Going public through the back door: A comparative analysis of SPACs and IPOs

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We study the fundamental, operational, and aftermarket characteristics of special purpose acquisition companies (SPACs) created in the U.S. during the years 2003-2008. We compare the characteristics of the 156 firms that chose to merge with SPACs to become a public company with the 794 firms that chose the traditional initial public offering (IPO) route. In addition, we analyze the changes in SPAC and IPO firms' operational performance and stock market returns in the year following the floatation of new shares. This is the first study that focuses on the long-term financial and operational performance of SPAC firms. Operational performance of SPAC firms is significantly inferior to their industry peers and to contemporaneous IPO firms. SPAC firms carry more debt, are smaller, invest less, and have lower growth opportunities than the firms that conduct a conventional IPO. While excess stock returns for both IPO and SPAC firms are negative, they are substantially more negative for SPAC firms. In light of the substantially negative investment performance of SPACs that is uncovered in this study, investors should be wary of participating in SPAC transactions.

JEL Classifications: G32; G34; K22
Keywords: SPAC; IPO; Reverse merger; Operating performance; Stock performance

1. Introduction

A special purpose acquisition company, also known as SPAC, is a public "shell" entity created for the express purpose of acquiring a yet-to-be-specified operating company within a two-year time frame. SPAC sponsors raise sizable funds through an IPO with the intent of acquiring a hitherto unknown company in a specified industry or sector. In this paper, we study the fundamental, operational, and aftermarket (that is after consummating a merger with a private company) characteristics of all the 156 SPACs that were sponsored in the U.S. during the six-year period 2003-2008. Merging our sample of SPAC transactions with the full set of conventional IPOs over the same time period, we compare the characteristics of the firms that chose the SPAC format to become a public company with those that chose the traditional IPO format. In addition, we analyze the changes in SPAC and IPO firms' operational performance and stock market returns in the year following the floatation of new shares. We find SPACs to be significantly inferior to their industry peers and to contemporaneous IPO firms in terms of operational performance and stock returns. Further, in the year of the merger, SPAC firms carry more debt, are smaller, invest less, and have lower growth opportunities than firms that conduct a conventional IPO in the same year as well as relative to industry benchmark.

Our study adds to the literature in two ways. We examine for the first time the characteristics of the firms that choose to merge with SPACs and contrast them with the firms that choose to go public via the traditional IPO route. Second, we document for the first time how entities formed via SPAC mergers perform operationally and financially in the year following the transaction. In the IPO and reverse merger literatures, other studies have documented financial and operational performance following the key transaction. A study focusing exclusively on SPACs is warranted due to distinct nature of SPACs that separate them from reverse mergers. Although, in legal and technical terms, SPACs appear similar to reverse mergers, in substance, motivation, and the roles of the participants, the two methods are very different. According to Sjostrom (2008), comparing SPACs and traditional

IPOs is more meaningful than comparing reverse mergers and IPOs. There have not been any studies that compare SPACs and traditional IPOs. Our study addresses this gap. We find SPACs to be significantly inferior to contemporaneous IPO firms as well as industry peers in terms of *ex-post* operating performance and stock returns. Our findings clearly indicate that the particular route a firm has chosen to become a publicly traded entity has important consequences and should be paid attention to by investors and analysts.

The rest of the paper is organized as follows: in Section 2 we review the literature and provide a background on the purpose and mechanics of SPAC formation. Section 3 describes the details of the data set used in the study. In Section 4, we discuss the results of our data analysis. Section 5 concludes with a summary of key findings in the paper.

2. Literature and Background on SPACs

2.1 Literature Review

The existing literature for the SPAC activity consists of a handful of papers. In addition to the literature that directly focuses on SPACs, there are papers that include SPACs within the context of broader research topics. One of the streams looks at SPACs as a form of private equity investment vehicle. Another stream examines SPACs as part of the reverse merger/reverse takeover transactions.

To assess the contribution of this study in contrast to the existing studies on reverse mergers, it is helpful to note the key differences between SPACs and plain-vanilla reverse mergers. The most obvious difference between the two involves the substantial amount of cash a SPAC brings to the table most of which is kept in escrow until a merger is consummated. In contrast, a reverse merger shell has very little or no assets of any kind. The IPO to fund a SPAC would have taken place in the past two years, whereas a typical reverse merger shell would have done its IPO long time ago. Distinctively, SPACs are slated to liquidate if they are unable to complete a merger within two years of their IPO, whereas reverse merger shells may continue their dormant existence indefinitely. SPACs are run by highly-regarded top management teams that often have expertise in a specific industry or a geographical area. Reverse merger shells usually do not possess a management team. In SPAC transactions, the initiative to search for and merge with a private target is in the hands of the publicly-traded SPAC, whereas in the case of reverse mergers, the private company management is in the driver's seat, often taking on the combined entity's management. Therefore, the main goal in a SPAC transaction is to find a suitable operating company to merge with, whereas in a reverse merger, it is to access the financial markets using an empty shell as a conduit. Finally, SPACs by definition have a clean slate with a short and straightforward track record, whereas reverse merger shells often have a longer and troubled history that may create legal or reputational liabilities for the combined entity in the future. In sum, SPACs are distinctly different from reverse mergers in many respects, to the extent of being considered a stand-alone asset class (Lewellen 2009).

Although the term SPAC was first coined in 2003, studies that directly focus on SPACs began to appear after the SPAC activity achieved a critical mass beginning in 2006. The pivotal text on reverse mergers by Feldman and Dresner (2006) dedicates one chapter (Ch. 14) to SPACs. The authors explain the legal and regulatory characteristics of SPACs and outline the steps involved in creating a SPAC. Berger (2008) notes the emergence of SPACs as a strategic option for firms that aim to access capital markets without a traditional IPO. He recounts three successful SPAC examples to highlight the advantages and disadvantages of the SPAC process. He also provides statistics on the step-wise success rate of SPACs, as they move through the two-year process. Lewellen (2009) describes SPACs akin to "public LBOs" with a well-defined life cycle, allowing the author to measure portfolio alphas before and after the completion of acquisitions. Finally, Jenkinson and Sousa (2011) focus on the market reaction to the acquisition announcement returns made by SPACs to devise a rule that SPAC shareholders could use to approve or reject the proposed deal. The authors document that many value-destroying deals may be approved due to large "vote-buying" trades immediately before the decision date.

Our SPAC versus traditional IPO findings are similar to those reported in studies of reverse merger transactions. Gleason et al. (2005) find significant underperformance for reverse mergers and report that less than half of the firms survive two years after the reverse merger. Adjei et al. (2008) similarly report that companies that go public using a reverse merger have inferior *ex-ante* performance relative to IPO firms and are more likely to be delisted from a stock exchange in the three years after going public. Sjostrom (2008) argues that comparison of traditional IPOs with reverse mergers is misguided and is not meaningful. However, he singles out SPACs as a specialized reverse merger transaction that is directly comparable to traditional IPOs. This comparison is what our study undertakes to fill the gap in the literature.

3.2 Background on SPACs

Motivations behind recent SPAC activity:

Shell mergers have been around since the 1990s as an alternative route for private companies to attain public listing without going through the expensive and risky traditional IPO process. In spite of the apparent advantages over IPOs, shell mergers remained on the margins of the corporate finance practice until 2003. Beginning in 2003, a unique shell formation called SPAC (Special Purpose Acquisition Company) took on an increasingly important role among the non-traditional, shell-oriented methods. SPACs' growing popularity and increased acceptance in the corporate finance mainstream are attributed to the following unique features (Feldman and Dresner 2006):

- SPACs have cash, usually at least $5 million, and on average around $200 million; traditional shells are typically hollowed-out entities with no assets of significant value.
- SPAC shares have a relatively active and liquid trading market; most shell shares do not.
- SPACs are brand-new entities with no operational history; traditional shells are often burdened legally or reputationally due to their earlier operations.

Formation of SPACs and other shells is governed by the SEC Rule 419 passed in 1992 to make reverse merger transactions more legitimate. SPACs take advantage of an exemption that nullifies the restrictions of Rule 419, as long as a company has at least $5 million in assets (or seeks to raise $5 million in a public offering). However, many SPACs choose to adopt some of the Rule 419 restrictions to make them more attractive to investors (Feldman and Dresner 2006). As a pioneer of this approach, David Nussbaum, founder of EarlyBirdCapital, voluntarily imposed these additional rules on the SPACs he created:

- All money raised is put in escrow, except for a small percentage for operating expenses and commissions paid to investment bankers.
- A time limit of two years to find a merger partner (Rule 419 requires 18 months).
- SPAC shares are publicly traded.
- SPACs specialize in an industry or geography and are managed by an expert team.

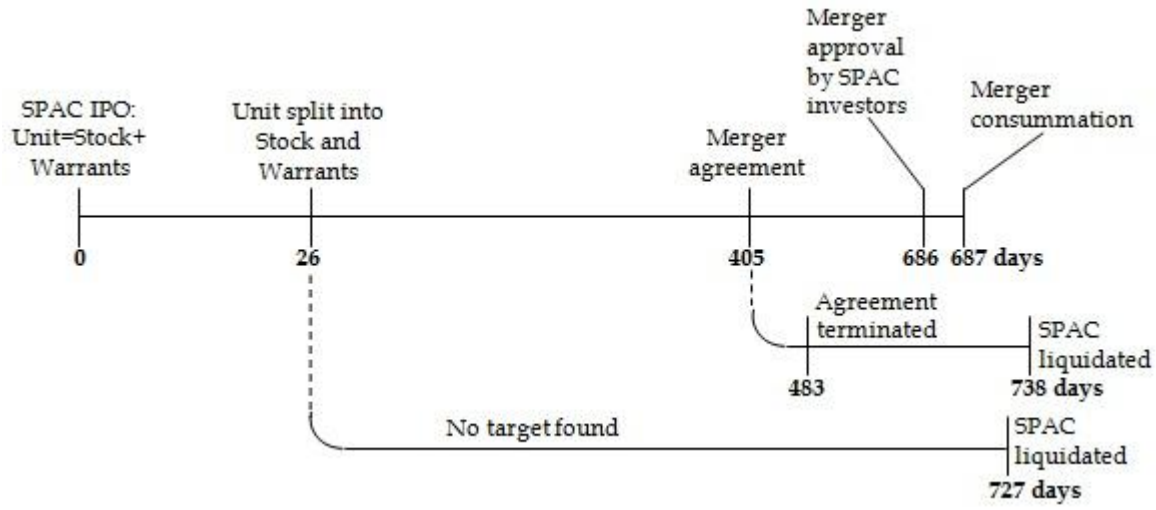
SPAC investors are sold a unit that consists of a share of common stock in addition to one or two warrants. About ninety percent of the raised capital is held in escrow and earns interest while the SPAC searches for a merger target. If investors do not approve the eventual deal that is proposed, they receive 92 to 95 percent of their original investment within the two years after they participate in the SPAC IPO. In the mean time they have the option of an immediate exit by selling their SPAC share and warrants in liquid public markets.

There are also clear advantages for private companies of being acquired by SPACs. SPAC merger is quicker, cheaper, and less stressful than an IPO and the funds are already raised with no uncertainty about the initial stock price the market may bear. In fact, SPAC market is often active and healthy even when the new issue market is unfavorable. Smaller companies that usually would not be good candidates for an IPO can still raise money and attain public listing through SPACs. Finally, the original SPAC managers often take an active role in the post-merger entity providing a source of highly-qualified managerial and advisory talent.

Milestones in the Life of a SPAC:

The timeline of the major events in the life cycle of a SPAC along with the median number of days from the SPAC IPO date to each milestone is depicted in Figure I. The median numbers of days are based on the sample of 156 SPACs that had an IPO during the period of 2003-2008. The usual steps from the initial SPAC IPO to the consummation of the merger with the target company (or liquidation as the case may be) are outlined in Appendix A.

Fig. I



Typical stages in the life of a SPAC along with the median numbers of days from IPO to each event

Table 1
Status of SPACs

	Number	%
Total SPAC IPOs	156	100.0%
Successful	71	45.5%
Single transaction	67	94.4%
Two transactions	4	5.6%
Previously failed transaction	3	4.2%
Pending	10	6.4%
Development stage	31	19.9%
Liquidated	44	28.2%
No target	11	25.0%
Single failed transaction	30	68.2%
Two failed transactions	3	6.8%

Note: The table outlines the status of the 156 SPACs that were created over the period of 2003-2008. Successful SPACs already merged with their target. Pending SPACs are those that agreed to merge but have not yet completed the transaction. Development stage SPACs are still searching for a suitable target. Liquidated SPACs have run out of time before they could identify a target.

While SPAC lifecycle of events often conform to the steps outlined in Appendix A, most transactions display some variation, depending on SPAC managers' success in negotiating with their merger targets and in convincing their shareholders to vote in favor of consummation. The probability of a

SPAC successfully consummating a merger is approximately 45% based on our sample of completed transactions (Table 1). Table 2 provides further details about the timing of events in the life of a SPAC. The average number of days between the IPO date and the merger agreement date across all SPACs is 408 days (about 13 months). However, this statistic is drastically different for SPACs that were able to consummate a merger (successful SPACs) and those that failed to consummate a merger and eventually had to be liquidated. While successful SPACs entered into an agreement within 395 days, liquidated SPACs took on average more than two months longer (468 days) to enter into a merger agreement, if they did so at all. Given the limited amount of time SPACs have, to complete a transaction, failing to identify a target in a timely manner compromises the SPAC's ability to finalize the merger within the allowed time. As can be seen from the sample of successful SPACs, it takes as long as 7 months (216 days) from the merger agreement date to the merger approval by the shareholders.

Table 2
Descriptive Statistics: 2003-2008

	N	Mean	Median	Min	Max	St. Dev.
All mergers (N = 86)						
Days from IPO to agreement	86	408.3	455	74	840	187.8
Successful SPACs (N = 71)						
Days from IPO to agreement	75	395.5	405	74	840	188.5
Days from IPO to terminated agreement	3	349.3	331	218	499	141.4
Days from agreement to approval	75	216.1	186	20	638	113.1
Days from approval to consummation	75	2.5	1	0	21	4.2
Days from IPO to consummation	75	614.1	687	245	1004	172.6
Liquidated SPACs (N = 44)						
Days from IPO to agreement	43	467.9	483	142	696	155.1
Days from agreement to termination	43	178.2	177	24	512	104.5
Days from IPO to liquidation	42	735.9	731.5	490	878	74.6

Note: The table contains descriptive statistics for 71 SPACs that consummated a merger and 44 SPACs that were liquidated over the period of 2003 and 2008.

3. Data Sources and Sample Characteristics

3.1. Data

SPAC data: Our sample of SPACs comes from proprietary data obtained from The Reverse Merger Report, which is published by DealFlow Media, Inc. The initial comprehensive list of SPACs collected from the reports contains 156 companies that had an IPO between 2003 and 2008. For each SPAC in the sample we identify the success and timing of acquisition of a target by screening 8-K, 10-Q, and 10-K filings in SEC's EDGAR database. In addition, we screen the filings for details on a SPAC's IPO, declared sector/country focus, and the identity of its IPO underwriters. Operating performance data were collected from the Compustat database. Stock return data were collected from CRSP (Center for Research in Security Prices).

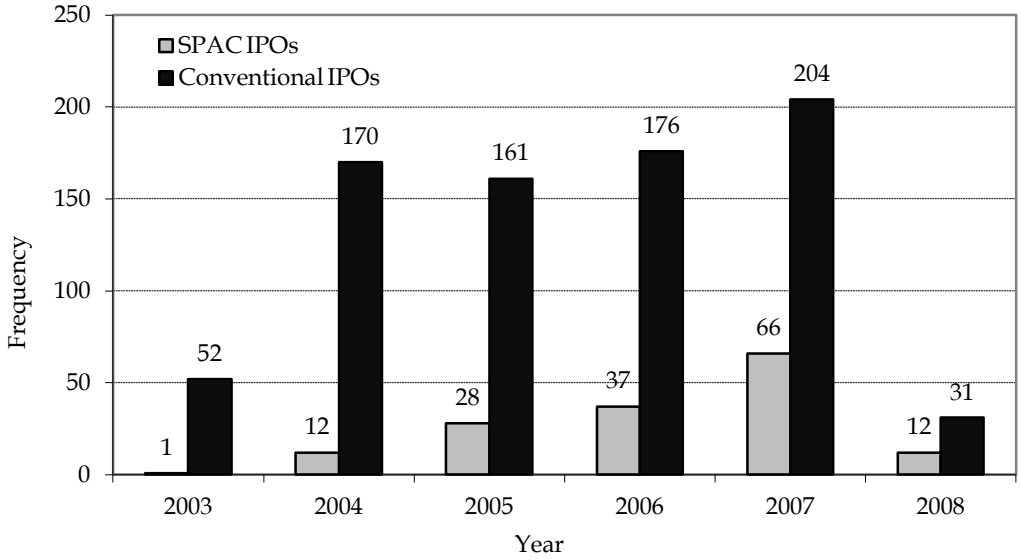
Out of the 156 SPACs in the sample, we identified 71 firms that successfully completed a merger at the time of this study. After eliminating firms with missing operating performance data, our final sample used in the regression analysis contains 34 firms. The lost observations represent primarily foreign domiciled post-merger entities that are not required to make financial disclosures in the U.S.

IPO Data: We retrieve the conventional IPO data for the period 2003-2008 from Hoovers IPO Central .

3.2 Sample Description

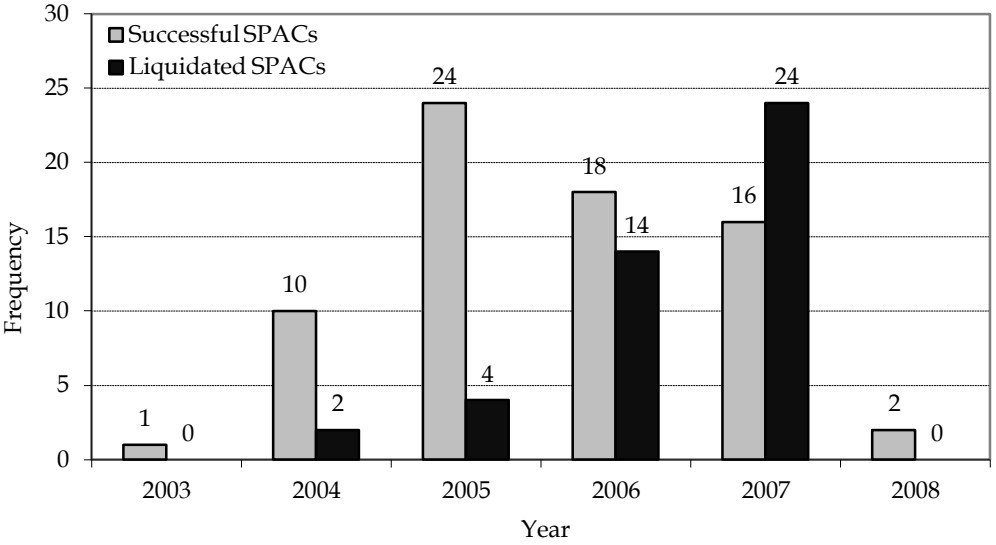
Our full sample consists of 156 SPACs that conducted an IPO during the period of 2003-2008 (see Figure II). As reported in Table 1, 71 SPACs managed to find and merge with target companies whereas 44 SPACs were liquidated due to their failure to find a target, with most of the liquidations taking place in 2006 and 2007 (see Figure III). The rest of the SPACs in the sample are either in the process of completing a merger (10 firms) or are still searching for a target (31 firms). The majority of SPACs that were successful in finding a target, merged with a single private firm (94.4%) whereas four SPACs (5.6%) merged with multiple targets. Given the two-year timeline that SPACs pledge to follow, only three SPACs (4.2%) managed to merge with a new target after SPAC shareholders voted down a previous merger proposal.

Fig. II



Number of conventional and SPAC initial public offerings that came to market in each year from 2003 to 2008

Fig. III



Number of SPACs that completed a merger and SPACs that liquidated in each year from 2003 to 2008

Table 3
Declared SPAC Focus

Panel A: Declared SPAC focus (% of SPACs)				
	Industry	Country/Region	Other	None/General
2003-2008	70%	23%	5%	17%
Panel B: Frequency Distribution of Reported Industries				
Country/Region		Number		Frequency
Not reported		66		77%
Reported		20		23%
China		7		35%
North America		5		25%
North America & Europe		3		15%
India		3		15%
Israel		2		10%
Panel C: Frequency Distribution of Reported Countries and Regions				
Industry		Number		Frequency
Not reported		26		30%
Reported		60		70%
Technology		14		23%
Entertainment		12		20%
Financial services		12		20%
Health care		10		17%
Consumer products		7		12%
Energy		6		10%
Services		6		10%
Transportation		4		7%
Industrial		4		7%
Real estate		3		5%
Defense		2		3%

Note: Panels A, B, and C of this table present statistics on geographic and industry focus declared by SPACs during the 2003-2008 period.

4. Results

In Table 4, we take a first look at the differences in IPO characteristics between SPACs and traditional IPOs. For the sample of 156 SPACs that went public between 2003 and 2008, the total amount of equity raised was about $21 billion compared to more than $180 billion raised by 794 conventional IPO firms during the same time period, as reported in Panel A of Table 4. Furthermore, the larger size of traditional-IPO issue total is observed in each of the six years in the sample. While this observation is mostly due to the fact that there are significantly more traditional IPOs than SPAC IPOs in any given year, Panel B of Table 4 shows that the average amount of funds raised by IPO firms is also greater than that of a typical firm that had a traditional IPO, $229 million versus $211. In both cases, the means are greater than their corresponding medians indicating that the distribution of funds raised in both SPAC and traditional IPOs is skewed to the right with several large amounts pulling the means up. A comparison of the minimum and maximum values for the two distributions reveals that the distribution of funds raised by the SPACs is noticeably tighter with

a narrower range of amounts of dollars raised. Similar results are observed for the share price. While SPACs' units are offered at a lower price than shares in conventional IPOs, there is little variation in the initial unit price, ranging from $5 to $9.75. Each unit of a SPAC typically consists of one share of common stock and one or two stock warrants, which start trading separately a few days after the IPO. The median number of warrants per SPAC unit in the sample is one.

Table 4
IPO Characteristics

Panel A: Total Amount Raised ($ mill)

	2003-2008	2003	2004	2005	2006	2007	2008
SPAC IPO	21,023.37	21.00	362.48	2,027.57	3,296.46	11,926.86	3,389.00
Conventional IPO	180,072.33	10,243.65	32,840.58	27,592.33	37,623.69	47,622.05	24,150.04

Panel B: IPO Characteristics

	Mean	Median	Min	Max	St. Dev.
Amount raised ($ mill)					
SPAC IPO	210.82	138.00	51.60	1,035.00	188.19
Conventional IPO	229.39	113.75	1.40	17,864.00	708.65
Initial Unit Offer Price ($/share)					
SPAC IPO (as of separation date)	7.78	7.40	5.00	9.75	1.30
Conventional IPO	14.78	14.00	3.25	85.00	5.97
Warrants Per Unit					
SPAC IPO	1.60	1.00	0.50	10.00	1.40
Conventional IPO	--	--	--	--	--

Note: Panels A and B of this table show the descriptive statistics for the sample of 156 SPAC IPOs and 794 conventional IPOs. The statistics for SPAC IPO amount and initial unit offer price in Panel B are based on incomplete sample of 83 SPACs.

We examine SPACs and IPOs during the time period 2003-2008 using three empirical approaches. First, we compare a host of financial and operating characteristics of newly minted IPOs and post-merger SPAC targets both in a univariate setting and using regression methodology (Tables 5 and 9). In so doing, we are able to pinpoint the key distinguishing features between firms that choose the IPO route and those that merge with a SPAC to attain publicly-traded status. Second, we track the changes in operating performance of post-merger SPAC targets and new IPOs over the course of the first one year of their tenure as a public company (Tables 6 and 7). In both first and second empirical approaches, we generate results two ways: on a stand-alone basis and on an industry-adjusted basis. Adjusting for industry allows us to control for industry effects and examine the direct effects of choosing the SPAC route versus the IPO route. In the third approach, we compare post-merger and post-IPO stock returns over several holding periods in raw and market-adjusted form (Table 9).

We compare mean and median levels of twenty four variables for SPACs and IPOs (Table 5). Each variable is reported using its nominal level and industry-adjusted level. The first group of variables in Table 5 is size related. We discuss only median results to avoid the potentially distorting influence of outliers. All figures discussed exhibit a statistical significance level of 1% or 5% unless indicated otherwise. The median IPO firm commands a significantly larger size than the median post-merger SPAC entity measured in terms of assets, market capitalization, sales, EBITDA (Earnings before interest, taxes, depreciation and amortization), and operating cash flow.

During our sample period, the median IPO had $270.9 million in total assets, whereas the median SPAC firm had $161.7 million in assets. The sales level for the median IPO firm was $140.5 million; more than twice the $69.6 million sales generated by the median SPAC firm. The difference between IPO and SPAC firms in terms of their profit and cash flow was even more pronounced. The median IPO firm had five-fold greater EBITDA (Earnings before interest, taxes, depreciation and

amortization) at $27.6 million than the $4.5 million earned by the median SPAC firm. Whereas the median SPAC firm had a minuscule $370,000 in operating cash flow, the median IPO firm generated $17.5 million in operating cash.

Table 5
Summary Statistics for SPACs and IPOs

	SPACs		IPOs		Wilcoxon test	
	Mean	Median	Mean	Median		
Size						
Total assets ($ mil)	284.16	161.73	1,068.73	270.89	-109.17	**
Adjusted total assets ($ mil)	-432.37	-66.49	285.03	19.08	-85.56	***
Market value of equity ($ mil)	167.81	83.28	999.36	439.26	-355.98	***
Adjusted market value of equity ($ mil)	-109.64	-67.54	483.28	139.97	-207.52	***
Sales ($ mil)	137.52	69.60	516.91	140.45	-70.85	***
Adjusted sales ($ mil)	-431.35	-138.08	-82.39	-2.42	-135.65	***
EBITDA ($ mil)	13.56	4.46	98.31	27.58	-23.13	***
Adjusted EBITDA ($ mil)	-46.59	-16.85	-2.13	0.78	-17.62	***
Number of employees (000s)	1.48	0.41	1.81	0.44	-0.02	
Adjusted number of employees (000s)	-0.40	-0.23	0.15	-0.02	-0.21	**
Operating cash flow ($mil)	14.72	0.37	49.21	17.52	-17.15	***
Adjusted operating cash flow ($ mil)	-30.55	-14.68	-21.30	-0.19	-14.49	***
Investing cash flow ($ mil)	-26.01	-14.84	-154.37	-31.38	16.54	***
Adjusted investing cash flow ($ mil)	10.90	7.11	-93.00	-10.45	17.55	***
Operating Performance						
Operating profit margin	-0.43	0.07	-2.51	0.16	-0.08	***
Adjusted operating profit margin	-0.55	-0.03	-2.58	0.03	-0.06	***
Return on assets	0.05	0.03	0.08	0.06	-0.03	*
Adjusted return on assets	0.03	0.00	0.06	0.03	-0.03	
Operating return on assets	0.00	0.04	0.06	0.10	-0.06	***
Adjusted operating return on assets	-0.08	-0.04	0.02	0.01	-0.05	***
Operating cash flow to total assets	-0.01	0.00	0.03	0.06	-0.06	***
Adjusted operating cash flows to total assets	-0.07	-0.06	0.00	0.00	-0.06	***
Total asset turnover	0.74	0.62	0.74	0.53	0.09	
Adjusted total asset turnover	-0.17	-0.07	-0.01	-0.07	0.00	
Sales per employee ($ 000s)	879.27	138.74	1,252.40	244.10	-105.37	**
Adjusted sales per employee ($ 000s)	599.85	-37.41	919.03	7.62	-45.03	**
Solvency						
Current ratio	2.81	1.38	4.62	2.69	-1.31	***
Adjusted current ratio	0.80	-0.21	2.62	0.73	-0.94	***
Debt ratio	0.25	0.20	0.22	0.11	0.09	**
Adjusted debt ratio	0.10	0.08	0.04	-0.02	0.10	**
Long-term debt ratio	0.18	0.11	0.18	0.04	0.06	
Adjusted long-term debt ratio	0.07	0.01	0.07	0.00	0.01	
Interest burden	0.08	0.05	0.13	0.09	-0.03	
Adjusted interest burden	0.01	0.01	0.07	0.02	-0.01	
Capital Expenditures						
Capital expenditures ($ mil)	24.76	2.66	85.69	8.35	-5.70	***
Adjusted capital expenditures ($ mil)	-8.43	-3.32	26.14	0.68	-4.00	***
Capital expenditures to sales	6.21	0.04	0.41	0.06	-0.02	
Adjusted capital expenditures to sales	6.09	0.00	0.29	0.01	-0.01	
Acquisition to sales	7.91	0.08	0.07	0.00	0.08	***
Adjusted acquisition to sales	7.91	0.08	0.07	0.00	0.08	***

Table 5 (continued)
Summary Statistics for SPACs and IPOs

Growth Opportunities						
Price/Earnings	45.57	36.54	66.87	30.03	6.51	
Adjusted price/Earnings	36.08	13.98	56.31	19.38	-5.40	
Price to sales	10.47	1.46	24.76	3.20	-1.75	***
Adjusted price to sales	8.87	-0.05	22.19	0.96	-1.01	**
Market to book	2.50	1.38	6.09	3.36	-1.98	***
Adjusted market to book	0.57	-0.46	3.80	1.03	-1.49	***

Note: The table contrasts twenty four characteristics of SPACs and IPOs. The characteristics are grouped under five categories: size, operating performance, solvency, capital expenditures, and growth opportunities. Each characteristic is compared at its nominal level as well as industry-adjusted level. The mean and median for each variable is reported and the null hypothesis of equality of medians for the SPAC and the IPO is tested using the Wilcoxon rank sum test. The median differences ($Median_{SPAC}$ -- $Median_{IPO}$) are reported in the right-most column. *, **, and *** indicate significance at the 10%, 5%, and 1% confidence level, respectively.

The industry-adjusted figures reinforce the size patterns observed using the nominal figures. SPAC firms tend to be significantly smaller than their industry median in contrast with the IPO firms, which are typically larger or only slightly smaller than their industry median. For example, the median SPAC firm EBITDA level was $16.9 million below its industry median. The median IPO firm in contrast generated a slightly–better–than–industry EBITDA of $0.8 million. The difference in raw number of employees was immaterial and not statistically significant. However, when adjusted for industry medians, SPAC firms appear to employ significantly lower number of workers than their peers (-0.23), whereas IPO firm employment numbers are similar to their peers (-0.02).

The general pattern in size-related variables is smaller SPAC firms and larger IPO firms both compared to each other and their industry peers. This finding is not surprising in light of the fundamental differences in the way SPAC firms and IPO firms initially tap public markets. The size of a SPAC is limited by the funds it raises in its initial IPO. Therefore, the operating company that the SPAC will be able to acquire is also limited in size. There is no such inherent size limitation in conventional IPOs. Firms of all sizes have been able to tap equity markets using the conventional IPO process.

We track the operating performance of SPAC firms and IPO firms using six variables in raw and industry-adjusted form (Table 5, second group of variables). Across the board, IPOs outperform SPACs significantly except in the case of the variable TATO (Total asset turnover) in which case they are at about the same level. Operating profit margin, return on assets (with 10% statistical significance only), operating return on assets, operating cash flow to total assets, and sales per employee for SPACs are typically about half as much as the ratio levels for IPOs. These findings are in line with those reported by Adjei et al. (2008). They found that companies choosing to go public using another unconventional method—reverse merger—are smaller and have inferior ex-ante performance relative to IPO firms.

Industry-adjusted figures indicate that in addition to underperforming concurrent IPO firms, SPACs also perform worse than their industry peers. In contrast IPOs perform better than their industry peers. As a representative example, the operating profit margin for the median SPAC is 7% compared to 16% level for the median IPO company. The industry–adjusted operating profit margin for the median SPAC firm is 3% less than the industry median, whereas for the median IPO firm, the same variable is 3% higher than the industry median.

In the case of measures of solvency, the difference between IPOs and SPACs continue to be significant. IPOs tend to be more liquid with a median current ratio of 2.69 than SPACs that exhibit a median current ratio of 1.38. The debt ratio for the median SPAC is 20% and for the median IPO it is 11%. On an industry-adjusted basis, the same pattern is observable, with IPOs being more liquid and less levered than the industry and SPACs being less liquid and more levered than the industry. We

do not observe any statistically significant differences between IPOs and SPACs when comparing their solvency using long-term debt ratio and interest burden metrics.

Table 6
Operating Performance of SPAC Targets Before and After Merger

Measure of operating performance	From 0 to +1
Panel A: Operating Return on Assets	
Median level in Year 0 (%)	
SPAC target firms = 4.20**	
Matched industry firms = 9.95***	
Median change (%)	-1.08
Median industry-adjusted change (%)	-0.29
Number of observations	25
Panel B: Operating Profit Margin	
Median level in Year 0 (%)	
SPAC target firms = 7.49	
Matched industry firms = 8.68***	
Median change (%)	0.85
Median industry-adjusted change (%)	1.55
Number of observations	24
Panel C: Operating Cash Flow to Total Assets	
Median level in Year 0 (%)	
SPAC target firms = 0.09	
Matched industry firms = 6.46***	
Median change (%)	-0.73
Median industry-adjusted change (%)	0.73
Number of observations	24
Panel D: Sales	
Median level in Year 0 (M$)	
SPAC target firms = 69.604***	
Matched industry firms = 214.471***	
Median change (%)	39.226***
Median industry-adjusted change (%)	17.7195**
Number of observations	25
Panel E: Total Asset Turnover	
Median level in Year 0 (%)	
SPAC target firms = 62.18***	
Matched industry firms = 77.95***	
Median change (%)	8.94
Median industry-adjusted change (%)	18.17*
Number of observations	25

Note: The table reports the median percent change in the operating performance for 42 firms that merged with a SPAC from 2003 to 2008. Year 0 is the calendar year of the SPAC merger. Year +1 is the first calendar year after the SPAC merger. The industry-adjusted change is the deviation from the industry median in the same year. The significance tests are based on Wilcoxon signed ranked test, for the hypothesis of the median sign equal zero. *, **, and *** indicate significance at the 10%, 5%, and 1% confidence level, respectively.

Table 7
Operating Performance of IPO Firms

Measure of operating performance	From 0 to +1
Panel A: Operating Return on Assets	
Median level in Year 0 (%)	
IPO issuing firms = 10.35***	
Matched industry firms = 7.68***	
Median change (%)	-0.47***
Median industry-adjusted change (%)	-0.86***
Number of observations	485
Panel B: Operating Profit Margin	
Median level in Year 0 (%)	
IPO issuing firms = 15.58***	
Matched industry firms = 9.49***	
Median change (%)	-0.14
Median industry-adjusted change (%)	-0.12
Number of observations	469
Panel C: Operating Cash Flow to Total Assets	
Median level in Year 0 (%)	
IPO issuing firms = 6.14***	
Matched industry firms = 5.79***	
Median change (%)	0.12
Median industry-adjusted change (%)	-0.17
Number of observations	496
Panel D: Sales	
Median level in Year 0 (M$)	
IPO issuing firms = 140.452	
Matched industry firms = 143.379***	
Median change (%)	31.8795***
Median industry-adjusted change (%)	6.843***
Number of observations	498
Panel E: Total Asset Turnover	
Median level in Year 0 (%)	
IPO issuing firms = 52.96	
Matched industry firms = 72.09	
Median change (%)	1.54***
Median industry-adjusted change (%)	0.63
Number of observations	498

Note: The table reports the median percent change in the operating performance for 572 IPO firms that went public from 2003 to 2008. Year 0 is the calendar year of the IPO. Year +1 is the first calendar year after the IPO. The industry-adjusted change is the deviation from the industry median in the same year. The significance tests are based on Wilcoxon signed ranked test, for the hypothesis of the median sign equal zero. *, **, and *** indicate significance at the 10%, 5%, and 1% confidence level, respectively.

Table 8
Stock Returns after Consummation of SPAC merger and Conventional IPO

	Mean	t-stat		Median	Sign test		Wilcoxon rank sum test		% positive	% negative
1-month buy-and-hold returns										
SPAC merger (n=42)										
Stock raw return	-5.37	-2.47	**	-5.57	0.00	***	0.00	***	26.19	73.81
Market return	-0.81	-1.34		-0.91	0.64		0.26		45.24	54.76
Excess returns	-4.57	-2.21	**	-3.48	0.02	**	0.01	***	30.95	69.05
Conventional IPO (n=570)										
Stock raw return	-0.02	-0.03		-0.20	0.59		0.62		48.77	51.23
Market return	0.50	3.40	***	1.13	0.00	***	0.00	***	64.56	35.44
Excess returns	-0.52	-0.88		-0.97	0.09	*	0.10		46.32	53.68
3-month buy-and-hold returns										
SPAC merger (n=41)										
Stock raw return	-14.85	-3.22	***	-15.51	0.03	**	0.00	***	31.71	68.29
Market return	-4.69	-2.16	**	2.22	0.76		0.24		53.66	46.34
Excess returns	-10.16	-2.83	***	-12.08	0.00	***	0.00	***	24.39	75.61
Conventional IPO (n=569)										
Stock raw return	1.84	1.50		-1.61	0.08	*	0.94		46.22	53.78
Market return	0.85	3.24	***	2.73	0.00	***	0.00	***	60.98	39.02
Excess returns	1.00	0.87		-2.68	0.01	**	0.28		44.82	55.18
6-month buy-and-hold returns										
SPAC merger (n=34)										
Stock raw return	-20.93	-3.13	***	-24.54	0.00	***	0.00	***	17.65	82.35
Market return	-3.38	-1.51		-1.42	0.61		0.42		44.12	55.88
Excess returns	-17.56	-2.99	***	-27.18	0.00	***	0.00	***	17.65	82.35
Conventional IPO (n=564)										
Stock raw return	4.57	2.79	***	-0.65	0.77		0.17		49.29	50.71
Market return	2.97	7.98	***	5.14	0.00	***	0.00	***	69.15	30.85
Excess returns	1.60	1.03		-3.56	0.05	**	0.53		45.74	54.26
1-year buy-and-hold returns										
SPAC merger (n=29)										
Stock raw return	-38.82	-4.20	***	-58.79	0.00	***	0.00	***	13.79	86.21
Market return	-8.94	-2.39	**	-5.00	0.06	*	0.07	*	31.03	68.97
Excess returns	-29.89	-3.81	***	-35.76	0.00	***	0.00	***	13.79	86.21
Conventional IPO (n=540)										
Stock raw return	4.51	1.58		-5.27	0.04	**	0.20		45.56	54.44
Market return	1.94	2.53	**	7.66	0.00	***	0.00	***	64.07	35.93
Excess returns	2.57	0.98		-9.45	0.00	***	0.01	**	42.41	57.59

Note: The table presents summary statistics for stock buy-and-hold returns over one month, three months, six months and one year after SPAC merger and conventional IPO. The SPAC merger sample consists of 42 transactions from 2003 to 2008. The IPO sample has 570 firms that went public during the same time period. We report the buy-and-hold stock returns for the merged entity and IPO firms, the value-weighted CRSP index, and the corresponding excess stock return. The reported statistics are the mean, median, and the respective percentages of positive and negative returns in each sample. T-statistics are reported testing the hypothesis of mean return equals to zero. Sign test p values indicate the probability of more returns being positive than found in the sample. Wilcoxon signed rank test p values are for the hypothesis of media return equals zero. *, **, and *** indicate significance at the 10%, 5%, and 1% confidence level, respectively.

Table 9
Tests of Propensity to Use SPAC or IPO methods

Explanatory variables	Model 1A	Model 1B	Model 2A	Model 2B	Model 3A	Model 3B
Intercept	-0.5602**	-0.3671	-1.2641***	-1.2557	0.6299	0.8798
Total assets	-0.001***	-0.0011***			-0.0012***	-0.0012***
Market to book	-0.0990**	-0.1025**			-0.0952**	-0.1041**
Debt ratio	0.9928*	1.0395*			1.3411**	1.3230**
Current ratio	-0.0464	-0.0607			-0.0532	-0.0685
Oper. return on assets	0.1281				-0.4468	
Oper. cash flow to total assets		0.8574*				0.3476
Total asset turnover	-0.1805	-0.3023*			-0.4453**	-0.4929**
IA Total assets			0.0000	0.0000		
IA Market to book			-0.0658*	-0.0678*		
IA Debt ratio			0.7033	0.7304		
IA Current ratio			-0.0537	-0.0640*		
IA Oper. return on assets			-0.7384			
IA Oper. cash flow to total assets				-0.0998		
IA Total asset turnover			-0.3182*	-0.3144*		
Industry Total assets					0.0000	0.0000
Industry Market to book					-0.5942***	-0.5506***
Industry Debt ratio					-2.2333**	-1.8502*
Industry Current ratio					0.1517	0.1556
Industry Oper. return on assets					2.4005	
Industry Oper. cash flow to total assets						2.1176
Industry Total asset turnover					0.2144	0.0426
N (SPAC/IPO)	35/389	34/389	35/389	34/389	35/389	34/389
Pseudo R^2	0.1536	0.1740	0.1107	0.1077	0.2563	0.2621

Note: The table presents results of probit regression estimation of the propensity of firms to go public using SPAC or IPO. The dichotomous dependent variable takes on the value of 1 in the case of a SPAC, and the value of 0 in the case of an IPO. The positive sign for a coefficient indicates the propensity of choosing the SPAC route is increasing in that specific attribute whereas a negative sign indicates the opposite. The top panel includes seven variables at the entity level. The middle panel includes the industry adjusted version of the same seven entity-level variables. The bottom panel includes average values for the same seven variables at the industry level. The models A and B employ the variables operating return on assets and operating cash flow to assets, respectively. *, **, and *** indicate significance at the 10%, 5%, and 1% confidence level, respectively.

The divergent nature of IPOs and SPACs is further evidenced by the measures in Table 5 that pertain to capital expenditures. The median IPO firm makes $8.35 million in capital outlays; more than triple the $2.66 million, the median SPAC firms spends. This is not suprising considering the larger average size of IPO firms in the sample discussed above. When the same variable is scaled by a size proxy (Capital expenditures to sales), the difference vanishes both economically and statistically. Using another metric scaled by sales, (Acquisition to sales), we find that the median SPAC spends 8% of its revenues to make acquisitions, when the comparable figure for median IPO firm is 0%.

In examining growth opportunities as the driver of the choice between the SPAC and IPO routes, we find that the relative valuation metrics Price-to-sales and Market-to-book ratios for IPOs

are at more than twice the level than those for SPACs. Industry–adjusted figures for both growth opportunity proxies indicate that SPACs tend to be below their industry peers and IPOs tend to be above. When we use the Price/Earnings (P/E) ratio to detect differences in growth opportunities, we find no statistically significant difference between IPOs and SPACs. Early stage companies, having low or no earnings, may be the culprit rendering the P/E ratio relatively meaningless.

In addition to the univariate comparison of IPO and SPAC firm characteristics, we use six multivariate regression specifications to reveal the relationship of the firm characteristics with the propensity to choose IPO versus SPAC routes (Table 6). Using a probit regression (SPAC=1, IPO=0), we measure the incremental effect of each variable by controlling for other variables and industry-level ratios. The results are largely in line with the univariate results reported above. The propensity to choose the SPAC route is inversely related to firm size (Total assets), but unrelated to industry size (Industry total assets). Firms with greater growth opportunities (Market-to-book ratio) tend to be IPO firms. SPAC firms carry more debt, are less efficient, and come from industries with lower growth opportunities and lower debt burden than industries that IPO firms operate in. Below is the summary of the findings of the univariate and multivariate comparisons of SPAC and IPO firms:

Operating Performance of SPAC and IPO Firms

Next, we examine the operating performance of SPAC and IPO firms over time, following the merger with the private entity (in case of SPACs) or the IPO. Prior studies (Jain and Kini 1994; Mikkelson et al. 1997) found significant decline in operating performance of IPO firms in the years immediately following the stock offering. We measure the change in the operating performance of SPAC and IPO firms over the one year period from t=0 (year of SPAC merger or IPO) to t=+1. In line with the previous literature, our operating performance measures are: operating return on assets, operating profit margin, operating cash flow to total assets, sales, and total asset turnover.

On all five measures, the median level for SPAC firms at t=0 was below the industry median (Table 7, left column). In contrast, in the year of their IPO, median IPO firms performed above their industry median in the case of three operating return/cash ratios (Table 8, left column in Panels A, B, C). In case of sales, IPO firms and their industries were at about the same level (Table 8, Panel D). In the case of total asset turnover, the IPO numbers appear below the industry, but due to lack of statistical power, we are not able to interpret the difference conclusively.

As to the change in operating performance over the course of the one year (from t=0 to t=1) for SPACs and IPOs, our results contradict some of the findings in the IPO literature (Tables 6 and 7). Previous studies that examined post-IPO operating performance found that the operating performance declines significantly in the year after the IPO, as much as 3-5% (Jain and Kini 1994). The change in operating performance of SPACs in the first year is immaterial and statistically not significant for the bottom-line focused metrics (Table 7, Panels A, B, and C). Similarly, change in IPO operating performance measured using operating income or cash flow based ratios is almost non-existent (Table 8, Panels A, B, and C). The decline in operating return on assets is significant at 1% level but the magnitude of the industry-adjusted decline is very small (-0.86%). This small decline and the increase in total asset turnover for the median IPO by 1.54% contradict the findings in the literature.

The disappearance and even reversal of the operating performance decline for IPOs indicate a fundamental shift in the IPO markets between the time periods of earlier studies (e.g. 1976-1988 in Jain and Kini (1994)) and our sample period of 2003-2008.[1]

On the other hand, in line with the IPO literature, sales increased significantly in the first year for both SPACs and IPOs. Median company sales (Tables 6 and 7, Panel D) increased $30 to $40 million and industry-adjusted sales also improved at a slower but statistically significant rate.

[1] Although conventional IPOs are not the central to the focus of our study, we reran our IPO operating performance metrics for various adjacent subperiods since 1988 and observed that the performance decline originally reported in Jain and Kini (1994) has diminished gradually over time. The results are available from the authors on request.

The results in Tables 6 and 7 show that industry comparison of IPO and SPAC firms at *t*=0 is favorable for IPO firms and unfavorable for SPAC firms. Two possible explanations could account for the apparent overperformance of IPO firms in the year of the stock offering. The first possibility is selection bias. Firms that successfully go through the IPO process are almost by definition those that have an attractive recent and current performance, at least on paper. When an IPO candidate's operating performance declines significantly, there is a high probability that it will have to delay or cancel the offering. The market valuation may not be attractive to the firm insiders any longer, or the demand for the offering may not be robust. In other words, IPO aspirants must put their best foot forward or the offering may fall apart. As a result, successful IPO firms are inherently above-average performers.

Additionally, even if its fundamentals are not solid, a firm on the path to an IPO has a strong incentive to "window dress" their results until the offering is completed. Therefore, IPO firms' appearing to outperform their industry at *t*=0, with fundamentally strong or window-dressed accounting figures, is not surprising. It could be that the firms that choose the relatively-low-stakes SPAC route are either unable to outperform their industry peers or are unwilling to bend their accounting figures to look better than their fundamentals warrant. Instead of attracting intense scrutiny typical in a high-profile IPO process, a private company may prefer to take advantage of the negotiating power that comes from dealing with a potential suitor, the SPAC, which has a strong incentive to close the transaction before their time runs out and have to liquidate their investment vehicle.

After-market Stock Returns of SPAC and IPO Firms

Finally, we examine the stock market performance of SPAC and IPO firms for the one year period after the new stock begins trading (Table 9). We compute the 1-month, 3-month, 6-month, and 1-year buy-and-hold returns for newly issued post-merger SPAC and IPO shares. We use both raw and excess returns. In the IPO literature underperformance in the year following the offering is well-documented (Loughran and Ritter 2005; Ritter and Welch 2002).

We find that the underperformance of the SPAC-target combinations in the first year of trading is significantly more pronounced than that of the conventional IPO firms. The median SPAC firm excess returns for 1-month, 3-month, 6-month, and 1-year holding periods are -3.48%, -12.08%, -27.18%, and -35.76% respectively. In comparison, in line with the IPO literature the median IPO firm excess returns for the corresponding holding periods are -0.97%, -2.68%, -3.56%, and -9.45%, respectively. While excess stock returns for both IPO and SPAC firms are negative, they are substantially more negative for SPAC firms.

5. Conclusions

In this paper, we study the fundamental, operational, and aftermarket (that is after consummating a merger with a private company) characteristics of 156 SPACs that were sponsored in the U.S. during the six-year period 2003-2008. In particular, we compare the characteristics of the firms that chose the SPAC format to become a public company with those that chose the traditional IPO format. In addition, we analyze the changes in SPAC and IPO firms' operational performance and stock market returns in the year following the floatation of new shares. We find SPACs to be significantly inferior to their industry peers and to contemporaneous IPO firms in terms of operational performance and stock returns. Further, in the year of the merger, SPACs carry more debt, are smaller, invest less, and have lower growth opportunities than the firms that conduct a conventional IPO in the same year.

SPACs provide another avenue for firms to go public in addition to traditional IPO and reverse merger. Our findings from SPAC transactions mirror those reported in studies of reverse merger transactions, where going public using a reverse merger is associated with inferior performance. Adjei et al. (2008) find significantly inferior after-market performance for reverse merger firms compared to IPO firms. Gleason et al. (2005) report that less than half of the firms survive following the reverse merger. According to Sjostrom (2008), comparing SPACs and traditional IPOs is more

meaningful than comparing reverse mergers and IPOs. To our knowledge, there have been no studies that directly compare SPACs and traditional IPOs. Our study addresses this gap in the literature. Our findings conclusively indicate that the particular route a firm has chosen to become a publicly traded entity (SPAC versus traditional IPO) has important consequences and should be paid attention to by investors and analysts.

In light of the extremely poor investment performance of SPACs in the year following the merger, it is a fair question to ask, why these formations still exist and why SPAC shareholders continue to approve any merger proposals. The evidence could be construed as SPAC shareholders continuing to make irrational decisions in the face of clear market signals. Jenkinson and Sousa (2009) similarly report that many SPAC shareholders approve value-destroying deals and propose a merger approval decision rule based on market prices. In this study, we contrast the poor performance by SPACs as reported in several studies, with traditional IPO underperformance and find that SPACs on average underperform even traditional IPOs, both financially and operationally. Investors should be cautious in participating in SPAC deals, if not avoid them altogether.

References

Adjei F, Cyree KB, Walker MM (2008) The determinants and survival of reverse mergers vs IPOs. *J Econ Finance* 32: 176-194. doi: 10.1007/s12197-007-9012-4

Berger R (2008) SPACs: An Alternative Way to Access the Public Markets. *J Appl Corp Finance* 20: 68-75. doi: 10.1111/j.1745-6622.2008.00194.x

Feldman DN, Dresner S (2006) Reverse Mergers: Taking a Company Public Without an IPO. Bloomberg Press, New York

Gleason, KC, Rosenthal L, Wiggins III RA (2005) Backing into being public: an exploratory analysis of reverse takeovers. *Journal of Corporate Finance*, December, pp. 54-79.

Jain B, Kini O (1994) The post-issue operating performance of IPO firms. *J Finance* 49: 1699-1726

Jenkinson T, Sousa M (2011) Why SPAC Investors Should Listen to the Market. *J of Applied Finance* 21: 38-57

Lewellen S (2009) SPACs as an Asset Class. *Unpublished working paper.* Yale School of Management

Loughran T, Ritter JR (1995) The new issues puzzle. *J Finance* 50: 23-51. doi:10.2307/2329238

Mikkelson W, Partch M, Shah K (1997) Ownership and operating performance of companies that go public. *J Financ Econ* 44: 281-307. doi:10.1016/S0304-405X(97)00006-8

Sjostrom, WK. (2008) The Truth About Reverse Mergers. *Entrepreneurial Business Law Journal*, Vol. 2.

Appendix A

The steps that are typically followed in the process of creating a SPAC, seeking a merger target and merging with the target are outlined below:

- Choose the underwriter(s), managers, and the accounting firm.
- Decide on industry and/or country focus (if any).
- Determine the amount of capital to be raised.
- Structure the unit pairing the stock with warrants (typically one common share + one or two warrants)
- Settle on the number of units to be issued, the public offering price, and the number of over-allotment units, if any.
- File the form S-1 ("red herring") with the SEC. File amended S-1 forms as needed.
- File the form 424B3, a prospectus, spelling out the terms of the initial public offering.
- Hold an initial public offering of the units. The money raised is held in escrow.
- File 8-K, Item 8.01, "Other Events," with the SEC to document the occurrence of the IPO.
- Document any concurrent private placement of warrants to the founding officers in the same 8-K that announced the IPO. Purchasers generally agree not to sell or transfer any Private Placement Warrants until after the Company has completed a business combination.
- If there was an over-allotment of units the sale of these units are also documented in an 8-K, Item 8.01, "Other Events."
- Shortly after the IPO, allow the warrants to trade separately from the common stock. File 8-K, Item 8.01, "Other Events," to announce that this has occurred.
- Search for a potential acquisition for a reverse merger. When a merger partner has been selected and an agreement to merge has been reached, file an 8-K, Item 1.01, "Entry into a Material Definitive Agreement," to document the agreement.
- Finalize the agreement. Each side may choose to renegotiate as circumstances change. Put together a proposal. File 8-Ks as needed to document changes.
- A presentation may be prepared to explain the proposed merger to analysts, stockholders and potential investors. A copy will be filed as part of an 8-K with the SEC.
- Put the proposal up for a shareholder's vote. Many agreements allow those who vote against the merger the right to have their shares converted into a pro rata portion of the proceeds from the Company's initial public offering held in trust.

Appendix B

The variables used in the study defined in terms of their COMPUSTAT mnemonics are listed in the following table.

Ratio Name	COMPUSTAT Variables
Acquisitions to sales	AQC/SALE
Capital expenditures	CAPX
Capital expenditures to sales	CAPX/SALE
Current ratio	ACT/LCT
Debt ratio (Total debt / Total assets)	(DLC+DLTT)/AT
EBITDA	EBITDA
Interest burden (Interest expense to operating income)	XINT/OIBDP
Investing cash flow	IVNCF
Long-term debt ratio (Long-term debt to total assets)	DLTT/AT
Market to book	MKVALT/CEQ
Market value of equity	MKVALT
Number of employees	EMP
Operating cash flow	OANCF
Operating cash flow to total assets	OANCF/AT
Operating profit margin	OIBDP/SALE
Operating return on assets	OIBDP/AT
Price/Earnings	((PRCH_F+PRCL_F)*CSHO)/(2*NI)
Price to sales	MKVALT/SALE
Return on assets	NI/AT
Sales	SALE
Sales per employee	SALE/EMP
Total assets	AT
Total asset turnover	SALE/AT