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SPAC merger announcement returns and subsequent performance

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Abstract

Special purpose acquisition companies (SPACs) are created to raise capital and then find non-listed operating companies with which to merge. While most of the extant research has focused on SPAC initial public offerings, we study what happens when SPACs announce business combinations. Our analysis of 236 'deSPACs' completed between January 2012 and June 2021 in the United States documents an average short-term announcement return of +7.4% and a 1-year abnormal return of −14.1% (−18.0% over 2 years) for public investors beginning from the merger announcement. Short-term returns decrease with longer times from initial public offering until announcement.

KEYWORDS

deSPACs, IPO, performance, special purpose acquisition companies (SPACs)

JEL CLASSIFICATION

G14, G30, G34, G24

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1 | INTRODUCTION

Special purpose acquisition companies (SPACs) are companies that do not have any operating business, yet raise funds through initial public offerings (IPOs) for the sole purpose of merging with a private target company within a limited period of time. In 2020, SPACs set a record of 248 IPOs and $83.4 billion raised in the United States, only to be eclipsed in 2021 with 613 IPOs raising $162.5 billion, according to SPAC Research. Studies, however, document that postmerger share prices tend to fall for most SPACs (Gahng et al., 2021; Jenkinson & Sousa, 2011; Klausner et al., 2022). Gahng et al. (2021) note that, although SPAC IPO investors have earned an annualized return of 15.9% from the IPO until the merger or liquidation date, there are 'stark differences' in returns between common shares and warrants in the postmerger period. They explain why companies would opt to go public via a SPAC merger by focusing on the economic role of SPAC sponsors and discussing the economic rationale for various features of a typical SPAC. In this paper, we extend the empirical evidence by focusing on what happens when a successful business combination—the so-called 'deSPAC'—is announced.[1]

The announcement day of a proposed merger is the focal point in the lifetime of a SPAC, but it may be met either positively or negatively by the market. Our focus on the announcement day is guided by the literature on mergers and acquisitions (M&As), with the notable difference that the acquirer in SPAC mergers does not have an operating unit and thus there is no synergy gain. As documented by Gahng et al. (2021), merging with a SPAC is a more expensive way of going public for a private operating company than a traditional IPO. On the contrary, however, it is the received wisdom that SPACs have a regulatory advantage over 'standard' IPOs in that they take place under merger regulations rather than security issuance regulations [although the US Securities and Exchange Commission (SEC) has called this 'regulatory arbitrage' into question].[2]

Regarding the securities issuance laws that apply to IPOs, merger law provides 'safe harbour' provisions for forecasts of future revenue and profits. Klausner et al. (2022) give a detailed explanation of these regulatory differences. It is supported by the evidence that there have been very few Section 11 cases against post-merger SPACs in connection with their mergers.[3] To consider the 'regulatory arbitrage opportunity' of SPACs between merger and security issuance laws, we empirically analyze their announcements of business combinations through an M&A lens.

We construct a data set of 236 deSPACs announced in the United States between January 2012 and June 2021 for which a merger was consummated by 1 July 2021. We combine multiple sources of SPAC data, manually check several deal characteristics and control for rumours before the official announcement. We first investigate post-merger announcement performance in the short term, using the period around the day a SPAC announces a business combination target to gauge stock market response. Second, we calculate the buy-and-hold-abnormal returns (BHARs)

[1]A deSPAC transaction enables the target company to go public by merging with a SPAC. For the purpose of this paper, we use the terms 'merger' and 'business combination' interchangeably throughout.
[2]See www.sec.gov/news/public-statement/spacs-ipos-liability-risk-under-securities-laws
[3]Any material misstatement in or omission from an effective Securities Act registration statement as part of a deSPAC business combination is subject to Securities Act Section 11. Note that also liabilities could arise under Section 10(b) of the Exchange Act and Rule 10b–5, which prohibit intentional or reckless material misstatements or omissions in connection with the purchase or sale of a security (see Coates, 2022; for SPAC law).

of these SPACs over 6–24 months from the announcement day and from the deSPAC date to examine long-term performance.

Our study provides new insights into the performance of deSPACs for public SPAC investors. First, note that prior literature based on earlier sample periods finds abnormal announcement returns of less than +2% on average (e.g., Dimitrova, 2017; Lakicevic & Vulanovic, 2013). Our more recent evidence shows that abnormal returns are on average +7.4% in the 5 days around the announcement of the target. By focusing on announcements that result in completed mergers, we are introducing a look-ahead bias. When we include announcements that result in the SPAC liquidating without consummating a merger, the average falls to +6.4%. We further find that announcement effects are lower when the time from IPO until the announcement is longer.

These positive short-term effects, however, do not persist over time. We observe a negative performance in all periods for the 12 months to 2 years from the announcement of the business combination. Average abnormal performance after 12 months is −14.1%, while it is −20.2% after 18 months and −18.0% after 24 months. The negative long-run performance is consistent with prior literature (e.g., Dimitrova, 2017; Howe & O'Brien, 2012; Kolb & Tykvova, 2016). While most prior literature uses the deSPAC date, in line with prior M&A studies, we use the announcement of the merger as the event date. The SPAC process can be separated into four periods: (i) IPO to merger announcement, (ii) merger announcement, (iii) announcement to completion or liquidation and (iv) the deSPAC period. Dimitrova (2017) is the only study that also examines these subperiods and begins from the merger announcement and does not start solely from the deSPAC date. To compare our results with the previous literature, we also measure the long-term performance from the deSPAC date but find that our results are less extreme than reported in earlier studies.

Examining the long-term performance, we find that the relative size of the target to the acquiring SPAC is associated with the long-term results. This finding extends the literature on SPACs and is in line with that from the M&A literature that smaller public acquirers experience larger positive returns upon announcing acquisition targets (Moeller et al., 2004). Consistent with our short-term results, we find that deSPACs that announced target combinations earlier tend to perform better than those that announced a target after a longer search period.

2 | LITERATURE REVIEW

Previous research on SPACs examines legal aspects and specific structural characteristics (e.g., Coates, 2022; Cumming et al., 2014; and Lakicevic et al., 2014), the determinants of the likelihood of successful merger outcomes (e.g., Cumming et al., 2014; Lakicevic & Vulanovic, 2011; Lakicevic et al., 2014), as well as the agency conflicts in SPAC structures (e.g., Del Giudice & Signori, 2021; Klausner et al., 2022). Kolb and Tykvova (2016) examine the decision criteria of companies going public by merging with a SPAC instead of engaging in a traditional IPO. Many of these papers use samples consisting of SPAC IPOs that were conducted before 2016. Since then, the structural characteristics have changed.[4]

[4]Another structural shift in the characteristics of SPACs occurred in 2010 when SPAC-specific listings were introduced by Nasdaq. They were subsequently adopted by NYSE Amex in January 2011. These changes include, among others, smaller sponsor promotes and lower maximum redemption thresholds, but also longer windows to find suitable targets (extended from 18 to 36 months). A comprehensive list of changes in the SPAC structure can be found in Gahng et al. (2021).

First, the number of SPACs and the amount they raise through IPOs has significantly increased over time. In 2010, SPACs raised on average $80 million; in 2020, that amount increased to $308 million (Gahng et al., 2021).[5] The increased number of SPACs may also impact the performance of common investors. Second, in recent years, SPACs have found target companies more easily as fewer SPACs are liquidated, although the high issuance in 2021 is widely thought to have changed the supply/demand situation.[6] Third, high-profile investors and sponsors have entered the market. Fourth, most of the SPACs were traded over the counter, before and after the merger, before 2011. Since then, nearly all SPACs are traded on an organized exchange. We, therefore, study SPACs conducted after 2012 and compare our results with previous studies examining deSPACs that went public before 2010 (e.g., Dimitrova, 2017).

Two recent studies on SPAC IPOs are closely related to ours. Gahng et al. (2021) examine 905 SPAC IPOs in the United States between January 2010 and September 2021. They calculate the performance of both liquidated and completed SPACs. They show that SPAC IPO investors earned annualized average returns of 15.9% through the date of liquidation or merger completion, but that deSPACs had negative average returns of −8.1% in the 1st year, while warrants returned 68.0%. Moreover, merging with a SPAC is significantly more expensive for private operating companies than conducting a traditional IPO.

We use a comparable data set and focus on the characteristics of SPACs that conducted successful mergers. Klausner et al. (2022) analyze 47 deSPACs completed between January 2019 and June 2020. They mainly focus on the structure and the costs of SPACs that successfully merged and report that SPAC IPO investors who redeemed their shares earn average annualized returns of 11.6%. This includes the redemption price plus the market value of their warrants and rights at the time of the SPAC merger.

2.1 | Short-term announcement effects of SPACs

Some of the extant literature has examined the performance of SPACs around the two major announcement events in their lifecycle: the merger announcement date and the completion or deSPAC date. Using a sample of 88 SPACs that conducted IPOs from 2003 and announced their target companies before February 2009, Lakicevic and Vulanovic (2013) analyze performance around merger completion dates. They find statistically significant abnormal returns of −6.3% during the [0, +3] event window. The performance is worse for longer event windows (e.g., −9.6% during the [0, +7] event window). The authors argue that this poor performance may be attributable to trading activities occurring before the merger date, where parties in favour of the merger may be purchasing stocks at a premium before the proxy vote.

Howe and O'Brien (2012) study a sample of 116 SPACs that completed their IPOs between 2003 and 2008 and find cumulative abnormal returns (CARs) of +1.7% during the [−5, +5] event window around the announcement date. Splitting the sample at the median value of various variables, their results show that SPACs with a higher percentage of independent board directors perform better in the long run.

[5]SPAC Analytics and SPAC Research report average SPAC IPO proceeds of $336 million. Gahng et al. (2021), however, exclude overallotment options, leading to the difference in the average IPO proceeds.

[6]According to SPAC Insider, around 25% of SPACs between 2010 and 2015 were liquidated and returned capital to investors. During 2015–2020, more than 90% of SPACs merged with an operating target company and only a few were liquidated.

Dimitrova (2017) focuses on the merger announcement day and examines abnormal returns over a 3-day event window for 68 SPACs that announced their target companies between 2004 and 2010. She documents a positive abnormal performance of +1.5%, driven largely by SPACs that completed acquisitions. One of the requirements in SPAC contracts is that the initial target business must have a fair market value equal to at least 80% of the SPAC's net assets. She finds that deals with values close to the required 80% of SPAC assets at the time of the merger agreement signing have a negative effect on short-term performance. This may be due to cases where SPAC management chooses an acquisition target just for the sake of closing the deal and collecting returns on their investments. Interestingly, Dimitrova (2017) notes that the longer it takes a SPAC to announce an acquisition, the more positive is the abnormal returns.

These results are contrary to the findings of Degeorge et al. (2016), who show that secondary buyouts (SBOs) made late in the investment period tend to underperform other SBOs. However, Dimitrova's (2017) sample of SPACs terminates about 10 years ago, when the SPAC market was more sporadic (Blomkvist & Vulanovic, 2020). The announcement of a business combination may carry a different meaning in a 'hot' market. For example, a longer duration between IPO and deal announcement could point to SPAC founders being forced to make unsuitable acquisitions, as last-minute opportunistic deals. Moreover, as explained by Gahng et al. (2021), the structure of SPACs fundamentally changed in 2010 due to two main changes. First, voting and redemption rights became two independent decisions, allowing public shareholders to approve a bad deal and redeem their shares. The second change increased the disciplinary tool of redemption rights as sponsors bought more private placement warrants or units and put more money into the trust, making redemptions more attractive. For this reason, we believe that a reassessment of the relationship between time to the announcement and abnormal returns upon announcement may shed new light on the phenomenon.

2.2 | Long-run performance of SPACs

Existing studies show that SPACs underperform firms that are similar in size and book-to-market ratio, as well as IPOs. Howe and O'Brien (2012) analyze the long-run performance of 79 SPACs that went public during 2003–2008. They find that average buy-and-hold returns over the 6 months after the merger vote date, which is shortly before the deSPAC or liquidation date, yield −14%. For periods of 1 and 3 years, they find mean buy-and-hold returns of −32.5% and −53.8%, respectively. Jenkinson and Sousa (2011) consider SPAC IPOs between 2003 and 2008 and also examine the postacquisition performance of 43 SPACs, beginning from the vote that confirmed the proposed acquisition. They report an average cumulative return of −24% after 6 months for the deSPACs, calculated on an equally weighted basis. However, investors who only supported deals where the market reaction to the proposed acquisition was positive 'reaped handsome, low-risk profits'. Using a sample of 161 SPACs that conducted IPOs between 2003 and 2009, Lakicevic and Vulanovic (2013) find average buy-and-hold unit returns of −28.7% for 66 SPACs that completed a merger and −8.2% for 23 SPACs that were still seeking a target and did not announce a merger yet. Lakicevic and Vulanovic (2013) calculate the buy-and-hold returns in both samples for investors who bought one SPAC unit on the IPO date and who hold the unit until the end of the observation period in the last week of June 2009.

Kolb and Tykvova (2016) study what they call the wave of 'new-generation' SPACs beginning in 2003 after the introduction of Rule 419 Blank Check Offering Terms aiming to

improve transparency, shareholder protection and the alignment of interest between shareholders and SPAC sponsors,[7] and find severe underperformance for SPAC IPOs compared to market, industry and comparable IPO firms. Abnormal performance is measured for periods of 6, 12, 24 and 60 months beginning on the 1st day after the SPAC acquisition has been completed. BHARs calculated with the Russell 2000 as the benchmark index yield −46%, −59% and −102% for investment horizons of 12, 24 and 60 months, respectively. Abnormal performance is substantially worse than that for comparable IPOs across all windows and benchmarks.

Using a similar sample of SPAC IPOs between 2003 and 2010, Dimitrova (2017) documents an average stock performance of −41.5% for 71 SPACs from the merger announcement date until 1-year postacquisition. Average long-term performance over the same period for the Russell 2000 index and industry and size-matched firms was −0.1% and −5%, respectively. In Dimitrova's sample, SPACs substantially underperform IPOs and companies of similar size and from the same industry. Most recently, Klausner et al. (2022) examine the long-run performance of 47 SPACs that completed mergers between 2019 and 2020. They calculate BHARs over 3, 6 and 12 months post completion date. For 6 and 12 months, they report mean returns in excess of the Russell 2000 of −10.9% and −21.5%, respectively.

Dimitrova (2017) conducts a cross-sectional regression of 4-year post-IPO long-term performance on various ownership-, governance-, firm-, deal- and SPAC-specific variables. The results show an inverted U-shaped relationship between time to announcement and long-run performance. Moderate values of time to announcement have a positive effect on long-run performance, while extremely small and large values have a negative effect. Dimitrova (2017) argues that a longer time to announcement correlates with a thorough selection process and due diligence of the target company, which leads to a more valuable acquisition. In contrast, acquisitions announced soon after the IPO, or close to the deadline for finding a target company, are assessed by the market as less valuable. She also notes that the underwriter being the financial advisor in the merger has a negative effect on long-term performance. And SPACs that pay part of the underwriter fees only upon completion perform worse in the long run than those that did not have deferred fees.

Finally, Gahng et al. (2021) break down the SPAC lifecycle into the SPAC period and the deSPAC period. The SPAC period extends from the SPAC IPO date to either the business combination completion date or the liquidation date. The deSPAC period begins the day the SPAC begins trading as an operating company with a new company name. Gahng et al. (2021) calculate long-term performance until the earlier of the 1- (3-) year anniversary or the delisting date (or 30 September 2021). On average, for 114 deSPACs from January 2012 to September 2020, they find that deSPAC period common shares significantly and persistently underperform the market. This pattern is consistent with the above-mentioned prior studies, all of which find poor deSPAC period common share returns. However, the authors deepen the analysis by considering warrants and find a strong difference between investor returns on common shares and warrants for the companies that went public via SPACs. Common shares produce equally

[7]The first 'new-generation' SPAC was Millstream Acquisition Corp which went public in August 2003 (Cumming et al., 2014). These new-generation SPACs offerings are larger than $5 million, which exempts them from the penny stock rule (SEC Rule 3a-51-1). Cumming et al. (2014) define these SPACs as 'first generation' SPACs as they were the first ones that were explicitly regulated under the new rule for blank check companies. Most of the SPACs issued before this date were often classified (and regulated) as 'penny stocks' (Cumming et al., 2014; Kolb & Tykvova, 2016).

weighted average returns of −8.1% in the 1st year, underperforming the market by 24.7%, while warrants returned on average 68.0% over the same period.

2.3 | Agency conflicts and benefits of M&A announcements

While the announcement day of a proposed merger is the focal point in the lifetime of a SPAC, not all parties involved may benefit in a similar vein. Klausner et al. (2022) argue that SPAC sponsors may paint a 'rosy picture' of the post-merger company and question the quality of SPACs' disclosure as sponsors might benefit from information asymmetries. They indeed document that SPAC sponsors have mean payoffs of over $100 million on risk capital of approximately $10 million[8] and conclude that the costs of a merger are borne by SPAC investors who did not redeem their shares in advance. Gahng et al. (2021) document that 'the sponsors frequently take haircuts to ensure that the SPAC has enough cash to consummate the merger'. These haircuts (concessions) vary across deals so that the profits of the sponsors are on average not as high as sometimes assumed, especially for underperforming deals.

While we do not contribute directly to the discussion of who benefits from merger announcements, we examine whether the market still perceives announcements of business combinations overall as value-enhancing as reported in earlier studies (e.g., Dimitrova, 2017; Lakicevic & Vulanovic, 2013). It might be that the negative experience from previous SPAC deals now leads to a muted market reaction. Or, as SPACs have considerably increased between 2019 and 2021, it could also be that the market appreciates merger announcements even more than in the past. This would further indicate that investors perceive their recent investments to be different from the past. To this extent, we focus on deals announced between January 2020 and June 2021 and examine whether the short-term stock market reaction is more pronounced during this peak of SPAC IPOs. We further examine how the market reacts, conditional on impending merger deadlines for finding a target company. Impending deadlines increase the agency conflicts between sponsors (closing any deal) and common stockholders (only positive NPV deals).

3 | DATA AND METHODOLOGY

3.1 | Sample and data sources

We obtain our data on SPAC IPOs from three sources: Refinitiv Eikon/SDC Platinum, SPAC Insider (spacinsider.com) and SPAC Research (spacresearch.com). We identify 375 SPAC IPOs issued on either the NYSE or the Nasdaq that announced a business combination between 1 January 2012 and 30 June 2021. We double-check each announcement date carefully and use the earliest date found in the press releases. As of 1 July 2021, 236 of our sample deSPACs had completed a business combination, 127 had announced a merger that was still pending and 12 were later withdrawn and liquidated. This paper focuses mainly on

[8]In addition, Klausner et al. (2022) also find that sponsors obtain high returns even if the deSPAC is not well-performing.

the sample of 236 deSPACs that successfully completed their business combinations (completed deals).

The information on SPAC characteristics comes from a variety of sources. Most data is directly obtained from Refinitiv Eikon/SDC Platinum, SPAC Insider and SPAC Research. Any missing information is manually obtained from the EDGAR database.[9] Our stock data is obtained from Refinitiv Datastream and total returns of the SPACs and merged companies are available until 1 September 2021.

The summary statistics are provided in Table 1 and the variable definitions are listed in Table A1. As reported in Panel (a) of Table 1 and in line with prior research, we find a strong increase in SPAC activity in recent years. The number of deals increased every year, with a total of 100 SPAC business combinations announced in 2020. Our data extends only until 30 June 2021, but the trend appears to be continuing, as we have 156 deal announcements in the first 6 months of 2021.[10]

Eliminating pending deals, we find that most announced deals will ultimately be completed. Approximately 5% (12 of 248 deals) are later withdrawn, but, as of 1 September 2021, no deal announced in 2020 or at the beginning of 2021 has yet been withdrawn. Focusing on completed deals [Panel (b) of Table 1], we find that the total assets of target operating companies are on average 1.69 times the market value of the SPAC's public IPO shares of common stock at the announcement date. They average 284 trading days to announce a target (the announcement of a withdrawal is on average 382 trading days) and a further 104 trading days to complete the business combination.[11] In 53% of our deSPACs sample, at least one top bank is involved in the SPAC IPO or the business combination.

3.2 | Empirical strategy

3.2.1 | Short-term performance

We define short-term abnormal performance as the abnormal stock price performance of SPACs around the day of announcing their potential acquisition target to shareholders. We apply a short-term event study methodology to examine this phenomenon. Stock performance is measured by calculating daily abnormal returns computed using the market-adjusted model as the difference between the firm's stock return and the return of the reference market on day t, as follows:

$$AR_{i,t} = R_{i,t} - R_{m,t}, \tag{1}$$

where $R_{i,t}$ is the return of stock i on day t and $R_{m,t}$ is the market return on day t. We use the Russell 2000 as the reference index (see, e.g., Dimitrova, 2017; Kolb & Tykvova, 2016).

[9]We used as additional sources the definitive proxy statement (SEC Form DEFM14A), Form S-4 and/or 8-K filings, either issued by the SPAC or by the combined company subsequent to the merger.
[10]Note that we report the year of the merger announcement, not the year of the IPO.
[11]Gahng et al. (2021) report an average of 154 calendar days (median of 148 days) for 267 announcements of nonwithdrawn deals between January 2017 and March 2021. One hundred fifty-four calendar days corresponds to approximately 106 trading days.

TABLE 1 Summary statistics of the special purpose acquisition companies (SPACs) sample.

This table reports all SPACs that went public during our sample period and provides the descriptive statistics for completed SPACs. Panel (a) shows the distribution of events for the entire sample of 375 merger announcements of SPACs that went public during the period from January 2012 to June 2021. The sample is split into 236 completed deals, 12 withdrawn deals and 127 that had not completed the merger as of 1 July 2021 (still pending deals). Panel (b) provides the descriptive statistics for the sample of 236 completed deSPACs on which we focus in this paper. Relative size is defined as the book value of target assets relative to the market value of the SPAC's public float. The variables are defined in Table A1.

(a) Number of SPACs per year

Merger announcement (year)	Completed	Withdrawn	Still pending	Total
2012	0	0	0	0
2013	2	2	0	4
2014	5	2	0	7
2015	8	1	0	9
2016	14	1	0	15
2017	16	2	0	18
2018	26	3	0	29
2019	36	1	0	37
2020	96	0	4	100
2021	33	0	123	156
Total	236	12	127	375

(b) Descriptive statistics of 236 completed deSPACs

Variable	Median	Mean	Standard deviation	Min	Max
Relative size	0.78	1.69	2.286	0.02	16.5
Trading days to announcement	278	284	173	27	827
Trading days to acquisition	99	104	40.243	34	337
Top bank	0	0.53	0.500	0	1

Adding the abnormal returns of the days in the event window results in the CAR of firm i:

$$\mathrm{CAR}_{i,(T_1,T_2)} = \sum_{t=T_1}^{T_2} \mathrm{AR}_{i,t}. \tag{2}$$

Taking the mean of the CARs of all sample firms provides us with the cumulative average abnormal returns (CAARs) of the sample:

$$\mathrm{CAAR}_{(T_1,T_2)} = \frac{1}{N}\sum_{i=1}^{N} \mathrm{CAR}_{i,(T_1,T_2)}. \tag{3}$$

To test whether CAARs differ significantly from zero, we perform a parametric cross-sectional t test and a nonparametric sign test. As abnormal returns might be clustered in time and therefore the t test significance levels would be likely to be overstated, we cluster our standard errors by year.[12] Our analysis focuses on the three different event windows, [−1, +1], [−1, +2] and [−1, +3]. All event windows include the day of announcement but also capture the business day before the announcement to account for (potential) information leakage or deal rumours. M&A announcements are indeed sometimes anticipated and news reports are released before a formal announcement is made. We, thus, analyze newspaper articles and control for whether we find any information on a potential merger. We control for both names, the SPAC and the target, around the announcement date in the Lexis news database. However, despite checking all SPAC deals manually, we mostly found announcements of nonbinding letters of intent. We, therefore, decided to control our results by using the flag 'Deal Began as Rumour', provided by the SDC platform. This approach has also recently been used by Carletti et al. (2021). Our results show that 46 of the 236 completed SPAC merger announcements (approximately 20%) were leaked or began with rumours. We split the sample and analyze for SPACs with prior rumours and without short-term analysis independently. We find no significant difference.

3.2.2 | Long-run analysis

The samples of the long-run analysis are constructed based on the main sample of the short-term event study. We calculate BHARs for the post-event periods of 6, 12, 18 and 24 months. The number of observations in our sample diminishes with an increase in the time horizon (144 deals announced before 31 August 2020 and completed before 1 July 2021, for 12-month returns; 109 deals announced before 28 February 2020 and completed before 1 July 2021, for 18-month returns; and 93 deals announced before 31 August 2019 and completed before 1 July 2021, for 24-month returns) due to the end of our investigation period on 1 September 2021.[13] To calculate the long-term performance of SPAC merger announcements and to be included in at least one of the subperiods, we require stock data to be available for the respective number of months after the announcement date. This procedure leads to different sample sizes, but mainly due to the end of stock returns in September 2021 and is not driven by a survivorship bias. To calculate abnormal returns, we apply the buy-and-hold return methodology. The BHAR of firm i for the period of t_2-t_1 + 1 months is calculated as follows:

$$\mathrm{BHAR}_i(t_1, t_2) = \prod_{t=t_1}^{t_2}(1 + R_{it}) - \prod_{t=t_1}^{t_2}(1 + R_{bt}), \tag{4}$$

where R_{it} and R_{bt} are the monthly returns of firm i for month t and the monthly return of the benchmark index for month t, respectively. The Russell 2000 index is again used as the reference index. The monthly return of a stock is calculated as the total return between the

[12]As the basic t test does not allow control for clustering, we follow the methodology reported in Derrien et al. (2021) using the estimate of the constant from a linear regression with no explanatory variables, where the significance is calculated by clustering standard errors at the year level. In a further robustness test, we also use quarterly data for clustering to increase the number of clusters. The significance levels are not different from the ones reported for years. Note that we do not cluster for the two subsamples of ongoing deals and deals completed in 2020 and 2021 due to small variations in clusters.

[13]Note that the sample size is not reduced due to delistings of SPACs but only due to the period of the announcement.

opening price on the first business day (closing price on the day before the first business day) and the closing price on the last business day of the respective month. We define 1 month as equal to 21 business days. The 1st month begins on the first business day after the merger announcement date. We also calculate BHARs beginning from the deSPAC date, which is the closing date of the deal. BHARs are calculated from the day after the announcement date until the end of the respective post-event period. Hence, no dividends are assumed and the overnight return is missing each month.

Finally, we determine the average BHAR for each period by calculating the arithmetic mean of the BHARs in the sample. Because the distributions of BHARs over long time horizons are positively skewed, we use the bootstrapped skewness-adjusted *t* test as suggested by Lyon et al. (1999) to test for statistical significance for long-term returns.

4 | RESULTS

4.1 | Short-term event study

Panel (a) of Table 2 reports the short-term event study results for the total sample of 375 SPAC merger announcements. Consistent with previous findings on the short-term performance of SPACs, the CAARs are significantly positive for all event windows. The CAAR in the event window [−1, +3] is +6.44%, while those during the [−1, +2] and [−1, +1] event windows are +6.35% and +6.67%, respectively. However, previous research using merger announcements from earlier years finds CARs with a smaller magnitude, in the range of +1.2% to +1.7% (Dimitrova, 2017; Lakicevic & Vulanovic, 2013).

Panels (b–d) of Table 2 split the sample conditional on the outcome of the deal. Panel (b) reports the short-term abnormal returns for the 236 SPACs that successfully completed a business combination. The results are highly significant and positive. We find that, during the 5 days around the merger announcement, the abnormal returns are on average +7.41%. In contrast, merger announcements of business combinations that are later withdrawn exhibit considerably lower abnormal returns (c). Those in the [−1, +3] event window are on average +1.03% and lack significance as indicated by the *t* test using year-robust clusters and the sign test[14].

Note that Dimitrova (2017) finds a significant return of +1% for her total sample of completed and withdrawn acquisitions. However, by splitting the sample, she finds that positive CAARs around the announcement date are driven exclusively by deSPACs and liquidated deals are not statistically different from zero. Our results are therefore in line with those of Dimitrova (2017). However, as the number of liquidated deals in our sample is low at 12, the results provide rather anecdotal evidence and should be interpreted carefully.

Panel (d) of Table 2 shows the results for merger announcements that remain pending as of 1 July 2021. The average abnormal return is +5.10% (median +1.00%) in the [−1, +3] event window, ranging between that for completed and withdrawn deals. The results are significant according to the *t* test and the sign test.[15]

[14]The results also lack significance when applying the regular *t* test without clustered standard errors.
[15]Note that we generally report the *t* test statistic using standard errors clustered by year. As Panel (d) contains only few observations from 2020 and largely consists of deals announced in 2021, standard errors are not clustered by year for this subsample and would otherwise lead to insignificant results.

TABLE 2 Short-term event study.

This table reports average and median abnormal returns computed using the market-adjusted model, calculated as the difference between the firm's stock return and the return of the reference market on day t. We use three event windows relative to the announcement day: [−1, +3], [−1, +2] and [−1, +1]. Panel (a) considers the original sample of 375 merger announcements from SPACs that went public between January 2012 and June 2021. This sample is divided into 236 deSPACs that completed a business combination (b), 12 deSPACs that later withdrew from a merger deal (c) and 127 SPACs that had not yet completed a merger as of 1 July 2021 (d). The remainder of the paper focuses on the sample of 236 completed deSPAC deals. To test the significance of the abnormal returns, a parametric cross-sectional *t* test (*t* test) and a nonparametric sign test (Sign *z*) are applied. To take into account the possible correlation of returns for a given year, the standard errors of the *t* test are clustered at the year level in (a) to (c). As the pending deals in (d) are obtained only from 2020 and 2021, the standard errors of the *t* test are not clustered by year for this subsample. Abbreviations: CAAR, cumulative average abnormal return; CAR, cumulative abnormal return. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Event window	CAAR (%)	Median CAR (%)	*t* test	Sign *z*
(a) Original sample (375 obs.)				
[−1,+3]	6.44	1.45	3.75***	5.983***
[−1,+2]	6.35	1.63	3.70***	5.429***
[−1,+1]	6.67	1.03	3.65***	5.850***
(b) deSPACs with completed business combinations (236 obs.)				
[−1,+3]	7.41	2.09	3.69***	5.663***
[−1,+2]	7.22	2.05	3.45***	4.958***
[−1,+1]	7.75	1.61	3.47***	5.403***
(c) deSPACs later withdrawn (12 obs.)				
[−1,+3]	1.03	0.49	0.83	0.932
[−1,+2]	1.09	0.19	1.33	0.622
[-1,+1]	0.88	−0.01	0.90	0.207
(d) Merger announced but not completed (127 obs.)				
[−1,+3]	5.10	1.00	3.60***	2.425**
[−1,+2]	5.20	1.00	3.63***	2.446**
[−1,+1]	5.22	1.00	3.73***	2.551**

To further analyze abnormal returns postmerger announcement, we focus on the time between the business combination announcement and the effective date (either the completion/deSPAC date, or the withdrawn date). The average time to deal completion or withdrawal is 123 trading days (median 100 days), but the duration varies across the sample. To analyze the abnormal returns during the time between the merger announcement and the effective/withdrawn date, we apply the methodology suggested by Malmendier et al. (2016). Their approach is similar to that of traditional event studies but analyzes the time between two dates when the duration is not consistent across the sample. We use this method to shed light

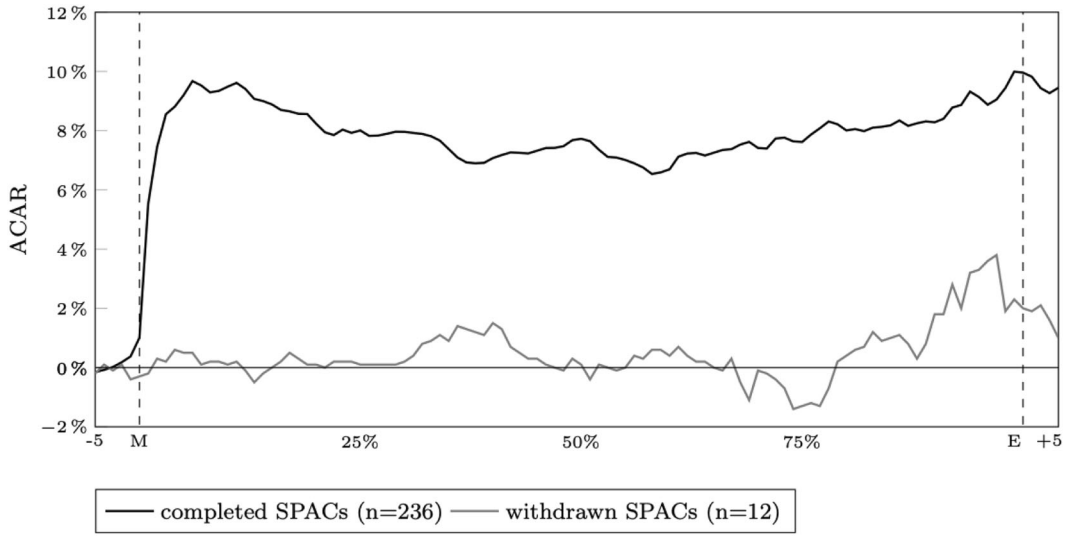

FIGURE 1 Abnormal performance until completion/withdrawal of the deal. This figure shows the results of the cumulative abnormal stock returns (CARs) for the sample of 248 merger announcements through the time of the final merger decision (either completion or withdrawal). The sample is divided into 236 completed and 12 withdrawn merger announcements. The CARs are standardized between merger announcement day (M) and effective day (E) following Malmendier et al.'s (2016) approach. The graphic illustration shows the cumulative average abnormal return development during the $[R-5;\hat{D}+5]$ event window, beginning 5 days before the merger announcement and ending 5 days after the effective date. SPAC, special purpose acquisition company.

on the period when the merger is pending and to graphically illustrate the time between the merger announcement and the effective/withdrawn date.

In line with Malmendier et al. (2016), we first standardize the merger closing period to a relative time period, that is, between $t_R = 0\%$ and $t_R = 100\%$. We use linear interpolation for the abnormal returns between the event-specific event windows T_i, beginning on the day of the merger announcement (M) and ending on the effective/withdrawn day (E). For example, if the SPAC needs 110 trading days to finalize the deal, that is, $T_i = 110$, the standardized cumulative abnormal returns after $t_R = 10\%$ relative time, are equal to the CAR after $110 \times 10\% = 11$ trading days, that is, $\mathrm{CAR}_i(t_R T_i)$. If the merger time is not an integer number, CAR_i is calculated via linear interpolation. Figure 1 displays the abnormal returns in the period when the deal is still pending. The graph also covers the 5 days before the merger announcement and the 5 days following the effective or withdrawn date. Figure 1 confirms the substantial difference between SPAC deals that are later confirmed and those that are withdrawn.

As the number of SPAC merger announcements increased in 2020–2021 from the rate in prior years, we report subperiod results. Panel (a) of Table 3 reports the abnormal returns for merger announcements of our completed mergers sample for 2012–2019. We find positive values for all event windows. The test statistics show that they are highly significant. Panel (b) of Table 3 provides the corresponding results for SPACs announced only in 2020 and the first half of 2021.[16] We again find that the CAARs are highly significant and positive. While

[16]Note that the standard errors are not clustered by year in Panel (b) due to the small variation in the number of years.

TABLE 3 Short-term event study before 2020 and 2020-2021.

This table reports the abnormal returns of deSPACs announced between January 2012 and December 2019 (a) and January 2020 and June 2021 (b) for the sample of 236 merger announcements completed later. Abnormal returns are computed using the market-adjusted model, calculated as in Table 2. To test the significance of the abnormal returns, a parametric cross-sectional *t* test (*t* test) and a nonparametric sign test (Sign) are applied. To take into account the possible correlation of returns for a given year, the standard errors of the *t* test are clustered at the year level in (a). As deals in (b) are obtained only from the 2 years, we forego cluster standard errors of the *t* test for this subsample. Abbreviations: CAAR, cumulative average abnormal return; CAR, cumulative abnormal return; SPAC, special purpose acquisition company. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Event window	CAAR (%)	Median CAR (%)	*t* test	Sign *z*
(a) deSPAC announcements before 2020 (107 obs.)				
[−1,+3]	2.13	1.50	6.99***	5.414***
[−1,+2]	2.00	1.71	6.59***	4.371***
[−1,+1]	1.81	1.28	6.35***	4.834***
(b) deSPAC announcements in 2020 and the first half of 2021 (129 obs.)				
[−1,+3]	11.79	3.33	5.45***	2.641***
[−1,+2]	11.53	3.36	5.44***	2.641***
[−1,+1]	12.68	3.52	6.04***	2.817***

abnormal performance before 2020 is around +1.81% in the [−1, +1] event window (and is, therefore, similar to that reported in Dimitrova, 2017), announcements of business combinations in 2020 and the first half of 2021 show abnormal performance of +12.68%. This increase over earlier years indicates that the market appreciates merger announcements during this time period, although the announcement returns appear to have fallen back in the second half of 2021 and later. Note that the *t* test also implies much higher standard errors than in earlier periods.[17]

While we found that the short-term returns are considerably larger between January 2020 and June 2021, we now focus in more detail on the drivers behind the abnormal returns around the announcement date by examining the time between the IPO and the target announcement. Dimitrova (2017) finds that this time is positively associated with abnormal returns. However, as the SPAC market has changed significantly since the end of Dimitrova's (2017) sample period, we first evaluate whether this relationship still exists. Mergers announced shortly before the merger deadline may indicate that the sponsors force a deal as they mainly gain value when the SPAC successfully merges, while common shareholders only benefit from positive NPV deals (Del Giudice & Signori, 2021; Klausner et al., 2022). We define the variable 'days to announcement' as the number of trading days between the SPAC's IPO issue date and the announcement of the target. Table 4 shows the sample split by the median days to the announcement (278 trading days).

[17]The large difference between the subperiods also indicates that returns are clustered in time and therefore the significance levels of the *t* test would likely be overstated as it assumes independence of observations. We, therefore, cluster standard errors of the *t* test by year when the sample consists of observations from several years.

TABLE 4 Short-term event study results split by days to announcement.

This table reports the average abnormal returns of deSPACs for the sample of 236 completed merger announcements, split by the median number of trading days to announce a target (278). Abnormal returns are computed using the market-adjusted model, calculated as in Table 2. To test the significance of the abnormal returns, a parametric cross-sectional *t* test (*t* test) and a nonparametric sign test (Sign) are applied. To take into account the possible correlation of returns for a given year, the standard errors of the *t* test are clustered at the year level in both panels. Abbreviations: CAAR, cumulative average abnormal return; CAR, cumulative abnormal return; SPAC, special purpose acquisition company. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Event window	CAAR (%)	Median CAR (%)	*t* test	Sign *z*
(a) Days to announcement ≤278 (117 obs.)				
[−1,+3]	10.00	2.91	3.07**	4.79***
[−1,+2]	9.82	2.50	2.90**	4.89***
[−1,+1]	10.34	2.82	2.88**	5.63***
(b) Days to announcement >278 (119 obs.)				
[−1,+3]	4.81	1.43	3.09**	4.68***
[−1,+2]	4.60	1.66	2.92**	4.10***
[−1,+1]	5.17	1.08	2.68**	4.04***

We find a +10.34% abnormal stock market reaction for SPACs that needed less than 278 trading days to announce a target. Those that needed more time had positive returns of +5.17%. This provides evidence that the stock market does not appreciate longer durations between the IPO and target announcements, indicating that impending deadlines increase the agency conflicts between sponsors and common stockholders.

4.2 | Results of the long-run analysis

Table 5 reports the results for the long-run performance analysis, with BHAR summary statistics for the postevent periods of 6, 12, 18 and 24 months, beginning from the merger announcement date. The number of observations decreases with the length of the observation period as our stock return data ends on 1 September 2021 (144 for 12-month returns, 109 for 18-month returns and 93 for 24-month returns) but not due to the delisting of firms. In line with prior findings on SPAC performance, the results show that the postmerger announcement periods underperform in the long run, but also that performance deteriorates over time. The average BHAR is +3.57% for the 6-month period, which still mainly covers the premerger period as the deal has not been completed yet in many cases; it is, however, statistically negative for 12 (−14.10%), 18 (−20.18%) and 24 months (−18.02%), when the post-merger performance is incorporated.

In summary, the results show that SPACs underperform the market in the long run and that their median performance deteriorates over longer event windows, while we do not find significant abnormal returns on average in the first 6 months after the merger announcement. The stark difference between short-term and long-run results could be explained by the

TABLE 5 Long-term abnormal performance from merger announcement.

This table reports the results of the long-term market performance for completed special purpose acquisition companies (deSPACs), starting from the announcement date and using the largest sample size possible for each event window. Therefore, the number of observations in the sample diminishes with the increase in the time horizon (144 for 12-month returns, 109 for 18-month returns and 93 for 24-month returns) due to the end of our investigation period on 1 September 2021. Thus, all 6-month BHARs involve deSPACs announced before 28 February 2021, all 12-month BHARs involve deSPACs announced before 31 August 2020, all 18-month BHARs involve deSPACs announced before 28 February 2020 and 24-month BHARs involve deSPACs before 31 August 2019, respectively. None of the SPACs was delisted during this time. Buy-and-hold abnormal returns (BHAR) are calculated for the post-event periods of 6, 12, 18 and 24 months, with the BHAR methodology using the Russell 2000 as the benchmark. The bootstrapped skewness-adjusted *t* test as suggested by Lyon et al. (1999) is applied. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

BHAR (months)	No. obs.	Median (%)	Mean (%)	Standard deviation	Max	Min	Neg:Pos	*t* test
6	230	−7.86	3.57	81.147	858.343	−88.204	139:91	0.790
12	144	−31.48	−14.10	73.511	389.236	−137.679	98:46	−2.302**
18	109	−40.89	−20.18	81.166	352.438	−149.506	81:28	−3.361***
24	93	−55.69	−18.02	165.196	1352.264	−129.763	72:21	−2.791**

hypothesis of Klausner et al. (2022) stating that SPAC sponsors paint a 'rosy picture' and that SPAC sponsors benefit from information asymmetries. However, when comparing our long-term results with prior findings, the underperformance is considerably less extreme. Howe and O'Brien (2012) find average BHARs of −14% and −32.5% after 6 and 12 months subsequent to the proxy vote, respectively, which is shortly before the deSPAC or liquidation date. Kolb and Tykvova (2016) find average BHARs of −46% and −59% after 12 and 24 months from the deSPAC date, respectively.

Lewellen's (2009) findings indicate that SPACs have slightly positive BHARs beginning from the announcement date and extending through the completion date. Mechanically, because of the redemption option, a SPAC stock price is unlikely to fall much below the trust amount before the deSPAC date. Therefore, SPACs begin performing poorly after the completion date. This may explain (at least to some extent) the larger negative BHARs found by Kolb and Tykvova (2016).

Dimitrova (2017) examines the BHARs of SPACs for the whole period from the merger announcement until a year after the acquisition was completed. Average BHARs of −41.5% are significantly worse than the −14.1% we find for the 12-month period. Note, however, that Dimitrova (2017) calculates BHARs from the announcement date until 1 year after the completion date. The calculation window, therefore, is larger than our 12-month window and closer to our 18-month window. Nonetheless, this does not fully explain the vast difference between the results. Previously published research on SPAC performance includes SPAC IPOs from 2003 to 2015. In our sample, the earliest SPAC included in the long-term performance analysis had an IPO in 2012. The latest SPAC IPO in our sample of 12-month BHARs conducted its IPO in August 2020. Thus, only a small fraction of SPACs included in our sample is also captured in the samples of previous research.

TABLE 6 Long-term abnormal performance from effective date.

This table reports the results of the long-term market performance, starting from the effective date special purpose acquisition companies (deSPAC date) and using the largest sample size possible for each event window. Returns are measured until 1 September 2021. Thus, all 6-month BHARs involve deSPACs effective before 28 February 2021, all 12-month BHARs involve deSPACs before 31 August 2020, all 18-month BHARs involve deSPACs effective before 28 February 2020 and 24-month BHARs involve deSPACs before 31 August 2019, respectively. Therefore, the number of observations in the sample diminishes with the increase in the time horizon (192 for 6 months, 126 for 12-month returns, 107 for 18-month returns and 91 for 24-month returns) due to the end of our investigation period. None of the SPACs was delisted during this time. Buy-and-hold abnormal returns (BHARs) are calculated for the post-event periods of 6, 12, 18 and 24 months, with the BHAR methodology using the Russell 2000 as the benchmark. The bootstrapped skewness-adjusted *t* test as suggested by Lyon et al. (1999) is applied. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

BHAR (months)	No. obs.	Median (%)	Mean (%)	Standard deviation	Max	Min	Neg:Pos	*t* test
6	182	−19.355	−18.749	43.715	122.564	−124.65	119:63	4.19***
12	126	−24.850	−18.528	70.353	304.875	−130.82	84:42	2.48**
18	107	−29.501	−6.878	160.74	1239.44	−116.84	72:38	0.41
24	91	−37.354	−13.451	227.06	1979.35	−146.44	59:32	0.55

The results may also be sensitive to ending the return computations on 1 September 2021. The ETF SPAK fell by about 20% from 1 September 2021 to 31 March 32022, while the S&P500 was up 1%. One explanation for the better long-run performance of SPACs in this paper compared to previous research might be that SPAC managers have improved their abilities to identify value-creating target companies. This is also supported by our short-term results. Moreover, as argued by Gahng et al. (2021), sponsors may be evaluating merging companies more efficiently. Another possible explanation is that we measure the long-term performance starting from the announcement day and not from the effective or completion date. The results using the effective or deSPAC date of the merger transaction are provided in Table 6. The results are similar to the ones earlier reported as we find a significant underperformance which is less extreme than in previous research.[18] It is also worth noting that the BHARs beginning from the deSPAC date are similar to those reported in Table 5 using the merger announcement dates with horizons that are 6-months larger (which include the approximately 4 months between announcement and completion date).

4.3 | Determinants of the long-run performance of deSPACs

In this section, we focus on three potential determinants of the long-run performance of deSPACs. First, we analyze whether deSPACs that are supported by a reputable underwriter

[18]We also exclusively focus on completed deals in our long-term analysis. The results for the long-term analysis of withdrawn deals are rather small with average (median) BHARs of −1.83% (−1.01%) in the 12 months after the announcement. Our finding of lower underperformance is therefore not driven by our sample selection of completed deals.

exhibit better performance in the post-merger announcement period than those with less reputable underwriters. The presence of a reputable bank may indeed lead to better acquisition negotiations and to the identification of more valuable target companies. Panel (a) of Table 7 splits our sample into two subsamples, conditional on top bank involvement and shows the equally weighted BHARs. For the sample with a top bank, we find a slightly positive 3.2% average performance in the 18 months post-merger announcement, but a worse average performance for SPACs without a top bank at −30.3% in the first 18 months post-announcement. In the 24-month period, the difference in abnormal returns diminishes and both samples show a negative performance. However, banks without a top bank involved continue to exhibit slightly worse returns. This is in line with Gahng et al. (2021), who rank underwriters according to prestige and find that SPACs with more reputable lead underwriters tend to have higher deSPAC returns. Klausner et al. (2022) also report that 'high quality' sponsors have higher average deSPAC returns than 'non-high quality' sponsors do.

Second, we split the sample according to relative deal size, defined as the book value of target assets relative to the market value of the SPAC's public float. This variable, therefore, is partly a measure of the size of the target but it is also correlated with the market-to-book ratio.[19] We create three groups based on the relative size between the target company and SPAC. The results show that the negative long-term performance of deSPACs is significantly greater if the relative size is small. If it is smaller than 1, the average BHAR is −37.4% for the 18-month period and −63.5% for the 24-month post-announcement period. If the relative size is larger, the negative performance is less pronounced. We find that if the relative size exceeds 2, the BHARs are −0.9% and 31.3%, respectively. This is a novel finding in the SPAC literature and can be explained by prior M&A literature. Moeller et al. (2004) find evidence that smaller public acquirers experience larger positive returns upon announcing acquisition targets. They argue that CEOs of larger firms tend to overpay for their acquisition targets. If this relationship also applies to SPACs, the costs of overpaying for the target are paid in part by the shareholders that hold the stock over the period of the merger. Most of the variation in the relative size measures comes from the book value of assets. Thus, the evidence is that the deSPAC returns are worse when the target's book assets are low.

Third, we split the sample conditional on the number of days between the SPAC's IPO and the announcement of the business combination. Our results for the short-term market reaction have shown that announcing a target relatively quickly has a significantly positive impact on announcement returns. We find a similar effect for the long-term results. Both samples show negative performance in the 18 months post target announcement. However, deSPACs that announced the target later tend to perform substantially worse than those with shorter periods between the IPO and the merger announcement. This difference is even more pronounced for the 24-month postmerger announcement period, as the sample of deSPACs that needed less time shows a positive performance of +5.1%. Those with longer durations underperformed by 41.7% on average.

Panel (a) of Table 7 reports the ordinary least squares regression results using the 18- and 24-month BHARs as dependent variables,[20] and controlling for industry- and year-fixed effects.

[19]Although we control for industries, we acknowledge that our measure of relative size does not allow to distinguish between the effect of the difference in the size of the target relative to the SPAC and the effect of market valuations. Relative size of the target and acquirer (SPAC) is measured at the end of the day of the announcement. The results are however similar using market prices on the day before the announcement, eliminating potential effects if the SPAC was announced after trading hours.

[20]We focus on these two periods because univariate results show they are significantly different from zero and are, therefore, the most instructive.

TABLE 7 Determinants of long-term performance from merger announcement date.

This table reports the average long-run returns of completed special purpose acquisition companies (deSPACs) for the sample of 236 completed merger announcements. As in Table 5, we calculate BHARs by using the Russell 2000 index as the benchmark and beginning from the merger announcement date. Panel (a) reports the results split by the involvement of a top investment bank; relative size of the target and acquirer (SPAC), computed as the value of the total assets of the target, as stated in the SPAC's proxy statement, to the market value of the SPAC's shares of common stock at the announcement date; median number of days to announcement (median number of trading days is 321 for the 109 SPACs in the 18 months and 329 days for the 93 firms over the 24-month period, respectively); and median number of SPACs looking for a target (median number of SPACs is 52 for the 109 SPACs in the 18 months and 48 SPACs for the 93 firms in the 24-month period, respectively). Panel (b) shows the regression results for the long-term abnormal returns. The dependent variables are the firm's buy-and-hold abnormal return (BHAR) in the 18 months post announcement (left side) and 24 months post deal announcement. Relative size is defined as the book value of target assets relative to the market value of the SPAC's public float. Time to announcement is the number of trading days between the SPAC's initial public offering (IPO) issue date and the announcement date of the target. Top bank is a binary variable that equals 1 if at least one top bank is involved in the SPAC IPO or the business combination on the acquirer side. Top bank is defined as being among the 10 largest banks in terms of collected fees in 2020 according to the league table of the Financial Times (2020). Industry and year-fixed effects are included in the regression. Industry effects are based on the Fama and French 48-industry classification. Standard errors are clustered by year and reported in parentheses. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

(a) Univariate sample split

	18 months		24 months	
	Obs.	**BHAR (%)**	**Obs.**	**BHAR (%)**
Top bank = 1	49	3.21	43	−16.14
Top bank = 0	60	−30.28	50	−19.64
Relative size <1	40	−37.39	32	−63.53
1 ≤ Relative size < 2	30	−26.77	27	−39.07
2 ≤ Relative size	39	−0.94	34	31.11
Time to announcement ≤ median	55	−8.58	47	5.13
Time to announcement > median	54	−32.00	42	−41.67

(b) Cross-sectional regression

	BHAR 18 months				BHAR 24 months			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Relative size	0.143**	-	-	0.123**	0.140*	-	-	0.130*
	(0.055)			(0.051)	(0.081)			(0.071)
Time to announcement	-	−0.345**	-	−0.357**	-	−0.274	-	−0.236
		(0.123)		(0.108)		(0.178)		(0.237)
Top bank	-	-	0.420	0.397	-	-	0.295	0.285
			(0.343)	(0.298)			(0.199)	(0.214)
N	109	109	109	109	93	93	93	93
R^2	0.378	0.353	0.362	0.442	0.349	0.319	0.316	0.377

We observe that the time to announcement and the relative deal size have a significant impact on the long-term performance of deSPACs in the 18 months postdeal announcement. The top bank involvement, however, lacks significance. We also find that the effects in the 24-month period are less pronounced, and, here, relative size has the only significant effect (Model 8).

To summarize, SPACs that acquire larger target companies perform better in the long run. Moreover, a shorter time to announcement positively influences long-run stock performance. But the effects are mainly limited to 18 months post-deal announcement.

5 | CONCLUSION

This study examines the announcement returns and long-term performance of SPACs that conducted IPOs between January 2012 and June 2021. We note that the characteristics of SPACs have changed significantly in recent years. Nevertheless, we are able to confirm prior results that SPACs exhibit positive abnormal returns on average around the merger announcement, while SPACs underperform the market in the long term. We find that the average merger announcement return is +6.4% and an even higher return of +7.4% on the proposed mergers that were subsequently completed.

Focusing on the completed SPAC mergers announced between January 2020 and June 2021, when the number of SPACs significantly increased compared to earlier periods, we find an abnormal stock performance of +12.7% in the [−1, +1] event window, while merger announcements between 2012 and 2019 are associated with abnormal returns of +1.8%. However, we observe a negative abnormal performance in the long run. Beginning from the merger announcement, the average abnormal performance after 12 months is −14.1%, while it is −20.2% after 18 months and −18.0% after 24 months. The results are comparable using the deSPAC date. The negative underperformance we find in this analysis, however, is less extreme than in previous findings. The evidence in this study and other concurrent studies by Klausner et al. (2022) and Gahng et al. (2021), suggests that deSPAC period abnormal returns are poor, but not as poor as in the pre-2010 period. This is perhaps related to arguments by Gahng et al. (2021) that the SPAC market has become more efficient over time. If the returns had remained as poor as those pre-2010, it would certainly be an even bigger puzzle why we have seen such a large SPAC boom in 2020–2021.

Our short-term results also show that the longer it takes a SPAC to identify a target company, the lower the short-term announcement of abnormal returns will be. DeSPACs announcing the target later tend to perform significantly worse in the 18 months after the merger announcement than those with shorter periods between the IPO and the merger announcement, suggesting that impending deadlines increase agency conflicts between sponsors and common shareholders (Klausner et al., 2022). We document that long-run performance is shaped by the relative size of the target company to the size of the SPAC. DeSPAC performance is significantly worse when the business combination takes place with a smaller target, as measured by the book value of target assets relative to the market value of the SPAC's public float.

One drawback of our study is that SPAC merger announcements having the highest short-term abnormal returns are the most recent ones. As there are not sufficient years to study yet, these observations could not be used for the long-term analysis. Future research should examine whether the structural change of SPACs and the increased attention on SPACs lead to improved long-term abnormal returns of these deals. Second, the benefits from SPAC

transactions are not equally distributed among the involved parties. This paper mainly focuses on common shareholders but it would be interesting to shed more light on the question of how the 'pie' is split between different stakeholders.

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DATA AVAILABILITY STATEMENT

Data sharing is not applicable because the data supporting the findings of this study were obtained from commercial databases used under license.

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APPENDIX

(Table A1)

TABLE A1 Variable definitions.

Variable	Description	Source
Relative size	Relative size of the target and acquirer (SPAC), computed as the value of the total assets of the target, as stated in the SPAC's proxy statement, to the market value of the SPAC's shares of common stock at the end of the day of the announcement. The number of public shares (excluding sponsor shares) of common stock is computed as gross proceeds including overallotment, divided by the unit offer price, as stated in the S-1 Form. Private Investment in Public Equity (PIPE investments) is not considered.	EDGAR Database, Refinitiv Eikon, SPAC Insider, SPAC Research
Time to announcement (days)	Number of trading days between the SPAC's IPO issue date and the announcement date of the target.	Refinitiv Eikon, SPAC Insider, SPAC Research
Time to acquisition (days)	Number of trading days between the announcement date of the target and the completion date of the deal.	Refinitiv Eikon, SPAC Insider, SPAC Research
Top bank	Dummy variable that equals 1 if at least one top bank is involved in the SPAC IPO or the business combination on the acquirer side. Top banks are defined as being among the 10 largest banks in terms of collected fees in 2020 according to the league table of the Financial Times (2020), namely, Barclays, BNP Paribas SA, Bofa Securities Inc., Citi, Credit Suisse, Deutsche Bank, Goldman Sachs & Co., JP Morgan, Morgan Stanley and Wells Fargo & Co.	Refinitiv Eikon, Financial Times