared to LGL_MKT. As mentioned previously, the big 4 accounting firms no longer hold the top auditor rank for new IPOs. KPMG is the highest-ranking auditor, out of the big 4, that is present in ranking of auditors in 2020. However, the market share of KPMG is only 11.09 percent at rank 3, compared to a market share of 47.23 percent for WithumSmith+Brown at rank 1 in 2020.[13]

Table 6. Descriptive statistics

Panel A: Dependent variables

Variable	N	Mean	Median	Std. Dev.	Minimum	Maximum
P(ACQ)	134	0.9500	1.0000	0.2230	0.0000	1.0000
CAR_AN_3day	103	0.0410	0.0069	0.1094	-0.1993	0.4340
CAR_AN_5day	103	0.0381	0.0074	0.1022	-0.2187	0.3840
CAR_AN_7day	103	0.0368	0.0076	0.0964	-0.1939	0.3196
CAR_ACQ_3day	103	-0.0342	0.0102	0.2193	-0.8606	0.4102
CAR_ACQ_5day	103	-0.0384	-0.0079	0.3131	-0.9430	1.0410
CAR_ACQ_7day	103	-0.0418	-0.0252	0.3941	-1.1235	1.2906
ARR_AN	103	0.0717	0.0403	0.1070	-0.0309	0.5420
ARR_ACQ	103	0.2980	0.0661	0.6390	-0.3101	3.2559

Panel B: Independent variables

Variable	N	Mean	Median	Std. Dev.	Minimum	Maximum
UND_DC	134	20.4761	17.2917	12.7565	2.5000	66.0000
UND_MKT	134	0.1508	0.1274	0.1225	0.0065	0.6112
LGL_DC	134	26.4000	19.0000	26.2160	1.0000	149.0000
LGL_MKT	134	0.0976	0.0947	0.0634	0.0009	0.2630
AUD_DC	134	46.2200	41.0000	48.2150	1.0000	199.0000
AUD_MKT	134	0.3377	0.3715	0.1487	0.0028	0.5175

Panel C: Control variables

Variable	N	Mean	Median	Std. Dev.	Minimum	Maximum
SPAC_size	134	266.7019	230.0000	192.0841	39.0000	1100.0000
Overallotment	134	0.8600	1.0000	0.3500	0.0000	1.0000
Days_to_ACQ/LIQ	134	613.8800	602.5000	245.5020	144.0000	1364.0000
Days_to_AN	103	460.5400	445.0000	199.6840	69.0000	839.0000
Days_to_ACQ	103	609.1600	603.0000	215.937	154.0000	1253.0000
Nr_of_UND	134	2.4600	2.0000	.09940	1.0000	5.0000
Nr_of_MAN	134	6.9300	7.0000	1.3670	3.0000	10.0000
Target_IND	134	0.7700	1.0000	0.4230	0.0000	1.0000
Target_GEO	134	0.1000	0.0000	0.2970	0.0000	1.0000

Notes: This table reports the descriptive statistics for each variable included in the statistical models. The data of the dependent variable is calculated based on the earliest available data point for the share price. In case the first data point of the price data is after the announcement date, the SPAC was not included in the analysis. The CAR data has been calculated against the Russell 2000 index as a benchmark and the alpha and beta value have been adjusted to include the price data up until the announcement date and the acquisition date respectively. All return variable data has been winsorized at the 5 percent level to reduce the effects of extreme outliers. The data of the independent variables is adjusted dynamically after each year to represents a fair value of deal count and market share.

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[13] https://news.bloombergtax.com/financial-accounting/spac-ipo-audits-dominated-by-niche-firms-as-big-four-stand-aside

Panel C presents the descriptive statistics of the control variables that have been used in this study. The mean SPAC size is approximately U.S. $266 million. Boyer and Baigent (2008) report a mean SPAC size of U.S. $71 million in their sample between 2003 and 2006. Dimitrova (2017) reports a mean SPAC size of U.S. $275 million in her sample between 2003 and 2010. These observations do not necessarily indicate that SPACs target similar sized companies for their acquisition. Each SPAC is free to negotiate terms that satisfy their investors and the owners of the company that is being acquired. Naturally, the market capitalization of firms goes up over time. However, since target characteristics are not included in this research, no conclusion can be drawn on the average firm size of targets. The statistics regarding the overallotment variable suggest that, on average, the overallotment option is exercised for most SPAC IPOs. Lakicevic and Vulanovic (2013) report a lower mean for their overallotment variable, which suggests that in the period 2003-2013 exercising the overallotment option was not as common as in 2015-2021. Data regarding the days to announcement and days to acquisition suggest that, on average, the process of identifying a target, negotiating a deal and announcing the deal takes more than twice as long as closing the deal. The mean of Days_to_AN is 460.54 compared to a mean of 609.16 for Days_to_ACQ. Another important note is the fact that the maximum for both the days to announcement, and days to acquisition exceeds the time limit mentioned in previous sections. The descriptive statistics in the research by Cumming et al. (2014) and Kim et al. (2020) show similar observations. Based on the 8K-filings of certain SPACs in this sample, these observations can be attributed to multiple extension periods that have been granted by proxy votes. The number of underwriters in the underwriter syndicate varies between 1 and 5 in the sample used in this research. The mean number of underwriters is 2.46, compared to the research of Cumming et al. (2014), who reports a mean value of 3.59 for the number of underwriters. The mean Nr_of_MAN shows a value of 6.93. This value is comparable to the mean number of managers reported by Cumming et al. (2014). The values of the means for Target_IND and Target_GEO show that, on average, far more SPACs target a specific industry, compared to a specific country or region.

5.3. Bivariate analysis

A bivariate analysis is conducted in order to check the correlation between variables. Table 7 presents the Pearson's correlation matrix. The CAR_AN variables show highly positive and significant correlations, which is in line with expectations, since these variables measure returns surrounding the announcement date. Similarly, the CAR_ACQ variables also show highly positive and significant correlations. The ARR_AN variable shows no correlation with any of the other return variables. Contrary, the ARR_ACQ variable shows positive correlation at the 0.01 level with all of the return variables. This observation is most likely caused by the fact that the ARR_AN returns are, on average, close to the risk-free rate and experience low variance.

Regarding the independent variables, no significant correlation is observed between the UND_DC and UND_MKT variables. This is most likely due to the fact that the construction of the variables differs because multiple underwriters can be involved with a single SPAC. In contrast, both LGL_DC and LGL_MKT, and AUD_DC and AUD_MKT show a positive and significant correlation. Since only one legal firm, and one auditor is involved with a single SPAC, this correlation is expected. Between intermediaries, the EXP variables show a low but positive and significant correlation.

Furthermore, the correlation of the control variables is presented. The SPAC size variable shows a positive and significant correlation with the UND_MKT variable. This correlation is expected since a bigger SPAC size results in a higher market share for the underwriters. Overallotment and Nr_of_UND show no significant correlation with any of the variables. Days_to_AN shows a negative and significant correlation with all the EXP variables. This indicates that a higher level of experience among intermediaries can result in a faster acquisition announcement. Similarly, Days_to_ACQ shows the same correlation pattern, which is expected.

Table 7. Pearson's correlation matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	CAR_AN_3day	1.000																					
2	CAR_AN_5day	.919**	1.000																				
3	CAR_AN_7day	.865**	.942**	1.000																			
4	CAR_ACQ_3day	-0.026	-0.002	0.007	1.000																		
5	CAR_ACQ_5day	0.036	0.091	0.112	.895**	1.000																	
6	CAR_ACQ_7day	0.032	0.094	0.117	.791**	.929**	1.000																
7	ARR_AN	-0.065	-0.021	-0.073	0.124	0.072	-0.005	1.000															
8	ARR_ACQ	.357**	.318**	.283**	.287**	.315**	.336**	.412**	1.000														
9	UND_DC	0.098	0.025	-0.029	0.042	0.015	-0.026	.413**	.279**	1.000													
10	UND_MKT	0.061	0.113	0.135	.203*	.259**	.215*	-0.081	0.028	-0.015	1.000												
11	LGL_DC	-0.034	-0.073	-0.112	0.142	0.091	0.007	.308**	0.143	.531**	-0.014	1.000											
12	LGL_MKT	-0.136	-0.149	-0.109	0.060	0.035	0.010	-0.055	-0.096	0.142	.261**	.685**	1.000										
13	AUD_DC	0.161	0.150	0.108	.224*	0.178	0.124	.332**	.346**	.412**	-0.114	.437**	-0.002	1.000									
14	AUD_MKT	0.004	0.018	0.003	0.110	0.106	0.140	0.120	0.183	0.073	0.154	0.054	-0.061	.513**	1.000								
15	SPAC_size	0.159	.206*	0.194	0.168	0.170	0.142	0.002	.202*	0.073	.606**	-0.007	0.190	-0.012	.240*	1.000							
16	Overallotment	-0.049	-0.053	-0.047	0.078	0.042	-0.016	0.081	0.052	-0.015	0.092	0.050	0.012	0.082	0.124	0.075	1.000						
17	Nr_of_UND	0.100	0.146	0.150	-0.018	-0.027	-0.007	-0.001	-0.026	-0.133	0.099	-0.114	-0.131	-0.180	0.069	0.054	0.125	1.000					
18	Days_to_AN	-.234*	-0.186	-0.112	-0.147	-0.064	-0.057	-0.165	-.250*	-.513**	.267**	-.285**	0.131	-.370**	0.015	0.115	0.077	0.115	1.000				
19	Days_to_ACQ	-.241*	-0.191	-0.126	-.213*	-0.131	-0.108	-0.164	-.307**	-.527**	0.184	-.329**	0.049	-.394**	0.003	0.019	0.042	0.108	.938**	1.000			
20	Nr_of_MAN	-0.098	-0.059	-0.108	0.051	0.052	-0.015	0.088	0.040	0.023	-0.034	.201*	0.089	0.141	0.169	0.124	0.133	-0.076	-0.031	-0.037	1.000		
21	Target_IND	0.058	0.049	0.073	0.122	0.173	.194*	-0.004	0.163	-0.073	0.054	-0.086	-0.022	0.110	.267**	0.111	0.077	-0.017	0.121	0.089	0.114	1.000	
22	Target_GEO	-0.135	-0.136	-.199*	-0.193	-.252*	-.246*	0.068	-.275**	0.081	-.324**	0.135	0.025	-0.035	-.226*	-.382**	-0.153	-0.011	-0.141	-0.064	-0.063	-.645**	1.000

5.4.   Logistic regression model

This section presents the results of the logistic regression model that has been used to test the formulated hypothesis 1 in section 2.4. Next to the main regression results, the results of the robustness checks are discussed.

5.4.1. Assumptions

In order to conduct logistic regression analysis, various assumptions have to be met. First, the dependent variable should be measured on a dichotomous scale. In this research a binary dependent variable is used to represent either a successful acquisition by a SPAC, or a liquidation of a SPAC. Second, observations are independent and the dependent variable is mutually exclusive and exhaustive. Third, multicollinearity has to be assessed. Multicollinearity exists when independent variables are highly correlated. Logistic regression requires there to be little or no multicollinearity among the independent variables. Furthermore, a large sample size is generally required to achieve statistical significance.

5.4.2. Hypothesis 1 - Logistic regression results

The first hypothesis is tested with a logistic regression model. Table 8 presents two logistic models. The first model contains all observations in the original data set. However, the distribution of the dependent variable was heavily skewed towards one side. This is a common problem in logistic regression analysis in for instance the fraud detection models used by insurance companies. Chawla et al. (2002) have developed a method to optimize the original sample for logistic regression called synthetic minority over-sampling technique, or SMOTE. In short, synthetic observations are created by using two nearest neighbors and Euclidian distance over normalized vectors. The approach is effective because new synthetic examples from the minority class are created that are plausible. In order to balance the acquisition and liquidation classes, 120 synthetic observations have been created between the existing 7 observations in the minority class. Model 1 reports the results of the initial sample, and model 2 reports the results of the sample that includes the synthetic observations.

The results in model 1 in table 8 show statistically significant results for UND_MKT, LGL_DC, LGL_MKT, and AUD_MKT. The beta coefficients of UND_MKT, LGL_MKT, and AUD_MKT are much higher compared to the other beta coefficients. This can be a consequence of the skewed distribution of the dependent variable. This can also be a result of the measurement scales used in the model and the fact that the dependent variable is binary. The values of market share variables are significantly smaller due to the fact that these variables are measured in percentages compared to absolute values for the deal count variables. The beta coefficients are significantly lower in model 2 after including synthetic observations. In model 1, the sign for UND_MKT is negative and high which implies that an increase in underwriter market share reduces the probability of a successful acquisition. Cumming et al. (2014) found a similar negative relation between underwriter track records and acquisition probability in their research. LGL_DC also has a negative effect on the acquisition probability. LGL_MKT shows a very high and positive value which indicates that the market share of the legal firm improves the probability of an acquisition. The market share of the auditor has a significant negative effect on the acquisition probability. Model 1 has a low R-squared value compared to model 2 which indicates that model 2 explains more variance. Furthermore, model 1 is not statistically significant in the Hosmer and Lemeshow Test, while model 2 is very significant. This test is used to assess the model fit. A significant Chi-square value indicates a good model fit.

The results in model 2 show beta coefficients with higher statistical significance. All independent variables except AUD_MKT are statistically significant at the 1 percent level. The signs of the beta coefficients are similar to model 1 and are less extreme due to the inclusion of the synthetic observations. Furthermore, the days to acquisition or liquidation variable shows a significant beta coefficient. However, the effect is weak and does not have a great influence on the acquisition

probability. Nr_of_MAN shows a significant and positive value which indicates that the number of managers positively influences the probability of a successful acquisition. This positive relationship is in line with prior research by Lakicevic et al. (2014). Surprisingly, the sign of Target_GEO is negative and very significant. Tran (2010) and Lakicevic et al (2014) observed a positive relationship between a SPAC with a target geography and the acquisition probability. However, this variable was not significant in model 1 with the initial sample and therefor might be the result of a high concentration of SPACs with a target geography in the minority class.

Table 8. Logistic regression results for hypothesis 1

Variable	Binary dependent variable: acquisition = 1 / liquidation = 0	
	Model 1	Model 2
(Constant)	9.683	1.401
UND_DC	-0.079	0.114***
UND_MKT	-22.681*	-11.751***
LGL_DC	-0.554**	-0.160***
LGL_MKT	177.179**	39.805***
AUD_DC	0.521*	0.056***
AUD_MKT	-40.507*	0.009
SPAC_size	0.003	-0.003
Overallotment	-0.208	0.975
Days_to_ACQ/LIQ	-0.013	-0.007***
Nr_of_UND	2.652	0.215
Nr_of_MAN	-0.285	0.473***
Target_IND	2.800	0.029
Target_GEO	24.449	-2.298***
Region fixed effects	No	No
Year fixed effects	Yes	Yes
N	134	254
Cox & Snell R-squared	0.235	0.530
Hosmer and Lemeshow Test	0.999	20.286***

Notes: This table reports beta coefficients. The dependent variables represent the acquisition approval probability with a binary variable where acquisition = 1 and liquidation = 0. Model 1 presents the results for the initial sample. Model 2 includes 120 synthetic observations with a dependent variable liquidation to balance the overall distribution of the dependent variable. The synthetic observations have been constructed with the SMOTE methodology. All variable definitions can be found in Table 3. ***, **, * shows the significance at 1%, 5%, and 10% respectively.

In order to further justify the use of synthetic observations in model 2 the prediction power of both models is analyzed. Table 9 shows the prediction power of both logit models. Panel A reports the results for model 1, and panel B reports the results for model 2. Panel A shows that the model is able to predict 98.4 percent of the observations for the successful acquisition majority class. Only 42.9 percent of the observed liquidations is predicted. This results in a final percentage of correct predictions of 95.5 percent. However, in the original sample, 94.7 percent of the observations are successful acquisitions. Therefore, the predictive power of model 1 is almost equal to random guessing. Panel B shows that model 2 is able to predict 92.1 percent of the observations for the successful acquisition class. Furthermore, 83.5 percent of the observed liquidations is predicted. Overall the model predicts 87.8 percent of the observations correct. This is a significant increase compared to model 1 if the distribution of the classes is considered. In model 2, both classes contain 127 observations, which means that by random guessing only 50 percent of the observations should be predicted. Finally, the original 7 observations in the minority class have been tested in both models in order to check how accurate the predictions of the models are for the actual observations. Model

1 successfully predicted three liquidations in the minority class. Model 2 predicted five liquidations in the minority class.

Table 9. Prediction power of logistic model 1 and model 2

A. Prediction power of logit model

		Predicted		
		Acquisition	Liquidation	**Percentage correct**
Observed		1	0	
Acquisition	1	125	2	98.4
Liquidation	0	4	3	42.9
Overall percentage				95.5

B. Prediction power of logit model with SMOTE observations

		Predicted		
		Acquisition	Liquidation	**Percentage correct**
Observed		1	0	
Acquisition	1	117	10	92.1
Liquidation	0	21	106	83.5
Overall percentage				87.8

5.4.3. Robustness checks

In order to test the validity of the results in table 8, a robustness check has been performed. In line with prior research by Cumming et al. (2014), Lakicevic et al. (2014), Vulanovic (2016) and Kim et al. (2020), probit regression models have been developed to test hypothesis 1. Similar to the logistic regression analysis, two models have been tested. The results of the probit regression analysis can be found in table 14 in appendix E section 8.5.1. Model 1 is based on the initial sample, and model 2 is supplemented with 120 synthetic observations that have been constructed with the SMOTE methodology.

The results of the probit regression in model 1 show similar results compared to the logistic regression in table 8. All significant independent variables observed in the logistic model remain statistically significant at the same levels in the probit model. The magnitude of the beta coefficients is slightly lower in the probit model, but the signs remain the same. Furthermore, the signs of all other variables remain the same. The results for model 2 in table 14 show similar significance levels for the independent variables. The control variable Nr_of_MAN shows slightly reduced statistical significance. Additionally, the overallotment variable has become significant at the 10 percent level. The signs of all variables remain the same. The strength of the beta coefficients for model 2 is lower in the probit model compared to the logistic model, which is in line with the observations for model 1. Overall, the results presented in table 14 confirm that the results in table 8 are robust.

5.5.   OLS regression models

In this section, the results of the Ordinary Least Squares (OLS) regression analyses are described and discussed in order to test the formulated hypotheses in section 2.4. The results regarding the second and third hypotheses are discussed below. Next to the main regression results, the results of the robustness checks are discussed. The beta coefficients are reported as standardized beta coefficients because various measurements scales have been used for the independent variables. The advantage of reporting standardized beta coefficients is the fact that the strength of variables can be compared.

Reporting standardized beta coefficients is in line with prior research by Cumming et al. (2014), Kolb and Tykvová (2016), and Dimitrova (2017).

5.5.1. Assumptions

In order to conduct OLS regression analyses, various assumptions have to be met. First, the residuals of the regression should have a normal distribution. A normal P-P plot can be used to determine whether the residuals are normally distributed. The P-P plots show that the residuals of the regression are normally distributed. Second, multicollinearity has to be assessed. Multicollinearity exists when predictor variables are highly correlated with each other. VIF values are used to check this condition. The VIF values of the predictor variables should all be below the maximum threshold of 10. However, a value below 5 is generally considered more favorable. All variables have a VIF value below 10. The variables days_to_AN and days_to_ACQ have VIF values above 5. Third, the data should be homoscedastic. Data is homoscedastic if the data is normally distributed. This can be checked by using a scatterplot. After assessing the assumptions, the OLS regression seems the appropriate statistical method to test hypotheses 2 and 3.

5.5.2. Hypothesis 2 - OLS regression results

The second hypothesis in this research is split up in two parts. Hypothesis 2a states the more experienced the intermediary, the higher the CAR returns surrounding the announcement date. The main independent variables of interest in the OLS models are UND_DC, UND_MKT, LGL_DC, LGL_MKT, AUD_DC, and AUD_MKT. The OLS regression results are presented in table 10. In model 1 through 3 the intermediaries are included in the model separately. In model 4 all intermediary variables are included.

Table 10. OLS regression results for hypothesis 2a (CAR_AN)

Variable	7-day CAR surrounding announcement date (CAR_AN)			
	Model 1	Model 2	Model 3	Model 4
(Constant)	0.227*	0.061	0.031	0.146
UND_DC	-0.430***			-0.350**
UND_MKT	-0.077			-0.079
LGL_DC		-0.546***		-0.625***
LGL_MKT		0.252		0.367**
AUD_DC			0.170	0.564**
AUD_MKT			-0.032	-0.137
SPAC_size	0.090	-0.100	-0.005	0.012
Overallotment	-0.025	0.009	-0.037	-0.007
Days_to_AN	0.306	0.407	0.370	0.290
Days_to_ACQ	-0.329	-0.385	-0.292	-0.292
Nr_of_UND	0.127	0.172*	0.183*	0.172
Nr_of_MAN	-0.149	-0.073	-0.079	-0.111
Target_IND	0.096	0.146	0.057	0.111
Target_GEO	0.002	0.012	-0.050	0.006
Region fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	103	103	103	103
Adjusted R^2	0.122	0.130	0.017	0.206
F-statistic	1.835**	1.900**	1.101	2.262***

Notes: This table reports the standardized coefficients. The dependent variable (CAR_AN) has been winsorized at the 5% level. All variable definitions can be found in Table 3. ***, **, * shows the significance at 1%, 5%, and 10% respectively.

The results in model 1 of table 10 show that UND_DC has a very significant and negative effect on the 7-day CAR surrounding the announcement date. Since the beta coefficient of UND_DC is negative, an increase in the average number of deals per underwriter in the underwriter syndicate result in a lower 7-day CAR surrounding the announcement date. In model 2, the LGL_DC variable has a very significant and negative effect on the dependent variable. Additionally, the number of underwriters shows a positive effect with minor significance. Model 3 shows no significant effect in the main independent variables. However, a similar effect of the number of underwriters is observed. The adjusted r-squared value of the third model is very low compared to model 1 and 2. The full model is presented in model 4 and shows significant results for many of the main independent variables. The variables UND_DC and LGL_DC show similar effects as in model 1 and 2. Furthermore, the variables LGL_MKT and AUD_DC have become significant in the full model. Surprisingly, the signs for LGL_DC and LGL_MKT are opposite. This observation implies that legal firms with less SPAC deals, but a higher market share, positively influence the 7-day CAR surrounding the announcement date of the SPAC. The deal count of the auditor (AUD_DC) has a positive and significant effect on the dependent variable. Based on these observations, hypothesis 2a is rejected since the underwriter and legal firm deal count have a negative effect on the 7-day CAR surrounding the announcement date.

Hypothesis 2b states that the more experienced the intermediary, the higher the CAR returns surrounding the acquisition date. Table 11 reports the results of the OLS regression model that has been used to test this hypothesis. In model 1 through 3 the intermediaries are included in the model separately. In model 4 all intermediary variables are included.

Table 11. OLS regression results for hypothesis 2b (CAR_ACQ)

Variable	7-day CAR surrounding acquisition date (CAR_ACQ)			
	Model 1	Model 2	Model 3	Model 4
(Constant)	0.976^{**}	0.917^{***}	0.988^{***}	0.972^{**}
UND_DC	-0.080			-0.063
UND_MKT	0.208			0.197
LGL_DC		-0.165		-0.193
LGL_MKT		0.129		0.144
AUD_DC			0.127	0.215
AUD_MKT			-0.162	-0.178
SPAC_size	-0.070	0.002	0.048	-0.095
Overallotment	-0.033	-0.018	-0.031	-0.028
Days_to_AN	-0.062	-0.019	-0.020	-0.083
Days_to_ACQ	-0.185	-0.232	-0.200	-0.149
Nr_of_UND	-0.134	-0.080	-0.074	-0.109
Nr_of_MAN	-0.185^{*}	-0.191^{*}	-0.187^{*}	-0.174^{*}
Target_IND	-0.116	0.117	0.118	0.146
Target_GEO	-0.149	-0.177	-0.199	-0.162
Region fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	103	103	103	103
Adjusted R^2	0.111	0.094	0.101	0.093
F-statistic	1.751^{**}	1.623^{*}	1.677^{*}	1.496

Notes: This table reports the standardized coefficients. The dependent variable (CAR_ACQ) has been winsorized at the 5% level. All variable definitions can be found in Table 3. ***, **, * shows the significance at 1%, 5%, and 10% respectively.

The main independent variables do not show any significant results in any of the four models. This also results in a very low adjusted r-squared value for all 4 models, which shows that the models explain approximately 10% of the variance in the OLS regression models. One variable that does show significance in all four models is the number of managers of the SPAC (Nr_of_MAN). No prior research has observed a significant relationship between this variable and the CAR returns surrounding the acquisition date. Based on the fact that none of the main independent variables shows a significant effect on the dependent variable, hypothesis 2b is also rejected.

In conclusion, since both hypothesis 2a and hypothesis 2b have been rejected, the hypothesis that the more experienced the intermediary, the higher the CAR returns surrounding the main events in the SPAC lifecycle is rejected.

5.5.3. Hypothesis 3 - OLS regression results

The third hypothesis in this research is tested by two main OLS regression models. The first model analyzes the effect of experienced intermediaries on the annualized realized returns between the first trading day and the announcement date (ARR_AN). The results for this model are reported in table 10. In model 1 through 3 the intermediaries are included in the model separately. In model 4 all intermediary variables are included.

Table 12. OLS regression results for hypothesis 3 (ARR_AN)

Variable	Annualized realized returns between first trading day and announcement date (ARR_AN)			
	Model 1	Model 2	Model 3	Model 4
(Constant)	0.019	-0.110	-0.145	0.197
UND_DC	-0.149			-0.337***
UND_MKT	0.032			0.020
LGL_DC		0.892***		1.039***
LGL_MKT		-0.528***		-0.551***
AUD_DC			0.204	-0.313
AUD_MKT			-0.042	0.107
SPAC_size	-0.093	0.067	-0.080	0.090
Overallotment	-0.009	-0.068	-0.018	-0.067
Days_to_AN	0.231	0.263	0.255	0.189
Days_to_ACQ	-0.181	-0.120	-0.158	-0.130
Nr_of_UND	0.073	0.092	0.109	0.029
Nr_of_MAN	-0.005	-0.001	0.019	-0.060
Target_IND	0.184	0.065	0.151	0.088
Target_GEO	0.141	0.050	0.107	0.093
Region fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	103	103	103	103
Adjusted R^2	0.154	0.412	0.149	0.459
F-statistic	2.095***	5.202***	2.047**	5.125***

Notes: This table reports the standardized coefficients. The dependent variable (ARR_AN) has been winsorized at the 5% level. All variable definitions can be found in Table 3. ***, **, * shows the significance at 1%, 5%, and 10% respectively.

The results in model 1 in table 12 do not show a significant relationship between the underwriter variables and the dependent variable. The adjusted r-squared of model 1 is fairly low with a value of 0.154. The second model analyzes the effect of legal firm deal count and market share. Both the LGL_DC and LGL_MKT variable show very significant effects on the dependent variable. Interestingly,

the deal count variable shows a positive value, while the market share variable shows a negative value. These signs are opposite compared to the observations in the models regarding the CAR returns. The adjusted r-squared value of model 2 jumps to 0.412. This means model 2 is far superior in predicting variance in the regression model compared to model 1. Similar to model 1, model 3 does not report any significant effects on the dependent variable. The full model, reported under model 4, shows very significant relationships between UND_DC, LGL_DC, and LGL_MKT and the dependent variable. The signs of these effects are mixed. The underwriter deal count has a negative effect on the annualized realized returns up until the announcement date. This observation suggests that investors value SPACs higher when the SPAC is dealing with underwriters with a lower average deal count. A possible explanation for this observation can be the fact that investors might argue that these underwriters have more to proof and potentially will try harder to find a good target. The sign for AUD_DC is also negative. However, this observation has no statistical significance. The adjusted r-squared for the full model is the highest reported in table 12. Based on the observations, hypothesis 3 is rejected. However, before drawing a final conclusion, the effect of experienced intermediaries on the annualized realized returns between the first trading day and the acquisition date is also analyzed. An argument that needs to be made is the fact that returns up until the announcement date are mainly based on speculation since no target has been identified by the SPAC management team at this point in time.

Table 13 reports the results for the OLS regression models that analyze the relationship between experienced intermediaries and the annualized realized returns between the first trading day and the acquisition date. In model 1 through 3 the intermediaries are included in the model separately. In model 4 all intermediary variables are included.

Table 13. OLS regression results for hypothesis 3 (ARR_ACQ)

Variable	Annualized realized returns between first trading day and acquisition date (ARR_ACQ)			
	Model 1	Model 2	Model 3	Model 4
(Constant)	1.179**	0.344	0.254	1.398**
UND_DC	-0.337***			-0.447***
UND_MKT	-0.025			-0.036
LGL_DC		0.403***		0.506***
LGL_MKT		-0.258*		-0.232*
AUD_DC			0.164	-0.049
AUD_MKT			-0.047	0.019
SPAC_size	-0.077	-0.062	-0.128	0.017
Overallotment	-0.053	-0.082	-0.062	-0.087
Days_to_AN	0.337	0.406	0.391*	0.294
Days_to_ACQ	-0.371*	-0.344	-0.343	-0.318
Nr_of_UND	0.076	0.114	0.128	0.063
Nr_of_MAN	-0.120	-0.077	-0.066	-0.147*
Target_IND	0.215**	0.149	0.183	0.159
Target_GEO	0.062	-0.004	0.014	0.028
Region fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	103	103	103	103
Adjusted R^2	0.469	0.456	0.407	0.539
F-statistic	6.307***	6.031***	5.124***	6.678***

Notes: This table reports the standardized coefficients. The dependent variable (ARR_ACQ) has been winsorized at the 5% level. All variable definitions can be found in Table 3. ***, **, * shows the significance at 1%, 5%, and 10% respectively.

The first model in table 13 shows a very significant and negative effect of the UND_DC on the dependent variable. This negative sign is in line with all prior observations in this research thus far. Furthermore, the days to acquisition (Days_to_ACQ) variable shows a significant and negative effect on the dependent variable. Dimitrova (2017) found evidence for an inverse U-shaped relation between the time to acquisition and the long-term returns of a SPAC. There is no evidence such a relation exists for the relation between the days to acquisition and the returns during the lifecycle of the SPAC. TARGET_IND shows a significant and positive value. The adjusted r-squared of model 1 is the highest value reported for any of the individual models. Model 2 reports a significant and positive effect of the legal firm deal count (LGL_DC) on the annualized realized returns. Similar to prior observations in previous models, the sign for the LGL_MKT variable is opposite and statistically significant. Aside from the Days_to_AN variable, no coefficients show statistical significance in model 3. Surprisingly, the adjusted r-squared value of this model is still in line with model 1 and 2. Model 4 shows similar results to the observations in model 4 in table 12. The UND_DC and LGL_DC show very significant and opposite signs. Based on the observations in table 13, hypothesis 3 is rejected. The results for both ARR models are similar and provide evidence that a higher underwriter deal count does not result in higher annualized realized returns of SPACs. Contrary, there is strong evidence that the deal count of the legal firms does have a positive effect on the annualized realized returns of SPACs. This observed relationship can be the topic in future research to analyze the effect of legal firm deal count and market share on SPAC performance in more detail.

5.5.4. Robustness checks

Several robustness checks have been performed in order to test the validity of the results in this research. For each hypothesis different robustness checks have been conducted. For hypothesis 2a and 2b different dependent variables have been introduced, namely the 5-day CAR and 3-day CAR. Additionally, a subsample has been tested. The tables of the robustness checks can be found in Appendix E.

First, the results for hypothesis 2a are checked on its robustness. The 5-day CAR and 3-day CAR surrounding the announcement date are alternative measures for the dependent variable used in the original model in table 10. Instead of calculating the CAR over a 7-day period, the CAR has been calculated over 5 and 3 days respectively. Table 15 and table 16 present the results for these robustness checks. Both the independent models (model 1 through 3) and the full model (model 4) report similar results compared to the main regression in table 10. The independent variables that showed significance in the main regression maintain this statistical significance in the robustness checks. Furthermore, the beta coefficients show similar strengths and signs. The F-statistics for the full models (model 4) in all three measurements of the dependent variable is very significant. Next, table 17 reports the results for the subsample. This subsample contains all the SPACs that have registered headquarters in the US. The subsample represents approximately 75 percent of the total sample. The results show that the statistical significance of the main independent variables is slightly lower for UND_DC and LGL_MKT. Consequently, the adjusted r-squared of the models is slightly lower compared to the main regression in table 10. The signs and values of the significant independent variables, UND_DC, LGL_DC, and LGL_MKT, remains in line with observations in the other regression models. Overall, the results reported in table 15 through 17 imply that the results of the main regression reported in table 10 are robust.

Second, a similar procedure has been conducted to test the robustness of the results for hypothesis 2b reported in table 11. Table 18 and table 19 reported the regression results with the dependent variables 5-day CAR_ACQ and 3-day CAR_ACQ respectively. The results in table 18 report a significant beta coefficient in model 1 and model 4. In model 1, the UND_MKT variable becomes statistically significant, but only at the 10 percent level. Similarly, the same result is observed in model 4. Table 19 reports a significant beta coefficient for LGL_DC. These observations can be classified as random since

no confirmation is found in multiple models and the statistical significance is low. Furthermore, table 19 reports a statistical significance at the 5 percent level for model 1 through 3 for the Days_to_ACQ variable. The observed effect has a high and negative value. As mentioned in section 5.5.3., the days to acquisition and the ARR returns during the SPAC lifecycle also showed a negative relation. Next, table 20 reports the results of the subsample robustness check. Similar to the results reported in table 9, no statistical significance is observed in any of the main independent variables. Overall, the results reported in table 18 through 20 imply that the results of the main regression reported in table 11 are robust, although not statistically significant.

Third, the results for hypothesis 3 are checked on its robustness. Table 21 and table 22 report the results of the subsample robustness checks for the dependent variables ARR_AN and ARR_ACQ respectively. Model 2 shows similar strength and significance in the beta coefficients for LGL_DC and LGL_MKT. Both the main regression results (table 12) and the robustness check (table 21) show a high adjusted r-squared and significant F-statistic for model 2. Model 4 in table 21 reports significant beta coefficients for UND_DC, LGL_DC, LGL_MKT, and AUD_DC. The signs and strengths of these beta coefficients are in line with the observations reported in table 12. Furthermore, the adjusted r-squared and F-statistic are high and significant in both the main regression and the robustness check. Next, table 22 reports the results of the robustness check for the results reported in table 13. The beta coefficient of UND_DC in model 1 in table 22 remains significant but shows a lower value. Similarly, the value of the beta coefficient for UND_DC in model 4 is also lower compared to the value of UND_DC in model 4 in table 13. The observations in model 2 in table 22 remain significant for LGL_DC and LGL_MKT. Model 4 in the robustness check also shows statistically significant values for LGL_DC and LGL_MKT. However, the effects have become slightly stronger compared to the observation in table 13. The variable AUD_DC shows low statistical significance in the full model in table 22. The adjusted r-squared and F-statistic in the robustness check show even higher values. Overall, based on the results reported in table 21 and 22, the results for the main regression analyses in table 12 and table 13 are robust.

6. Conclusion

This chapter describes the conclusions and limitations of this study. First, the conclusions based on the results in the previous chapter are described and the formulated research question will be answered. Second, the limitations of this study will be discussed. Third, recommendations will be given for future research.

6.1. Conclusion

During the past few years, popularity of SPAC has increased significantly. Research on SPACs is still very limited. Researchers investigated factors that influenced the approval probability of SPACS and analyzed the stock market performance of SPAC surrounding key events. Furthermore, long term performance of SPACs has been studied by multiple researchers. However, some important factors had not yet been researched. Due to a high level of information asymmetry between investors and the SPAC management team it is important to analyze what factors can provide insight in SPAC performance prior to the target announcement. This study investigated the effect of experienced intermediaries on SPAC performance. The definition of experienced intermediaries used in this research is: *Experienced intermediaries are intermediaries that have worked on numerous prior SPAC deals and possess significant market share of the total SPAC market for intermediaries.* The experience of intermediaries is measured with two variables: deal count and market share. Both the effects on SPAC acquisition approval and the stock market returns of SPACs during their lifecycle have been analyzed. In this section, the research question that was formulated in section 1.2. will be answered:

Do experienced intermediaries positively influence the approval rate and investor returns of SPACs during their lifecycle?

To answer this question, three hypotheses have been formulated in section 2.4. The first hypothesis stated that the more experienced the intermediary, the higher the probability of the SPAC acquiring a target. Based on the results, it can be stated that the experience of intermediaries has mixed effects on the acquisition probability. UND_DC shows a positive effect on the approval probability while UND_MKT shows a negative effect on the dependent variable in model 2. Similar observations are made regarding the experience of auditors in model 1. These results suggest that for underwriters and auditors, more SPAC deals with a lower average deal value can result in a higher SPAC acquisition probability. Prior research by Dimitrova (2017) has shown that underwriters are incentivized to make bad acquisitions in order to collect their deferred underwriter fees. Smaller sized SPACs have more acquisition opportunities since private firms with a higher valuation are scarcer. The inverse seems to be true for legal firms, fewer SPAC deals with a higher average deal value may have a positive effect on the SPAC acquisition probability. The LGL_DC variable showed a negative effect on the approval probability while the LGL_MKT variable showed a positive effect on the dependent variable.

The second hypothesis is split in two sub hypotheses. Hypothesis 2a stated that the more experienced the intermediary, the higher the CAR returns surrounding the announcement date. Hypothesis 2b stated that the more experienced the intermediary, the higher the CAR returns surrounding the acquisition date. Based on the results, hypothesis 2a is rejected due to the fact that underwriter deal count and legal firm deal count have a negative effect on the 7-day CAR returns surrounding the announcement date. Similar to the results for hypothesis 1, some conflicting results are observed for legal firm experience. These results again suggest that legal firms with fewer deals and a higher average deal value positively influence the CAR returns surrounding the announcement date. The experience of the auditor may have a positive effect on the CAR returns surrounding the announcement. However, the auditor deal count variable shows low statistical significance and the auditor market share variable shows an insignificant negative value. Based on the descriptive statistics, on average, investors can expect positive returns surrounding the announcement date and

negative returns surrounding the acquisition date. SPACs with less experienced underwriters can expect more positive returns surrounding the announcement date. Underwriters with less experience may have higher motivation to find promising targets in order to establish a good reputation in the SPAC market. SPACs that contracted a legal firm with a higher average deal value can expect higher returns surrounding the announcement date. Hypothesis 2b is also rejected due to a lack of statistical significance. Furthermore, the results again show conflicting signs regarding the experience of the intermediaries.

The third hypothesis stated that the more experienced the intermediary, the higher the annualized realized returns of SPACs during their lifecycle. The results show conflicting effects between the deal count variables and the market share variables once again. Surprisingly, the signs for the variables regarding legal firm experience have flipped. This suggests that legal firms with more deals but a lower average deal value have a more positive effect on the annualized realized returns of SPACs. Furthermore, the higher the average number of deals of the underwriters of a SPAC, the lower the annualized realized returns. Investors could be aware of the number of prior deals the underwriter syndicate has been involved in and reason that these underwriters chase quantity instead of quality. In addition, the higher the deal count of an auditor, the lower the annualized realized returns. Based on the results in the main regression analyses and the robustness checks, hypothesis 3 is also rejected.

All things considered, to answer the research question, experienced intermediaries do not positively influence the approval rate nor the investor returns of SPACs during their lifecycle. Aside from the acquisition approval probability, underwriter experience has a negative effect on SPAC performance. As mentioned previously, underwriters have a conflict of interest with investors and benefit from any successful acquisition made by the SPAC. It is therefore important for investors to consider prior experience by the underwriter syndicate of a SPAC before making an investment. For the SPAC management team it may be beneficial to choose underwriters that still have to build a reputation for themselves in the SPAC market. Legal firm experience has mixed effects on SPAC performance. A possible explanation for the observed results regarding legal firms can be attributed to the different ways firms handle lawsuits filed against the SPAC. A theory could be that active lawsuits increase the exposure of the SPAC due to reporting in the press. In case of a positive outcome for the investors or the SPAC, performance could be influenced. Since the presence of retail investors has grown significantly in the past two years, social media coverage of such lawsuits could also influence investor returns and acquisition approval probability. More research is required in order to confirm this theory. Auditor experience in terms of number of prior deals shows a positive effect on acquisition approval probability and investor returns surrounding the announcement date. In all other regression models auditor experience does not show a statistically significant relationship to SPAC performance.

6.2. Limitations

As concluded in the previous section, the results of this study showed interesting results regarding the role of intermediaries on the performance of SPACs, which have not been previously identified in the literature. However, a limitation of this study is that only recent SPACs have been analyzed due to a lack of historical data availability regarding SPAC details. Furthermore, the uneven distribution between liquidated SPACs and SPACs that successfully acquired a company proved to be challenge. Currently many SPACs are still searching for a suitable target and in a couple years a more suitable dataset may be available to test the effect of experienced intermediaries on the SPAC acquisition approval probability. Another limitation of this study is the fact that no control variables regarding target companies have been used due to information constraints since most of these companies were privately held firms that did not have the obligation to share company information. Moreover, the variables regarding intermediary experience have been dynamically measured on an annual basis. To increase the validity of this research, in future research, the variables regarding intermediary experience can be adjusted after every new deal to reflect accurate deal count and market share at

any given time. The last limitation is that most data regarding the independent variables has been collected manually, so it might be possible that some data has been recorded incorrectly, which could have influenced the results of this study. Since the research has a sufficient sample size, the possible influence of such an error should not significantly influence the results of this research.

6.3. Recommendations for further research

The first recommendation is to analyze the relationship between market crashes and the popularity of SPACs. Prior research by Blomkvist and Vulanovic (2020) concluded that SPAC popularity is negatively related to the volatility in the stock market. However, based on recent popularity and the possible explanation that financial distressed companies are looking to go public through a SPAC acquisition in order to raise cash, a different relationship could exist. Similarly, the amount of capital raised in private equity funds hit record highs in 2020 due to a wide variety of financial distressed companies that could be targeted. Second, future research could be focused on the long-term performance of SPACs and the effect intermediaries may have on the returns for investors. Intermediaries are heavily involved with the deal making process between the SPAC and the acquired company. Arrangements made in these deals may have consequences for the new business combination years later. For instance, many SPAC deals involve a lock-up expiry period for early investors or shareholders from the private company that was acquired. Third, the role of social media promotion by SPAC management teams and the relation to the performance of the SPAC could provide insight in whether such promotion has influence on SPACs trading above NAV prior to an acquisition announcement. The market share of retail investors has grown exponentially due to the corona crisis and often volatility was driven by hype or social media promotions of certain stocks. For instance, the short squeeze of Gamestop and AMC. There might be a significant relationship between the mentions on social media and the performance of a SPAC. Additionally, the effect of lawsuits filed against a SPAC could be analyzed in regards to social media exposure and popularity of the SPAC. This increase in exposure may in turn have an effect on the acquisition approval probability or the investor returns.

Finally, a suggestion to regulatory bodies can be made. SPACs have received a bad name in various periods of their existence. Their initial form was often used for pump and dump schemes. New regulations have improved the transparency of modern SPACs. However, SPAC sponsors still have a conflict of interest with SPAC investors due to a very low break-even price. Many value-destroying deals have been approved to provide SPAC sponsors and shareholders of private firms with a cash-out opportunity. Many retail investors have lost significant amounts of money due to false claims and promises made by both the SPAC sponsor, as well as the management of the private firms. Due to the newly introduced structure of deferred underwriter fees, intermediaries may have a conflict of interest with investors as well. Increased investor protection may be required to avoid malicious intentions from SPAC sponsors or SPAC intermediaries. An example of such protection may be an extended lock-up period for SPAC sponsors and shareholders of the acquired company. The reduction of information asymmetry may also prove a viable solution. External auditing of private firms by auditors that are not involved with the SPAC deal may result in higher investor protection.

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8. Appendices

8.1. Appendix A – Literature review

The table summarizes literature on SPACs from 2003 until 2020 related to the research in this paper. The table reports authors, sample, time period, dependent variable and main findings. The data in this table is extracted from the appendix of the paper by Schachmurove & Vulanovic (2018) and supplemented with research published in more recent years.

Authors	Data	Sample	Time Period	Dependent Variables	Main Findings
Sjostrom (2008)	EDGAR	>70 SPACs	2003-2006	Descriptive study on legal aspects and structure of SPACs	SPACs are compared with reverse mergers and private investment in public equity (PIPE) companies. Their structure is a valid alternative to traditional IPOs from the perspective of a private company because it enables injection of cash into a new company, share liquidity and vested-in underwriters.
Jog & Sun (2007)	Datastream, Factiva, SDC Platinum, EDGAR	62 SPACs	2003-2006	Excess rate of return to management and investors	SPACs are a " home run " for founders. Shareholders of blank check IPOs earned minus 3 % annualized abnormal returns, while management earned 1900% annualized returns. Median size of the typical SPAC listed at AMEX is similar to median size of typical company listed at AMEX. Underwriting fees are close to 7% and at similar level as typical IPO fees. SPACs exhibit very low level of underpricing.
Boyer & Baigent (2008)	Bloomberg, EarlyBird Capital, EDGAR	87 SPACs	2003-2006	Excess rate of returns and underpricing levels	On average, investment in SPACs provided higher return than in the NASDAQ index in years 2004 and 2005, while SPACs underperformed the NASDAQ index in 2006. SPACs exhibit 1.23% underpricing at their IPO. In overall SPACs offer a less costly and faster route to public financing, especially in periods with low IPO activity.
Floros (2008)	Compustat, Factiva, SDC Platinum	14 SPACs	2003-2007	Excess returns	He classifies SPACs as a reverse merger and compares them with penny stock issuing companies. Reverse mergers and SPACs as their subset are a convenient corporate structure to foreign private companies with high levels of debt, low legal efficiency in their home country and low level of protections of shareholders' rights.
Lewellen (2009)	Bloomberg, CRSP, EDGAR, SDC Platinum, Morgan Joseph reports	158 SPACs	2003-2008	Excess returns at various lifecycle periods. Beta of SPACs as an asset class	SPACs should be recognized as new asset class. Their structure and behavior is unlike any other class in public equity markets. Their returns after merger announcement are close to 3% on a monthly basis. SPACs after the merger exhibit negative returns. Their Beta is approximately 0.75.
Kim (2009)	CRSP, Deal Flow Media, EDGAR, EOD Data, SDC Platinum, WRDS	158 SPACs	2003-2008	IPO size, underwriter quality, abnormal returns, underpricing levels	SPACs experience positive merger announcement returns. Their managers, on average, have longer tenure in the industry than managers of comparable IPOs. Managerial experience of SPACs is a signal for the firm quality, which attracts more outside investors and produces higher offer size at IPO. Furthermore, it impacts the level of underwriting spread and the level of quality and interest of institutional investors. Experience of SPAC management teams positively increases the possibility of an acquisition.
Jenkinson & Sousa (2011)	Capital IQ	161 SPACs	2003-2009	Excess returns	In overall, SPACs are not value creating. Financial markets are able to identify bad SPACs prior to the date of acquisition, but in spite of that, many acquisitions are approved notwithstanding expected post-merger's negative returns. Overall, more than half of the SPAC acquisitions are value destroying. Six months after the merger, SPAC investors experience average cumulative returns of -24%. Furthermore, it gets worse with time, as reported one-year average cumulative return is -55%. The sub-group of best performing SPACs exhibit -6.2% annual return.

Thompson (2010)	Datastream, EDGAR, Factive, SDC Platinum	162 SPACs	2003-2010	Excess returns	SPAC investors approve acquisitions that seem value reducing, despite good voting mechanisms that protect them. SPACs, in overall, exhibit significantly positive returns of 1.1% on the date of the merger announcement. The announcement CAR (cumulative average returns) in a three-day window is 1.5%.
Tran (2012)	COMPUSTAT, CRSP, EDGAR, Morgan Joseph report, SDC Platinum	108 SPACs	2003-2009	Excess returns, means of payment dummy variable	SPACs are an important innovation in the financial market. Compared to other public acquirers, SPACs are benefitting from three characteristics: the specialization of underwriters and managers, the ownership structure, and the monitoring role of long-term institutional investors. SPACs execute more focused acquisitions, are less likely to structure these deals as cash only or tender offer, opposed to their public counterparts, and are able to negotiate an additional 7.6% discount in comparison with other acquirers who target the private companies.
Floros & Sapp (2011)	Deal Flow Media, PrivateRaise Database	111 SPACs	2003-2008	Excess returns	Comparatively, SPACs exhibit negative and lower returns than typical shell companies.
Datar, Emm & Ince (2012)	Deal Flow Media, PrivateRaise Database, EDGAR	156 SPACs	2003-2008	Excess returns, size	They compare 156 SPACs to 794 firms that conducted traditional IPOs during the same period. Overall, they find that the operational performance of SPACs is inferior to industry peers and conventional IPOs in the same period. In addition, SPACs carry more debt, are smaller in size, invest less and have lower growth opportunities than the benchmark firms.
Lakicevic and Vulanovic (2013)	Bloomberg, CRSP, EDGAR	161 SPACs	2003-2009	Excess returns at various lifecycle periods for shares, units and warrants	All three SPACs securities exhibit positive merger announcement returns, but the degree of reported positive performance varies and is the highest for warrant holders. Post-acquisition SPAC unit holders experience -28% buy and hold return.
Howe & O'brien (2012)	Mergent Online, CRSP	158 SPACs	2003-2008	Excess returns	SPACs experience positive buy and hold returns after the merger announcement. In the long run, the average six-month return is equal to -14%, average one-year return is -33% and average three-year return is -54%. The board independence and the structure of the ownership do not have a significant effect on the returns.
Dimitrova (2017)	Bloomberg, CRSP, EDGAR, SDC Platinum	73 SPACs	2003-2010	Excess returns at various lifecycle periods	SPACs exhibit poor performances across the board. Their four year-long buy and hold returns are on average -51.9%. The performance is related to the degree of managerial pressure for the completion of the deal, since their incentives with respect to approval are not aligned with the other investors. Using measures of accounting performance such as operating margins and return on sales, SPACs significantly underperform various benchmarks.
Cumming, Haβ & Schweizer (2014)	Deal Flow Media, EDGAR, Morgan Joseph reports, Thompson One, Proprietary data	163 SPACs, 139 SPACs for main analysis	2003-2010	Approval dummy variable	The strongest influence on the approval of SPACs acquisitions comes from the block-holding structure. In deals where the level of ownership by hedge funds and private equity funds increases, merger likelihood decreases. Younger management teams have a higher approval rate. However, managerial experience and enhanced boards do not positively improve the likelihood of an acquisition. Similarly, the support of well-known underwriters and larger syndicates do not increase the likelihood of approval.
Lakicevic, Schachmurove & Vulanovic (2014)	Bloomberg, Chicago Board Option Exchange, EDGAR, Morgan Joseph reports	184 SPACs, 163 SPACs for main analysis	2003-2012	Merger status dummy variable	Timing of the merger announcement, the deals which focus on China, and deals underwritten by the EarlyBirdCapital increase merger likelihood. SPACs significantly change their corporate structure in the first decade of their existence due to market pressures and constant realignments of incentives among major stakeholders.

Schachmur ove & Vulanovic (2015)	Bloomberg, CRSP, EDGAR, Morgan Joseph reports	193 SPACs	2004-2013	Buy and hold returns to stakeholders	The shipping industry uses SPACs as a source of financing in order to gain access to the U.S. financial markets. While investors in shipping focused SPACs exhibit low positive buy and hold returns of 3%, founders of these SPACs reap significant positive returns.
Schachmur ove & Vulanovic (2016)	Bloomberg, CRSP, EDGAR, Morgan Joseph reports	184 SPACs	2003-2011	Buy and hold returns	SPACs are frequently used as an exit strategy for Chinese private companies. SPACs merging with Chinese companies were under the regulatory and market pressure in 2011. These SPACs exhibited a decline in performance. In overall, Chinese focused SPACs overperform the SPACs focused on other geographical areas.
Kolb & Tykvová (2016)	Morgan Joseph reports, TriArtisan, EDGAR, Ellenoff Grossman & Schole, Capital IQ	127 SPACs	2003-2015	Merger status dummy variable, excess returns	SPACs acquisitions are a viable alternative to IPOs for firms that wish to access the public markets in turbulent times when IPOs may be difficult to accomplish. VC involvement is negatively related to the probability of a SPAC acquisition. Private equity prefers regular IPOs over SPAC acquisitions to sell their stakes. Although there is a cash out advantage associated with SPAC acquisitions, they do not seem to attract profitable and prestigious firms.
Vulanovic (2016)	Bloomberg, Datastream, EDGAR, WRDS	105 SPACs	2003-2013	Survival analysis, post-merger status dummy	Structural characteristics of SPACs are important in determining post-merger outcomes. Increases in pre-merger commitment on behalf of the SPAC management, underwriters and initial positive market performance increase the likelihood of post-merger survival. However, mergers with high transaction costs and a focus on foreign companies are more likely to fail.
Kim, Ko, Jun & Song (2020)	KOSDAQ	127 SPACs	2010-2017	Exit strategy dummy, operating performance	Private firms in Korea with smaller size and larger controlling shareholders' ownership merge with SPACs rather than take the conventional IPO route. Controlling shareholders try to protect their control rights after going public. SPAC merger firms in Korea are not inferior to traditional IPO firms, different from findings of prior studies based in the US.
Blomkvist & Vulanovic (2020)	EDGAR	441 SPACs	2003-2019	SPAC market share, SPAC volume, sponsor share	SPAC issuance is negatively related to VIX and VRP. The findings are attributed to risk-averse investors' unwillingness to participate in SPAC issues during times of high VIX and VRP. Sponsors signal quality by increasing their warrant share in successful SPAC issues.

8.2. Appendix B – Comparison of Rule 419 offerings with SPAC offerings

The table summarizes the main difference between a Rule 419 firm and a SPAC. All information presented in the table below is retrieved from Riemer (2007).

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

8.3. Appendix C – US SPAC and IPO activity

This table has been retrieved from spacanalytics.com.

Year	SPAC IPOs	Total IPOs	%	SPAC Proceeds $M	Total US IPO Proceeds $M	%
2021	315	437	72%	101,534	164,906	62%
2020	248	450	55%	83,353	179,356	46%
2019	59	213	28%	13,600	72,200	19%
2018	46	225	20%	10,750	63,890	17%
2017	34	189	18%	10,048	50,268	20%
2016	13	111	12%	3,499	25,779	14%
2015	20	173	12%	3,902	39,232	10%
2014	12	258	5%	1,750	93,040	2%
2013	10	220	5%	1,447	70,777	2%
2012	9	147	6%	490	50,131	1%
2011	16	144	11%	1,110	43,240	3%
2010	7	166	4%	503	50,583	1%
2009	1	70	1%	36	21,676	0%
2008	17	47	36%	3,842	30,092	13%
2007	66	299	22%	12,094	87,204	14%
2006	37	214	17%	3,384	55,754	6%
2005	28	252	11%	2,113	61,893	3%
2004	12	268	4%	485	72,865	1%
2003	1	127	1%	24	49,954	0%
Total	951			253,966		

8.4. Appendix D – List of SPACs used in the sample

SPAC ticker	SPAC name	Post SPAC ticker	Post SPAC name
TPGH	TPG Pace Holdings Corp.	ACEL	Accel Entertainment
CPAA	Conyers Park II Acquisition Corp.	ADV	Advantage Solutions Inc
BRAC	Black Ridge Acquisition Corp.	AESE	Allied Esports Entertainment
FSAC	Federal Street Acquisition Corp.	AGLY	Agiliti
DFBH	DFB Healthcare Acquisitions Corp.	AHCO	AdaptHealth
BRPM	B. Riley Principal Merger Corp.	ALTG	Alta Equipment Group Inc
KAAC	Kayne Anderson Acquisition Corp.	ALTM	Altus Midstream
SRUN	Silver Run Acquisition Corporation II	AMR	Alta Mesa Resources
HYAC	Haymaker Acquisition Corp. II	ARKO	ARKO Corp
MNCL	Monocle Acquisition Corporation	ASLE	AerSale Corporation
BWMC	Boxwood Merger Corp.	ATCX	Atlas Technical Consultants
KBLM	KBL Merger Corp. IV	ATNF	180 Life Sciences Corporation
WRLS	Pensare Acquisition Corp.	AVCT	American Virtual Cloud Technologies
INDU	Industrea Acquisition Corp.	BBCP	Brundage-Bone Concrete Pumping
OPES	Opes Acquisition Corp.	BFI	BurgerFi International
LTN	Union Acquisition Corp.	BIOX	Bioceres Crop Solutions Corp
MFAC	Megalith Financial Acquisition Corp.	BMTX	BM Technologies, Inc.
TMCX	Trinity Merger Corp.	BRMK	Broadmark Realty Capital Inc.
TWLV	Twelve Seas Investment Corporation	BROG	Brooge Holdings Limited
PAAC	Pacific Special Acquisition Corp.	BRQS	Borqs Technologies
SMMC	South Mountain Merger Corp.	BTRS	BTRS Holdings Inc.
DDMX	DD3 Acquisition Corp.	BWMX	Betterware De Mexico
CCC	Churchill Capital Corp.	CCC	Clarivate Analytics Plc
WYIG	JM Global Holding Company	CCNC	Code Chain New Continent
ARYB	ARYA Sciences Acquisition Corp II	CERE	Cerevel Therapeutics
TOTA	Tottenham Acquisition I Limited	CLNN	Clene Nanomedicine, Inc.
IPOC	Social Capital Hedosophia Holdings Corp. III	CLOV	Clover Health Investments, Corp.
SAMA	Schultze Special Purpose Acquisition Corp.	CLVR	Clever Leaves Holdings
SAQN	Software Acquisition Group Inc.	CURI	CuriosityStream Inc.
FMCI	Forum Merger Corporation	CVON	ConvergeOne Holdings
DEAC	Diamond Eagle Acquisition Corp.	DKNG	DraftKings Inc
TRNE	Trine Acquisition Corp.	DM	Desktop Metal Inc.
LHC	Leo Holdings Corp.	DMS	Digital Media Solutions, Inc.

CNAC	Constellation Alpha Capital Corp.	DMTK	DermTech
LOAK	Live Oak Acquisition Corp.	DNMR	Danimer Scientific, Inc.
BMRG	B. Riley Principal Merger Corp. II	EOSE	Eos Energy Enterprises, Inc.
JFK	8i Enterprises Acquisition Corp	EQOS	Diginex Limited
BLVD	Boulevard Acquisition Corp. II	ESTR	Estre Ambiental S.A.
OSPR	Osprey Energy Acquisition Corp.	FLMN	Falcon Minerals Corporation
ACTT	Act II Global Acquisition Corp.	FREE	Whole Earth Brands Inc
SPAQ	Spartan Energy Acquisition Corp.	FSR	Fisker Inc.
FPAC	Far Point Acquisition Corporation	GB	Global Blue Group
CFFA	CF Finance Acquisition Corp.	GCMG	GCM Grosvenor Inc.
CTAC	ChaSerg Technology Acquisition Corp.	GDYN	Grid Dynamics Holdings, Inc
LCA	Landcadia Holdings II, Inc.	GNOG	Golden Nugget Online Gaming, Inc.
HCAC	Hennessy Capital Acquisition Corp. IV	GOEV	Canoo Holdings
TKKS	TKK Symphony Acquisition Corporation	GSMG	Glory Star New Media Group
GLAC	Greenland Acquisition Corporation	GTEC	Greenland Technologies Holdings
GTYH	GTY Technology Holdings Inc.	GTYH	GTY Technology Holdings
ATAC	Atlantic Acquisition Corp.	HFFG	Hf Foods Group
OAC	Oaktree Acquisition Corp.	HIMS	Hims & Hers Health, Inc.
GPAQ	Gordon Pointe Acquisition Corp.	HOFV	Hall of Fame Resort & Entertainment Company
PACQ	Pure Acquisition Corp.	HPK	HighPeak Energy, Inc.
HCCH	HL Acquisitions Corp.	HTOO	Fusion Fuel Green PLC
SHLL	Tortoise Acquisition Corp.	HYLN	Hyliion
MUDS	Mudrick Capital Acquisition Corporation	HYMC	Hycroft Mining Holding Corporation
LGC	Legacy Acquisition Corp.	ID	PARTS iD
MIII	M III Acquisition Corp.	IEA	Infrastructure and Environmental Alternatives
TIBR	Tiberius Acquisition Corporation	IGIC	International General Insuranc Hldgs Ltd
ARYA	ARYA Sciences Acquisition Corp.	IMTX	Immatics N.V.
HSAC	Health Sciences Acquisitions Corporation	IMVT	Immunovant Inc.
FNTE	FinTech Acquisition Corp. II	IMXI	International Money Express
MTEC	MTech Acquisition Corp.	KERN	Akerna
PVT	Pivotal Acquisition Corp.	KLDI	KLDiscovery Inc
GIG	GigCapital, Inc.	KLR	Kaleyra
CMSS	CM Seven Star Acquisition Corporation	KXIN	Kaixin Auto Holdings
GMHI	Gores Metropoulos, Inc.	LAZR	Luminar Technologies, Inc.
ANDA	Andina Acquisition Corp. II	LAZY	Lazydays Holdings

PAAC	Proficient Alpha Acquisition Corp.	LGHL	Lion Group Holding Ltd
ACAM	Acamar Partners Acquisition Corp.	LOTZ	CarLotz, Inc.
NEBU	Nebula Acquisition Corp.	LPRO	Open Lending Corp.
LFAC	LF Capital Acquisition Corp.	LSEA	Landsea Homes Corporation
EDTX	EdtechX Holdings Acquisition Corp.	METX	Meten EdtechX Education Group
TPGE	TPG Pace Energy Holdings Corp.	MGY	Magnolia Oil & Gas Corporation
FVAC	Fortress Value Acquisition Corp.	MP	MP Materials Corp.
CCXX	Churchill Capital Corp III	MPLN	MultiPlan Corporation
NESR	National Energy Services Reunited Corp.	NESR	National Energy Services Reunited
HRMN	Harmony Merger Corp.	NEXT	NextDecade
NFC	New Frontier Corporation	NFH	New Frontier Health
VTIQ	VectoIQ Acquisition Corp.	NKLA	Nikola Corporation
HCAC	Hennessy Capital Acquisition Corp. III	NRCG	NRC Group Holdings Corporation
CIC	Capitol Investment Corp. IV	NSCO	Nesco Holdings
IPOB	Social Capital Hedosophia Holdings Corp. II	OPEN	Opendoor Technologies Inc.
AHPA	Avista Healthcare Public Acquisition Corp.	ORGO	Organogenesis Holdings
HYAC	Haymaker Acquisition Corp.	OSW	OneSpaWorld
OMAD	One Madison Corporation	PACK	Ranpak Holdings Corp
GRSH	Gores Holdings III, Inc.	PAE	PAE Inc
FTAC	FinTech Acquisition Corp. III	PAYA	Paya Holdings Inc.
JSYN	Jensyn Acquisition Corp.	PECK	The Peck Company
CHAC	Chardan Healthcare Acquisition Corp.	PHGE	BiomX
STLR	Stellar Acquisition III Inc.	PHUN	Phunware
PTAC	PropTech Acquisition Corporation	PRCH	Porch Group, Inc.
GPAC	Global Partner Acquisition Corp.	PRPL	Purple Innovation
MACQ	M I Acquisitions, Inc.	PRTH	Priority Technology Holdings
KCAC	Kensington Capital Acquisition Corp.	QS	QuantumScape
DOTA	Draper Oakwood Technology Acquisition Inc.	RBZ	Reebonz
DPHC	DiamondPeak Holdings Corp.	RIDE	Lordstown Motors Corp.
GPIA	GP Investments Acquisition Corp.	RMNI	Rimini street
RMG	RMG Acquisition Corp.	RMO	Romeo Power, Inc.
TBRG	Thunder Bridge Acquisition, Ltd.	RPAY	Repay Holdings Corporation
DMYT	dMY Technology Group, Inc.	RSI	Rush Street Interactive, Inc.
TZAC	Tenzing Acquisition Corp.	RVPH	Reviva Pharmaceuticals Holdings, Inc.
INSU	Insurance Acquisition Corp.	SFT	Shift Technologies

EACQ	Easterly Acquisition Corp.	SG	Sirius International Insurance Group
HHHH	Wealthbridge Acquisition Limited	SJ	Scienjoy Holding Corp
FEAC	Flying Eagle Acquisition Corp.	SKLZ	Skillz
CPAA	Conyers Park Acquisition Corp.	SMPL	The Simply Good Foods Company
IPOA	Social Capital Hedosophia Holdings Corp.	SPCE	Virgin Galactic Holdings Inc
EAGL	Platinum Eagle Acquisition Corp.	TH	Target Hospitality Corp
HCCO	Healthcare Merger Corp.	TLMD	SOC Telemed, Inc.
NFIN	Netfin Acquisition Corp.	TRIT	Triterras, Inc.
FMCI	Forum Merger II Corp.	TTCF	Tattooed Chef, Inc
ORSN	Orisun Acquisition Corp.	UK	Ucommune International Ltd
MPAC	Matlin & Partners Acquisition Corp.	USWS	US Well Services
CCH	Collier Creek Holdings	UTZ	Utz Brands, Inc
GHIV	Gores Holdings IV, Inc.	UWMC	UWM Holdings Corporation
LSAC	LifeSci Acquisition Corp.	VINC	Vincera Pharma, Inc.
GRAF	Graf Industrial Corp.	VLDR	Velodyne Lidar, Inc
GSHT	Gores Holdings II, Inc.	VRRM	Verra Mobility Corp
GSAH	GS Acquisition Holdings Corp.	VRT	Vertiv Holdings Co
MOSC	Mosaic Acquisition Corp.	VVNT	Vivint Smart Home
IAM	I-AM Capital Acquisition Company	WINR	Simplicity Esports and Gaming
EAGL	Double Eagle Acquisition Corp.	WSC	WillScot Corporation
HHHH	Wealthbridge Acquisition Limited	SJ	Scienjoy Holding Corp
LCA	Landcadia Holdings, Inc.	WTRH	Waitr Holdings
QPAC	Quinpario Acquisition Corp. 2	XELA	Exela Technologies
PIC	Pivotal Investment Corporation II	XL	XL Fleet Corp
BCAC	Bison Capital Acquisition Corp.	XYNO	Xynomic Pharmaceuticals Holdings
BHAC	Barington/Hilco Acquisition Corp.	-	-
ELEC	Electrum Special Acquisition Corp	-	-
VEAC	Vantage Energy Acquisition Corporation	-	-
STNL	Sentinel Energy Services Inc.	-	-
RWGE	Regalwood Global Energy Ltd.	-	-
ALGR	Allegro Merger Corp.	-	-
FLLC	Fellazo Inc.	-	-

8.5. Appendix E – Robustness check results

8.5.1. Probit regression results – robustness check hypothesis 1

Table 14. Probit robustness check

Variable	Binary dependent variable: acquisition = 1 / liquidation = 0	
	Model 1	Model 2
(Constant)	5.012	1.050
UND_DC	-0.037	0.057***
UND_MKT	-12.826*	-6.552***
LGL_DC	-0.304**	-0.089***
LGL_MKT	97.239**	22.399***
AUD_DC	0.281*	0.034***
AUD_MKT	-21.943*	-0.417
SPAC_size	0.002	-0.001
Overallotment	0.084	0.543*
Days_to_ACQ/LIQ	-0.007	-0.004***
Nr_of_UND	1.439	0.106
Nr_of_MAN	-0.170	0.215**
Target_IND	1.590	0.019
Target_GEO	9.979	-1.241***
Region fixed effects	No	No
Year fixed effects	No	No
N	134	254

Notes: This table reports beta coefficients. The dependent variables represent the acquisition approval probability with a binary variable where acquisition = 1 and liquidation = 0. Model 1 presents the results for the initial sample. Model 2 includes 120 synthetic observations with a dependent variable liquidation to balance the overall distribution of the dependent variable. The synthetic observations have been constructed with the SMOTE methodology. All variable definitions can be found in Table 3. ***, **, * shows the significance at 1%, 5%, and 10% respectively.

Table 15. 5-day CAR_AN robustness check

Variable	5-day CAR surrounding announcement date (CAR_AN)			
	Model 1	**Model 2**	**Model 3**	**Model 4**
(Constant)	0.221**	0.040	0.011	0.145
UND_DC	-0.456***			-0.372***
UND_MKT	-0.065			-0.067
LGL_DC		-0.522***		-0.594***
LGL_MKT		0.214		0.327**
AUD_DC			0.183	0.569**
AUD_MKT			-0.073	-0.175
SPAC_size	0.087	-0.088	-0.003	0.021
Overallotment	-0.046	-0.012	-0.057	-0.028
Days_to_AN	0.293	0.409	0.362	0.284
Days_to_ACQ	-0.314	-0.379	-0.275	-0.277
Nr_of_UND	0.123	0.171*	0.187*	0.168
Nr_of_MAN	-0.138	-0.059	-0.065	-0.099
Target_IND	0.145	0.191	0.112	0.165
Target_GEO	0.056	0.063	-0.004	0.058
Region fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	103	103	103	103
Adjusted R^2	0.151	0.145	0.033	0.228
F-statistic	2.063**	2.018**	1.203	2.433***

Notes: This table reports the standardized coefficients. The dependent variable (CAR_AN) has been winsorized at the 5% level. All variable definitions can be found in Table 3. ***, **, * shows the significance at 1%, 5%, and 10% respectively.

Table 16. 3-day CAR_AN robustness check

Variable	3-day CAR surrounding announcement date (CAR_AN)			
	Model 1	Model 2	Model 3	Model 4
(Constant)	0.281**	0.087	0.070	0.204
UND_DC	-0.424***			-0.341**
UND_MKT	-0.139			-0.142
LGL_DC		-0.576***		-0.629***
LGL_MKT		0.278*		0.379**
AUD_DC			0.078	0.474*
AUD_MKT			-0.041	-0.149
SPAC_size	0.100	-0.133	-0.039	0.011
Overallotment	-0.025	0.009	-0.034	-0.003
Days_to_AN	0.307	0.393	0.364	0.294
Days_to_ACQ	-0.351	-0.393	-0.312	-0.322
Nr_of_UND	0.104	0.138	0.144	0.147
Nr_of_MAN	-0.203**	-0.122	-0.130	-0.167*
Target_IND	0.191	0.248*	0.173	0.223*
Target_GEO	0.078	0.098	0.038	0.084
Region fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	103	103	103	103
Adjusted R^2	0.140	0.153	0.026	0.217
F-statistic	1.977**	2.085**	1.159	2.349***

Notes: This table reports the standardized coefficients. The dependent variable (CAR_AN) has been winsorized at the 5% level. All variable definitions can be found in Table 3. ***, **, * shows the significance at 1%, 5%, and 10% respectively.

Table 17. Subsample CAR_AN robustness check

Variable	7-day CAR surrounding announcement date (CAR_AN) US only			
	Model 1	Model 2	Model 3	Model 4
(Constant)	0.204*	0.074	0.079	0.156
UND_DC	-0.301**			-0.262*
UND_MKT	-0.064			-0.079
LGL_DC		-0.456**		-0.544***
LGL_MKT		0.211		0.310*
AUD_DC			0.062	0.532
AUD_MKT			-0.076	-0.161
SPAC_size	0.079	-0.046	0.017	0.029
Overallotment	-0.036	-0.008	-0.051	-0.010
Days_to_AN	0.321	0.402	0.372	0.284
Days_to_ACQ	-0.360	-0.398	-0.344	-0.321
Nr_of_UND	0.151	0.174	0.195*	0.183
Nr_of_MAN	-0.133	-0.073	-0.080	-0.112
Target_IND	0.068	0.105	0.055	0.131
Target_GEO	-0.027	-0.006	-0.067	-0.006
Region fixed effects	No	No	No	No
Year fixed effects	Yes	Yes	Yes	Yes
N	75	75	75	75
Adjusted R^2	0.127	0.155	0.071	0.176
F-statistic	1.864**	2.089**	1.457	1.999**

Notes: This table reports the standardized coefficients. The dependent variable (CAR_AN) has been winsorized at the 5% level. All variable definitions can be found in Table 3. ***, **, * shows the significance at 1%, 5%, and 10% respectively.

Table 18. 5-day CAR_ACQ robustness check

Variable	5-day CAR surrounding acquisition date (CAR_ACQ)			
	Model 1	Model 2	Model 3	Model 4
(Constant)	0.720**	0.741**	0.781**	0.652
UND_DC	0.000			-0.010
UND_MKT	0.282*			0.268*
LGL_DC		-0.182		-0.240
LGL_MKT		0.227		0.248
AUD_DC			0.170	0.248
AUD_MKT			-0.094	-0.104
SPAC_size	-0.137	-0.037	0.042	-0.180
Overallotment	0.055	0.071	0.057	0.058
Days_to_AN	-0.046	-0.036	-0.008	-0.097
Days_to_ACQ	-0.251	-0.285	-0.280	-0.195
Nr_of_UND	-0.164	-0.098	-0.102	-0.135
Nr_of_MAN	-0.132	-0.158	-0.151	-0.127
Target_IND	0.123	0.123	0.102	0.133
Target_GEO	-0.120	-0.160	-0.169	-0.136
Region fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	103	103	103	103
Adjusted R^2	0.103	0.081	0.068	0.086
F-statistic	1.691*	1.528	1.437	1.455

Notes: This table reports the standardized coefficients. The dependent variable (CAR_ACQ) has been winsorized at the 5% level. All variable definitions can be found in Table 3. ***, **, * shows the significance at 1%, 5%, and 10% respectively.

Table 19. 3-day CAR_ACQ robustness check

Variable	3-day CAR surrounding acquisition date (CAR_ACQ)			
	Model 1	Model 2	Model 3	Model 4
(Constant)	0.408*	0.339*	0.324*	0.326
UND_DC	-0.122			-0.098
UND_MKT	0.182			0.178
LGL_DC		-0.290		-0.342*
LGL_MKT		0.215		0.254
AUD_DC			0.087	0.255
AUD_MKT			0.004	-0.034
SPAC_size	-0.017	0.007	0.079	-0.073
Overallotment	0.021	0.043	0.022	0.031
Days_to_AN	0.264	0.307	0.316	0.238
Days_to_ACQ	-0.559**	-0.608**	-0.588**	-0.532*
Nr_of_UND	-0.139	-0.081	-0.086	-0.115
Nr_of_MAN	-0.094	-0.091	-0.091	-0.080
Target_IND	0.176	0.191	0.143	0.181
Target_GEO	-0.043	-0.065	-0.085	-0.042
Region fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	103	103	103	103
Adjusted R^2	0.123	0.125	0.101	0.117
F-statistic	1.845**	1.856**	1.671*	1.641*

Notes: This table reports the standardized coefficients. The dependent variable (CAR_ACQ) has been winsorized at the 5% level. All variable definitions can be found in Table 3. ***, **, * shows the significance at 1%, 5%, and 10% respectively.

Table 20. Subsample CAR_ACQ robustness check

Variable	7-day CAR surrounding acquisition date (CAR_ACQ) US only			
	Model 1	Model 2	Model 3	Model 4
(Constant)	0.947**	0.935**	1.078***	0.967**
UND_DC	0.004			-0.008
UND_MKT	0.195			0.160
LGL_DC		-0.137		-0.158
LGL_MKT		0.194		0.187
AUD_DC			0.228	0.271
AUD_MKT			-0.234	-0.221
SPAC_size	-0.076	-0.014	0.047	-0.092
Overallotment	-0.058	-0.047	-0.045	-0.052
Days_to_AN	-0.023	-0.039	-0.055	-0.092
Days_to_ACQ	-0.282	-0.286	-0.247	-0.210
Nr_of_UND	-0.039	0.009	0.011	0.002
Nr_of_MAN	-0.153	-0.170	-0.159	-0.148
Target_IND	0.088	0.093	0.098	0.124
Target_GEO	-0.201	-0.227	-0.258*	-0.232
Region fixed effects	No	No	No	No
Year fixed effects	Yes	Yes	Yes	Yes
N	75	75	75	75
Adjusted R^2	0.135	0.130	0.148	0.127
F-statistic	1.922**	1.884**	2.033**	1.681*

Notes: This table reports the standardized coefficients. The dependent variable (CAR_ACQ) has been winsorized at the 5% level. All variable definitions can be found in Table 3. ***, **, * shows the significance at 1%, 5%, and 10% respectively.

Table 21. Subsample ARR_AN robustness check

Variable	(ARR_AN) US only			
	Model 1	Model 2	Model 3	Model 4
(Constant)	0.044	-0.082	-0.127	0.248
UND_DC	-0.165			-0.280**
UND_MKT	0.050			0.055
LGL_DC		0.906***		1.084***
LGL_MKT		-0.528***		-0.572***
AUD_DC			0.087	-0.610**
AUD_MKT			-0.004	0.148
SPAC_size	-0.108	0.056	-0.087	0.023
Overallotment	-0.008	-0.091	-0.018	-0.075
Days_to_AN	0.236	0.273	0.272	0.242
Days_to_ACQ	-0.183	-0.153	-0.188	-0.186
Nr_of_UND	0.076	0.120	0.114	0.046
Nr_of_MAN	-0.004	0.002	0.017	-0.047
Target_IND	0.162	0.031	0.142	0.041
Target_GEO	0.135	0.022	0.107	0.062
Region fixed effects	No	No	No	No
Year fixed effects	Yes	Yes	Yes	Yes
N	75	75	75	75
Adjusted R^2	0.150	0.430	0.133	0.493
F-statistic	2.043**	5.476***	1.909**	5.563***

Notes: This table reports the standardized coefficients. The dependent variable (ARR_AN) has been winsorized at the 5% level. All variable definitions can be found in Table 3. ***, **, * shows the significance at 1%, 5%, and 10% respectively.

Table 22. Subsample ARR_ACQ robustness check

Variable	(ARR_ACQ) US only			
	Model 1	Model 2	Model 3	Model 4
(Constant)	1.076*	0.384	0.431	1.481***
UND_DC	-0.260**			-0.324***
UND_MKT	-0.022			-0.026
LGL_DC		0.471***		0.620***
LGL_MKT		-0.279**		-0.300**
AUD_DC			-0.062	-0.415*
AUD_MKT			-0.032	0.049
SPAC_size	-0.065	-0.021	-0.105	0.002
Overallotment	-0.051	-0.104	-0.057	-0.085
Days_to_AN	0.328	0.386*	0.386*	0.324
Days_to_ACQ	-0.363*	-0.348*	-0.368	-0.358*
Nr_of_UND	0.094	0.136*	0.130	0.082
Nr_of_MAN	-0.103	-0.070	-0.061	-0.128*
Target_IND	0.175	0.096	0.162	0.113
Target_GEO	0.045	-0.029	0.012	-0.006
Region fixed effects	No	No	No	No
Year fixed effects	Yes	Yes	Yes	Yes
N	75	75	75	75
Adjusted R^2	0.512	0.549	0.472	0.619
F-statistic	7.221***	8.220***	6.311***	8.617***

Notes: This table reports the standardized coefficients. The dependent variable (ARR_ACQ) has been winsorized at the 5% level. All variable definitions can be found in Table 3. ***, **, * shows the significance at 1%, 5%, and 10% respectively.