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Investor Reaction to SPACs' Voluntary Disclosures

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ABSTRACT: SPACs are formed to combine with and provide a private firm public trading status and a capital infusion. Firms that enter the public market through a SPAC combination are believed to possess greater voluntary disclosure discretion than traditional IPOs as they obtain their public trading status through a merger. Consistent with regulators' concerns, recent research finds that SPACs use this discretion opportunistically by issuing optimistic guidance. This study examines how investors respond to these disclosures. We find that optimistic projections increase retail purchasing, which is higher than that of institutional purchasing. Additionally, we find that investors partially see through the optimism and exit at the redemption date. Furthermore, we find that institutional investors increasingly divest their holdings for combinations with optimistic projections. Investors as a whole, however, fail to see through the optimism, as combinations with optimistic projections considerably underperform in the two years following the combination.

Data Availability: All data are publicly available from the sources identified in the text.

JEL Classifications: M41.

Keywords: voluntary disclosure; SPACs; revenue forecasts; retail investors.

> This case [Stable Road Acquisition Company] illustrates risks inherent in SPAC transactions, as those who stand to earn significant profits from a SPAC merger may conduct inadequate due diligence and mislead investors.
> —SEC Chair Gary Gensler (Securities and Exchange Commission (SEC) 2021a)

I. INTRODUCTION

Special purpose acquisition company (SPAC) popularity has exploded in recent years (Figure 1). For the first time, SPACs raised a larger amount of capital than traditional initial public offerings (IPOs) in 2020 (Ritter 2023). One of the most touted benefits of going public through a SPAC combination rather than a traditional IPO is the belief that SPACs possess the ability to disclose information more freely (e.g., Coates 2022; Klausner, Ohlrogge, and Ruan 2022), as it is believed that merger disclosure regulations rather than equity offering disclosure regulations apply. Accordingly, SPAC combinations do not face IPOs' "quiet period"—that is, the inability to disclose information beyond what is included in a firm's prospectus before going public (e.g., Bushee, Cedergren, and Michels 2020). Further, the Private Securities Litigation Reform Act of 1995 (PSLRA) provides safe harbors for firms issuing forward-looking

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FIGURE 1
Number of SPAC IPOs and Combinations

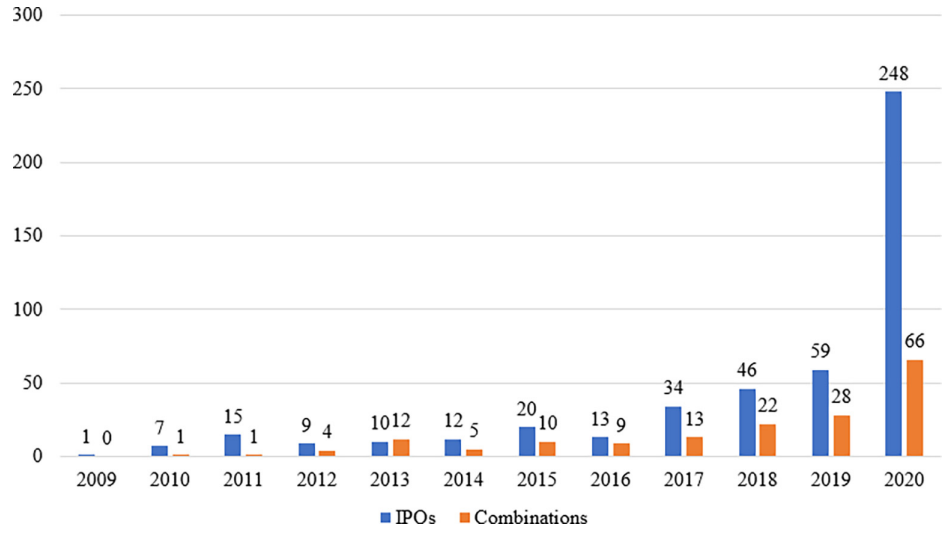

Figure 1 illustrates the number of SPAC IPOs and combinations by year between 2009 and 2020. These data are obtained from SPACInsider and manually verified from company filings found on EDGAR.
(The full-color version is available online.)

statements, but this does not apply to forward-looking information disclosed by firms in the IPO process. SPAC combinations are currently thought to be covered under these protections, allowing them to include financial projections in their filings.[1] Consistent with target firms' incentives to inflate their projections given these protections and limited incentives by SPAC sponsors to question their projections, Blankespoor, Hendricks, Miller, and Stockbridge (2022) document that SPACs issue overly optimistic revenue projections.

This study examines whether, how, and when market participants are influenced by the optimistic revenue forecasts released by SPAC target firms in four primary tests. First, we examine if optimistic forecasts lead to increased purchasing by retail and institutional investors in the period between the release of the forecast and the combination's closing date. Second, we investigate whether optimistic forecasts influence shareholder redemptions, which may be higher if investors see through the hype or lower if they buy into it. Third, we examine how optimistic forecasts influence institutional investors' holding decisions in the reporting periods surrounding the close of a combination. Finally, we examine whether optimistic forecasts are followed by more negative post-combination returns, consistent with investors being misled. Ultimately, whether investors are misled by SPAC's optimistic forecasts and mispricing occurs is unclear, as investors may be sophisticated enough to see through the inflated projections.

SPAC combinations offer an opportune setting to examine how voluntary disclosure affects investor responses in the period preceding a public equity issuance for the following reasons. First, an analysis on how voluntary disclosure by firms with no proven track record before an equity offering influences the actions of investors has remained elusive in the U.S. regulatory environment. As mentioned, traditional IPO firms are not provided safe harbors for forward-looking disclosures and are restricted from voluntarily disclosing information other than that found in their registration statement during the "quiet period" (Bushee et al. 2020). The SPAC setting also allows us to examine how investors respond to opportunistic disclosures before an equity offering. Prior studies have documented that, unlike SPACs (e.g., Blankespoor et al. 2022), voluntary disclosures for seasoned equity offerings (SEOs) are used to reduce information asymmetry before the offering (Li and Zhuang 2012; Shroff, Sun, White, and Zhang 2013). Therefore, the SPAC setting investigates investors' response to disclosures with different characteristics before an equity offering.

Moreover, the SPAC setting itself possesses unique features that are worth investigating. Unlike other equity offerings, such as IPOs and SEOs, SPACs face special incentive structures, encounter less oversight from conventional intermediaries (e.g., underwriters), and attract greater retail investor interest by offering them an opportunity to invest

[1] SPACs and various SPAC participants may have overestimated such protection as litigation against SPACs is now emerging (e.g., Coates 2022).

in a private firm before it enters the public market.[2] In addition, unlike investors of IPO or SEO firms, SPAC investors have the ability to redeem their shares before the completion of a combination and still maintain exposure by retaining their warrants (Gahng, Ritter, and Zhang 2023). Therefore, as SPACs possess both retail and institutional participation and have multiple securities simultaneously trading on the open market, the SPAC setting allows for a more comprehensive examination of investors' decision-making in response to firm disclosures around equity offerings.

Using all SPAC combinations consummated between 2009 and 2020, we confirm the findings of Blankespoor et al. (2022) using the set of projections released closest to the combination's close date. Consistent with their evidence of hyping, we find that SPAC revenue forecasts are, on average and at the median, off by 16.6 percent and 6.4 percent of the forecasted amount, respectively. In our primary tests, we find that investors are generally misled by the forecasts. Specifically, we find that retail investors are more likely to purchase shares of SPACs that hype their revenue forecasts and that their increased purchasing exceeds that of institutional investors, which is consistent with retail investors' lack of financial sophistication (Barber and Odean 2000, 2008). Regarding the economic magnitude, a one standard deviation increase in our scaled *Forecast Error* variable leads to a 3.4 percent increase in the retail trade imbalance, representing a 32 percentage point increase from the mean value. In addition, consistent with more informed investors partially seeing through the hype and exiting their positions, we find higher levels of redemptions and institutional investor divestiture rates for SPACs with more optimistic forecast errors. The exiting is relatively large. For example, a one standard deviation increase in our scaled *Forecast Error* variable leads to an 8.2 percentage point increase in redemptions, representing an 18 percent increase from the mean value. Finally, we find that SPACs with optimistic forecasts underperform those with pessimistic forecasts for the three-, six-, 12-, and 24-month periods following the combination using a calendar-time portfolio approach. Although some investors see through the hype, these results are consistent with the market being unable to fully undo the hyping efforts before a combination closes. Regarding the economic magnitude, a portfolio that buys and holds optimistic (pessimistic) SPACs for 12 months post-combination earns an average monthly abnormal return of −5.54 percent (0.64 percent) or, alternatively, an annualized abnormal return of −49.5 percent (8.0 percent).

For completeness, we re-examine our main tests for SPAC warrant holders, and, unlike SPAC shareholders, we fail to find large effects from hyping. We find that institutional investors are less likely to purchase warrants in the presence of greater hype and that returns to warrant holders are mixed. When we combine the SPAC's common share and warrant returns, our underperformance inferences remain unchanged.

Collectively, our study provides several contributions. First, our findings add to the growing literatures in accounting and finance on SPACs—an alternative approach for private firms to raise capital and enter the public markets that recently gained mainstream appeal (Figure 1).[3] In the first study to examine SPAC projections, Blankespoor et al. (2022) find that SPACs issue lengthy projections during the going public process, rarely meet the projections, and subsequently decrease their usage post-combination. They conclude that SPAC projections appear out of line with business fundamentals and call on future research to further examine SPAC forecast optimism as well as how investors respond to these biased disclosures. Our study answers this call.

Our results suggest one reason why, despite their history of poor post-combination performances, SPACs continue to consummate combinations. Namely, investors are being misled by SPACs' disclosures during the going public process. These findings also help explain prior and concurrent finance research that consistently documents poor post-combination market performance for SPAC combinations (e.g., Dimitrova 2017; Gahng et al. 2023; Kolb and Tykvová 2016) and concurrent accounting research documenting that SPAC combinations have poor financial reporting quality (Kim, Park, Peterson, and Wilson 2022).

In addition, our results indicate that the market sees through SPAC hyping in a nuanced manner. We document that although retail investors are more likely to purchase shares of SPACs with optimistic projections, some institutional investors can partially unravel the optimism, leading them to redeem their shares or divest their position. Collectively, however, the market is largely unable to identify the optimism in the forecasts as a sufficient number of investors forgo the opportunity to redeem their shares, allowing SPACs with optimistic projections to close their combinations.

[2] Subsequently, SPACs have become known as the "poor man's private equity," as retail investors are locked out of private equity deals and most traditional IPOs (Dimitrova 2017).

[3] Not unexpectedly, new SPACs and traditional IPOs both fell dramatically after the 2022 stock market decline. However, among private firms interested in obtaining public trading status, the popularity of SPAC combinations has not declined relative to that of traditional IPOs. For example, in 2022, we find a total of 86 SPAC IPOs and a total of 102 closed SPAC combinations compared with only 38 traditional IPOs using data from SPACInsider and Jay Ritter's webpage (see https://site.warrington.ufl.edu/ritter/files/IPO-Statistics.pdf). Therefore, although it is premature to speculate whether SPAC popularity will return to levels seen in 2017–2021, SPACs continue to play an important role in bringing private companies into the public market.

Outside of the SPAC setting, our findings may provide insight into how mispricing for other types of firms going public (e.g., IPOs) may arise if PSLRA-protected forward-looking disclosures were allowed. However, we caution that our findings may not be exclusively driven by the perceived safe harbor protections of the PSLRA alone. Rather, the results may be driven by the PSLRA's protections in conjunction with the other unique features of SPACs, which include strong short-term incentives to close combinations, loose oversight, and greater retail investor interest.

Second, our findings contribute to the debate over the regulatory leniency of SPAC disclosures, especially as our evidence of investor reliance on opportunistic disclosures and market mispricing could support the SEC's recent concerns over the disclosure practices of SPACs. In March of 2022, the SEC released a proposal intended to enhance the disclosure requirements and investor protections of SPACs (Securities and Exchange Commission (SEC) 2022). Of importance to our study, the proposal seeks to formally revoke the PSLRA safe harbor protections for SPACs' forward-looking statements.[4] Although the SEC has often questioned whether SPAC investors are being misled by target firm disclosures, there are no published academic articles supporting their concerns.[5] Although it is currently unclear if the SEC will eliminate the safe harbor, our findings provide evidence in support of the SEC's concerns and the intervention or against the lack of intervention.

Importantly, even if the SEC eliminates the statutory safe harbor covering forward-looking statements for SPACs as proposed, it may not completely stop SPACs from releasing forward-looking statements. Notably, the Committee on Securities Regulation of the New York City Bar Association highlight in a comment letter submitted to the SEC that state corporate law and other SEC rules require disclosure of material information, which often includes target projections, used by SPAC boards to determine which targets to acquire (Miller 2022). Further, Culhane et al. (2022) argue that SPACs will likely continue to release projections because (1) the projections are critical to marketing the proposals, (2) private investment in public equity (PIPE) investors will demand that the projections obtained in their due diligence efforts be publicly released so that they can trade without reserve, and (3) projections likely fall within the SEC's "bespeaks caution" doctrine, which provides protection for forward-looking information if partnered with appropriate cautionary or risk disclosures.[6]

Finally, our evidence contributes to the literature on manager's revenue forecasts (e.g., Lansford, Lev, and Tucker 2013; Koo and Lee 2018), especially the early but still limited literature examining the strategic use of long-term forecasts before raising capital. In closely related research, Armstrong, Davila, Foster, and Hand (2007) find that managers of unregulated private firms issue optimistic long-term revenue forecasts when raising capital from venture capitalists. We extend this literature by providing evidence that optimistic long-term revenue forecasts issued by publicly traded SPACs influence investor trading and market pricing.

II. BACKGROUND, PRIOR LITERATURE, AND HYPOTHESIS DEVELOPMENT

Institutional Background of SPACs

SPACs are blank check companies that access the public markets for capital despite having no prior operating history. Their sole purpose is to enter into a business combination, usually with a private company, by offering a potential target both a significant cash infusion and public trading status through a reverse merger. At the time of their IPO, SPACs issue $10 units consisting of one share of common stock and a number or fraction of warrants that are exercisable after a combination. SPACs then place a significant portion of the IPO proceeds, any deferred underwriting fees, and the capital from their sponsor's private placements into a trust account. The trust then invests in government securities until (1) a combination occurs, (2) shareholders are afforded an opportunity to redeem their shares, or (3) the SPAC is liquidated.

Following the IPO, SPACs immediately begin searching for potential targets, as they only have between 12 to 24 months to complete a combination before being forced to liquidate. SPACs can identify any target (or targets) if their

[4] The proposal also includes several other noteworthy rules and rule amendments requiring additional disclosures related to projections (e.g., disclosures about why projections were prepared and by whom, all material assumptions used in their construction, and their usefulness as of their filing date), among other major changes (e.g., disclosures of sponsor compensation, conflicts of interest, dilution, and transaction fairness). The proposal also includes additional guidance on general projection requirements, such as the importance of (1) distinguishing between projections and historic figures, (2) the inclusion of historic figures, and (3) defining any non-GAAP measures.

[5] For instance, SEC chairman Gary Gensler questioned whether SPAC investors are being appropriately protected and provided with sufficient information to make informed decisions with a particular concern for retail traders in front of the U.S. House Appropriations Committee (Securities and Exchange Commission (SEC) 2021b). Further, both the Commission's Investor Advisory Committee and Small Business Capital Formation Advisory Committee raised concerns about the effectiveness of disclosures provided to SPAC investors in the months leading up to the SEC's proposal (SEC 2022).

[6] Consistent with these arguments, we find that SPACs' disclosure of projections has not been deterred. In the three months before the SEC's proposal, 25 combinations were announced, of which 19 (76 percent) provided projections with their going public documents. In the three months following the SEC's proposal, 32 combinations were announced, of which 23 (72 percent) provided projections with their going public documents.

estimated market value is at least as large as 80 percent of the funds held in the trust account. Once a target is identified and an agreement is secured, the SPAC files a current report providing preliminary information about the proposal. At or after this announcement, the SPAC further files additional documentation with more extensive information about the combination, including the investor presentation, the target's financial statements, financial projections, information about the upcoming vote, and other relevant information.

The SPAC then holds a meeting where shareholders vote on the proposed combination. Shareholders are granted two votes: (1) to approve the proposal and (2) to remain shareholders of the combined company.[7] Those who do not wish to remain part of the company can redeem their shares for their portion of the trust account, which typically amounts to $10 plus some of the interest earned on the trust. Originally, only proposals with both majority shareholder approval and a redemption rate lower than a predetermined threshold were consummated; however, more recent SPACs have largely removed this restriction so nearly any proposal with shareholder approval will proceed.[8] Following approval, the target firm is acquired by the public SPAC through a reverse merger, with the combined entity typically taking on the name or some variation of the name of the private target. Concurrently with the closing, many combinations also raise additional capital through a PIPE transaction.

SPACs are brought to market by an experienced management team (i.e., the sponsor) who utilizes their reputation, expertise, and networks to seek out potential targets. The management team is not provided a salary during the formation of the SPAC or the search process. Instead, they are granted the opportunity to purchase deeply discounted shares (known as founder shares), which typically equate to 20 percent of the post-IPO shares. These shares are not allowed to be traded until after a combination and lockup period. Yet, due to the steep discount that the founders receive, these shares become extremely lucrative after a combination materializes. The sponsors are also expected to purchase additional securities through private placement offerings that take place simultaneously with the SPAC's IPO to fund the trust account. The founder shares and private placement securities are termed the "at-risk capital" because if the SPAC is forced to liquidate, the founders waive their rights to participate in the fund distribution, and, as a result, these securities lose all value. Dimitrova (2017) examines how the incentives created by the contractual features of SPACs affect their performance and finds evidence that the value destruction appears to be driven by the contractual features that provide the sponsor with incentives to pursue any combination regardless of its quality rather than face liquidation and lose their at-risk capital.

Prior Literature

Examining SPACs that entered the public markets before our sample period, studies have analyzed combination determinants, post-combination performance, and the agency problem induced by the SPACs' organizational design (see Shachmurove and Vulanovic (2017) for a review of these papers). The recent SPAC boom has reinvigorated this literature. For example, Gahng et al. (2023) examine the costs of going public via a SPAC combination as well as their market performances. Confirming prior results, they find positive (negative) returns pre-combination (post-combination) and positive warrants returns. Klausner et al. (2022) also investigate the costs built into the SPACs' organizational structure and conclude that they are far higher than previously documented.

SPACs and the private firms they bring public are believed to be afforded greater disclosure discretion during their going public process than firms entering the public market via traditional IPOs as they are currently believed to be afforded safe harbors regarding forward-looking disclosures under the PSLRA and do not fall under the purview of any quiet period restrictions. SPAC-related parties can use this discretion either opportunistically to hype their combination or to lower information asymmetries. Prior studies find that SEO firms use disclosure before an equity offering to reduce information asymmetries and their cost of capital (Li and Zhuang 2012; Shroff et al. 2013). These findings may not generalize to the SPAC setting, as there are strong incentives to hype a proposal. Target firms, who create the financial projections, have several reasons to hype proposed combinations (Blankespoor et al. 2022). Because of the inherently high level of uncertainty over their value, the target firm's management can demand greater consideration by raising expectations of their value by releasing optimistic projections. At the same time, higher expectations may also lead to fewer redemptions, increasing the size of their capital infusion and avoiding costs associated with deal failure.

SPAC sponsors also have incentives to either allow or overlook optimistic disclosures.[9] First, SPACs are competing with other SPACs and capital providers for potential targets (Blankespoor et al. 2022). This competition may lead

[7] Some SPACs bypass the shareholder meeting by instead conducting a tender offer, which is an alternative way to allow dissenting shareholders an opportunity to exit the company.

[8] Because of these changes, we restrict our analysis to those SPACs that have entered the public markets after 2009.

[9] These incentives to hype are not likely to be tempered by typical financial intermediaries. SPAC combinations are not underwritten, so they lack the traditional monitoring conducted by underwriters. The original SPAC underwriters are often retained as financial advisors; yet no underwriter liability is present within this arrangement, and their monitoring efforts may be compromised due to a portion of the original underwriter fees remaining contingent on a deal taking place (Klausner et al. 2022). Other monitoring agents such as financial analysts are not yet established at the time of the combination, so SPACs can, in general, portray their future with less external scrutiny.

sponsors to overlook optimistic projections to successfully close a deal. Sponsors may also overlook elevated expectations because of their compensation structure. As sponsors lose the entirety of their at-risk capital if the SPAC is forced to liquidate, higher expectations may lead to a greater likelihood of a successful deal, which ensures that the sponsor retains their securities. Further, unequal post-combination payouts allow sponsors to benefit financially from nearly any combination regardless of its quality.

Blankespoor et al. (2022) are the first to provide evidence of the usage of forward-looking information by SPACs during the going public process. They find that SPACs issue projections that are, on average, four years ahead, only met 35 percent of the time, and dramatically reduced in frequency once a combination is closed. The study concludes that SPAC projections are out of line with business fundamentals. Although Blankespoor et al. (2022, 4750) provide evidence of optimistic SPAC projections, the study does not examine how market participants respond to these disclosures and calls on future research to examine this important issue. Our study answers this call and fills this void. In closely related concurrent work, both Chapman, Frankel, and Martin (2021) and Dambra, Even-Tov, and George (2022) also attempt to provide such evidence.

Chapman et al. (2021) examine various aspects of SPAC disclosures during their going public process (e.g., tone, forecasts, forecast intensity, and projected growth rates) and find evidence that various aspects of the disclosures are negatively related to redemptions, positively related to returns and retail investor purchases during the period between the announcement and the combination's closing, and negatively related to spreads in the post-combination period. As they find no relation between their measures and post-combination returns, they conclude that SPACs' voluntary disclosures are not opportunistic nor do they lead to mispricing. The difference in findings with our results are likely due to how opportunistic forward-looking information is measured and differences in research designs. Chapman et al. (2021) focus on several different aspects of SPACs' voluntary disclosures, whereas we focus on verifiable revenue forecast errors. Also, using a calendar-time portfolio approach, we examine post-combination returns after controlling for known risk factors, which Chapman et al. (2021) do not consider.

In contrast, like our study, Dambra et al. (2022) find evidence that investors appear to be misled by SPAC revenue forecasts. Important differences exist, however, between our studies. First, we focus on benchmarking revenue forecasts against actual revenue realizations to analyze the market response to managerial hyping, whereas Dambra et al. (2022) instead focus on the compound annual growth rates (CAGRs) of projected revenues. They motivate their use of CAGRs by highlighting that they are commonly used in practice for valuations. We do not follow this approach as CAGRs of projected revenues are just as likely to capture real revenue growth rather than managerial hyping.[10] Although our approach leads to a smaller sample and an examination of shorter horizon forecasts, actual forecast errors should provide cleaner identification and more direct evidence related to the SEC's concern of SPACs' usage of optimistic guidance (SEC 2022).

Second, we more comprehensively investigate whether and which investors can see through the hyping efforts. Specifically, we find that greater redemptions and institutional divestitures occur for SPACs with more optimistic forecasts, consistent with some investors—particularly institutional investors—detecting the hype and exiting their positions. In contrast, Dambra et al. (2022) find evidence that CAGRs are negatively associated with shareholder redemptions. We believe that the disparity in results is attributable to different data sources and research design decisions as well as the different variable of interest.[11] In addition, different sample periods and control variables are used in the two analyses.

Dambra et al. (2022) also examine the daily market response to investor presentation filings. We do not conduct a similar investigation, as positive reactions at the filings can be caused by either managerial hyping or reduced information asymmetry. Further, the study also examines media coverage around the filing date and subsequently filed class action lawsuits. We do not investigate these issues, as they fall outside our primary research questions. Instead, our study more thoroughly examines issues related to investors' responses to SPAC disclosures. Specifically, we explore how institutional investors respond to optimism through various divestiture analyses and provide a more extensive examination of investor responses by examining both common share and warrant trading and returns.

Hypothesis Development

Retail and Institutional Investor Reactions to SPAC Projections

If a SPAC uses its voluntary disclosure discretion opportunistically to hype its proposed combination, investors with varying levels of financial sophistication may respond differently. SPACs have been described as a "poor man's

[10] Dambra et al. (2022) attempt to alleviate this concern by providing evidence that CAGRs are positively associated with forecast bias (see their Table 9), but they fail to find a significant association after controlling for historic revenue in column (5).

[11] Rather than collecting redemption amounts by hand, as is done in our study, Dambra et al. (2022) rely on data from Boardroom Alpha, a data source that we found to be less complete and reliable than hand collection for earlier firms in our sample.

private equity fund" because they provide retail investors access to an investment vehicle similar to that of a private equity fund for which they are locked out of (Dimitrova 2017). Lacking financial sophistication, retail investors are likely unaware of the complex capital structure of SPAC combinations and are more likely to be deceived by hyping efforts (e.g., Barber and Odean 2000; Barber and Odean 2008).[12] Also, prior studies have found that retail investors are more vulnerable to managements' opportunistic pro forma earnings disclosures (e.g., Bhattacharya, Black, Christensen, and Mergenthaler 2007). On the other hand, prior work has shown that institutional investors can discern optimistically biased management forecasts (e.g., Ajinkya, Bhojraj, and Sengupta 2005). Therefore, we expect that retail investors are more likely to purchase SPACs that are hyped by optimistic guidance, whereas institutional investors are less likely to do so. Importantly, retail investors have ready access to SPAC forecasts without needing to locate actual filings. For instance, SPAC revenue projections are widely disseminated on popular investor platforms—for example, we highlight the subreddit r/SPACs, an investor platform covering SPACs, in Appendix B—and, accordingly, retail investors likely base their trades on the projections.

Shareholder Redemptions and Divestitures

Although less sophisticated investors may be fooled by the optimistic projections and purchase shares in the expectation of long-term value appreciation, some investors may be capable of seeing through the inflated revenue estimates. Being aware of the incentives of SPACs to hype, more sophisticated and informed investors may identify and discount the bias, which is consistent with prior literature documenting their ability to see through the optimism in guidance issued by public firms (Ajinkya et al. 2005; Lee and Zhu 2022). We predict that at least some portion of market participants can suspect the hype and either redeem or sell their shares for proposals with heightened levels of suspected hyping. This allows them the ability to exit their investment before the floor that limits their downside potential is lost.[13] However, if investors do not fully understand the complex structure and subsequent hyping incentives of SPACs or if they lack sufficient information to form more accurate forecasts, investors may be unable to fully undo inflated forecasts when deciding whether to redeem or sell their shares.

Post-Combination Return Performance

Although we predict that some portion of investors can see through the hyping efforts and exit, SPAC combinations can still obtain shareholder approval and retain sufficient levels of cash to close if enough investors are unable to fully see through the inflated projections and rely on them to arrive at a valuation figure. Therefore, we predict that SPACs with inflated forecasts will experience negative post-combination returns when investors later obtain additional information about the forecast or actual revenue realizations. By focusing on post-combination returns, we can provide direct evidence of hyping efforts under the premise that elevated stock prices due to prior hyping through inflated forecasts cannot be sustainable in the long run (e.g., Shroff et al. 2013).[14]

III. SAMPLE SELECTION, VARIABLE DEFINITIONS, AND DATA SOURCES

Sample Selection

Table 1 outlines the sample selection process that we describe in detail below. We rely on data provided by SPACInsider to identify all SPACs that have gone public since 2009 and have successfully combined (i.e., the process of reverse merging with the private firm is complete, and the new entity is publicly trading) before 2021.[15] We exclude SPACs that went public before 2009 because they possess significant structural differences (e.g., stronger voting rights,

[12] Alternatively, retail investors might trade regardless of the SPACs' hyping efforts, as they have been shown to purchase IPO stocks even when there is more bad news present (Bushee et al. 2020).

[13] SPAC common shares should have a price floor near $10 until a combination closes, as dissenting shareholders can always choose to redeem their shares for $10 before a combination closes if they view the proposal unfavorably.

[14] Note, however, that we do not focus on the returns between a combination's announcement and completion, as this window does not allow for a direct test of share prices increasing due to a reduction in information asymmetry or hyping. Also, even if the market detects the hyping efforts, the market cannot react negatively because of the price floor that SPACs provide until the combination closing date.

[15] We take steps to manually verify that the data from SPACInsider are both correct and complete. First, we verified all data obtained from SPACInsider by identifying corroborating information filed on EDGAR. Second, we ensured that the database was not lacking coverage by downloading all registration statements filed during the sample period with an SIC code of "6770," which is exclusively used by blank check companies.

TABLE 1

Sample Selection Process

Description	Firms	Projections
SPACs that have gone public between 2009 and 2020	474	
SPACs that have liquidated[a]	(26)	
SPACs that are still searching/announced a target[a]	(277)	
Completed SPAC Combinations[a]	**171**	
Provide no projections	(14)	
Provide no revenue projections	(17)	
Combinations with Revenue Forecasts	**140**	**486**
Realizations are not released[a]	(29)	(262)
Delisted before realizations	(2)	(10)
Combinations with Forecast Errors	**109**	**214**

Table 1 provides details of our sample selection process. Our sample runs from 2009 to the end of 2020 and excludes combinations that closed after this date. The initial data are obtained from SPACInsider and are manually verified from filings filed on EDGAR. Revenue forecasts are obtained from a manual search through all relevant SEC documents (i.e., current reports, prospectuses, proxy statements, registration statements, and tender offers) filed between the combination announcement date and its completion. Revenue forecasts are obtained at two points in time: the earliest released forecasts, which are used for the investor trading tests, and the latest released forecasts issued before the combination close, which are used for the remaining tests. Revenue realizations are obtained from Compustat for fiscal years ending up to 2020.
[a] As of December 31, 2020.

lower trust percentages, higher levels of dilution, etc.).[16] During our sample period, 474 SPACs entered the public markets, and 171 successfully combined. Of the remaining SPACs, 26 have liquidated and 277 are either searching for a target or have announced a proposal as of the end of 2020.[17] Figure 1 documents the yearly breakdown of SPAC IPOs and combinations.

Examining SPAC combinations completed before 2021 should provide us with a strong setting to examine how investors behaved during the period in which SPACs and target firms presumably possessed the greatest ability to hype and misled investors. Starting near the end of our sample period in 2020, prominent academic work (e.g., Klausner et al. 2022) and business press articles began to emerge on SPACs' usage of forward-looking information (e.g., Celarier 2021). Throughout the year, more work began to shed light on the aggressiveness of SPAC projections (e.g., Blankespoor et al. 2022), with the attention ultimately culminating in the SEC's proposal to enhance SPAC disclosure requirements (SEC 2022). Although SPACs were not deterred from disclosing projections (see footnote 5), the possibility exists, however, that investor responses to the projections became more muted due to the elevated attention and scrutiny. Accordingly, the 2009–2020 sample period could represent the cleanest possible setting to test our hypotheses, as it avoids including potential combinations for which investor reliance on forward-looking forecasts may be compromised. The possibility also exists that investors did not alter their behavior due to the increased scrutiny, which would lead to the same predictions.

Focusing on the 171 SPACs that have consummated a combination before the end of 2020, we collect all projections disclosed between the proposal's announcement and its completion by hand. We search through all relevant SEC filings (i.e., current reports, prospectuses, proxy statements, registration statements, and tender offers) and retain two sets of projections. We keep the first set of projections and those issued closest to the combination date.[18] We use the initial set of projections to analyze investor trading behaviors between the date of their release and the close of the combination.

[16] For example, when comparing Gahng et al.'s (2023) documentation that the average SPAC in their sample contained no more than 0.8 warrants per share with an earlier study such as Jenkinson and Sousa (2009), which documented that SPACs contained 1.432 warrants per share, it is evident that SPACs have become less dilutive. Furthermore, Gahng et al. (2023) discuss that sponsors were expected to increase their private placement purchases, which subsequently increased the per share value of the trust account after 2010. These studies fail to mention the change in the conversion threshold, which was simultaneously removed at the time of these other changes. The conversion threshold was a rule that required SPACs not to proceed with a combination if a certain percentage (usually 20–40 percent) of the shareholders redeemed their shares (see Blank Rome LLP (2014) for further explanation).

[17] Although the 277 SPACs that have announced a proposal or are still searching for a combination target as of the end of 2020 do not enter our sample, most of these firms will go on to successfully combine in the years that follow.

[18] These projections will be equal if the SPAC does not update their projections during the going public process.

We use the latter set of projections in the remaining tests, as these projections will be relied on by investors when deciding to remain a shareholder or redeem their shares.

We find financial projections for 157 combinations; two of the 14 combinations without forecasts do disclose industry-specific forecast measures. Therefore, consistent with Blankespoor et al. (2022), we find that SPACs exploit the opportunity to disclose forward-looking projections. We further focus on revenue forecast errors rather than other projections for several reasons. First, revenue forecasts are important metrics closely followed by the market. Rees and Sivaramakrishnan (2007) show that the market's response to an earnings announcement is determined by whether the firm jointly meets or beats analysts' earnings and revenue forecasts. Second, for firms without an established performance history, revenue projections are more difficult for outsiders to question than earnings projections. In the setting of private venture-backed firms, Armstrong et al. (2007) argue and find supporting evidence that, whereas managers will issue optimistic future revenue forecasts because they are hard to disprove, expense forecasts tend to have reasonable "internal consistency" with the revenue forecasts (i.e., expense forecasts are pessimistic but not more pessimistic); combined, this leads to optimistic profit forecasts. This argument can be applied to SPACs, which are also small and hard to value (Bai, Ma, and Zheng 2023). Third, although profitability measures are most forecasted for our sample, firms provide several different profitability measures, such as earnings before income, taxes, depreciation, and amortization (EBITDA); net income; gross profit; and other similar measures. The use of different profitability measures makes it difficult to compare forecast errors, especially because they are often reported as "adjusted" numbers disclosed without sufficient details as to what is adjusted. Revenue forecasts, however, are uniformly reported across all SPACs and are provided with nearly the same frequency. Finally, the examination of revenue forecast errors rather than forecasted revenue growth rates affords us the ability to verify the projections *ex post*, as high projected revenue growth rates are not reflective of hyping efforts if the firm meets the forecast. Thus, our focus on forecast errors more directly captures hyping efforts.

Revenue forecast errors are calculated using revenue realizations from Compustat. We are unable to obtain realizations for 29 firms (262 forecasts) because the financials had not yet been released as of the end of 2020 and for two firms (ten forecasts), which were delisted before releasing any financials. For both sets of our projections, we are left with 109 unique combinations and 214 revenue forecasts that have available forecast errors.

Variable Definitions

We define our forecast error variable, *Forecast Error*, as the forecasted revenue minus the actual revenue scaled by the forecasted amount.[19] First, we examine whether optimistic forecasts differentially affect retail and institutional trade imbalances. Because only retail order flows can receive price improvement, Boehmer, Jones, Xiaoyan Zhang, and Xinran Zhang (2021) develop a measure that discerns retail investor buy and sell trades from other trades in Trade and Quote (TAQ) data.[20] Using this measure, we calculate the retail trade imbalance (*Retail Trade Imbalance*) as the number of retail buy trades minus the number of retail sell trades divided by the total number of retail trades between the projection's release date and the combination's completion date.[21] Further, we define trades that are over $50,000 as institutional trades.[22] We calculate the institutional trade imbalance (*Institutional Trade Imbalance*) in an identical manner as *Retail Trade Imbalance*. Of our final sample of 109 SPACs, ten do not have sufficient trading data.

We also investigate whether optimistic forecasts influence the percentage of shareholders that choose to redeem their shares as well as the rate of institutional investor divestiture. Subject to the SPAC's discretion, shares can be redeemed either through a tender offer or in the days leading up to a shareholder meeting in connection with either a combination or for the purpose of extending the SPAC's life. We collect the number of redeeming shareholders from a variety of filings by hand (e.g., current reports, quarterly reports, or annual reports). The variable *Redemptions* is measured as the number of redeemed shares divided by the total number of nonfounder shares issued at the SPAC's IPO net of any

[19] Qualitatively similar results are found using the combination's implied market value of equity as the deflator.

[20] Most market orders from retail investors are executed using their brokers' own inventory rather than being executed on the exchanges. In that case, the executed price is slightly (typically subpenny) better than the national best bid or offer (NBBO) to satisfy Regulation 606T. However, institutional investors' orders are typically sent to exchanges, and the executed prices are in round pennies.

[21] Barber, Huang, Jorion, Odean, and Schwarz (2023) question whether the Boehmer et al. (2021) measure accurately identifies the signs of retail trades. They find that this concern is intensified when a security's bid-ask spread increases, as the algorithm used by Boehmer et al. (2021) assigns buy and sell trades based on the subpenny digits of the executed price. In untabulated tests, our inferences are robust to excluding trades made on days when the average bid-ask spread is higher than $0.05. However, we caution that we cannot fully dismiss measurement error concerns.

[22] This measure is motived by Bushee et al.'s (2020) classification of trades greater than $50,000 as institutional trades. Bushee et al. (2020) state that although $50,000 trades may not capture all institutional trades because of trade slicing, it is not likely to capture any retail trades. The effect of such misclassification would be to bias against us finding evidence of retail traders and institutional traders responding differently to optimistic forecasts. We additionally test a $20,000 threshold, as firms in Bushee et al.'s (2020) sample are significantly larger than the SPACs in our sample (i.e., $455 million versus $173 million), and find that our inferences remain unchanged.

redemptions made in connection with extending the SPAC's corporate life.[23] Because SPAC investors have three options (i.e., they can redeem their shares, remain shareholders, or sell their shares in the open market) in the days leading up to a combination's close, we also examine institutional investor divestiture rates. We construct a combination's divestiture rate by identifying the number of shares held by 13-F filers in the reporting period before a combination's closing date and the number of shares held by the same 13-F filers in the subsequent reporting period. Each combination's divestiture rate, *Divest*, is measured as the pre-combination holdings less the post-combination holdings scaled by the pre-combination holdings.

Finally, we examine whether optimistic forecasts lead to negative post-combination returns. Daily stock returns are obtained from CRSP when possible and Bloomberg if they are not found in the CRSP database.[24] Returns are measured from the date of the combination until three, six, 12, or 24 months later. Of the 109 unique firms with forecast errors, we obtain three-, six-, 12-, and 24-month returns for 97, 91, 87, and 68 firms, respectively.

Data Sources and Descriptive Statistics

All SPAC variables are collected by hand from relevant EDGAR filings. Further, we obtain non-SPAC revenue forecasts from I/B/E/S, financial information from Compustat, stock returns from CRSP or Bloomberg, retail and institutional trades from TAQ, CEO tenure from Execucomp, and institutional ownership data from the WRDS SEC Analytics Suite when available and FactSet otherwise. All of our data are collected through the end of 2020. Appendix A provides detailed variable descriptions.

Table 2, Panel A presents summary statistics for the variables, and Panel B presents correlations between our key variables.[25] As shown in Panel A, SPACs issue forecasts that are optimistically biased. Specifically, our variable of interest, *Forecast Error*, implies that the average (median) difference between the forecasted revenue and the actual revenue is 16.6 percent (6.4 percent) of the forecasted amount. Across all revenue forecasts, the forecast was optimistic 68.2 percent of the time. These univariate statistics suggest that SPACs exploit the opportunity to disclose forward-looking guidance by issuing optimistic revenue projections.

We provide detailed evidence of revenue forecast optimism and determinants of the optimism in Appendix C. Using the universe of all revenue forecasts, forecasts from firms that recently underwent a traditional IPO, and nearest neighbor matched forecasts, we find that SPAC-issued revenue projections are more optimistic and that the associated forecast errors are larger. For instance, similar to Blankespoor et al. (2022), we find that SPACs' *Forecast Errors* are 43.3 percent larger than all other revenue forecasts and 11.5 percent larger than the forecasts of post-IPO firms. Additionally, we find little evidence that observable SPAC combination and forecast characteristics are significantly associated with SPAC forecast errors.

IV. RESEARCH DESIGN AND RESULTS

In this section, we investigate our primary research questions about how optimism in SPAC revenue forecasts affects (1) trading behavior by retail and institutional investors, (2) shareholder redemptions and institutional investors divestiture rates, and (3) SPAC mispricing.

Retail and Institutional Investor Reactions to SPAC Projections

We begin by examining retail trading activity to identify if retail investors are disproportionally influenced by hyping efforts and use institutional trading activity as a basis for comparison. The sample consists of all identified revenue forecasts from combinations with daily TAQ trading data for the period between the initial release of the projections and the combination's close. The dependent variable in the analysis is either *Retail Trade Imbalance* or *Institutional Trade Imbalance*. The variable of interest, *Forecast Error*, is based on the first set of released projections and is increasing with optimism. We standardize *Forecast Error* to a mean of zero and standard deviation of one to ease interpretations in all of our analyses.

Our subsequent analyses include the following control variables: *SPAC Size*, as larger SPACs have a larger pool of private firms to seek out, which may allow for the identification of more favorable combinations and alleviate the need

[23] Our inferences are unchanged if we alternatively use the overall percentage of redeeming shareholders.

[24] Bloomberg returns are a close substitute for CRSP returns. Specifically, Lewellen (2009) finds that Bloomberg returns are accurately matched to CRSP returns 99.9 percent of the time.

[25] The descriptive statistics are tabulated for the set of projections released closest to the combination's closing date. The initially released projections are similar. For example, the mean (median) values of the initially released *Forecast Error*, *Optimism*, and *Accuracy* are 0.189 (0.084), 0.696 (1.00), and −0.284 (−0.160) respectively.

TABLE 2

Summary Statistics

Panel A: Descriptives

Outcome Variables	n	Mean	Std. Dev.	25th Percentile	Median	75th Percentile
Forecast Error	214	0.166	0.380	−0.008	0.064	0.403
Optimism	214	0.682	0.467	0.000	1.000	1.000
Accuracy	214	−0.281	0.305	−0.465	−0.147	−0.031
Retail Trade Imbalance	98	0.107	0.203	0.000	0.102	0.228
Institutional Trade Imbalance	95	0.074	0.296	−0.089	0.061	0.224
Redemptions	109	0.461	0.375	0.015	0.515	0.843
Modified Redemptions	109	0.372	0.388	0.000	0.265	0.753
Divest	109	0.635	0.368	0.250	0.759	0.977
DED Divest	55	0.650	0.463	0.000	1.000	1.000
QIX Divest	99	0.640	0.408	0.256	0.896	0.999
TRA Divest	100	0.767	0.283	0.569	0.909	0.988
Growth Divest	99	0.683	0.379	0.354	0.894	0.997
Value Divest	101	0.717	0.335	0.517	0.873	0.992
3 Month Return	97	−0.046	0.548	−0.267	−0.075	0.086
6 Month Return	91	−0.124	0.408	−0.405	−0.181	0.205
12 Month Return	87	−0.182	0.528	−0.563	−0.249	0.024
24 Month Return	68	−0.290	0.844	−0.756	−0.525	−0.054
Control Variables						
SPAC Size	109	212.029	169.569	70.000	172.500	300.000
At Risk	109	6.440	3.438	3.825	6.025	8.855
Dilution	109	1.221	0.450	0.908	1.089	1.454
Trust Percentage	109	100.606	1.013	100.000	100.000	101.000
Days to Announce	109	477.514	186.872	342.000	472.000	626.000
Board Representation	109	0.889	0.303	1.000	1.000	1.000
SPAC Dual Role	109	0.055	0.229	0.000	0.000	0.000
Tenure	109	7.890	7.676	2.000	6.000	10.000
Forecasted Years	109	3.211	1.866	2.000	3.000	4.000
Forecasted Measures	109	2.385	0.719	2.000	2.000	3.000
Revenue Growth	109	0.349	0.658	0.014	0.141	0.459
Media Mentions	109	103.165	59.908	60.000	90.000	140.000
Disclosures	109	8.248	4.743	5.000	7.000	11.000
Days to Completion	109	138.495	58.694	101.000	122.000	163.000
SPAC Mafia	109	0.295	0.235	0.084	0.276	0.436
Contemp. Return	102	0.108	0.506	−0.039	0.023	0.169

(continued on next page)

for hyping; *Disclosures*, the number of 8-K filings issued within the examination window, as retail investors are known to purchase stocks that draw their attention; *Days to Completion*, the number of days between the announcement and close; *At Risk*, the sponsor's investment in the SPAC, as larger amounts of forfeitable capital may lead the sponsor to push lower-quality combinations with the aid of hyping efforts to avoid large financial losses; *Dilution*, the possible dilution of the proposed company's shares due to the sponsor shares and the warrants or rights issued with the units, as higher levels of dilution are unfavorable to investors and, thus, could increase incentives to hype proposals; and *Trust Percentage*, the per-share amount of capital held in the trust account, as increasing the trust makes the act of redemption more lucrative for investors, again increasing hyping incentives.

Following Dimitrova (2017), we also include controls for the length of the search effort, *Days to Announce*, and its square *Days to Announce*^{2}. A short search effort as well as one that occurs close to the SPAC's deadline could signal a lack of effort or a last-ditch effort to push a combination—both of which may require hyping. Also following Dimitrova (2017), we control for SPAC management involvement in the proposed company with *Board Representation* and *SPAC*

TABLE 2 (continued)

Panel B: Correlations

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Forecast Error	(1)		0.807	−0.599	−0.023	−0.074	0.192	0.157	−0.227	−0.381	−0.395	−0.437
Optimism	(2)	0.624		−0.349	0.051	−0.123	0.176	0.184	−0.146	−0.249	−0.272	−0.341
Accuracy	(3)	−0.371	−0.225		−0.058	0.024	−0.041	−0.064	0.142	0.302	0.268	0.398
Retail Imbalance	(4)	−0.014	0.016	−0.015		−0.191	−0.013	−0.185	0.178	0.341	0.232	0.128
Institutional Imbalance	(5)	0.028	−0.060	−0.054	−0.227		−0.155	−0.113	0.086	0.116	0.028	0.134
Redemptions	(6)	0.187	0.200	−0.063	0.004	−0.059		0.619	−0.177	−0.222	−0.239	−0.322
Divest	(7)	0.113	0.206	−0.033	−0.110	−0.098	0.592		0.004	−0.110	−0.227	−0.166
3 Month Return	(8)	−0.027	−0.049	−0.003	0.027	0.208	−0.000	−0.006		0.660	0.470	0.381
6 Month Return	(9)	−0.248	−0.223	0.204	0.333	0.114	−0.204	−0.152	0.257		0.790	0.688
12 Month Return	(10)	−0.260	−0.201	0.220	0.222	0.045	−0.202	−0.264	0.103	0.780		0.817
24 Month Return	(11)	−0.068	−0.124	0.112	0.052	0.258	−0.091	−0.131	0.095	0.696	0.730	

Table 2 provides summary statistics. Panel A presents statistics for the full sample, and Panel B presents correlations between the variables of interest. Spearman (Pearson) correlation coefficients are presented in the top (bottom) diagonal of the table.
All variables are defined in Appendix A.

Dual Role, as greater involvement has been found to improve performance as well as signal belief and commitment to the new company. *Tenure* captures the private firm's management's ability. We also include *Forecasted Years* and *Forecasted Measures*, the number of years for which revenue forecasts are provided and the number of provided measures (i.e., profitability, cash flows, revenue, and capital expenditures projections), to capture the intensity of forecasting efforts. We include *Revenue Growth*, the actual growth rate of the private firm before it enters the market, to control for nonhype revenue growth expectations.[26] Finally, we include *Contemp. Return* and *Media Mentions*, the contemporaneous market return and number of media articles on the firm during our examination window, given that they could influence investor trading. Every specification includes closing year, forecast horizon, and industry fixed effects based on the Fama-French 49 industry classifications. Standard errors are clustered at the firm level.[27] If retail or institutional investors are more likely to purchase shares in SPACs that hype their proposals, we expect a positive coefficient estimate on our variable of interest.

Table 3 presents the results. Columns (1) to (4) ((5) to (8)) display the results when the dependent variable is *Retail Trade Imbalance* (*Institutional Trade Imbalance*). Further, columns (1) and (5) present the results when using all available revenue forecast errors, and columns (2) and (6) ((3) and (7)) present the results when using the forecast error with the shortest (longest) horizon per combination.[28] Consistent with our prediction, we find evidence across columns (1) to (3) suggesting that retail investors increase their purchases of SPACs that hype their proposals by issuing optimistic revenue projections. Regarding economic magnitude, a one standard deviation increase in *Forecast Error* leads to a 3.4 percentage point increase in the retail trade imbalance toward purchases. These results suggest that retail investors are influenced by the SPAC hyping efforts, which is likely due to their lack of financial sophistication and inability to undo managers' imbedded optimism. In contrast, we fail to find evidence that institutional investors purchase SPACs based on hype in columns (5) to (7). In untabulated tests, we stack the model specifications from columns (1) and (5) and find that the coefficients on *Forecast Error* are significantly different from one another. This provides further evidence that institutional investors are significantly less responsive to optimistic forecasts than retail investors.[29]

[26] In untabulated robustness analyses, we explore two alternative proxies for investors' nonoptimistic revenue growth expectations, as *Revenue Growth* may be an imperfect proxy. First, we use the combination's projected cumulative annual growth rate (*CAGR*). Second, we use realized revenue scaled by the market value of equity under the assumption that the nonhype revenue growth expectation would be identical to the actual realized revenue. Although capturing different aspects of investors' nonoptimistic revenue growth expectation, these alternative measures also have limitations. Specifically, *CAGR* is an imperfect proxy as it includes the portion of revenue growth that is driven by the hyping efforts. In addition, realized revenue assumes that investors can perfectly arrive at true revenue, which managers may not even know, at the time of their trading. In any event, using these two alternative proxies does not alter our inferences.

[27] In untabulated results, our primary inferences are robust to clustering standard errors at the industry level.

[28] The number of observations for tests examining the sample of forecast errors with the shortest or longest horizon per combination do not total the number of forecast errors in the full sample for three reasons: (1) some combinations possess more than two forecast errors, (2) some combinations only possess one forecast error, and (3) the research design results in singletons dropping out of the analyses.

[29] Our sample period overlaps with the SEC's Tick Size Pilot Program (TSPP), which may have hindered brokers' ability to provide price improvements to retail investors. This may also impact our *Retail Trade Imbalance* measure. To alleviate this concern, we estimate our models after removing observations that overlapped with the TSPP. In untabulated results, despite limiting our sample considerably, our inferences are qualitatively similar.

TABLE 3

Investor Trading Activity and Forecast Errors

Dependent Variable:	***Retail Trade Imbalance***				***Institutional Trade Imbalance***			
Examination Window:	**Forecast to Close**			**Placebo**	**Forecast to Close**			**Placebo**
Sample:	**Full Sample** (1)	**Shortest Horizon** (2)	**Longest Horizon** (3)	**Full Sample** (4)	**Full Sample** (5)	**Shortest Horizon** (6)	**Longest Horizon** (7)	**Full Sample** (8)
Forecast Error	**0.0338****	**0.0519***	**0.0678*****	**−0.0172**	**−0.0262**	**−0.0355**	**−0.0052**	**−0.0164**
	(2.23)	**(1.95)**	**(2.91)**	**(−0.74)**	**(−0.94)**	**(−0.69)**	**(−0.10)**	**(−0.47)**
SPAC Size	−0.0017***	−0.0014***	−0.0010*	−0.0010*	−0.0008	−0.0002	−0.0008	−0.0009
	(−3.32)	(−2.75)	(−1.93)	(−1.77)	(−0.99)	(−0.17)	(−0.83)	(−0.76)
Disclosures	−0.0011	0.0021	0.0007	−0.0099	−0.0062	−0.0053	−0.0070	−0.0141
	(−0.16)	(0.26)	(0.08)	(−1.09)	(−0.52)	(−0.40)	(−0.49)	(−0.89)
Days to Completion	0.0010	−0.0186	−0.0245	−0.0353	0.1332	0.2861	0.2988	0.3976
	(0.01)	(−0.09)	(−0.12)	(−0.10)	(0.38)	(0.81)	(0.70)	(0.76)
At Risk	0.0823***	0.0687***	0.0533**	0.0550**	0.0487	0.0251	0.0466	0.0688
	(3.84)	(3.14)	(2.40)	(2.57)	(1.27)	(0.50)	(0.96)	(1.35)
Dilution	0.0516	0.0343	0.0666	0.0550	0.2358*	0.3211*	0.1239	−0.0141
	(0.71)	(0.38)	(0.72)	(0.68)	(1.79)	(1.87)	(0.73)	(−0.09)
Trust Percentage	−0.0980***	−0.0744**	−0.0556*	−0.0249	−0.0648	−0.0678	−0.0849	−0.0110
	(−3.04)	(−2.27)	(−1.90)	(−0.66)	(−1.00)	(−0.92)	(−0.98)	(−0.17)
Days to Announce	0.0758	−0.0292	−0.0446	−0.1166	0.6898*	0.8883**	0.7568	−0.0222
	(0.36)	(−0.11)	(−0.21)	(−0.43)	(1.90)	(2.21)	(1.36)	(−0.04)
Days to Announce^2	−0.0335	0.0003	−0.0026	0.0236	−0.1825	−0.2853*	−0.2162	−0.0255
	(−0.43)	(0.00)	(−0.03)	(0.22)	(−1.38)	(−1.93)	(−1.09)	(−0.14)
Board Representation	0.2055***	0.1592**	0.1776**	−0.1314	−0.0876	−0.0237	−0.0453	0.0148
	(4.36)	(2.69)	(2.62)	(−1.34)	(−0.74)	(−0.14)	(−0.29)	(0.12)
SPAC Dual Role	0.0409	−0.0256	−0.0898	−0.3762*	0.4253*	0.4885*	0.4498	0.0531
	(0.24)	(−0.14)	(−0.58)	(−1.73)	(1.91)	(1.84)	(1.43)	(0.22)
Tenure	0.0018	0.0018	0.0043	0.0023	−0.0075	−0.0049	−0.0095	0.0058
	(0.66)	(0.63)	(1.49)	(0.56)	(−1.25)	(−0.74)	(−1.41)	(0.65)
Forecasted Years	−0.0269*	−0.0227	−0.0477***	−0.0048	−0.0050	−0.0322	−0.0042	0.0415
	(−1.82)	(−1.35)	(−2.76)	(−0.33)	(−0.23)	(−0.99)	(−0.12)	(1.52)
Forecasted Measures	0.0232	0.0195	0.0515	0.0328	−0.0733	−0.0976	−0.1293*	−0.0280
	(0.79)	(0.59)	(1.64)	(0.71)	(−1.45)	(−1.59)	(−1.78)	(−0.41)
Revenue Growth	−0.0366	−0.0461	−0.0280	0.0216	−0.0439	0.0186	−0.0115	0.0577
	(−1.12)	(−1.10)	(−0.78)	(0.49)	(−0.72)	(0.22)	(−0.13)	(0.78)

(continued on next page)

TABLE 3 (continued)

Dependent Variable:	***Retail Trade Imbalance***				***Institutional Trade Imbalance***			
Examination Window:	**Forecast to Close**			**Placebo**	**Forecast to Close**			**Placebo**
Sample:	**Full Sample**	**Shortest Horizon**	**Longest Horizon**	**Full Sample**	**Full Sample**	**Shortest Horizon**	**Longest Horizon**	**Full Sample**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Media Mentions	−0.0009*	−0.0007	−0.0006	0.0008	−0.0015	−0.0020*	−0.0013	0.0001
	(−1.69)	(−1.09)	(−0.96)	(1.26)	(−1.59)	(−1.77)	(−1.12)	(0.10)
Contemp. Return	0.1392**	0.1323	0.0985	0.0606	0.1009	0.0984	0.0735	0.1710
	(2.09)	(1.66)	(1.30)	(0.64)	(1.09)	(0.83)	(0.58)	(1.49)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Forecast Horizon FE	Yes	No	No	Yes	Yes	No	No	Yes
Observations	173	83	83	173	167	80	80	175
Adjusted R^2	0.5301	0.2109	0.3063	0.4071	0.4264	0.1292	−0.0063	0.2522

***, **, * Denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 3 examines the association between investor trading activity and revenue forecast errors. The dependent variable is *Retail* (*Institutional*) *Trade Imbalance* in columns (1) to (4) ((5) to (8)). *Retail Trade Imbalance* is the number of retail buy trades minus retail sell trades divided by the total number of retail trades over the period between the release of the forecast and the combination's close date based on the retail trading measure introduced by Boehmer et al. (2021) for columns (1) to (3). Column (4) is a placebo test that measures *Retail Trade Imbalance* over the period between the SPAC's IPO and the combination's announcement date. *Institutional Trade Imbalance* is the number of buy trades that are over $50,000 minus the number of sell trades that are over $50,000 divided by the total number of trades over $50,000 over the period between the release of the forecast and the combination's close date for columns (5) to (7). Column (8) is a placebo test that measures *Institutional Trade Imbalance* over the period between the SPAC's IPO and the combination's announcement date. Columns (1), (4), (5), and (8) examine the full sample of revenue forecasts, and columns (2) and (6) ((3) and (7)) exclusively examine the set of forecasts with the shortest (longest) horizon per combination. The variable of interest is *Forecast Error*, which is measured as the forecasted revenue minus the actual realization scaled by the forecasted value. We standardize this variable to ease interpretations. Industry fixed effects are based on the Fama-French 49 industry classifications. Reported t-statistics (in parentheses) are based on standard errors clustered at the firm level.
All variables are defined in Appendix A.

We also include a placebo test to ensure that we are picking up investor trading behaviors related to the public release of the revenue projections and not any private communication before their public release. To do so, we repeat our analysis but shift the examination window to the interval between the SPAC's IPO and the public release of the projections. The results are displayed in columns (4) and (8). We find that *Forecast Error* is not significantly associated with trading activity before the public release of the forecasts.

Shareholder Redemptions and Divestitures

We next examine if and which investors can see through the hyping efforts and react to optimistic forecasts by using *Redemptions* as the dependent variable. *Redemptions* measures the percentage of shares that were converted into cash from the trust account in the days leading up to the close of a combination. We use the same variable of interest, control variables, and fixed effects used in our trade imbalance analyses.[30] If some investors can unravel the hyping efforts and opt to redeem their shares as a result, we expect a positive coefficient on the variable of interest. Alternatively, if all investors fail to detect or are unable to determine the direction of the bias in the projections, investors may redeem fewer shares, leading to a negative or insignificant association.

The results are presented in Table 4. Again, column (1) presents the results using all available revenue forecast errors, and column (2) (3) presents the results when using the forecast error with the shortest (longest) horizon per combination. Consistent with some shareholders undoing the hyping efforts, our variable of interest is statistically positive and economically important. For a one standard deviation increase in *Forecast Error*, shareholder redemptions increase by 8.2 percentage points.

Klausner et al. (2022) provide evidence that a group of 13-F filers termed the "SPAC Mafia" heavily invest in pre-combination SPACs and, possessing no intent of remaining shareholders of the post-combination entity, either redeem or sell their shares before a combination closes. To ensure that our results are not attributable to revenue forecast errors covarying with SPAC Mafia holdings, we make several attempts to control for the influence of these investors. Similar to Klausner et al. (2022), we define SPAC Mafia members as investors that held pre-combination shares in more than 15 SPACs in our sample and had an average divestiture rate of greater than 90 percent (i.e., on average, they divested more than 90 percent of their pre-combination holdings after a combination took place).[31] Using this classification scheme, we control for SPAC Mafia influence in two ways. First, we define a variable *SPAC Mafia* as the number of shares held by SPAC Mafia firms as of the closest 13-F filing date to the combination's closing divided by the number of public SPAC shares. We include this as an additional control variable in column (4). As expected, the coefficient on *SPAC Mafia* is significantly positive. More importantly, our inferences are unchanged after its inclusion. As an alternative design, we define a new redemption variable, *Modified Redemptions*, as the proportion of shares redeemed after removing the shares held by the SPAC Mafia. The results obtained from using this dependent variable are presented in column (5). Again, our inferences remain unchanged and, accordingly, suggest that our results are not attributable to the actions of SPAC Mafia firms.

In the days leading up to a combination's close, SPAC investors have three options: redeem their shares for cash, remain shareholders, or sell their shares in the open market. The redemption analyses provide insights into whether investors redeem their shares or remain shareholders but cannot detect investor sales nor can they provide insights into specifically who or what group of investors are redeeming their shares. We overcome this limitation by analyzing investor divestiture rates (i.e., the rate at which investors divest their shares either by redeeming or selling in the periods surrounding the close of a combination).[32] Specifically, we construct divestiture rates for each combination by identifying the number of shares held by 13-F filers in the reporting period before a combination's closing date and the number of shares held by the *same* 13-F filers in the subsequent reporting period. Each combination's divestiture rate, *Divest*, is the pre-combination holdings less the post-combination holdings scaled by the pre-combination holdings. If institutional investors are responsible for the elevated levels of redemptions in the presence of managerial hyping due to their ability to see through the optimism, we expect to find elevated divestiture rates in the presence of managerial hyping as well. To test this, we re-estimate the previous tests by replacing the dependent variable with *Divest*.

The main results are presented in columns (1) to (3) of Table 5. Consistent with institutional investors undoing the managerial hyping and either redeeming or selling their shares as a result, we find that *Forecast Error* is statistically

[30] We remove *Disclosures* and *Days to Completion* from our set of controls because they are intended to control for retail trading activities. However, similar inferences are obtained when they are included. Further, *Contemp. Return* is also removed, as its inclusion induces the "bad control" problem discussed in Angrist and Pischke (2009). Essentially, *Contemp. Return* can be used as an outcome variable in the current research design.

[31] As this classification is a researcher-driven choice (i.e., we choose the number of SPACs that the investor must own and the average divestiture rate), we use other similar cutoffs and find that our inferences are unchanged.

[32] These analyses do have some limitations given that they can only be used to investigate institutional investors whose holdings are publicly visible via regular 13-F filings.

TABLE 4

Shareholder Redemptions and Forecast Errors

Dependent Variable:	***Redemptions***				***Modified Redemptions***
Sample:	**Full Sample**	**Shortest Horizon**	**Longest Horizon**	**Full Sample**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Forecast Error	**0.0823****	**0.0944****	**0.0969****	**0.0698****	**0.1218*****
	(2.47)	**(2.11)**	**(2.38)**	**(2.55)**	**(3.76)**
SPAC Size	−0.0010	−0.0017*	−0.0013	−0.0007	−0.0018**
	(−1.29)	(−1.77)	(−1.51)	(−0.91)	(−2.09)
At Risk	−0.0011	0.0346	0.0198	0.0003	0.0371
	(−0.03)	(0.71)	(0.45)	(0.01)	(0.89)
Dilution	0.1510	0.0687	0.1047	0.1806*	0.1160
	(1.46)	(0.57)	(0.89)	(1.82)	(1.00)
Trust Percentage	0.0086	−0.0283	−0.0262	−0.0207	0.0756
	(0.18)	(−0.55)	(−0.52)	(−0.50)	(1.44)
Days to Announce	−0.0013	−0.0017	−0.0019	−0.0020**	−0.0009
	(−1.31)	(−1.39)	(−1.56)	(−2.08)	(−0.83)
Days to Announce^2	0.0000*	0.0000*	0.0000*	0.0000***	0.0000
	(1.87)	(1.86)	(1.98)	(2.79)	(1.29)
Board Representation	0.1670	0.1732	0.1966	0.1181	0.1410
	(1.53)	(1.25)	(1.48)	(1.45)	(1.20)
SPAC Dual Role	−0.0922	−0.1976	−0.1498	−0.0980	−0.1743
	(−0.43)	(−0.80)	(−0.64)	(−0.54)	(−0.87)
Tenure	0.0017	0.0013	0.0025	−0.0043	−0.0057
	(0.28)	(0.20)	(0.39)	(−0.73)	(−0.82)
Forecasted Years	−0.1101***	−0.0951***	−0.1018***	−0.1017***	−0.0661***
	(−4.59)	(−2.97)	(−3.27)	(−4.79)	(−2.70)
Forecasted Measures	0.1236**	0.1169*	0.1328**	0.0813	0.1374**
	(2.21)	(1.77)	(2.02)	(1.54)	(2.53)
Revenue Growth	−0.0812	−0.0826	−0.0960	−0.0921	−0.0951*
	(−1.30)	(−1.06)	(−1.26)	(−1.54)	(−1.81)
Media Mentions	−0.0007	−0.0009	−0.0009	−0.0004	0.0004
	(−0.97)	(−1.05)	(−1.15)	(−0.55)	(0.48)
SPAC Mafia				0.6750***	
				(4.37)	
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Forecast Horizon FE	Yes	Yes	No	No	Yes
Observations	211	100	100	211	211
Adjusted R^2	0.4201	0.1639	0.1742	0.5313	0.3499

***, **, * Denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 4 examines the association between the percentage of SPAC shareholders that opt to redeem their shares in connection with a proposed combination and revenue forecast errors. The dependent variable in columns (1) to (4) is *Redemptions*, which is measured as the number of shares converted into cash from the trust account in connection with a proposed combination divided by the number of public shares net of redemptions made in connection with extending the corporate life of the SPAC. The dependent variable in column (5) is *Modified Redemptions*, which is measured as the number of shares that were converted into cash from the trust account in connection with a proposed combination net of SPAC Mafia ownership shares divided by the number of public shares net of both redemptions made in connection with extending the corporate life of the SPAC and the SPAC Mafia shares. Columns (1), (4), and (5) examine the full sample of revenue forecasts, and column (2) (3) exclusively examines the set of forecasts with the shortest (longest) horizon per combination. The variable of interest is *Forecast Error*, which is measured as the forecasted revenue minus the actual realization scaled by the forecasted value. We standardize this variable to ease interpretations. Industry fixed effects are based on the Fama-French 49 industry classifications. Reported t-statistics (in parentheses) are based on standard errors clustered at the firm level.

All other variables are defined in Appendix A.

TABLE 5

Divestitures and Forecast Errors

Classification:	**Aggregate**			**Investor Type**			**Investment Style**	
Dependent Variable:	***Divest***			***DED***	***QIX***	***TRA***	***Growth***	***Value***
Sample:	**Full Sample**	**Shortest Horizon**	**Longest Horizon**			**Full Sample**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Forecast Error	**0.0712****	**0.0996****	**0.0744***	**0.0664***	**0.0467**	**0.0331**	**0.0978*****	**0.0302**
	(2.13)	**(2.45)**	**(1.85)**	**(1.90)**	**(1.11)**	**(1.51)**	**(2.97)**	**(0.75)**
SPAC Size	0.0000	−0.0008	−0.0004	0.0033**	−0.0014	0.0007	−0.0006	0.0006
	(0.06)	(−0.91)	(−0.43)	(2.20)	(−1.27)	(0.94)	(−0.66)	(0.79)
At Risk	−0.0445	−0.0043	−0.0233	−0.2134***	0.0071	−0.0612*	−0.0270	−0.0555
	(−1.14)	(−0.09)	(−0.55)	(−3.23)	(0.14)	(−1.80)	(−0.64)	(−1.51)
Dilution	0.2399**	0.1670	0.1997*	−0.2131	−0.0273	0.1706**	0.0940	0.2551**
	(2.31)	(1.56)	(1.79)	(−1.13)	(−0.17)	(2.01)	(0.76)	(2.28)
Trust Percentage	0.0468	0.0221	0.0251	0.2158**	−0.0196	0.0825**	−0.0038	0.0901
	(1.09)	(0.53)	(0.57)	(2.16)	(−0.29)	(2.11)	(−0.07)	(1.62)
Days to Announce	0.0007	0.0006	0.0005	0.0007	−0.0007	0.0005	0.0011	−0.0015*
	(0.70)	(0.61)	(0.50)	(0.37)	(−0.57)	(0.61)	(0.96)	(−1.75)
Days to Announce^2	−0.0000	−0.0000	−0.0000	−0.0000	0.0000	−0.0000	−0.0000	0.0000
	(−0.78)	(−0.55)	(−0.45)	(−0.46)	(0.67)	(−0.85)	(−0.96)	(1.09)
Board Representation	0.2143*	0.2707*	0.2981*	0.6007***	0.1759	0.2062**	0.2093*	0.2078
	(1.68)	(1.75)	(1.93)	(3.25)	(1.16)	(2.41)	(1.90)	(1.61)
SPAC Dual Role	−0.1290	−0.2004	−0.1289	−1.1144***	−0.1004	−0.0425	0.0580	−0.2104
	(−0.56)	(−0.78)	(−0.51)	(−3.75)	(−0.39)	(−0.28)	(0.25)	(−1.62)
Tenure	0.0073	0.0071	0.0076	−0.0120	0.0050	0.0046	0.0085	0.0034
	(1.10)	(1.05)	(1.11)	(−1.22)	(0.72)	(0.84)	(1.35)	(0.60)
Forecasted Years	−0.0804***	−0.0596*	−0.0645*	0.0774	−0.0100	−0.0534**	−0.0682**	−0.0427*
	(−2.97)	(−1.78)	(−1.83)	(1.35)	(−0.30)	(−2.55)	(−2.08)	(−1.75)
Forecasted Measures	0.1526***	0.1452**	0.1489**	0.3927***	0.0966	0.1627***	0.1623**	0.1191**
	(3.14)	(2.58)	(2.63)	(3.51)	(1.21)	(4.03)	(2.56)	(2.45)
Revenue Growth	−0.0239	−0.0485	−0.0564	−0.0134	−0.0514	0.0088	−0.0401	−0.0185
	(−0.50)	(−0.76)	(−0.89)	(−0.22)	(−0.92)	(0.22)	(−0.74)	(−0.37)
Media Mentions	−0.0007	−0.0008	−0.0008	−0.0024*	−0.0006	−0.0002	−0.0002	−0.0014**
	(−1.04)	(−1.03)	(−1.05)	(−1.71)	(−0.81)	(−0.37)	(−0.23)	(−2.41)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Forecast Horizon FE	Yes	No	No	Yes	Yes	Yes	Yes	Yes

(continued on next page)

TABLE 5 (continued)

Classification:	**Aggregate**			**Investor Type**			**Investment Style**	
Dependent Variable:	***Divest***			***DED***	***QIX***	***TRA***	***Growth***	***Value***
Sample:	**Full Sample**	**Shortest Horizon**	**Longest Horizon**			**Full Sample**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Observations	211	100	100	106	189	194	187	195
Adjusted R^2	0.4891	0.2205	0.1966	0.7215	0.4446	0.5482	0.4628	0.5077
Pre-Combination Holdings				4.53%	14.56%	47.59%	35.90%	29.55%

***, **, * Denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 5 examines the association between divestiture rates and revenue forecast errors. The dependent variable in columns (1) to (3) is *Divest*, which is measured as the percentage of shares retained by 13-F filers through the combination's closing. Specifically, for each combination, we obtain the number of shares held by 13-F filers in the reporting period immediately before the combination's closing date and calculate the percentage of these shares that they are still holding in the first reporting period after the combination. The dependent variable in columns (4) to (6) is the divestiture rate of the 13-F filers classified into dedicated, quasi-indexers, or transient investors according to Bushee (1998). The dependent variable in columns (7) and (8) is the divestiture rate of the 13-F filers classified into growth or value preferences according to Abarbanell et al. (2003). Columns (1) and (4) to (8) examine the full sample of revenue forecasts, and column (2) (3) exclusively examines the set of forecasts with the shortest (longest) horizon per combination. The variable of interest is *Forecast Error*, which is measured as the forecasted revenue minus the actual realization scaled by the forecasted amount. We standardize this variable to ease interpretations. At the bottom of the table, the average percentage of public shares held by the various group is displayed. Industry fixed effects are based on the Fama-French 49 industry classifications. Reported t-statistics (in parentheses) are based on standard errors clustered at the firm level.

All other variables are defined in Appendix A.

positive in all examined samples. Regarding economic magnitude, a one standard deviation increase in *Forecast Error* leads to divestiture rates that are higher by 7.1 percentage points. To provide further evidence on which institutional investors are divesting their positions, we calculate separate divestiture rates for 13-F filers classified by Bushee's (1998) investor type (i.e., we calculate a separate divestiture rate for dedicated (*DED*), quasi-indexer (*QIX*), and transient investors (*TRA*)) and Abarbanell, Bushee, and Smith Raedy's (2003) investment style (i.e., we calculate a separate divestiture rate for growth (*Growth*) and value preferences (*Value*)).[33] We present the results using investor type (preferences) divestiture rates in columns (4) to (6) ((7) and (8)). The results for investor type suggest that dedicated investors divest their holdings to a greater extent in the presence of hyping. However, the coefficient on *Forecast Error* is insignificant for *QIX* and *TRA*. These results are consistent with the interpretation that dedicated institutional investors can gain information that signals impending bad news because of their constant monitoring efforts (Chen, Harford, and Li 2007; Ramalingegowda 2014). For the investor preference results, we find that growth preference investors divest their holdings to a greater extent in the presence of hyping. We fail to find similar evidence for value preference investors, and, in untabulated tests, we find that growth preference investors divest significantly more than value preference investors. We interpret these results as growth preference investors being more likely to see through the hype due to having greater information than value preference investors (Bushee and Goodman 2007).

Post-Combination Return Performance

Our last and perhaps most important test of whether the market can successfully undo the optimism in managers' revenue forecasts is an examination of whether post-combination returns are explained by optimistic revenue forecasts. We focus on long-term post-combination returns because the unraveling of managerial hyping will occur when investors receive further information and observe realizations about earlier forecasts and statements (e.g., Shroff et al. 2013). Although we find that some investors were able to redeem or exit, if the market as a whole does not fully detect hyping before the completion of a combination, we expect abnormal negative long-term returns from SPACs with optimistic forecasts. Instead, if investors do not base their pre-combination pricing on optimistic forecasts, abnormal negative long-term returns will not be associated with optimistic forecasts.

We estimate post-combination returns using calendar-time portfolio regressions. We first obtain monthly returns of SPACs following their combinations. We then Winsorize returns at the top and bottom percentiles to minimize the effects of extremely volatile monthly returns. Next, we form rolling portfolios with SPACs entering and remaining in the portfolios for three, six, 12, and 24 months. SPACs are grouped into optimistic or pessimistic portfolios based on whether their projections were higher or lower than the actual realizations. Because SPACs can have multiple forecasts, we classify SPACs as pessimistic if at least one forecasted revenue amount is smaller than the actual realized revenue. In the last step, monthly portfolio returns, net of the risk-free rate, are regressed on the Fama-French three factors (Fama and French 1993) and a momentum factor following Carhart (1997) to control for known risk factors.

Figure 2 graphs the cumulative average raw returns as well as the upper and lower bounds for SPACs assigned to their respective portfolios for two years post-combination. Interestingly, the figure shows that at around four months after the close, the average return of SPACs assigned to the optimistic portfolio becomes much more negative than the average return for the SPACs assigned to the pessimistic portfolio. This difference continues to grow and remains more negative through the end of the 24-month period.

In Table 6, Panel A, we provide the calendar-time regression results for the optimistic and pessimistic SPAC portfolios. Consistent with Figure 2, the optimistic portfolio returns are significantly negative and economically large over all holding periods. In contrast, the pessimistic portfolio returns are insignificant across all holding periods. Focusing on the 12-month window, the optimistic portfolio's monthly returns average −5.54 percent; whereas the pessimistic portfolio's monthly returns average 0.64 percent. Annually, this translates to abnormal returns of −49.54 percent (i.e., $(1 - 0.0554)^{12} - 1$) and 7.96 percent (i.e., $(1 + 0.0064)^{12} - 1$), respectively. Panel B provides evidence that a long position in the pessimistic portfolio and a short position in the optimistic portfolio earns a monthly return averaging 5.02 percent. In untabulated analyses, we find that both institutional investors (i.e., approximately 25 percent of outstanding shares are held by 13-F filers) and retail investors (i.e., the outstanding shares held by non-13-F filers) hold post-combination shares. Therefore, although institutional investors are more likely to divest their positions in the presence of pre-combination hyping, both groups of investors incur post-combination losses.

A potential concern is that a mechanical relationship exists between missed projections and returns (i.e., firms underperform due to missing their projections). To alleviate this concern, we use alternative *ex ante* portfolio

[33] The investment preference analyses allow for investors' growth preference to subsume their size preference as SPACs are generally small firms (i.e., large and small growth preferences are combined into "growth" preferences).

FIGURE 2
Post-Combination Returns by Forecast Characteristic

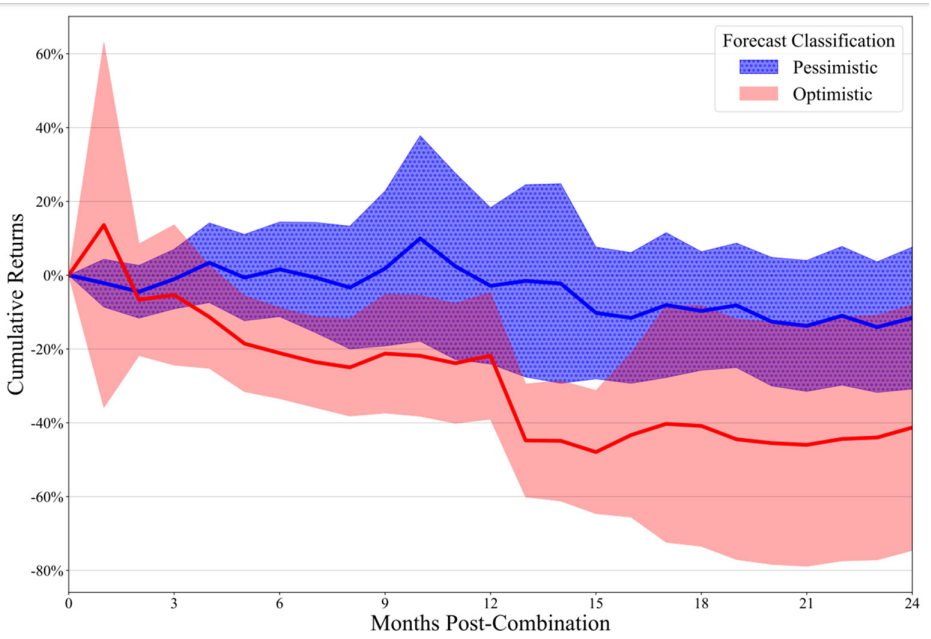

Figure 2 illustrates the cumulative post-combination returns for SPACs based on whether they entered into the optimistic or pessimistic portfolios. Firms are classified as optimistic if their revenue forecasts are larger than the realized revenue amounts and as pessimistic if at least one of their revenue forecasts was smaller than the realized revenue amount. Returns are obtained from CRSP or Bloomberg. The bold lines indicate the average cumulative return for firms in the portfolio, and the faded areas highlight the upper and lower bounds.
(The full-color version is available online.)

TABLE 6
Calendar-Time Portfolio Regressions

Panel A: Portfolio Returns

	3 Month		6 Month		12 Month		24 Month	
Error Level:	***Pessimistic***	***Optimistic***	***Pessimistic***	***Optimistic***	***Pessimistic***	***Optimistic***	***Pessimistic***	***Optimistic***
Constant	**0.0117**	**−0.0490****	**0.0066**	**−0.0549*****	**0.0064**	**−0.0554*****	**−0.0029**	**−0.0462*****
	(0.59)	**(−2.47)**	**(0.60)**	**(−3.42)**	**(0.65)**	**(−5.03)**	**(−0.44)**	**(−4.07)**
$R_m - R_{rf}$	1.1848	1.2788	0.8178	0.9676	0.7327	1.2388	0.9103	1.2466
	(2.58)	(2.59)	(2.98)	(2.41)	(2.92)	(4.46)	(5.19)	(4.26)
SMB	−1.1568	1.3497	−0.2941	0.9432	−0.1567	0.8230	0.9116	1.3788
	(−1.42)	(1.59)	(−0.67)	(1.40)	(−0.38)	(1.76)	(3.26)	(2.79)
HML	1.7437	−0.0665	1.0046	0.5005	1.0585	0.1664	0.5913	−0.2378
	(2.42)	(−0.09)	(2.46)	(0.78)	(2.78)	(0.38)	(2.24)	(−0.52)
Momentum	0.1206	0.6289	−0.0231	0.6013	0.1433	0.1987	0.0933	−0.0658
	(0.20)	(0.93)	(−0.06)	(1.13)	(0.43)	(0.56)	(0.41)	(−0.18)
Observations	66	79	81	102	95	109	100	114
Adjusted R^2	0.1688	0.1101	0.1858	0.0774	0.1611	0.2295	0.4180	0.2694

(continued on next page)

TABLE 6 (continued)

Panel B: Long-Short Portfolios (*Pessimistic – Optimistic*)

	3 Month	6 Month	12 Month	24 Month
Constant	**0.0406**	**0.0528*****	**0.0502*****	**0.0342*****
	(1.15)	**(2.78)**	**(3.64)**	**(2.80)**
$R_m - R_{rf}$	0.0745	0.1122	−0.1140	0.0532
	(0.10)	(0.24)	(−0.33)	(0.17)
SMB	−2.8420	−0.9454	−0.5127	−0.2384
	(−1.98)	(−1.25)	(−0.89)	(−0.47)
HML	1.9574	0.9223	1.1146	1.1065
	(1.59)	(1.30)	(2.07)	(2.30)
Momentum	0.0205	−0.4161	0.3134	0.4790
	(0.02)	(−0.66)	(0.68)	(1.16)
Observations	55	79	93	100
Adjusted R^2	0.0659	0.0105	0.0139	0.0147

Panel C: Portfolio Returns Using Alternative Measures

	3 Month		6 Month		12 Month		24 Month	
Measure:	**Below**	**Above**	**Below**	**Above**	**Below**	**Above**	**Below**	**Above**
CAGRs	0.0101	−0.0854***	−0.0049	−0.0681***	−0.0112	−0.0597***	−0.0092	−0.0558***
	(0.65)	(−4.47)	(−0.49)	(−4.00)	(−1.51)	(−4.51)	(−1.50)	(−4.09)
Alternative CAGRs	0.0209	−0.0620***	−0.0074	−0.0552***	−0.0119	−0.0526***	−0.0090	−0.0464***
	(1.59)	(−3.29)	(−0.67)	(−3.38)	(−1.45)	(−3.83)	(−1.23)	(−3.85)
Abnormal CAGRs	−0.0041	−0.0578**	−0.0029	−0.0541***	−0.0149*	−0.0545***	−0.0112	−0.0427***
	(−0.30)	(−2.64)	(−0.27)	(−3.00)	(−1.88)	(−4.04)	(−1.44)	(−3.55)

Panel D: Long-Short Portfolios Using Alternative Measures

Measure:	**3 Month**	**6 Month**	**12 Month**	**24 Month**
CAGRs	0.0633**	0.0420**	0.0362**	0.0393***
	(2.10)	(2.32)	(2.58)	(2.88)
Alternative CAGRs	0.0710**	0.0395**	0.0288*	0.0286**
	(2.59)	(2.22)	(1.80)	(2.22)
Abnormal CAGRs	0.0372	0.0338*	0.0267*	0.0222*
	(1.14)	(1.73)	(1.79)	(1.78)

***, **, * Denote significance at the 0.01, 0.05, and 0.10 levels, respectively, and are displayed only for alphas.
Table 6 presents the results of the calendar-time portfolio regressions. SPACs enter their respective portfolio in the month following their combination. For Panels A and B, observations are assigned to the optimistic portfolio if the forecasted revenue is larger than the realized revenue or to the pessimistic portfolio if any of the forecasted revenues are not larger than the realized revenue. For Panel A, the portfolio takes a long position for the first three, six, 12, and 24 months following the combination. For Panel B, the portfolio takes a long position for the pessimistic portfolio and a short position in the optimistic portfolio. Monthly returns on the portfolios, net of the risk-free rate, are regressed on the Fama-French three factors (Fama and French 1993) and a momentum factor following Carhart (1997). For each portfolio holding period, returns are Winsorized at the top and bottom percentiles. t-statistics are shown in parenthesis. Panels C and D replicate Panels A and B using alternative portfolio combination approaches and only display alphas for brevity. These approaches use various measures of CAGRs to sort observations into portfolios if the measure is either above or below the median. *CAGR* is measured using the last projected revenue and the earliest projected revenue. *Alternative CAGR* is measured using the last projected revenue and the pre-combination actual revenue where firms with zero pre-combination revenues are dropped. *Abnormal CAGR* is measured as the projected CAGR minus the actual revenue CAGR of industry matched IPO firms.
Variables are defined in Appendix A.

approaches. Following Blankespoor et al. (2022), we calculate the (1) cumulative annual growth rate (*CAGR*) using the last and earliest projected revenue figures, (2) an alternative definition of CAGR (*Alternative CAGR*) using the last projected revenue figure and the pre-combination actual revenue, and (3) an abnormal CAGR (*Abnormal CAGR*) where the actual CAGR for industry-matched IPO firms is subtracted from the first CAGR described above. Using these

TABLE 7

Warrant Analyses

Panel A: Warrant Trading Activity and Divestiture Analyses

Dependent:	***Retail Imbalance***	***Institutional Imbalance***	***Divest***
	(1)	**(2)**	**(3)**
Forecast Error	−0.0218	−0.0828**	−0.0291
	(−1.30)	(−2.45)	(−1.21)
Controls:	Yes	Yes	Yes
Industry FE:	Yes	Yes	Yes
Year FE:	Yes	Yes	Yes
Forecast Horizon FE	Yes	Yes	Yes
Observations	152	120	124
Adjusted R^2	0.7024	0.6645	0.5243

Panel B: Warrant Portfolio Returns

	3 Month		**6 Month**		**12 Month**		**24 Month**	
Measure:	***Pessimistic***	***Optimistic***	***Pessimistic***	***Optimistic***	***Pessimistic***	***Optimistic***	***Pessimistic***	***Optimistic***
Forecast Error	0.0791**	0.0214	0.0717**	−0.0225	0.0490*	−0.0270	0.0540**	0.0034
	(2.06)	(0.66)	(2.48)	(−0.91)	(1.82)	(−0.99)	(2.23)	(0.13)
	Below	***Above***	***Below***	***Above***	***Below***	***Above***	***Below***	***Above***
CAGRs	0.0666**	−0.0246	0.0327	−0.0094	0.0004	−0.0343	0.0137	0.0071
	(2.04)	(−0.56)	(1.42)	(−0.24)	(0.02)	(−1.30)	(0.74)	(0.19)
Alternative CAGRs	0.0992***	−0.0244	0.0438*	−0.0366	0.0171	−0.0448*	0.0103	−0.0224
	(2.86)	(−0.73)	(1.94)	(−1.23)	(0.91)	(−1.91)	(0.68)	(−0.82)
Abnormal CAGRs	0.0700**	−0.0474	0.0654***	−0.0671**	0.0051	−0.0119	0.0049	0.0033
	(2.17)	(−1.48)	(2.67)	(−2.36)	(0.28)	(−0.24)	(0.29)	(0.10)

(continued on next page)

definitions, firms enter portfolios based on whether they fall above or below the median. The results for these tests are displayed in Table 6, Panels C and D. For brevity, only alphas are displayed. The results are statistically and economically similar—and some even stronger—to those in Panels A and B.

Taken together, although some investors can see through the SPACs' hyping efforts and opt to redeem or sell their shares before the combination closes, the market largely does not see through such efforts and allows the combinations to proceed. We provide evidence that the optimism in managers' revenue forecasts is slowly unraveled after the combination is completed and when shareholders can no longer redeem their shares. Collectively, these results provide an explanation for why prior studies have found limited redemptions and large abnormal negative returns in the post-combination period (e.g., Gahng et al. 2023).

V. ADDITIONAL ANALYSES

As SPACs issue units consisting of common shares and warrants, they have multiple securities contemporaneously trading in the open market. An examination of investor responses to hyping would be incomplete without examining warrant investor responses. Therefore, we repeat our main tests for SPAC warrant holders.[34] We obtain warrant trading, investor holding, and return data from TAQ, the WRDS SEC Analytics Suite, and Bloomberg, respectively. From our original sample, we lose four SPACs that never issued warrants, three that redeemed their warrants concurrently with the close of their combination, and nine with missing warrant return data.

The results are displayed in Table 7. Panel A presents the results of tests examining the impact of hyping on retail and institutional investor warrant trading behavior (columns (1) and (2)) and 13-F filer warrant divestiture rates (column (3)).

[34] We do not perform a warrant redemption test as only common shareholders can redeem their securities.

TABLE 7 (continued)

Panel C: Warrant Long-Short Portfolios

Measure:	3 Month	6 Month	12 Month	24 Month
Forecast Error	0.0138	0.0500	0.0509	0.0197
	(0.23)	(1.35)	(1.18)	(0.50)
CAGRs	0.0371	−0.0343	0.0211	−0.0171
	(0.46)	(−0.76)	(0.85)	(−0.40)
Alternative CAGRs	0.1223**	0.0180	0.0345	0.0108
	(2.19)	(0.51)	(1.11)	(0.31)
Abnormal CAGRs	0.0543	0.0664*	−0.0130	−0.0277
	(1.04)	(1.76)	(−0.20)	(−0.68)

Panel D: Reconstructed Unit Portfolio Returns

	3 Month		6 Month		12 Month		24 Month	
Measure:	***Pessimistic***	***Optimistic***	***Pessimistic***	***Optimistic***	***Pessimistic***	***Optimistic***	***Pessimistic***	***Optimistic***
Forecast Error	0.0263	−0.0346*	0.0153	−0.0557***	0.0093	−0.0580***	0.0004	−0.0459***
	(1.47)	(−1.75)	(1.46)	(−3.72)	(0.90)	(−5.37)	(0.07)	(−3.69)
	Below	***Above***	***Below***	***Above***	***Below***	***Above***	***Below***	***Above***
CAGRs	0.0165	−0.0666***	−0.0171	−0.0576***	−0.0261***	−0.0592***	−0.0205**	−0.0566***
	(0.84)	(−3.36)	(−1.45)	(−3.26)	(−2.71)	(−4.26)	(−2.02)	(−4.34)
Alternative CAGRs	0.0357**	−0.0611***	−0.0008	−0.0575***	−0.0114	−0.0518***	−0.0104	−0.0450***
	(2.28)	(−3.07)	(−0.08)	(−3.57)	(−1.40)	(−3.87)	(−1.31)	(−3.56)
Abnormal CAGRs	0.0080	−0.0547**	0.0046	−0.0584***	−0.0124	−0.0549***	−0.0106	−0.0441***
	(0.55)	(−2.40)	(0.40)	(−3.37)	(−1.50)	(−4.17)	(−1.28)	(−3.42)

Panel E: Reconstructed Unit Long-Short Portfolios

Measure:	3 Month	6 Month	12 Month	24 Month
Forecast Error	0.0430	0.0643***	0.0595***	0.0403***
	(1.26)	(3.68)	(4.16)	(3.18)
CAGRs	0.0792**	0.0246	0.0279*	0.0352**
	(2.24)	(1.13)	(1.67)	(2.50)
Alternative CAGRs	0.0879***	0.0464**	0.0325*	0.0289**
	(2.80)	(2.52)	(1.98)	(2.07)
Abnormal CAGRs	0.0420	0.0435**	0.0329**	0.0277**
	(1.21)	(2.12)	(2.06)	(1.99)

***, **, * Denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 7 presents the results of the warrant tests. Panel A displays the results of tests examining the association between retail and institutional trading activity as well as warrant divestitures and revenue forecast errors. The dependent variable for column (1) is *Retail Trade Imbalance*, which is defined as the number of retail buy trades minus retail sale trades divided by total retail trades over the period from the forecast announcement date to the combination's closing date. The dependent variable for column (2) is *Institutional Trade Imbalance*, which is defined as the number of buy trades that are over $50,000 minus the number of sell trades that are over $50,000 divided by the total number of institutional trades over $50,000 over the period between the forecast announcement date and the combination's closing date. The dependent variable for column (3) is *Divest*, which is measured as the change in 13-F filers warrant holdings in the reporting periods surrounding the close of a combination. The variable of interest is *Forecast Error*, which is measured as the forecasted revenue minus the actual realization scaled by the forecasted value. All columns include the full set of control variables, which are untabulated for brevity. Panels B to E present the results of calendar-time portfolio regressions and only display alphas for brevity. SPACs enter their respective portfolio in the month following their combination. The panels present various portfolio creation approaches. When using the *Forecast Error* approach, observations are assigned to the optimistic portfolio if the forecasted revenue is larger than the realized revenue or the pessimistic portfolio if any of the forecasted revenues are not larger than the realized revenue. The other approaches use various measures of CAGRs to sort observations into portfolios if the measure is either above or below the median. *CAGR* is measured using the last projected revenue and the earliest projected revenue. *Alternative CAGR* is measured using the last projected revenue and the pre-combination actual revenue where firms with zero pre-combination revenues are dropped. *Abnormal CAGR* is measured as the projected CAGR minus the actual revenue CAGR of industry-matched IPO firms. Panel B takes a long position for the first 3, 6, 12, and 24 months following the combination. The portfolios in Panel C take a long position in the pessimistic (Below) observations and a short position in the optimistic (Above) observations. Panels E and F take the SPAC's common stock return and add back the scaled warrant return to reconstruct a unit return. Monthly returns on the portfolios, net of the risk-free rate, are regressed on the Fama-French three factors (Fama and French 1993) and a momentum factor following Carhart (1997). Industry fixed effects are based on the Fama-French 49 industry classifications. Reported t-statistics (in parentheses) are based on standard errors clustered at the firm level.

We find evidence in column (2) that more optimistic forecast errors lead to a negative trading imbalance for institutional investors. Further, in column (3), we fail to find that 13-F filers divest their warrant holdings to a greater or lesser extent around the combination's closing date. These results may differ from the common share divestiture tests because hyping may induce volatility and increase option value. Panels B and C provide mixed evidence for the calendar-time portfolio regressions for the warrant returns. Using various warrant portfolio tests, we find some evidence that warrants in the pessimistic portfolios earn significant positive returns in the months following a combination. Using various long-short portfolio strategies, we find, however, that the returns are generally insignificantly different.

Table 7, Panels D and E reconstruct the SPAC's original units and present calendar-time portfolio regressions. The units are reconstructed by taking the warrant's trading price multiplied by the number or fraction of warrants issued in the original unit and adding the common share's concurrent price. We then use these combined prices to calculate unit returns. Consistent with our expectations and prior findings, we document significantly negative alphas for the optimistic (above median *CAGR*) portfolios for all examined windows. We also document significantly positive alphas for the long-short strategies. Overall, these results provide additional insights relative to those that solely examine common shareholders, and they bolster our prior findings of poor post-combination performance for SPACs with optimistic revenue projections.

VI. CONCLUSION

In this study, we examine how investors are influenced by optimistic forward-looking disclosures made during a firm's going public process with a SPAC. By focusing on SPAC combinations, we can investigate how strategic voluntary disclosure by private firms entering the public equity market impacts investor trading and the pricing of such firms. We analyze how optimistic forward-looking disclosures by SPACs affect retail and institutional investor trading, redemptions and divestitures by investors, and market mispricing.

Overall, our results suggest that opportunistic forward-looking disclosures by SPACs influence investor buying behavior and market mispricing. When examining investor trading, we find that hyping by SPACs leads to increased retail investor purchasing and that this increase exceeds that of institutional investors. When investigating shareholder redemptions, we find that the market can partially see through the inflated estimates, as shareholders of SPACs with inflated projections are more likely to redeem their shares. Further, complementing these results, we document that institutional investors are more likely to exit their positions either through redemptions or open market sales for combinations with optimistic projections. Despite this, when examining post-combination returns, we find that a portfolio of SPACs with optimistic projections significantly underperforms a portfolio of SPACs with pessimistic projections in the two years following the combination. Overall, these results suggest that the market is largely unable to undo the optimism in SPAC projections.

These results contribute to several literatures. First, our findings extend the SPAC literature by showing that optimistic revenue projections mislead market participants (e.g., lead to retail investor purchasing and overvalued share prices) and provide an explanation for why SPACs have recently grown in importance despite their record of poor performance. Second, our findings provide evidence relevant to the SEC's new proposal to formally eliminate the PSLRA safe harbor protection currently believed to be given to SPAC's forward-looking statements. The findings provide support for intervention and suggest further implications if SPACs continue issuing forward-looking statements after the removal of the PSLRA safe harbor using alternative protections (e.g., the SEC's "bespeaks caution" doctrine). Finally, our findings extend prior literature investigating managers' use of long-term revenue forecasts by showing that SPACs' long-term forecasts influence investor trading and market pricing.

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APPENDIX A

Variable Descriptions

Variables	Definition (Sources)
Forecast Error	The difference between the forecasted revenue and the actual revenue, scaled by the forecasted revenue. For range forecasts, the average of the upper and lower bounds is used as the forecasted amount (I/B/E/S, Compustat, EDGAR).
Optimism	An indicator equal to 1 if the forecasted revenue was higher than the realized amount and 0 otherwise.
Accuracy	The negative of the absolute value of *Forecast Error*.
Redemptions	The number of SPAC shares redeemed divided by the total number of nonfounder shares issued at the SPAC's IPO net of any redemptions made in connection with an extension of the SPAC's corporate life (EDGAR).
Modified Redemptions	The number of SPAC shares redeemed net of shares owned by 13-F filers classified as members of the SPAC Mafia divided by the total number of nonfounder shares issued at the SPAC's IPO net of both redemptions made in connection with an extension of the SPAC's corporate life and shares held by SPAC Mafia filers (EDGAR, WRDS SEC Analytics Suite).
Divest	The percentage of shares divested by 13-F filers in the reporting periods surrounding a combination's close date. Specifically, it is the number of shares held by 13-F filers in the reporting period before a combination's close less the number of shares held by the same 13-F filers in the reporting period after a combination's close divided by the pre-combination holdings (WRDS SEC Analytics Suite).
DED Divest	The percentage of shares divested by 13-F filers classified as "dedicated investors" by Bushee (1998) (WRDS SEC Analytics Suite).
QIX Divest	The percentage of shares divested by 13-F filers classified as "quasi-indexer investors" by Bushee (1998) (WRDS SEC Analytics Suite).
TRA Divest	The percentage of shares divested by 13-F filers classified as "transient investors" by Bushee (1998) (WRDS SEC Analytics Suite).
Growth Divest	The percentage of shares divested by 13-F filers classified as "growth preference investors" by Abarbanell et al. (2003) (WRDS SEC Analytics Suite).

(continued on next page)

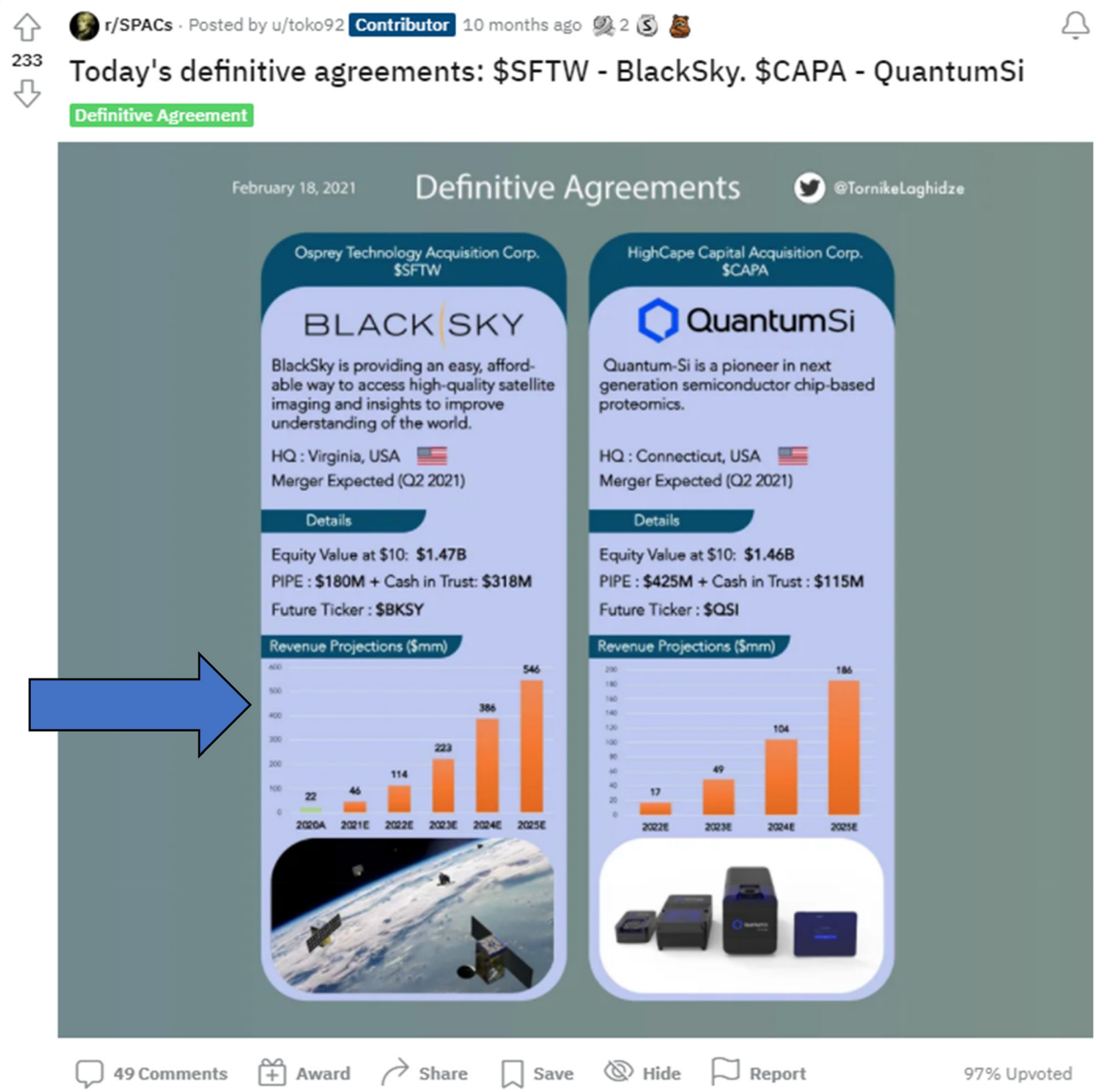
APPENDIX A (continued)

Variables	Definition (Source)
Value Divest	The percentage of shares divested by 13-F filers classified as "value preference investors" by Abarbanell et al. (2003) (WRDS SEC Analytics Suite).
3 Month Return	The buy-and-hold return measured from the combination completion date and ending three months later (CRSP, Bloomberg).
6 Month Return	The buy-and-hold return measured from the combination completion date and ending six months later (CRSP, Bloomberg).
12 Month Return	The buy-and-hold return measured from the combination completion date and ending 12 months later (CRSP, Bloomberg).
24 Month Return	The buy-and-hold return measured from the combination completion date and ending 24 months later (CRSP, Bloomberg).
Retail Trade Imbalance	The number of retail buy trades minus the number of retail sell trades divided by total retail trades over the period from the announcement date of the projections to the combination completion date (TAQ).
Institutional Trade Imbalance	The number of institutional buy trades minus the number of institutional sell trades divided by the total number of institutional trades over the period between the announcement date of the projections to the combination completion date (TAQ).
SPAC	An indication equal to 1 if the revenue forecast was issued by a firm in the going public process with a SPAC and 0 otherwise.
Size	Total assets of the private company (Compustat, EDGAR).
MB	The market value of equity over the book value of equity (Compustat, CRSP, EDGAR).
Tenure	The tenure of the CEO at the time of a forecast. For SPACs, this is the tenure of the CEO of the private company (Execucomp, EDGAR).
SPAC Size	The SPAC offering proceeds including any overallotments (measured in millions) (EDGAR).
At Risk	The amount of capital (measured in millions) that the SPAC management team invested through the purchase of founder shares and private placement offerings (i.e., unit, common shares, or warrant private placements) (EDGAR).
Disclosure	The number of 8-Ks disclosed between the combination announcement and completion date (EDGAR).
Dilution	The sum of founder shares, founder private placement securities, warrants, and rights over the total number of shares issued at the IPO (EDGAR).
Trust Percentage	The percentage of the total offering proceeds held in the trust account (EDGAR).
Days to Announce	The number of days between the SPAC IPO and the combination announcement (EDGAR).
Days to Completion	The number of days between the combination announcement and completion date (EDGAR).
Board Representation	An indicator equal to 1 if a member of the SPAC management team obtains a board seat of the post-combination company and 0 otherwise (EDGAR).
SPAC Dual Role	An indicator equal to 1 if a member of the SPAC management team is both the chairman and the chief executive officer of the post-combination company and 0 otherwise (EDGAR).
Forecasted Years	The number of years for which revenue forecasts are provided (EDGAR).
Forecasted Measures	The number of forecasted measures (i.e., profitability, cash flows, revenues, and capital expenditures) (EDGAR).
Revenue Growth	The revenue growth rate of the private firm before it enters the public market (EDGAR).
Media Mentions	The number of articles released about a SPAC during the period between the forecasts' release date and the close of a combination from both the Dow Jones and Web Editions of RavenPack with a relevance score greater than or equal to 70 (RavenPack).
SPAC Mafia	The percentage of pre-combination shares held by 13-F filers classified as members of the SPAC Mafia (EDGAR, WRDS SEC Analytics Suite).
Contemp. Return	The SPAC's return measured from the combination's announcement date until its close (CRSP, Bloomberg).
$R_m - R_{rf}$	The monthly excess return on the market factor following Fama and French (1993) (Kenneth French's website).
SMB	The monthly size factor following Fama and French (1993) (Kenneth French's website).
HML	The monthly value factor following Fama and French (1993) (Kenneth French's website).
Momentum	The monthly momentum factor following Carhart (1997) (Kenneth French's website).

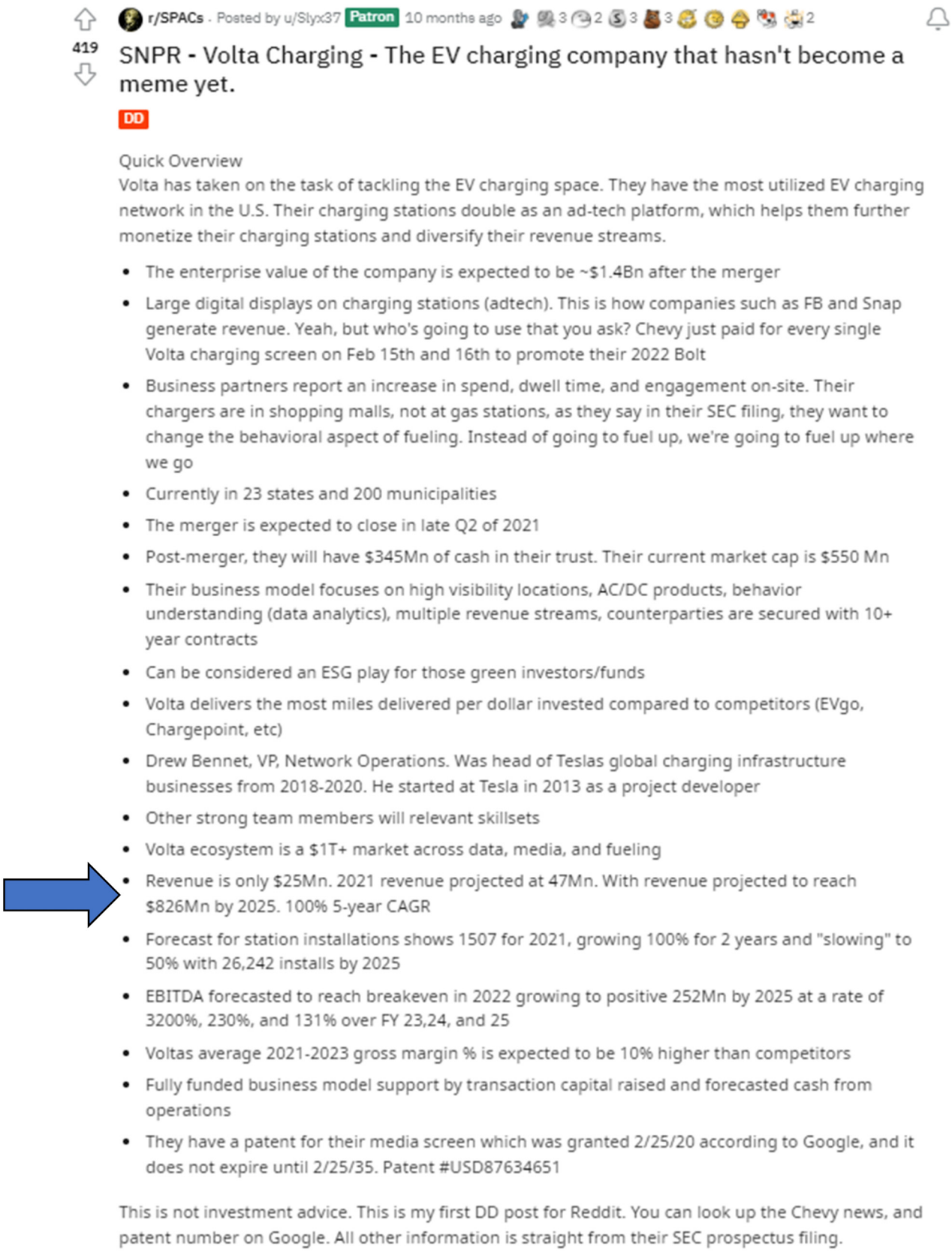
APPENDIX B

Social Media Dissemination of SPAC Revenue Projections

Below are two anecdotal examples illustrating that SPAC revenue projections are disseminated on investor social media platforms—for example, the popular subreddit r/SPACs. This subreddit has nearly 200,000 users who commonly post SPAC-related news, rumors, and analysis as of the end of 2021. The first post on February 18, 2021, highlights the two private companies that signed definitive agreements on that date.[35] For each firm, the user clearly highlights the revenue projections. The second post provides an example of a more in-depth user review of a target company.[36] One of their main points is the projected revenue (indicated by the blue arrows).



[35] https://www.reddit.com/r/SPACs/comments/lmmgol/todays_definitive_agreements_sftw_blacksky_capa/
[36] https://www.reddit.com/r/SPACs/comments/lmd8qn/snpr_volta_charging_the_ev_charging_company_that/



r/SPACs · Posted by u/Slyx37 Patron 10 months ago

419

SNPR - Volta Charging - The EV charging company that hasn't become a meme yet.

DD

Quick Overview
Volta has taken on the task of tackling the EV charging space. They have the most utilized EV charging network in the U.S. Their charging stations double as an ad-tech platform, which helps them further monetize their charging stations and diversify their revenue streams.

- The enterprise value of the company is expected to be ~$1.4Bn after the merger
- Large digital displays on charging stations (adtech). This is how companies such as FB and Snap generate revenue. Yeah, but who's going to use that you ask? Chevy just paid for every single Volta charging screen on Feb 15th and 16th to promote their 2022 Bolt
- Business partners report an increase in spend, dwell time, and engagement on-site. Their chargers are in shopping malls, not at gas stations, as they say in their SEC filing, they want to change the behavioral aspect of fueling. Instead of going to fuel up, we're going to fuel up where we go
- Currently in 23 states and 200 municipalities
- The merger is expected to close in late Q2 of 2021
- Post-merger, they will have $345Mn of cash in their trust. Their current market cap is $550 Mn
- Their business model focuses on high visibility locations, AC/DC products, behavior understanding (data analytics), multiple revenue streams, counterparties are secured with 10+ year contracts
- Can be considered an ESG play for those green investors/funds
- Volta delivers the most miles delivered per dollar invested compared to competitors (EVgo, Chargepoint, etc)
- Drew Bennet, VP, Network Operations. Was head of Teslas global charging infrastructure businesses from 2018-2020. He started at Tesla in 2013 as a project developer
- Other strong team members will relevant skillsets
- Volta ecosystem is a $1T+ market across data, media, and fueling
- Revenue is only $25Mn. 2021 revenue projected at 47Mn. With revenue projected to reach $826Mn by 2025. 100% 5-year CAGR
- Forecast for station installations shows 1507 for 2021, growing 100% for 2 years and "slowing" to 50% with 26,242 installs by 2025
- EBITDA forecasted to reach breakeven in 2022 growing to positive 252Mn by 2025 at a rate of 3200%, 230%, and 131% over FY 23,24, and 25
- Voltas average 2021-2023 gross margin % is expected to be 10% higher than competitors
- Fully funded business model support by transaction capital raised and forecasted cash from operations
- They have a patent for their media screen which was granted 2/25/20 according to Google, and it does not expire until 2/25/35. Patent #USD87634651

This is not investment advice. This is my first DD post for Reddit. You can look up the Chevy news, and patent number on Google. All other information is straight from their SEC prospectus filing.

(The full-color version is available online.)

APPENDIX C

Optimism in SPAC Revenue Forecasts

To provide formal evidence of the extent to which SPAC-issued revenue projections are optimistically biased, we examine the forecast optimism in a multivariate setting to control for known determinants of forecast bias with three alternative control groups. The first control group consists of all revenue forecasts existing at the intersection of the Compustat, CRSP, Execucomp, and I/B/E/S databases after the exclusion of financial firms (Blankespoor et al. 2022). This analysis essentially examines if SPAC-issued forecast properties are systematically different from the universe of forecasts. Our second control group includes revenue forecasts issued by firms that recently went public (i.e., revenue forecasts issued within the first three years of an IPO firm's public life).[37] This control group is similar to the comparison group of Blankespoor et al. (2022) and should provide for a comparison group that is similar in experience and expertise when it comes to issuing guidance. Our final control group is obtained using a nearest neighbor matching technique from the universe of revenue forecasts.

The dependent variable for our analysis is *Forecast Characteristic*$_{i,t,h}$, where i stands for firm, t stands for the year-quarter of the forecast, and h stands for forecast horizon. The variable represents three forecast characteristics in our analyses: *Forecast Error*, which is measured as the forecasted revenue minus the actual revenue scaled by the forecasted amount, *Optimism*, which is an indicator that equals 1 if the forecasted revenue was higher than the realized amount, and *Accuracy*, which is measured as the negative of the absolute value of *Forecast Error* following Koo and Lee (2018).[38]

In this analysis, we investigate the projections released closest to the combination's close date. The variable of interest, *SPAC*, is an indicator that equals 1 if the forecast is from a SPAC and 0 otherwise. Following Bradshaw, Lee, and Peterson (2016), our main set of controls include firm size (*Size*), growth opportunities (*MB*), and managerial ability (*Tenure*). In addition, like Dong, Fisman, Wang, and Xu (2021), we include industry, year-quarter, and forecast horizon fixed effects to control for any industry, time, or forecast horizon characteristic that may simultaneously impact firms' forecast characteristics and choice of going public through a SPAC combination. Year-quarter fixed effects mitigate concerns that COVID-19 or other similar yearly shocks may impact our results. Industry fixed effects are based on the Fama-French 49 industry classification scheme. We Winsorize all continuous variables at the top and bottom percentiles and cluster standard errors by firm. If SPAC forecasts are systematically optimistically biased (less accurate), we expect the *SPAC* variable to be significantly positive (negative).

The results are shown in Table C1 below. Panels A and B use the universe of revenue forecasts and IPO forecasts as the control group, respectively. We find that the coefficient estimates for *SPAC* are statistically significant in columns (1) and (2), providing further evidence that SPAC forecasts are optimistically biased compared to the universe of revenue forecasts (or to firms with a similar lack of forecasting experience in the case of IPO firms) after controlling for other possible determinants of the variation in forecast properties. Also, SPAC forecasts are significantly less accurate than forecasts provided by firms with a similar lack of experience. Regarding economic magnitudes, the column (1) estimates in Panels A and B suggest that SPAC forecasts are larger than their realizations by 43.3 percent and 11.5 percent of their forecasted value compared to all other revenue forecasts and post-IPO firms' revenue forecasts, respectively. The column (2) marginal effect for *SPAC* suggests that optimistic revenue forecasts are 21.7 percent and 24.9 percent more likely for SPAC forecasts than for all firms' revenue forecasts and post-IPO firms' revenue forecasts, respectively. Regarding forecast accuracy, column (3) provides evidence that SPAC forecasts are also less accurate than post-IPO firms' revenue forecasts and that their accuracy is insignificantly different from the universe of revenue forecasts.

Finally, Panel C presents means and medians after using a 1:5 nearest neighbor matching technique (matching on *Size*, *MB*, *Tenure*, industry, year-quarter, and forecast horizon). We continue to find that our variables of interest remain statistically different between the two groups. In sum, like Blankespoor et al. (2022), our findings suggest that SPACs exploit the opportunity to disclose forward-looking information in the going public process by issuing overly optimistic and less accurate revenue projections.

[37] We identify IPO firms from the SDC New Issues database according to the approach outlined in Lowry, Michaely, and Volkova (2017). Following this procedure, we identify 1,460 firms that went public during our sample period and subsequently match them to the I/B/E/S database. We find 2,780 revenue forecasts for 385 IPO firms in their first three years of public life, but the final sample drops to 79 firms with 559 forecasts after obtaining control variables. Allee, Christensen, Graden, and Merkley (2021) and Blankespoor et al. (2022) find that I/B/E/S guidance coverage is lacking for IPO firms. We find corroborating evidence of a lack of coverage of IPO firms in the I/B/E/S database but nevertheless obtain enough forecasts for comparative purposes.

[38] We use the negative of the absolute value so that the variable is increasing in accuracy.

TABLE C1

Revenue Forecast Optimism

Panel A: I/B/E/S Universe

Dependent Variable:	***Forecast Error***		***Optimism***		***Accuracy***	
	(1)		**(2)**		**(3)**	
SPAC	0.4332***	(2.80)	0.2169***	(2.80)	0.0971	(0.63)
Size	−0.0131	(−0.76)	0.0052	(0.91)	−0.0084	(−0.48)
MB	−0.0001	(−0.20)	−0.0001	(−0.69)	−0.0000	(−0.16)
Tenure	0.0056	(1.23)	−0.0002	(−0.18)	0.0059	(1.29)
Industry FE	Yes		Yes		Yes	
Year-Quarter FE	Yes		Yes		Yes	
Forecast Horizon FE	Yes		Yes		Yes	
Observations	26,924		26,918		26,924	
Adjusted R^2/Pseudo R^2	0.0002		0.0501		0.0002	

Panel B: IPO Firms

Dependent Variable:	***Forecast Error***		***Optimism***		***Accuracy***	
	(1)		**(2)**		**(3)**	
SPAC	0.1151**	(2.49)	0.2488**	(2.41)	−0.1143***	(−4.95)
Size	−0.0413***	(−3.09)	−0.0350*	(−1.81)	0.0315**	(2.22)
MB	0.0000	(1.09)	0.0001	(1.09)	0.0000	(1.07)
Tenure	−0.0075***	(−3.53)	−0.0069	(−1.15)	0.0041*	(1.87)
Industry FE	Yes		Yes		Yes	
Year-Quarter FE	Yes		Yes		Yes	
Forecast Horizon FE	Yes		Yes		Yes	
Observations	724		713		724	
Adjusted R^2/Pseudo R^2	0.1913		0.2341		0.2104	

Panel C: Nearest Neighbor Matching

Group:	**SPAC**			**Controls**			**Mean**	**Median**
	n	**Mean**	**Median**	**n**	**Mean**	**Median**	**Difference**	**Difference**
Size	214	5.0974	5.3893	1,070	6.9738	7.0002	−1.8763***	−1.6109***
MB	214	3.0162	2.0290	1,070	4.9170	2.6975	−1.9008***	−0.6685***
Tenure	214	7.5000	6.0000	1,070	7.1958	5.5014	0.3042	0.4986
Forecast Error	214	0.1659	0.0636	1,070	−0.0068	0.0012	0.1727***	0.0624***
Optimism	214	0.6822	1.0000	1,070	0.5150	1.0000	0.1672***	0.0000
Accurate	214	−0.2806	−0.1472	1,070	−0.0863	−0.0267	−0.1943***	−0.1205***

***, **, * Denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table C1 presents the results of tests analyzing whether revenue forecasts issued by SPACs are optimistically biased and less accurate than all other firms' revenue projections in Panel A, relative to recent IPO firms' revenue forecasts in Panel B, and relative to a matched sample in Panel C. Panels A and B present the results of estimating OLS regressions in columns (1) and (3) as well as logistic regressions in column (2). The dependent variable, *Forecast Error*, in column (1) is measured as the difference between the forecasted amount and the actual realization scaled by the forecasted amount. In column (2), the dependent variable, *Optimism*, equals 1 if the forecasted revenue was higher than the realization and 0 otherwise. The dependent variable in column (3) is the negative of the absolute value of *Forecast Error*. The variable of interest in Panels A and B is *SPAC*, which is an indicator variable that equals 1 if the revenue forecast was issued by a firm in the going public process with a SPAC and 0 otherwise. Industry fixed effects are based on the Fama-French 49 industry classification scheme. Marginal effects, rather than logistic regression coefficient estimates, are presented in column (2) of Panels A and B to ease interpretation. Reported t-statistics (in parentheses) are based on standard errors clustered at the firm level. Panel C presents means and medians for the SPAC sample and a nearest neighbor matched sample without replacement. SPAC observations are matched 1:5 based on *Size*, *MB*, *Tenure*, Industry, Year-Quarter, and Forecast Horizon.

Control variables are defined in Appendix A.

Determinants of Optimism in SPAC Revenue Forecasts

We also examine determinants of optimistic revenue forecast errors. We begin by presenting univariate evidence comparing SPACs that issued optimistic revenue forecasts against those that have issued at least one pessimistic revenue forecast in Table C2, Panel A below. We document that optimistic SPACs are significantly smaller, possess lower amounts of at-risk capital, and forecast fewer financial measures. In Panel B, we present the results from a regression of *Forecast Error* on observable SPAC, combination, and forecast characteristics. We also include industry, closing year, and forecast horizon fixed effects. Surprisingly, we find little evidence of systematic determinants of the forecast errors. We find that combinations for which a member of the SPAC team assumes both the CEO and chairman position of the post-combination firm are associated with higher forecast errors and that combinations that include a greater number of forecasted measures are associated with lower forecast errors.

TABLE C2

Revenue Forecast Error Determinants

Panel A: Univariate Analysis

	Optimistic SPACs (n = 62)		Pessimistic SPACs (n = 47)		Difference (Optimistic − Pessimistic)	
	Mean	**Median**	**Mean**	**Median**	**Mean**	**Median**
SPAC Size	175.027	134.400	260.500	206.400	−85.473***	−72.000*
At Risk	5.687	5.075	7.473	6.433	−1.786***	−1.358*
Dilution	1.249	1.150	1.188	1.067	0.061	0.083
Trust Percentage	100.798	100.000	100.381	100.000	0.418**	0.000
Institutional Ownership	0.742	0.825	0.810	0.870	−0.068	−0.045
Days to Announce	499.258	491.500	458.170	442.000	41.088	49.500
Board Representation	0.919	1.000	0.872	1.000	0.047	0.000
SPAC Dual Role	0.065	0.000	0.043	0.000	0.022	0.000
Tenure	8.726	6.500	6.979	6.000	1.747	0.500
Forecasted Years	2.855	3.000	3.702	3.000	−0.847**	0.000
Forecasted Measures	2.258	2.000	2.553	2.000	−0.295**	0.000**
Revenue Growth	0.320	0.194	0.660	0.119	−0.341	0.075

Panel B: Multivariate Analysis

Dependent Variable:	***Forecast Error***	
SPAC Size	0.0012	(1.05)
At Risk	−0.0688	(−1.35)
Dilution	−0.0679	(−0.52)
Trust Percentage	0.0382	(0.57)
Institutional Ownership	−0.1702	(−1.15)
Days to Announce	−0.0003	(−0.29)
Days to Announce^2	0.0000	(0.74)
Board Representation	0.1640	(0.82)
SPAC Dual Role	0.3134**	(2.27)
Tenure	−0.0100*	(−1.77)
Forecasted Years	−0.0009	(−0.04)
Forecasted Measures	−0.1209**	(−2.50)
Revenue Growth	0.0364	(0.70)
Industry FE	Yes	
Year FE	Yes	
Forecast Horizon FE	Yes	

(continued on next page)

TABLE C2 (continued)

Dependent Variable:	***Forecast Error***
Observations	211
Adjusted R^2	0.2614
Within R^2	0.2359

***, **, * Denote significance at the 0.01, 0.05, and 0.10 levels, respectively.
Table C2 examines determinants of SPAC forecast errors. Panel A compares SPACs that enter the optimistic portfolio with those that enter the pessimistic portfolio for the calendar-time portfolio returns test. The means (medians) are compared by a difference in means t-statistic (nonparametric Wilcoxon signed-rank test of difference in medians). Panel B reports the determinants in a multivariate setting. The dependent variable is *Forecast Error*, which is measured as the difference between the forecasted amount and the actual realization scaled by the forecasted amount. Industry fixed effects are based on the Fama-French 49 industry classification scheme. Reported t-statistics are based on standard errors clustered at the firm-level.
Variables are defined in Appendix A.