



THE IMPACT OF FINANCIAL CRISIS ON THE PERFORMANCE OF SPECIAL PURPOSE ACQUISITION COMPANIES (SPACs)

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Abstract in English

Special Purpose Acquisition Companies (SPACs) are listed companies without operating activities, and their sole purpose is to merge with a privately held entity. The analyses performed aimed to compare SPAC-merged companies against companies that followed traditional IPOs. The results point out that SPAC-merged firms have significantly weaker financial characteristics in relation to traditional IPOs and tend to go public during less favorable market conditions. Regarding the likelihood of a company going public through a SPAC merger, its higher leverage and lower growth opportunities are significant drivers for this choice, with emphasis during recession periods. The results from the performance analysis demonstrate that SPAC-merged companies significantly underperform the market and traditional IPOs both in the short- and long-run, and in different macroeconomic periods. SPAC-merged companies present significantly negative excessive returns in both crisis and non-crisis periods, and their performance is explained in part by higher market returns and weaker operating profitability.

Abstrato em Português

As Special Purpose Acquisition Companies (SPACs) são empresas cotadas sem atividades operacionais, e o seu único objectivo é fundir-se com uma entidade privada. As análises realizadas visavam comparar as empresas fundidas com SPACs com empresas cotadas a partir de IPOs tradicionais. Os resultados demonstram que as empresas fundidas SPAC têm características financeiras relativamente mais fracas e tendem a tornar-se públicas durante condições de mercado menos favoráveis. Quanto à probabilidade de uma empresa se tornar pública através de uma fusão com um SPAC, a sua maior alavancagem e menores oportunidades de crescimento são motores significativos para esta escolha, com ênfase durante períodos de recessão. Os resultados da análise de desempenho demonstram que as empresas fundidas pela SPAC têm um desempenho significativamente inferior ao mercado e aos IPOs tradicionais, tanto a curto como a longo prazo, e em diferentes períodos macroeconómicos. As empresas fundidas por SPACs apresentam retornos excessivos significativamente negativos tanto em períodos de crise como em períodos não-crise, e o seu desempenho é explicado em parte por retornos de mercado mais elevados e rentabilidade operacional mais fraca.

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Introduction

A privately held company usually has two options to raise capital when facing the need to scale operations, diversify its range of products, or boost its market presence. On one hand, it can get a loan which impacts the profitability as it pays interest, and on the other hand, it can issue shares to the public. The capital raised from the sale of the company's shares is considered a more cost-efficient option as it comes with an inflow of liquidity that impacts the balance sheet without hurting the net income.

To go public, private companies tend to follow a traditional process of an Initial Public Offering (IPO), however, before the financial crisis of 2008, an alternative named Special Purpose Acquisition Company (SPAC) was established. In this alternative process, SPACs are already publicly traded blank check companies that merge with a privately held company, becoming the latter listed on a stock exchange.

Previous studies (Jenkinson and Sousa, 2011, Dimitrova, 2017, Gahng et.al, 2022) analyzed the performance of SPAC-merged companies and concluded that these significantly underperform the market, the industry, and traditional IPOs. Following this information, this study has as one of the objectives to understand whether SPAC mergers are less economically viable companies, by analysing their performance.

Considering these returns from SPAC-mergers, it was studied if there were any differences in financial characteristics versus traditional IPOs, and if those characteristics influence the likelihood of companies going public through SPACs. In the end, the performance of our sample databases on SPAC-mergers and traditional IPOs was evaluated.

Further, from previous literature, it was observed that SPAC-mergers tend to increase during economic recession periods, in relative percentage to traditional IPOs (Dimitrova, 2017). This way, all the results presented in this thesis take into account the economic periods in their analyses.

From the analyses undergone in this thesis, it can be noted that SPAC-merged firms present significantly lower-quality financial indicators, specifically more leverage, and fewer growth opportunities when compared to traditional IPOs. It was also concluded that SPAC mergers go public during periods of higher *cost of debt*, *market volatility*, and national *net exports*, in relation to traditional IPOs.

The analysis of the likelihood of companies going public through a SPAC merger concludes that firms with more leverage and lower growth opportunities tend to go public via SPAC rather than through traditional IPOs. Regarding market-specific variables, private companies tend to merge with a SPAC when business sentiment and national exports are higher, and consumption levels are lower.

The study on Buy and Hold Abnormal Returns (BHARs) to evaluate the performance of companies after going public demonstrates that SPAC-mergers significantly underperform traditional IPOs for both short- and long-term periods (1-day, 3-days, 126-days, and 252-days). The results prevail when comparing economic cycles, however, the differences in performance are wider for the short-term and narrower for the long-term, during crisis periods.

To finalize, when regressing the performance on Fama/French 5-Factors, the results showed lower excess returns for SPAC-merged companies (relatively to IPOs). The lower excess returns are explained in part by market returns (1st factor), company size (2nd factor), and book-to-market equity value (3rd factor).

This thesis aims to develop the literature on SPACs by expanding the analysis of deals until the end of 2020. As such, the thesis includes the analysis of deals closed during a second economic recession (after the crisis of 2008), the 2020 pandemic crisis. This paper innovates by evaluating the impact of financial crises on SPACs by contrasting them with non-crises periods, through the analysis of financial characteristics of SPAC-merged companies, likelihood to go public via SPAC-merger, and performance.

A brief history of SPACs transformation

Special Purpose Acquisition Companies came to light in 2003, reshaped from the over-the-counter acquisition companies' format from the 80s and 90s (Vulanovic, 2017). At the time, the lack of legislation often led to the exploitation of SPAC investors as fraudulent SPAC founders would run away with the pooled investment since no rules regarding the management of money were in place until the SPAC merger. These circumstances slowed down the practice of this investment instrument in these decades. This lack of regulation led to the introduction of the Securities and Exchange Commission (SEC) Rule 419 (1992), which imposed tighter restrictions on blank check companies looking to be registered under the bylaws of this agency.

A new-age SPAC, in summary, begins to be a private shell company composed only of cash often founded and funded by experienced business personalities. To get listed on a stock exchange, the company follows a traditional IPO. In this phase, external investors buy shares in the SPAC, and the pooled sum of cash is mainly invested in government bonds (Jenkinson & Sousa, 2011). Once listed on a stock exchange, the board members pursue different private companies or parts of them. When the SPAC finds its target, and the private company is acquired, the private company is merged into the SPAC, with the latter ceasing to exist as one (de-SPAC) and beginning to be traded as a regular company.

SPACs have gained traction due to their several advantages against the traditional IPO. To begin, a SPAC already holds the capital, so its performance on the market would not be affected by the macroeconomic conditions, as the pricing is negotiated before the merger completion (upfront price determination). This readily accessible liquidity also benefits the target company shareholders if they choose to cash out, as their stake can be sold right away (faster) and in negotiated terms (not possible for the traditional IPO), at the SPAC acquisition date. Also, when compared to venture capital, SPACs allow for an early investment from institutional and retail investors into the pool of funds for the acquisition. Moreover, these external investors have the right to vote on the target to be acquired, which differs greatly from private pools of investments.

Additionally, for a traditional IPO, it would be difficult to find quality underwriters either due to the higher fees required or to the low level of demand from investors during recessions, leading to supplementary efforts to promote the event on “roadshows”. SPACs come to solve this problem by lowering the costs and time for a private company to get listed since the SPAC itself is already publicly listed when the reverse merger occurs. Consequently, SPAC firms generally face lower under-pricing than if they were to become listed in a stock exchange through a traditional IPO (Jenkinson & Sousa, 2011).

Kolb and Tykvová (2016) document that SPAC-mergers slowed down in frequency in 2008 during the financial crisis and increased after this recession period. And, despite the decrease in the total number of SPAC mergers, they have increased in relative percentage to traditional IPOs during the that period. From 2017 onwards, the total number of SPAC IPOs gained even more traction, culminating in a peak in 2021 with SPAC IPOs raising \$142 billion, corresponding to 72% of total proceedings in the U.S. IPOs’ universe (Geerken et.al, 2021). Despite going public often, SPACs only acquire a target around

50% of the time (Kolb & Tykvová, 2016). Adding to this is the fact that before the SPAC merger, the company's financial characteristics and performance are stable. Taking that into consideration, this thesis focuses on the developments during and after the merger completion.

Literature Review

Ten years of literature studying the SPACs system have brought to light its legal and financial structuring, history, characteristics, and performance. Studies have looked at the scope in which the SPAC industry inserts itself in the financial sector and how major stakeholders in this market are taking over the business as it grew in popularity.

This thesis focuses mainly on the performance of traditional IPOs in comparison to the SPAC-merged companies, and what variables (firm- and market-specific ones) impact the decision to go public through this alternative approach. In this study, performance analysis has been divided into short- and long-term returns.

From the prior literature available on SPACs, Lewellen (2009), with a sample of SPACs from 2003 to 2008, concludes that they present significant and negative excess monthly returns of -2% after the acquisition of a target has been completed. Accordingly, for the same period of analysis, Jenkinson and Sousa (2011) have reported, after the SPAC merger, equally weighted SPACs portfolio returns of -24% and -51%, after 6 and 12 months, respectively. Kolb and Tykvová (2016) also concluded that both SPAC-merged companies and traditional IPOs present significant and negative excess returns on their equally weighted monthly portfolio for the long run (6 to 60 months periods).

Regarding the short-term returns analysis, Cumming et. al (2014), based on a sample from 2003 to 2008, found positive and significant cumulative abnormal returns of 3% on the first 3 trading days after the SPAC-merge completion. Dimitrova (2012) from a sample from 2003 to 2010, also concluded that SPACs that, after completed, an acquisition deal produced significantly positive returns of 1% for their first 2 trading days after.

The poor long-term performance observed in prior papers is driven by the low level of founders' involvement in the SPAC-merged company after acquisition (Dimitrova, 2017), and principally by the equity incentives to target managers, the underwriters, and SPAC founders to accept value-destructive SPAC deals (Jenkinson and Sousa, 2011 &

Vulanovic, 2017).

A broad literature also exists on the traditional process, the Initial Public Offering (IPO) (Benveniste and Spindt, 1989; Ritter, 1991; Brau et al., 2003), studying their activity, pricing, allocation, and performance.

Beatty and Ritter (1986), with a sample from 1960 to 1982, proposed that IPOs usually face underpricing, with the newly listed stocks experiencing high returns in the short run. These authors point out that a probable reason for this phenomenon would be the uncertainty before the IPO (greater uncertainty leads to higher underpricing). Barry and Mihov (2015) also found average first-day-trading returns of 19% on a sample from 1980 to 2012. This high underpricing can be explained by lower debt levels, especially during periods of market uncertainty. Another significant cause for short-term abnormal performance is the IPO options granted to the private company's executives (Lowry et al., 2006), found in a sample from 1996 and 2000.

In the long run, Ritter (1991) using a sample from 1975 to 1984 concluded that IPOs tend to underperform significantly their benchmarks, (in a 3-year period), with companies performing worst during favorable economic periods. This happened as companies going public usually took advantage of investors' excess confidence on potential earnings leading to an overvaluation of the company. Shultz (2003), studying IPOs from 1973 to 1993, concludes that IPOs' cumulative abnormal returns (CARs) are significantly negative, with the underperformance intensifying as the holding period increases. CARs in the constructed equally weighted monthly portfolio go from -0,15% for the first month to -6,58% for the first 60 months of trading. Barry and Mihov (2015) from a broader and more recent sample (1980-2012) found that more leverage and no venture capital backing the company taken public are also statistically significant drivers of IPOs underperformance.

Additionally, from studies comparing the performance of both approaches to go public, Datar et.al (2012) on a sample from 2003 to 2008, concluded that both IPOs and SPAC-mergers significantly underperform the market with 1-month excess returns of -5% and -1% for SPAC-mergers and IPOs, respectively. For the long term, more specifically a 1-year period, they find returns of -30% (for SPAC-mergers) and +3% for IPOs. Similar results were found by Kolb and Tykvova (2016) from a sample from 2003 to 2015. The results for excess returns were -5% and -1% for 6 months, and -4% and -2% for 60

months, regarding SPAC-mergers and IPOs, respectively.

The traditional IPO vs SPACs

For this thesis, it is important to distinguish the usual method of going public versus the alternative approach. The traditional IPO involves the selling of a combined pool of new and old shares to the public. As this vehicle to access public capital is dependent on market conditions (Gleason et al., 2005), the economic circumstances affect the performance of these initial offerings.

In a traditional IPO, investors pay for the capital of a company going public, receiving shares available to trade in the public market. The goal then is to maximize the stock price. As the selling price must be established the day before the IPO's effective date with the underwriter, the market conditions play a role on this deal. Consequentially, in favorable economic cycles, the defined price is usually much higher than in a weaker cycle, considering the aim of this process to be the whole subscription of the offered shares (Ritter, 1991).

Further, and before this pricing stage of the traditional IPO process, there is the selection of an investment bank to provide the underwriting services. This phase consists of formal due diligence and regulatory findings that have the intent of promoting and making the private company appealing for investors. Then, after pricing and the subsequent IPO, the underwriter who has acquired shares at the offering price exercises the price stabilization process by trading those shares for 25 days after the IPO's effective date (Bradley et al., 2003).

In a reverse merger with a SPAC, instead of the private company promoting itself to raise interest for the subscription of shares with the initial public offering, in this case, the SPAC is the one investigating and seeking targets (private operating companies). Before this stage, SPACs are incorporated as private companies with private capital from the "sponsors" (founders) (Lakicevic et al., 2014). Then, the SPAC is taken public through a traditional IPO. In this stage, funds to be used in the target acquisition are raised, allocated to an escrow account, and then invested in risk-free assets (Jenkinson & Sousa, 2011). These funds can be kept locked for up to 2 years which is usually the limit for the SPAC management team to find a privately held firm to merge. In case a target is found, and terms agreed upon, the market is "heard" to confirm the valuation of the newly merged

companies, and additional funds are often raised to complete the deal. This additional funding stage is known as PIPE (Private investment in public entity). After PIPE agreements are closed, the final merger terms are negotiated with the target, and the agreement is signed.

To conclude the process of a SPAC-merger, a meeting for the investors (SPAC shareholders) is scheduled to vote on the deal, which can be concluded in one of three ways: 1. Approval and investment of the raised capital into the new entity; 2. Approval but receiving the invested funds before the acquisition; 3. Rejection and receive the invested capital back, the latter leading to a restart of the whole process. Considering a successful approval, the merger is completed with the invested capital from the SPAC shareholders who decided to invest their initial funds into the ultimate company, alongside the PIPE proceeds. Following this conclusion, the new entity would trade in the form of a public company, while the SPAC itself ceased to be an individual entity (Dimitrova 2017).

Apart from the lower dependence on market conditions, the main advantages of SPAC-mergers in comparison with the predominant approach to list companies in public exchanges are the founders' retention of greater ownership of the newly listed company, the faster process, lower economic risk, and lower fees.

Firstly, as the deal is made between two companies, more flexibility exists regarding ownership of the company taken public. This way, the initial owners of the target company can negotiate a major stake in the listed company, or conversely, the merger can be seen as an exit opportunity (Cumming et.al, 2014).

Secondly, the SPAC merger tends to be faster than the traditional IPO. A SPAC has the rule (Securities Act Rule 419) of finding a target to merge in a maximum of 18 months, with 24 months to complete the deal. Further, the target benefits from the fact that the SPAC is already a publicly listed company, saving the firm anywhere between 2 to 12 months (Floros and Sapp, 2011) in comparison to a traditional IPO. A rapid deal period also benefits SPAC investors as it decreases the probability of macroeconomic changes between the merger agreement and its consummation (lower economic risk).

Finally, in a merger with a SPAC, the underwriter fees tend to be lower as it does not need to promote the deal to investors on "roadshows". Further, from the target

perspective, it must only deal with the fees from the merger itself and not from the prior SPAC IPO.

On the other hand, SPACs also present some cons relatively to traditional IPOs, such as regulatory instability, possible dilution of shares, the reliance only on the management team's reputation to find a successful deal, or lower disclosure from the private company taken public.

First of all, as SPAC mergers have surged in recent years in frequency and deal value, the regulatory body (SEC) found the need to update rules and amendments governing SPACs. In the opposite way to traditional IPOs with well-established laws, the Securities Exchange Commission (SEC) is actively passing regulatory enhancements on SPACs to expand the underwriter liability in a SPAC deal and improve information disclosures on the “sponsors” experience, dilution of shares, or stakeholders’ compensation.

Additionally, the dilution of shares which is also seen as a point of improvement by the SEC, is a disadvantage against traditional IPOs, as between the SPAC IPO and the SPAC merger, additional capital may be raised. As funds in the SPAC trust aren't often enough to complete the merger, additional funds are raised from either debt financing or through a selected group of investors (PIPE) (Floros and Sapp, 2011). This does not affect traditional IPO investors, as they are only able to invest after the deal is done.

Lastly, the reliance on a SPAC management team to find a target makes the early investment in a SPAC much riskier than in a traditional IPO. As the SPAC investor does not know the target to be acquired, what financial characteristics that target would have, or how the deal is going to be priced and structured, this is a clear disadvantage compared to a traditional IPO. Further, and linking to the lower levels of information disclosure from the target which raises information asymmetry between the investors and SPAC management team (Vulanovic, 2017), the reliance on experience and past success of the “sponsors” is the sole reason to invest in a SPAC prior to merger.

From the pros and cons mentioned above, it can be concluded that a SPAC is not ideal to take companies public in comparison to traditional IPOs. As such, this thesis, in the following sections, aims to study the characteristics, deal drivers, and performance of both approaches to taking companies public. To assess this, in the first two sections, SPAC mergers and traditional IPOs' financial characteristics are compared and analyzed to understand if any of them have an influence on these companies when choosing a SPAC merger to go public. The second half of the results is developed around the returns and what drives them. These studies are developed taking into account the differences between expansionary and recession periods which is our main improvement to the SPACs literature.

Data and Methodology Outlook

The procedure undergone in this paper follows a sequence of 4 stages. The first stage includes the examination and comparison of financial indicators as well as in which market conditions both traditional IPOs and SPAC mergers tend to occur. In the second stage, the influence of the variables, studied in the first stage, is evaluated on the likelihood of a company going public through the traditional way versus through a SPAC. For this stage, SPAC-merged companies are matched with the most similar companies that went public via traditional IPOs. The matched sample, in the third stage, is evaluated by its performance in the short- and long-run. Finally, in the fourth stage, this matched sample is regressed on the 5-factor Fama/French model for a better understanding of the performance drivers. In every stage, besides the whole sample, each analysis is examined by segregating economic expansion and recession periods.

The population of SPAC mergers was analyzed from 2003 until the end of 2020. For our analysis, regarding the impact of financial crises on companies going public, were defined expansion and recession periods based on the "US Business Cycle Expansions and Contractions" database from the National Bureau of Economic Research (NBER).

The sample of SPAC-merged companies considered belongs to three Unites States' exchanges, namely public companies traded on the American Stock Exchange (AMEX), New York Stock Exchange (NYSE), and National Association of Securities Dealers Automated Quotations (NASDAQ). Based on these exchanges, two datasets were constructed, one of SPAC deals and another of traditional IPOs.

The SPAC-mergers database

The SPAC-mergers database was constructed from companies' filings in the SEC repository, from its internal database, the Electronic Data Gathering, Analysis, and Retrieval (EDGAR). From the sample gathered on SPACs (from 2003 to 2020), were only considered companies listed in the United States upon merger. As there are no complete nor publicly available datasets for the records of SPAC activity, the data collection was mainly manual and conducted based on the public issues on the SEC archives.

The dataset construction for the SPAC mergers followed two sources of information. First, from previous studies, SPAC IPOs were gathered and then looked up to check for mergers. Further, from these studies, SPAC mergers were also collected and validated. The second source of deals was the EDGAR database itself.

The main studies from which SPAC IPOs and SPAC-merged companies were collected were the "Sample of completed acquisitions by a SPAC acquirer" in Table 1 from "Perverse incentives of special purpose acquisition companies, the "poor man's private equity funds" (Dimitrova, 2017), the Gritstone Asset Management database, used as a source by Ghang et. al (2021), and other publicly available public records such as "SPAC data lists" [1], "SPAC Analytics" [2], and De-SPAC Exchange-Traded Fund (ETF) holdings [3]. Besides the aforementioned sources, the EDGAR filings repository was itself a source of data through searches of key filings mentioned such as "Blank Check" and "SPAC", the industry groups "Pooled Investment Fund" and "Investing", and a SIC search for "Blank Check Companies" (SIC 6770) [4].

The research in the EDGAR platform consisted of confirming primarily the SPAC IPO through the 424B4 form containing information about the IPO itself. Although it is less frequent, this information can be provided through forms 424B2 – form including information on new securities being offered; 424B3 – form displaying significant information updated from 424B2; or even S-1 - form providing elementary information on the financial and business regarding a particular security offering.

After the SPAC IPO confirmation, the 8-K forms – general forms employed to provide significant information to shareholders – are analyzed. There are two key 8-K forms for the data collection, one from which the announcement of a business or merger agreement with the target company is identified, and another afterward with the insights on the

completion of the agreement. The information concerning the merger conclusion can also be found on form 425 – form declaring details on merger or acquisition transactions. In these last forms (8-K and 425) business arrangement elements such as the name of the born public company, the listing date, and the trading ticker are collected.

From the dataset assembled, mergers were excluded in two specific circumstances, one in which the listing date was after 31.12.2020, and the second being when the public company trades on over-the-counter (OTC) markets. The sample gathered on completed SPAC mergers comprises a total of 156 confirmed deals, these being detailed in Table 1.

The traditional IPO database

The traditional IPOs were gathered from Compustat – North America by searching the entire database filtering for the variable “IPODATE” from January 2003 to December 2020. From this dataset, only companies listed on AMEX, NASDAQ, and NYSE were considered. As the source for the financial variables on these companies was Refinitiv Eikon Datastream, the IPOs were identified in this database through the ISIN code (also present on CRSP). The sample on traditional IPOs totaled 1438 companies, detailed in Table 1.

Table 1 – SPAC mergers and Traditional IPOs sample overview.

Industry (NAICS)	SPAC-Mergers		Traditional IPOs	
	Frequency	Percentage	Frequency	Percentage
Agriculture, Forestry, Fishing and Hunting	-	-	2	0%
Mining	9	6%	63	4%
Utilities	2	1%	20	1%
Construction	2	1%	3	0%
Manufacturing	40	26%	647	45%
Wholesale Trade	7	4%	24	2%
Retail Trade	11	7%	53	4%
Transportation and Warehousing	4	3%	59	4%
Information	24	15%	279	19%
Finance and Insurance	15	10%	76	5%
Real Estate Rental and Leasing	5	3%	45	3%
Professional, Scientific, and Technical Services	13	8%	55	4%
Management of Companies and Enterprises	3	2%	-	-
Administrative and Support and Waste Management and Remediation Services	8	5%	20	1%
Educational Services	1	1%	19	1%
Health Care and Social Assistance	1	1%	24	2%
Arts, Entertainment, and Recreation	5	3%	9	1%
Accommodation and Food Services	4	3%	31	2%
Other Services (except Public Administration)	1	1%	1	0%
Nonclassifiable Establishments	1	1%	8	1%
Total	156		1438	

In this table SPAC-mergers and traditional IPOs of companies going public from 2003 to 2020 are detailed by industry (NAICS).

An overview comparison between SPAC-mergers and Traditional IPOs

The first of four stages in the results section are the examination and comparison between the samples gathered on SPAC mergers and IPOs. To compare them, financial indicators were collected from the end of the quarter after going public. The variables to describe the companies were based on the assumption that companies going public via SPACs tend to lack on favorable financial indicators when compared to traditional IPOs. Thus, to represent a company, variables representing liquidity, leverage, growth opportunities, profitability, and size were chosen. The source for these variables was the Refinitiv Eikon Datastream. Besides the firm-specific variables between the two datasets, market-specific indicators were also gathered to understand under which economic conditions one and another tend to go public. The financial environment indicators chosen were *Business Investment and Sentiment*, *Cost of Debt*, the *Consumer Price Index*, *Market Volatility*, and U.S. *Net exports*. The values for these indicators were gathered from the Federal Reserve Economic Data (Fred) database.

Table 2 - Variables – Definitions

Firm – Specific Variable	Definition	Unit
<i>Current Ratio (Liquidity)</i>	Current Assets divided by Current Liabilities	Percentage (%)
<i>Debt Ratio (Leverage)</i>	Total liabilities divided by total assets	Percentage (%)
<i>Market-to-Book Ratio (Growth Opportunities)</i>	Market Capitalization divided by Net Book Value	Percentage (%)
<i>Return on Assets (Profitability)</i>	Net income divided by total assets	Percentage (%)
<i>Size</i>	Total Assets	Million USD
Market – Specific Variable		
<i>Business Investment And Sentiment</i>	Equity Market Volatility Tracker: Macroeconomic News and Outlook (End of the quarter)	Percentage (%)
<i>Cost of Debt</i>	3 months average lagged Market Yield on U.S. Treasury Securities at 10-Year Constant Maturity	Percentage (%)
<i>Consumer Price Index</i>	Consumer Price Index growth rate: Total All Items for the United States (End of the quarter)	Percentage (%)
<i>Market Volatility</i>	3 months average lagged volatility - CBOE Volatility Index: VIX	Percentage (%)
<i>Net Exports</i>	U.S. Net Exports of Goods and Services (End of the quarter)	Billion USD

In this table firm- and market-specific variables are defined.

Firm-Specific Variables

The firm-specific variables were chosen as a whole, with the intent of describing a company as financially poor or strong. The first variable chosen was the *current ratio* which describes the liquidity that a company holds to fulfill its operational obligations. Although both approaches to raising capital would improve the liquidity of a company, it is expected that SPAC-mergers still present lower levels than traditional IPOs. This would be the case since poor liquidity can lead to the seeking to raise capital through a faster approach (SPAC).

The second variable, the *debt ratio*, represents the leverage of a company (borrowed capital). Companies with high leverage wouldn't be appealing to traditional IPO investors as that would constrain future growth opportunities with debt expenses and the difficulty of raising additional borrowed capital. Also, it is expected that SPAC-merged companies present more leverage as SPACs can merge using borrowed money when the trust funds are not enough to complete the merger (which does not apply to a traditional IPO).

The *market-to-book ratio* is the third variable chosen and it aims to represent the expectations of the market for the growth opportunities of a company. It is predicted that a company with a strong financial performance would raise capital through a traditional IPO, as it would be confident at its financial arguments to attract investors. This way, it is anticipated that SPAC-merged companies would show lower growth opportunity levels as they tend to choose this approach of going public when their future growth is less promising or uncertain.

The fourth, *return on assets*, represents the profitability of a company. As mentioned in the literature review, it is stated that SPAC mergers tend to attract poorer-performing companies in terms of returns. This performance is usually linked to the capacity of generating profits, so it is likely that if SPAC mergers present lower returns, they would also present inferior profitability.

Finally, the variable *firm size* is expected to impact the choice of the approach to going public. Smaller companies would face the same fixed costs as a bigger company in a traditional IPO, as listing, auditing or legal fees. These fees are not applicable in a SPAC merger as the SPAC is already public, so it is predicted that smaller companies would choose this means of going public. Further, smaller companies would have more

difficulty in promoting themselves in a traditional IPO, as well as in finding an underwriter to complete this process due to their *size*.

Market-Specific Variables

The market-specific variables have the objective of describing the economic environment in which the companies sampled went public.

To achieve that, the first variable chosen was *business investment and sentiment* based on a market volatility tracker through the analysis of macroeconomic news and outlook. This tracker moves with the realized volatility of returns of the S&P500 index, our benchmark. Another variable chosen, *market volatility* is relatively connected with the first as it represents the implied volatility based on market expectations, and retrieved from options on the same index (S&P500 index)

From our literature analysis, traditional IPOs tend to go public more frequently during economic expansion periods as they are dependent on the market. On the opposite end, as SPACs already hold liquidity, SPAC mergers are less constrained by market conditions. This makes it predictable that SPAC mergers tend to go public when these two indicators are low relative to traditional IPOs. The two variables were chosen due to their ability to represent historical volatility (*business investment and sentiment*), and forward-looking implied volatility (*market volatility*). It is expected, for example that during periods of economic instability, such as financial crisis, *market volatility* would increase at a faster rate than *business investment and sentiment*.

To evaluate how the national *cost of debt* impacts the approach to going public, for this study, the market yield on 10-year U.S. Treasury securities was selected. This variable represents the interest rates at which the government is borrowing money, and it is directly linked to macroeconomic events. Before financial crises, this yield tends to increase with the intention of slowing down the economy due to the abundance of demand (often linked to inflation) to borrow money. Then, in case of recession, in which demand decreases, this yield decreases so that the market recovers. Regarding the two approaches to going public, it is expected that traditional IPOs increase (in relation to traditional IPOs) in periods before financial crises, taking advantage of investors' overconfidence in the market. In relation to traditional IPOs, SPAC-mergers are expected to increase in frequency when these rates are dropping, and it is harder to get capital (usually during financial crisis periods).

To examine whether the change in price levels affects the decision regarding the way to get listed, the *consumer price index* was analyzed. This indicator tends to be positive during economic expansion cycles as demand grows faster than supply, with disposable income increasing and suppliers catching up on the consumers' needs. On the other hand, it tends to go negative in recessions since demand decreases faster than supply. When applied to the choice of method for going public, it is expected that SPAC-merged companies are relatively more in demand when the changes in prices are negative, since it usually represents a recession period in which investors are more cautious and it is harder to get them on board through traditional IPOs.

The final variable selected for this analysis was the national *net exports*. This indicator completed our analysis of market conditions as it provides information about negative economic periods. During these periods the U.S. Dollar decreased, making it cheaper for consumers from other financial systems to afford products from the U.S., therefore making an increase in *net exports* observable during recessions. With this stated, a higher frequency of SPAC mergers with a positive correlation to *net exports* would be expected.

Summary Statistics for Firm- and Market-specific variables

In Table 3 the summary statistics are presented for SPAC mergers and traditional IPOs. In this analysis t-tests and Wilcoxon–Mann–Whitney tests were produced to check for significant differences when comparing the two approaches to raising capital.

Table 3 - Summary Statistics Comparison

Table 3.1. Summary Statistics Comparison – Whole Period

Variable	Whole Period					
	IPO		SPAC-Merger		Difference Significance	
Measure	Mean	Median	Mean	Median	Dif. Means	Dif. Medians
<i>Current Ratio</i>	5,95	2,76	4,99	1,65	0,95	1,12***
<i>Debt Ratio</i>	0,38	0,34	0,62	0,56	-0,23***	-0,22***
<i>Market-to-Book Ratio</i>	5,27	3,57	0,89	1,49	4,39***	2,08***
<i>Return on Assets</i>	-0,17	-0,04	-0,28	-0,06	0,12*	0,02***
<i>Size</i>	908 809	256 506	883 550	376 095	25 259	-119 589**
<i>Business Investment And Sentiment</i>	0,39	0,31	0,51	0,34	-0,12***	-0,04***
<i>Cost of Debt</i>	2,87	2,66	2,09	2,01	0,78***	0,66***
<i>Consumer Price Index</i>	0,19	0,2	0,17	0,18	0,02	0,03
<i>Market Volatility</i>	0,01	0,01	0,01	0,01	-0,00***	-0,00**
<i>Net Exports</i>	0,02	0,01	0,05	0,04	-0,02***	-0,04***
N	1438		156		1594	

Table 3.2. Summary Statistics Comparison – Non-Crisis Periods

Variable	Non-Crisis Period *					
Type	IPO		SPAC-Merger		Difference Significance	
Measure	Mean	Median	Mean	Median	Dif. Means	Dif. Medians
<i>Current Ratio</i>	5,94	2,94	1,04	1,65	4,9	1,29***
<i>Debt Ratio</i>	0,39	0,33	0,61	0,52	-0,23***	-0,19***
<i>Market-to-Book Ratio</i>	5,37	3,62	1,53	1,53	3,84***	2,09***
<i>Return on Assets</i>	-0,17	-0,04	-0,3	-0,06	0,13*	0,02**
<i>Size</i>	895 968	246 802	864 040	376 127	31 928	-129 325**
<i>Business Investment And Sentiment</i>	0,39	0,31	0,52	0,34	-0,13***	-0,04***
<i>Cost of Debt</i>	2,87	2,64	2,09	2,05	0,77***	0,59***
<i>Consumer Price Index</i>	0,19	0,2	0,15	0,12	0,03*	0,08
<i>Market Volatility</i>	0,01	0,01	0,01	0,01	0,00	0,00
<i>Net Exports</i>	0,02	0,01	0,05	0,04	-0,03***	-0,03***
N	1383		139		1522	

Table 3.3. Summary Statistics Comparison – Crisis Periods

Variable	Crisis Period *					
Type	IPO		SPAC-Merger		Difference Significance	
Measure	Mean	Median	Mean	Median	Dif. Means	Dif. Medians
<i>Current Ratio</i>	6,22	3,33	2,17	1,51	4,05***	1,82***
<i>Debt Ratio</i>	0,36	0,25	0,66	0,73	-0,30***	-0,48***
<i>Market-to-Book Ratio</i>	2,69	2,6	-0,39	1,46	3,07*	1,13**
<i>Return on Assets</i>	-0,1	0,01	-0,14	-0,04	0,05	0,05
<i>Size</i>	1 231 701	269 443	1 043 074	376 062	188 627	-106 619*
<i>Business Investment And Sentiment</i>	0,35	0,29	0,43	0,53	-0,07**	-0,23**
<i>Cost of Debt</i>	2,96	3,55	2,06	1,59	0,90***	1,96***
<i>Consumer Price Index</i>	0,31	0,39	0,29	0,39	0,02	0,00
<i>Market Volatility</i>	0,02	0,01	0,03	0,03	-0,01***	-0,01***
<i>Net Exports</i>	-0,01	0,01	0,00	0,02	-0,01	-0,01
N	55		17		72	

Table 3 presents sample summary statistics of firm- and market-specific variables, comparing traditional IPOs and SPAC-mergers executed in the period 01-2004 to 12-2020. The significance of differences in means was assessed by t-tests, and medians by Wilcoxon–Mann–Whitney tests. All variables have been Winsorized at the 2% level. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

From Table 3, firm- and market-specific indicators were examined. The firm-specific characteristics summary shows that SPAC-merged firms tend to present lower quality financial indicators when taken public, as expected. Considering the whole sample, the measures for leverage, growth opportunities, and current profitability are significantly

better in firms following traditional IPOs. This tendency is also present during non-crisis periods. During crisis periods, leverage, growth opportunities, and liquidity are significantly better indicators on the traditional IPOs side.

Leverage and growth opportunities are the indicators with significant differences present in every period of analysis. This first variable indicates, as predicted, that companies choosing SPACs to get listed tend to be less attractive for investors due to their higher levels of borrowed capital which implies higher financing expenses, costly raises of additional financing, or even limitations on investments. The analysis of the second variable indicates that investors expect significantly lower growth opportunities for companies that chose a SPAC merger, suggesting poorer quality on the balance sheet side, or lower performance from their operating activity.

In a comparison between crisis and non-crisis periods, besides the above-mentioned variables, leverage, growth opportunities, and current ratio are significantly higher for traditional IPOs in the crisis periods. This indicates that during recession periods companies with lower operating liquidity may not be appealing to investors, and so, they tend to choose a SPAC to merge. In the differences between the economic periods, during expansions, companies going public via traditional IPOs tend to present significantly higher returns on their assets. This may suggest that investors look at short-term profitability as a decisive indicator when looking at an IPO to invest in. Thus, companies with lower profitability tend to go for a SPAC.

Table 3 also presents significant differences regarding market-specific variables. The analysis of these indicators shows that SPAC-merged firms tend to go public during periods of worst market conditions. Considering the whole sample, the measures for the *cost of debt*, *market volatility*, and *net exports* are significantly better when traditional IPOs go public. This tendency of enhanced market conditions during the traditional IPOs is also present during crisis and non-crisis periods, individually.

The choice to go public under significantly weaker financial conditions through SPAC mergers is explained by the faster process (which is important in periods of uncertainty), the readily available liquidity, the savings on expenses to get listed, and the lack of appeal from these companies to investors.

Between the macroeconomic periods *business investment and sentiment*, and the *cost of debt*, continue to be significantly different. However, it is observed that the difference in average *market volatility* is only significant during the crisis periods analysis. This indicates that during crisis periods, companies going public via traditional IPOs tend to be relatively more cautious about the time to go public than during non-crisis periods. On the other hand, *net exports* are only significantly different during non-crisis periods, indicating that investors may be interested in the relative strength of the dollar. During crisis periods, the difference is not significant as investors probably turn to more broad indicators to rationalize their decision, such as *market volatility*.

The likelihood of a SPAC-merger

This section follows what was developed in section 1 on the sample overview, by analyzing which of the variables presented influence the choice of taking a company public through a SPAC merger.

To examine the impact of the firm and market variables, a multicollinearity test was first developed to understand whether they are statistically acceptable for a regression model. The first procedure for this test was to run a correlation matrix, presented in Table 4, and check for correlation between pairs of variables. In this test, every pair of variables obtained a correlation below 0.7, which was the assumed threshold for this study to indicate a strong linear relationship between two of the variables. For the second procedure, a Variance Inflation Factor (VIF) test was performed, presented in Table 5. This procedure aimed to validate whether a strong relationship exists between three or more variables even if there is no relationship pairwise. From the results of the VIF, every variable is below the threshold considered for the study, 5.0, which indicates no strong linear relationship between the variables chosen.

Table 4 - Correlation Matrix

Variables	Current Ratio	Debt Ratio	Market-to-Book Ratio	Return on Assets	Size	Business Investment And Sentiment	Cost of Debt	Consumer Price Index	Market Volatility	Net Exports
Current Ratio	1									
Debt Ratio	-0,45	1								
Market-to-Book Ratio	0,01	-0,10	1							
Return on Assets	-0,09	-0,19	0,04	1						
Size	-0,16	0,17	-0,01	0,15	1					
Business Investment And Sentiment	0,05	-0,01	0,03	-0,11	-0,03	1				
Cost of Debt	-0,18	0,01	-0,01	0,14	0,05	-0,15	1			
Consumer Price Index	-0,06	0,01	-0,03	0,00	0,01	0,08	0,24	1		
Market Volatility	-0,03	0,03	-0,06	0,02	0,05	0,08	-0,11	0,08	1	
Net Exports	0,07	-0,03	0,00	-0,01	-0,02	-0,25	-0,20	0,21	0,06	1

Table 4 presents the correlation between pairs of variables gathered on traditional IPOs and SPAC-mergers from that went public between 01-2004 to 12-2020.

Table 5 - Variance Inflation Factor (VIF) Results

Variable	R2	VIF
Current Ratio	0,07	1,08
Debt Ratio	0,29	1,42
Market-to-Book Ratio	0,03	1,03
Return on Assets	0,27	1,37
Size	0,14	1,17
Business Investment And Sentiment	0,04	1,04
Cost of Debt	0,76	4,22
Consumer Price Index	0,22	1,29
Market Volatility	0,32	1,47
Net Exports	0,19	1,23

Table 5 presents the results for multicollinear relationship between variables collected on traditional IPOs and SPAC-mergers from that went public between 01-2004 to 12-2020.

After the validation of the independence of variables, a logistic regression was developed to assess the likelihood of a company going public through a SPAC merger. The regression is binary and equals 1 for a SPAC merger, and 0 for a traditional IPO.

The logistic equation is as follows:

$$P(\text{SPAC merger})_i = 1 / (1 + e^{(\alpha + \beta_1 \text{Liquidity } i + \beta_2 \text{Leverage } i + \beta_3 \text{Growth Opportunities } i + \beta_4 \text{Profitability } i + \beta_5 \text{Size } i + \beta_6 \text{Business and Investment Sentiment } i + \beta_7 \text{Cost of Debt } i + \beta_8 \text{Consumer Price Index } i + \beta_9 \text{Market Volatility } i + \beta_{10} \text{Net Exports } + \sum_{11}^{26} \beta_j \text{Year fixed effects } i, j + \sum_{27}^{29} \beta_k \text{Industry Fixed Effects } i, k + u_i))$$

In the equation, i stands for an individual firm, and the variables are defined in Table 2. The equation accounts for year-fixed effects, by considering the year in which a company went public, to control for any time-specific circumstance that may not be observable and that influences the likelihood of a company getting listed via SPAC merger. Further, the equation also considers industry fixed effects and classifies companies as being part of the two main categories presented in Table 1, *Manufacturing* and *Information*, with the remainder of the industries being classified under the “Other” industry category (reference).

For the analysis of the regression model, besides the whole sample gathered and presented in Table 1, a set of similar companies was gathered. To achieve that, groups of companies were combined through propensity score matching without replacement, based on the predictors *size*, *industry*, and the *year* of the deal. Both sets (matched and non-matched samples) were matched for three analyses: the whole sample, non-crisis periods, and crisis periods. Results are presented in Table 6 in form of average marginal effects – the increase in one unit in the variable X leads to the increase/decrease of the likelihood of going public through a SPAC merger by Y.

The results show that regarding the firm-specific variables, companies with more leverage and lower growth opportunities tend to go public via SPAC mergers. Both variables are significant in the matched and non-matched samples.

In Table 3 it was observed that, in general, SPAC-merged companies and companies going public through traditional IPOs face significant differences regarding their leverage and growth opportunities. Considering that, these results from the likelihood analysis follow in line with the overview results, as since SPAC-merged companies are relatively more leveraged, they would be more sensitive to *cost of debt*. This is described in Table 6 with a positive correlation between *debt ratio* and the likelihood of getting listed via SPAC.

The indicator for growth opportunities follows the same rationale, as since the difference between both approaches is significant, investors are predictably responsive to this variable when investing in traditional IPOs. This way, the analysis of Table 6 demonstrates that as the *market-to-book ratio* increases, the likelihood of a SPAC merger tends to decrease. This statement is supported by the significance of the matched sample only during crisis periods.

In both cases, for leverage and growth opportunities, the impact of these indicators on the choice for a SPAC merger increases during crisis periods. During these periods the demand to invest in new companies is considerably lower, and so as expected, only companies with higher quality financial indicators tend to choose the traditional IPO to get on a stock exchange.

On the market-specific variables, it is observable that *Business Investment and Sentiment* is present with significance in both the whole and the matched sample (during non-crisis periods). This way, when compared to traditional IPOs, SPAC-merged firms tend to go public with more frequency during periods with higher *Business Investment and Sentiment* (positive relation).

When comparing economic periods individually based on the matched samples, during expansion periods, it is verified that *Consumer Price Index* affects significantly and negatively the likelihood of a company going public through a SPAC. This probably means that when prices are rising (which implies the economy is in an expansion period), companies prefer to go public through a traditional IPO and take advantage of the investors' confidence during this period.

Table 6 - Likelihood of a SPAC merger Results

Sample Sub-Sample Variables	Non-Matched Sample			Matched Sample		
	Whole Sample	Non-Crisis Sample	Crisis Sample	Whole Sample	Non-Crisis Sample	Crisis Sample
<i>Current Ratio</i>	0.0005 (0.0009)	0.0006 (0.0008)	-0.0135 (0.0167)	0.0020 (0.0030)	0.0023 (0.0031)	0.0137 (0.0277)
<i>Debt Ratio</i>	0.1007*** (0.0217)	0.0918*** (0.0215)	0.2226 (0.1844)	0.2874*** (0.0816)	0.2248*** (0.0842)	0.7679** (0.3029)
<i>Market-to-Book ratio</i>	-0.0018*** (0.0005)	-0.0017*** (0.0006)	-0.0224* (0.0124)	-0.0033 (0.0024)	-0.0031 (0.0023)	-0.0684*** (0.0245)
<i>Return on Assets</i>	-0.0021 (0.0151)	-0.0022 (0.0146)	0.0487 (0.1483)	-0.0079 (0.0718)	-0.0097 (0.0688)	0.0905 (0.2984)
<i>Log (Size)</i>	0.0018 (0.0117)	0.0004 (0.0119)	-0.0200 (0.0689)	- -	- -	- -
<i>Business Investment And Sentiment</i>	0.1031** (0.0425)	0.1006** (0.0416)	0.0635 (0.6458)	0.0971 (0.0831)	0.1465* (0.0887)	-1.2183 (1.0214)
<i>Cost of debt</i>	0.0065 (0.0279)	0.0101 (0.0297)	-0.1701 (0.1593)	-0.0006 (0.0282)	0.0033 (0.0305)	-0.1323 (0.1429)
<i>Consumer Price Index</i>	-0.0209 (0.0275)	-0.0181 (0.0288)	-0.3312 (0.2676)	-0.1560 (0.1015)	-0.2076* (0.1097)	-0.0119 (0.3969)
<i>Market Volatility</i>	-1.264 (1.193)	-1.849 (1.605)	15.1751 (9.5280)	-0.2938 (3.4713)	-6.1557 (5.6154)	-1.9249 (12.9874)
<i>Net Exports</i>	0.0048 (0.0917)	0.0038 (0.1016)	2.1693* (1.1575)	-0.0311 (0.3184)	0.0729 (0.3438)	6.8619 (4.5779)
N	1594	1522	72	312	278	34
N (SPAC-Mergers)	156	139	17	156	139	17
N (Traditional IPOs)	1438	1383	55	156	139	17
Pseudo-R ²	0,25	0,25	0,30	0,06	0,06	0,38
Prob > Chi ²	0,00	0,00	0,04	0,00	0,01	0,03

Table 6 presents the average marginal effects of logistic regressions. The logistic regressions from non-matched samples incorporate year and industry fixed effects. All variables are defined in Table 2 and standard errors are provided in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Buy and Hold Abnormal Returns (BHARs)

Section 3 of the results presents a comparative analysis of companies going public between the two approaches studied in this paper. After more theoretical studies in sections 1 and 2, in the second half of the results, the study focuses on delivering results that may be useful for the everyday investor.

The BHAR analysis is a comparison between the sample of companies going public and a benchmark under analysis, and was constructed based on the following equation:

$$BHAR_{i,T} = \prod_{t=1}^T (1 + r_{i,t}) - \prod_{t=1}^T (1 + r_{b,t})$$

In the equation, i stands for a company that went public, $r_{i,t}$ stands for the return of that company, and $r_{b,t}$ is the return for the benchmark selected.

For this section, the focal point of the study is the matched sample, as the aim is to analyze returns between similar companies. To measure the companies' performance, three benchmarks were selected. First, from CRSP - Index File on S&P500, the returns for the *Market* benchmark portfolio were collected. Additionally, from the Kenneth French website¹, the daily returns from the "49 Industry Portfolios" (*Industry*), and the "100 Portfolios Formed on Size and Book-to-Market" (*Size and BtM*) were retrieved. The BHAR results are presented in Table 7. For the *Industry* benchmark, the NAICS codes were converted to SIC codes² and then matched with the respective code of the 49 portfolios. For the benchmark *Size and Btm*, an equally weighted score between the variables *size* and *market-to-book ratio* was calculated, and then matched with the respective score from one of the 100 portfolios.

Table 7 - Buy and Hold Abnormal Returns (BHARs) Results

Table 7.1. BHARs Results – Whole Sample Period

Sample Period	Whole sample					
	IPO BHAR		SPAC BHAR		Difference Significance	
BHAR Measure	Mean	Median	Mean	Median	Dif. Means	Dif. Medians
1day						
<i>Market</i>	0,01	0,01	-0,01	0,00	0,03***	0,01**
<i>Industry</i>	0,01	0,01	-0,01	0,00	0,02***	0,01**
<i>Size & BtM</i>	0,01	0,01	-0,02	0,00	0,03***	0,01**
3day						
<i>Market</i>	0,02	0,00	-0,01	-0,02	0,03*	0,02***
<i>Industry</i>	0,02	0,00	-0,01	-0,02	0,03*	0,02***
<i>Size & BtM</i>	0,01	0,00	-0,02	0,00	0,02***	0,01
126day						
<i>Market</i>	0,07	-0,09	-0,19	-0,19	0,27***	0,10***
<i>Industry</i>	-0,02	-0,16	-0,28	-0,29	0,26***	0,13***
<i>Size & BtM</i>	-0,15	-0,09	-0,17	-0,12	0,02	0,03
252day						
<i>Market</i>	0,03	-0,18	-0,32	-0,38	0,34***	0,21***
<i>Industry</i>	-0,10	-0,30	-0,45	-0,49	0,35***	0,19***
<i>Size & BtM</i>	-0,27	-0,22	-0,26	-0,24	-0,01	0,01

¹ <http://mba.tuck.dartmouth.edu/>

² <https://www.naics.com/>

Table 7.2. BHARs Results – Non-Crisis Periods

Sample Period	Non-Crisis Sample					
BHAR Measure	IPO BHAR		SPAC BHAR		Difference Significance	
	Mean	Median	Mean	Median	Dif. Means	Dif. Medians
1day						
<i>Market</i>	0,01	0,01	-0,01	0,00	0,02**	0,01
<i>Industry</i>	0,01	0,01	-0,01	0,00	0,03***	0,01*
<i>Size & BtM</i>	0,02	0,01	-0,01	0,00	0,03***	0,01*
3day						
<i>Market</i>	0,02	-0,01	0,00	-0,01	0,01	0,01**
<i>Industry</i>	0,01	-0,01	0,00	-0,02	0,01	0,01**
<i>Size & BtM</i>	0,01	0,00	-0,01	-0,01	0,02**	0,00
126day						
<i>Market</i>	0,07	-0,10	-0,20	-0,18	0,28***	0,08***
<i>Industry</i>	-0,01	-0,18	-0,28	-0,29	0,26***	0,11***
<i>Size & BtM</i>	-0,16	-0,09	-0,16	-0,12	0,01	0,03
252day						
<i>Market</i>	0,00	-0,23	-0,33	-0,39	0,33***	0,16***
<i>Industry</i>	-0,10	-0,30	-0,41	-0,47	0,31***	0,17***
<i>Size & BtM</i>	-0,23	-0,19	-0,23	-0,22	0,00	0,03

Table 7.3. BHARs Results –Crisis Periods

Sample Period	Crisis Sample					
BHAR Measure	IPO BHAR		SPAC BHAR		Difference Significance	
	Mean	Median	Mean	Median	Dif. Means	Dif. Medians
1day						
<i>Market</i>	0,01	0,00	-0,04	-0,01	0,05*	0,01*
<i>Industry</i>	0,01	0,01	-0,03	0,00	0,04*	0,01*
<i>Size & BtM</i>	0,01	0,01	-0,04	-0,01	0,05*	0,02**
3day						
<i>Market</i>	0,02	0,04	-0,09	-0,03	0,11**	0,07**
<i>Industry</i>	0,02	0,03	-0,10	-0,04	0,12**	0,07**
<i>Size & BtM</i>	0,01	0,00	-0,04	0,00	0,06**	0,01*
126day						
<i>Market</i>	-0,01	-0,05	-0,14	-0,21	0,13	0,16
<i>Industry</i>	-0,07	-0,17	-0,31	-0,32	0,23	0,15*
<i>Size & BtM</i>	-0,04	-0,07	-0,22	-0,19	0,18*	0,11*
252day						
<i>Market</i>	-0,17	-0,20	-0,21	-0,33	0,04	0,13
<i>Industry</i>	-0,55	-0,66	-0,82	-0,75	0,26	0,08
<i>Size & BtM</i>	-0,48	-0,45	-0,51	-0,66	0,02	0,21

Table 7 presents BHARs, comparing traditional IPOs and SPAC-mergers executed in the period 01-2004 to 12-2020. The significance of differences in means was assessed by t-tests, and medians by Wilcoxon–Mann–Whitney tests. All variables have been Winsorized at the 2% level. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

From Table 7, it can be concluded that SPAC mergers perform significantly worse than traditional IPOs, and the selected benchmarks. It is also observed that SPAC-merged companies significantly underperform traditional IPOs in expansion and recession periods, individually. Further, the difference in BHAR tends to widen as the period duration increases.

By comparing the two periods of different economic conditions, differences in performance tend to increase in the short-term, during the 1- and 3-days periods. On the other hand, the opposite is observed for the long-term performance in the 126- and 252-days periods, as the difference decreases.

The different benchmarks produce similar results in the short-term analysis. However, in the long-term, while the *Market* and *Industry* benchmarks present similar average BHAR, the *Size and Book-to-Market* one tends to show no significant differences in the BHAR calculated for the two options of raising public capital. This discrepancy in BHAR significance is probably explained by the fact that the match-making from the original sample took into account the variable *size*. Thus, the book-to-market variable of the benchmark alone is not enough to differentiate the average BHAR between companies taken public via IPOs and SPACs.

The higher short-term BHAR difference in crisis periods follows what would be predictable from lower attractive stocks to invest in, with expected inferior growth opportunities. On the other hand, the long-term performance of SPAC mergers is boosted by a rapid recovery during the 2020 economic recession, which leads to closer results to traditional IPOs.

Fama-French 5 Factor Regression

Section 4 of the results is directly connected with the stock returns of the companies that were taken public, analyzed in section 3. In this stage, the performance of the matched sample was regressed on the Fama-French five factors to understand what the drivers of performance of the companies in the analysis are.

The regression equation considered is as follows:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_i(R_{m,t} + R_{f,t}) + s_iSMB_t + h_iHML_t + r_iRMW_t + c_iCMA_t + \varepsilon_{i,t}$$

In the equation, i stands for a company that went public, and $R_{i,t}$ for its return. $R_{f,t}$ is the risk-free return, α_i represents the portfolio excess return, and $R_{m,t}$ is the market return, comprised of all the companies listed in the AMEX, NASDAQ, and NYSE.

The factors following the market excess returns in the equation stand for the difference of returns between portfolios based on several variables. SMB_t stands for the difference of returns between portfolios of small, and big companies, HML_t is for portfolios on high and low book-to-market ratios, RMW_t is for portfolios on robust and weak operating profitability, and finally, CMA_t stands for portfolios on conservative and aggressive investments. The regressions were run on the same periods as the BHAR in section 3, and the results are presented in Table 8.

Table 8 - Fama-French Five Factor Regression Results

Table 8.1 Fama-French Five Factor Regression Results – Whole Period

Sample Period	Whole Sample							
	Type	Traditional IPO				SPAC-Merger		
Period	1d	3d	126d	252d	1d	3d	126d	252d
Variables								
<i>MktRF</i>	-0.1746 (0.6480)	1.1560 (0.7251)	0.3757 (0.6171)	1.2465** (0.5835)	0.1226 (0.6365)	1.6489 (1.0902)	0.3041 (0.4093)	1.0805** (0.4139)
<i>SMB</i>	0.4526 (1.2273)	-0.5813 (1.2389)	1.6688** (0.8119)	1.9204** (0.8909)	-0.5854 (1.4872)	-0.4322 (2.1203)	0.5333 (0.6738)	0.4763 (0.6314)
<i>HML</i>	0.1653 (1.0666)	2.8812*** (1.0639)	-0.2251 (0.8667)	-2.3950** (1.0298)	1.7328 (1.2601)	-0.6321 (1.6357)	-0.0558 (0.6299)	-0.9896 (0.6721)
<i>RMW</i>	-0.0174 (1.8880)	0.3095 (1.7348)	-1.7257 (1.4751)	0.7117 (1.5036)	-0.6574 (2.3618)	1.3197 (3.2341)	-0.6102 (1.0107)	-0.4658 (0.8940)
<i>CMA</i>	-0.8631 (2.2213)	-5.5542** (2.3025)	0.6646 (2.1167)	1.2238 (2.4381)	-4.3407 (2.8063)	5.3973 (4.1520)	-0.6683 (1.6166)	0.5464 (1.6541)
Constant (α)	0.0140** (0.0070)	0.0268** (0.0119)	0.0729 (0.0712)	-0.1247 (0.1584)	-0.0168** (0.0084)	-0.0049 (0.0210)	-0.1140** (0.0532)	-0.3253*** (0.1069)
Observations	136	136	136	136	140	140	140	140
R-squared	0,00	0,11	0,16	0,14	0,02	0,03	0,03	0,14
R-Adjusted	-0,04	0,08	0,13	0,11	-0,01	-0,01	0,00	0,11

Table 8.2 Fama-French Five Factor Regression Results – Non-Crisis Periods

Sample Period	Non-Crisis Sample							
Type	Traditional IPO				SPAC-Merger			
Period	1d	3d	126d	252d	1d	3d	126d	252d
Variables								
<i>MktRF</i>	-0.4286 (0.7726)	1.6383* (0.8583)	-0.0249 (0.9097)	0.8568 (0.6999)	-1.1226 (0.9607)	2.5941* (1.4534)	-0.0328 (0.5832)	1.1622** (0.5419)
<i>SMB</i>	0.2413 (1.3286)	-0.7870 (1.3786)	2.0675* (1.1354)	3.8661*** (1.1785)	0.4779 (1.5273)	0.2224 (2.3655)	-0.2140 (0.8200)	-0.1850 (0.8794)
<i>HML</i>	0.6423 (1.1440)	3.1278*** (1.1435)	-0.2914 (1.0933)	3.4853*** (1.1273)	1.6610 (1.4490)	0.1637 (2.0673)	0.3475 (0.8031)	-1.0477 (0.7090)
<i>RMW</i>	-0.5543 (2.0342)	0.3995 (1.8983)	-1.3300 (2.0110)	1.0777 (1.6480)	-2.1401 (2.5307)	0.8927 (3.5334)	-2.7925* (1.4976)	-1.1304 (0.9736)
<i>CMA</i>	-1.7530 (2.4301)	-6.2391** (2.5196)	0.7389 (2.3392)	1.5617 (2.4900)	-4.3978 (3.1218)	3.4452 (4.7865)	0.7504 (1.6321)	1.6455 (1.5690)
Constant (α)	0.0155** (0.0075)	0.0274** (0.0131)	0.0966 (0.0801)	-0.0805 (0.1661)	-0.0124 (0.0087)	0.0063 (0.0230)	-0.0450 (0.0586)	-0.3059*** (0.1131)
Observations	125	125	125	125	123	123	123	123
R-squared	0,01	0,12	0,16	0,18	0,03	0,04	0,05	0,09
R-Adjusted	-0,03	0,09	0,12	0,14	-0,01	-0,01	0,01	0,05

Table 8.3 Fama-French Five Factor Regression Results – Crises Periods

Sample Period	Crisis Sample							
Type	Traditional IPO				SPAC-Merger			
Period	1d	3d	126d	252d	1d	3d	126d	252d
Variables								
<i>MktRF</i>	1.0547 (0.9159)	1.8660 (1.4424)	0.6528 (1.0115)	3.5859 (1.9289)	1.6051 (0.8888)	0.9644 (2.1253)	-0.9896 (1.4426)	-3.9027 (2.7691)
<i>SMB</i>	0.6497 (2.1835)	-3.9100 (2.5445)	5.8054 (6.9628)	-5.8349 (6.0741)	-13.3761** (5.2766)	-1.9460 (5.0514)	-2.7237 (7.3184)	12.1000 (7.3188)
<i>HML</i>	-5.6278* (2.6735)	-7.8085* (3.5707)	-3.4968 (3.9424)	-2.0156 (4.3509)	3.7452 (2.6125)	-1.0734 (2.5819)	4.8080 (4.6865)	6.9935 (3.9885)
<i>RMW</i>	3.8586 (3.1534)	4.4186 (2.4186)	0.5787 (3.8012)	3.8565 (3.7218)	4.8524 (6.2566)	7.5178 (10.0012)	-2.4556 (5.6546)	-3.8991 (4.6188)
<i>CMA</i>	5.8114 (5.4040)	4.5505 (5.8013)	4.4348 (9.4907)	-1.7308 (11.4990)	-9.7226 (9.7828)	0.8175 (10.8345)	-24.9659 (14.6422)	-15.7534 (19.0167)
Constant (α)	0.0155 (0.0227)	-0.0106 (0.0215)	-0.5144 (0.5125)	0.3087 (1.1446)	-0.0768* (0.0348)	-0.1076 (0.0613)	0.1885 (0.6709)	-1.0069 (0.8804)
Observations	11	11	11	11	16	16	16	16
R-squared	0,74	0,67	0,34	0,62	0,53	0,12	0,43	0,61
R-Adjusted	0,48	0,34	-0,32	0,24	0,30	-0,33	0,15	0,42

Table 8 presents a regression analysis using the Fama-French 5 Factor Model, being the dependent variable the BHARs from Table 7's analysis, comparing traditional IPOs and SPAC-mergers executed in the period 01-2004 to 12-2020. All variables have been Winsorized at the 2% level. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

From Table 8, it is observable that SPAC-mergers tend to present lower alphas than traditional IPOs. In this regression, as stated, the alphas represent the excess return of the investment in one of the approaches to going public, relative to the Fama-French 5-factor model. Thus, according to the results of BHAR presented in Table 7, Table 8 demonstrates that SPAC-mergers show negative alphas, and so they tend to underperform. The results for alphas are negative and significant for the whole period sample, on the SPAC-merger side, for the short- and long-term analysis. When comparing to the alphas from traditional IPOs and SPAC mergers, the excess returns tend to be much more negative when companies choose SPACs to go public, both in the short- and long-run study.

The results from the expansionary versus recession periods indicate that SPAC mergers underperform in both periods, individually. Further, in recession periods, the excess returns for SPAC mergers tend to be more negative in relation to expansionary periods. Additionally, although the traditional IPOs face the same decrease in stock performance, the gap between the two approaches to going public widens during recession periods.

The negative excess returns are explained by the predictors from the 5-factor model. In an overview of the whole period sample, the positive and significant coefficient for Market minus Risk-Free (MktRf) indicates that the excess returns for SPAC-merged companies are in part explained by the market returns. Following the same rationale, the positive and significant Small minus Big (SMB), and negative High minus Low (HML) of traditional IPOs, indicate that the excess returns can be explained in part due to the size of companies (companies were small), and due to the book-to-market equity value (companies presented growth opportunities).

From the analysis of the distinct sample periods, it is observable that for the expansionary periods, SPAC-merger performance continues to be significantly driven by MktRf in the short- and long run. Further, during this period it was also observed that in the short-run the performance is significantly influenced by the weak operating profitability of SPAC mergers (negative sign). In the recession sample analysis, it is concluded that in the short-term periods again, the larger size of SPAC mergers has an impact on their performance.

Summary and Conclusion

The analyses developed in this paper contribute to a better understanding of how the SPAC-merged companies are characterized, and what the drivers for their choice of a SPAC to raise capital are.

The analysis of the sample of SPAC-merged companies, despite the lower number of observations, when compared to traditional IPOs, was able to conclude that SPAC-mergers are significantly financially inferior and tend to go public during periods of weaker market-specific variables (when matched against traditional IPOs). Further, from the analysis of the likelihood of a company going public through a SPAC merger, it can be concluded that SPACs attract companies with more leverage and lower growth opportunities (compared with traditional IPOs).

This paper also provides an analysis of the performance of the SPAC-merged companies. By analyzing the BHAR for the two methods for taking companies public, it was verified that SPAC-mergers perform significantly worse than traditional IPOs and also than the benchmarks on the *market*, *industry*, and *size and book-to-market*. To complete the analysis on performance, the Fama-French 5 factors regression analysis presents results pointing that SPAC-mergers' excessive returns tend to be significantly negative and lower than the traditional IPOs.

In the studied analyses, the periods of analysis were divided between crisis and non-crisis periods, to try to comprehend how financial recessions impact a SPAC merger. The overview of firms' characteristics shows that the differences between companies going public via SPACs and via IPOs slightly decrease during financial crises, despite traditional IPOs continuing to be more economically attractive to investors. Regarding the likelihood of a company going public through a SPAC merger were identified two indicators with significant influence on the whole sample period, leverage and growth opportunities. Both indicators increase (in absolute value) in their average marginal effect, with a positive and negative relationship to the likelihood of a SPAC merger, respectively.

From the analysis of financial recessions on the performance of SPAC-merged companies, the study concludes that their returns tend to decrease both in the short- and long-term. However, when compared to traditional IPOs, the negative difference between

companies following traditional IPOs decreases in the long term. This is supported by the fact that in the second recession under analysis, the 2020 pandemic one, a rapid recovery existed, which impacts the returns on the 126- and 252-day periods. In the study of drivers of this performance, the higher size (during crises), the market returns, and the weak investments (during non-crises) are drivers for performance in the short-term for SPAC-merged companies. When looking at the long-term returns, the market returns are significantly influential during non-crisis periods. Additionally, SPAC-mergers tend to have lower excess returns during recession periods, with significant and negative excess returns for the short-term, indicating overpricing of SPAC-merged companies when going public.

The results achieved are consistent over the analyses performed, with the traditional IPOs consistently outperforming SPAC-mergers in their economic viability and performance. The results are also accordingly predicted in terms of financial recessions leading to private companies choosing SPACs to go public and negatively affecting returns.

Looking forward, it is believed that SPAC mergers are here to stay, along with their increasing popularity and tighter regulations, continuing to compete with traditional IPOs as an alternative for more firms to raise public capital. As such, future studies on SPACs will have a wider database on SPAC deals, which certainly would improve the accuracy and value of results.

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