The Fairy Tale Decision of Holding SPAC Shares Past Midnight: A study on the Factors Affecting the Probability of a SPAC Being Good or Bad Prior to Approval Date

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Abstract for Masters

The Fairy Tale Decision of Holding SPAC Shares Past Midnight: A study on the Factors Affecting the Probability of a SPAC Being Good or Bad Prior to Approval Date.

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This study further examines a two-portfolio theory by Sousa and Jenkinson 2011, where the two portfolios are separated as "Good" and "Bad" SPAC (Special Purpose Acquisition Company) deals. Our paper utilizes new generational SPAC IPO data for the period between 2011-2018, by analyzing the determinants, firm and market specific, that affect the probability of a deal being "good" or "bad". We use hand collected data on the trust value and common shares outstanding for each quarter for 75 SPAC IPOs from their 10-Qs located in EDGAR and Fintel, to calculate Trust Value Per Share (TVPS), TVPS is defined as the pro-rata value of each common share outstanding (excluding sponsor shares) divided by the SPACs trust value. We categorize a SPAC deal as "Good" if the market price is greater than the TVPS, and a deal as "Bad" if the market price is below the TVPS, one day before the shareholder approval date, respectively. Our results indicate that 50 SPAC deals were "Good", and 25 deals were "Bad". These figures differ from those of Sousa and Jenkinson, which indicates a clear effect of the structural change of SPACs after 2011. Our logistic regression indicates a positive and statistically significant relationship between the dependent variable "Good" with the cumulative return of the SPAC and IPO Size, while a negative relationship was seen with the number of days between IPO and announcement, and Trust Value. We suggest investors redeem their shares prior to approval regardless of being classified as "Good" or "Bad".

Acknowledgements

I would like to thank my supervisor for the countless number of times she's helped me with organizing and building my data for analysis. The topic that I decided to work on is novel, which meant neither of us truly understood what we were getting into, but she still allowed me to pick this topic, and I'm grateful for that. I would like to thank my friend Filippe who helped in the process of manually collecting some data. The process was very iterative, which can be draining but he persisted.

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Introduction

SPACs, more formally known as Special Purpose Acquisition Companies, are once again the new darlings of capital markets. Although their presence is once again soaring, a lot of people still do not know what they are and how they are structured. A special purpose acquisition company is a firm that has gone public through an IPO; however, their sole purpose is to acquire, through a reverse merger, a private entity to make them publicly traded. The SPAC acts as another vehicle for private companies to access capital markets, instead of the traditional IPO route or a direct listing. SPACs are formed by experienced and institutionally savvy investors, who obtain around 20% of the merged entities' value. These shares, more formally known as "sponsor promote", however, are only available upon consummation of the merger. Thus, there seems to be a perceived incentive for management to get a deal done regardless of quality due to the high payout once the merger occurs. In order to mitigate against this risk, the shares that are given at IPO have a key feature that allows the shareholder to redeem their shares, at a pro-rata price, at any point in time prior to the results of the shareholder approval date. The redemption function allows investors to have a voice regarding the decision to merge or not because if enough investors redeem their shares, the SPAC would be forced to liquidate, and management/initial investors are left with nothing. This key feature should force "Good" deals through and "Bad" deals to be redeemed, however, noted by Sousa and Jenkinson (2011), this is not the case.

Most of the research on the topic of Special Purpose Acquisition companies analyzes their performance metrics relative to IPOs and their key institutional characteristics that could affect the probability of a merger occurring (e.g., imbedded incentives through sponsors promote). Datar, Emm, and Ince (2012) and Kolb and Tykvova (2016) both conjecture that 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, and operating cash flows. Furthermore, Dimitrova (2017) results exclaim the fact that SPACs post-merged entity performs worse on a market, firm, and industry comparable basis regarding operating and stock performance metrics. The existing literature paints a grim picture for SPACs post-merged entity. Our study builds on the theory that SPAC deals can either be "Good" or "Bad" based on a simple metric researched by Sousa and Jenkinson (2011).

Sousa and Jenkinson (2011) developed a two-portfolio theory to analyze the potential occurrence and performance of "Good" and "Bad" SPAC deals, based on the idea that managements pervasive incentive causes them to force deals through regardless of quality. Their metric for determining if a deal is "Good" or "Bad" is based on the trust value per share, which is the value of all the common shares outstanding (excluding the 20% allocated to the initial shareholders) divided by the trust value (gross proceeds from the IPO locked in an escrow account). This figure represents the value that a shareholder will receive if they choose to redeem their shares at any moment in time prior to shareholder approval results for a merger. The TVPS (Trust Value Per Share) is compared with the price of a common share in the market, and if the market price is higher than the TVPS then we have a potential "Good" deal because the market is anticipating higher expected growth prospectus. However, if the market price is lower than the TVPS, the market is anticipating value destruction and thus, it trades at a discount. Sousa and Jenkinson (2011) discovered that more "Bad" deals occur, and their performance post-merger is tremendously worse than those of the "Good" deals.

Our study builds upon Sousa and Jenkinson (2011) by incorporating a logistic regression model to analyze the factors, firm and market specific, affecting the probability of SPAC firm ending up in either the "Good" or "Bad" portfolio. The logistic regression has been incorporated in previous SPAC literature but it's only been used on the factors affecting the successfulness of the deal, we examine it from the perspective of deal quality, which is novel. Our study is important in understanding deal quality in the post-financial crisis period due to the swift shift in the fundamental structure of SPACs. Lakicevic et al (2014) discovered an evolutionary shift in the structure of SPACs from 2003-2012, such as (1) higher threshold of votes required to reject a merger, (2) fewer warrants per unit, (3) higher unit costs, (4) higher exercise prices for warrants, etc. Thus, the research that we will be conducting will be incorporating data that has a completely different fundamental structure than that of Sousa and Jenkinson (2011) and should determine if the moves by the SEC (Securities and Exchange Commission) did in fact help investors as measured by their post-merger performance. Furthermore, we are also interested in understanding the factors that may be affecting the performance of the differing "Good" and "Bad" portfolios through an OLS (Ordinary Least Squares) regression based on market variables. We conclude the analysis with a GARCH (1,1) model regarding the log returns of each SPAC with the "Good" and "Bad" portfolios to determine the persistence of volatility once the merger

becomes effective. Our intuition comes from the fact that if a "Bad" deal occurs, we should see more uncertainty by the market in pricing the security, thus, persistence should be stronger for "Bad" SPACs.

Our sample for the logistic regression consists of 75 SPAC firms that conducted an IPO from January 1st, 2010, to December 31st, 2018. This timeline allows us to incorporate the evolutionary change in SPACs structure post-financial crisis (2009) and gives us the opportunity to analyze the post-merger performance of the SPACs in 6-month time intervals. The only way we could create the variable TVPS was by manually extracting the figures from each SPACs 10-Q financial statement because this data was not available on Compustat. We excluded the sponsors shares from the total common shares because the sponsors promote only becomes active after the merger, thus, they have no claims on the current trust value.

Out of the 75 sample SPAC firms that we derived using 10-Q financial statements, 50 SPAC deals were classified as "Good", while 25 SPAC deals were listed as "Bad". On a relative basis, our results have 150% more good deals than Sousa and Jenkinson (2011), indicative of a structural shift post-financial crisis. Furthermore, the "Good" SPAC deals had a larger trust value one day before shareholder approval and took less time from IPO to approval than did "Bad" SPAC deals. This result is in line with Sousa and Jenkinson (2011). Our logistic regression indicated that the probability of being a "Good" SPAC deal was statistically significantly related to the cumulative return of the SPAC during the announcement to approval period (Positive), the days between IPO and announcement (negative), IPO Size (positive), the trust value one day before approval (negative), and year fixed effect (positive).

The "Good" SPAC portfolio illustrates an average return of (-8.23%) after 6-months, while the "Bad" SPAC portfolio has a return of (-7.34%). The Russell 2000 earned 2.5% on average for each comparable "Good" SPAC, while the return was 4.76% for each comparable "Bad" SPAC, thus, the "Good" SPAC had an excess return of (-10.73%), while the "Bad" SPAC had an excess return of (-9.93%), respectively. Both SPAC portfolios underperformed their comparable (IPO ETF) and market throughout each interval, in line with previous literature. The two portfolio's raw returns only diverged 24-months after the effective date, with the "Good" at (-25.9%) and the "Bad" at (-43.27%).

The OLS regression showed a similar pattern between the "Good" and "Bad" SPAC portfolios with their relationship with the Russell 2000 getting stronger each 6-months until they were both at positive and statistically significant coefficient estimates of 1.05 and 1.02, respectively. However, the relationship between the daily returns of the SPAC and IPO ETF decreased each 6-month interval, demonstrating its separation from the fundamentals of an IPO. Interestingly, the "Bad" SPAC did not have a statistically significant relationship with the variables after 6-months. This shows us the inability for the market to price the "Bad" deals as their relationship with the greater market cannot be derived. Although the short-term may be in question, the long-term aspect is clear, new aged SPAC deals, "Good" or "Bad", do not differ to the same degree as reported by Sousa and Jenkinson (2011).

Volatility persistence 24 months after the effective date was inconclusive for the "Bad" SPAC portfolio, however, the "Good" SPAC portfolio had most deals that demonstrated high levels of persistence. Based on our results we conclude that "Bad" and "Good" SPAC deals do not differ to a larger enough extent post-merger, and an investor should redeem their shares prior to shareholder approval date or else they will face negative wealth effects on average. The remainder of the paper is separated as the following: Section I (SPACs explained), Section II (Literature Review), Section III (Data), Section IV (Methodology), Section V (Results), Section VI (Discussion), and Section VII (Conclusion).

I. SPACs Explained

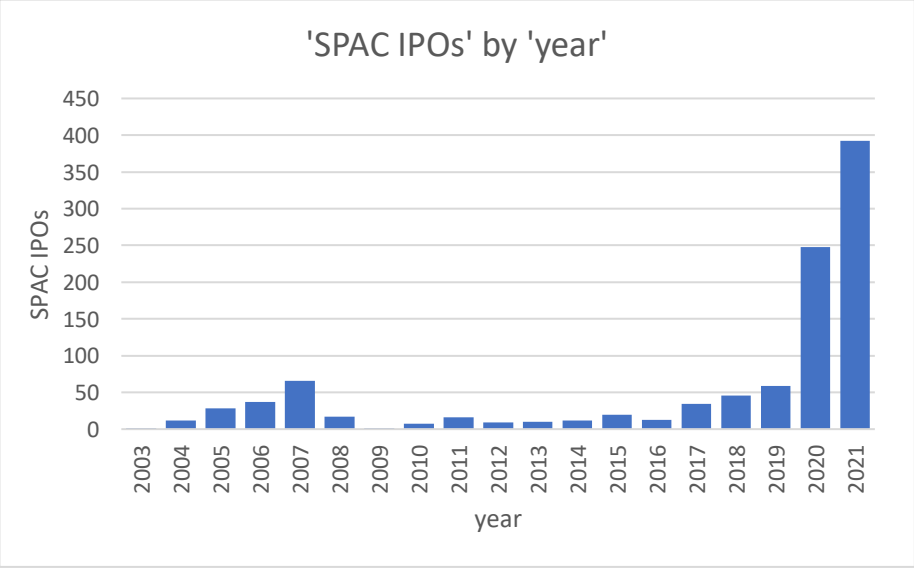
SPAC structure

A special purpose acquisition company, also known as a SPAC, is a company whose sole purpose is to acquire a private firm and propel them into the public markets. The SPAC is typically created by a group of top tier institutionally savvy minded individuals, who come together to form the management team, also known as the sponsors of the SPAC. The sponsors invest a low nominal amount, typically $25,000 total, to create the first shares of the SPAC. These shares are typically B class or F class on the financial statement and are locked away *until* a business combination is accomplished. Once a business combination has occurred, the sponsors shares will convert to class A common shares, which can be tradeable immediately unless the sponsors agree to extend their lockup period.

The main goal of the SPAC is to raise money through an IPO by offering Units (1 share of common stock and 0.5-in-the-money warrant) at a fixed price, typically 10.00$ per unit, and using these proceeds to acquire one or more private companies, which causes the target firm to become publicly traded in a reverse merger. Units issued by SPACs are immediately tradable, while trading with warrants and shares starts after the date by which underwriters exercise over allotment rights (Lakicevic et al 2014). Holders of SPAC shares are entitled to redeem their shares at any moment before the results of the shareholder approval meeting, this key feature gives investors a voice in determining if a merger should or should not occur. The redemption price is the TVPS (Trust Value per share), which is a pro-rata value based on the total amount of proceeds in the trust account divided by the total amount of common shares outstanding (excluding sponsor shares). If enough investors decide to redeem their shares, then the SPAC will be fully liquidated.

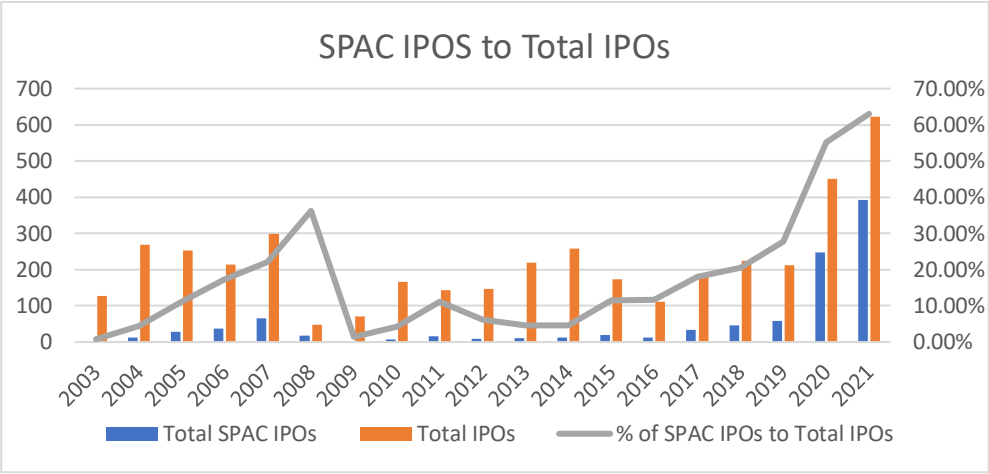
As seen in figure.1, SPAC IPOs began in 2003 and soared until the financial crash occurred in 2008-2009. It wasn't just SPAC IPOs that fell, as can be seen in figure.2, the overall market was faced with a severe liquidity burden and IPOs in general did not seem attractive enough. However, as seen in all three figures, the presence of SPACs is roaring back, as they represented 55.11% of the total IPOs issued in 2020, and so far, 63.02% of the IPOs issued in 2021. Although SPAC IPOs may be smaller than traditional IPOs, SPACs percentage of total IPO proceeds eclipsed 46.48% in 2020 and stands at a staggering 51.89% in 2021. These figures demonstrate a clear demand on the part of private companies, and they should be further understood by more practitioners in the finance world.

Figure 1. Total SPAC IPOs per year 2003-2021



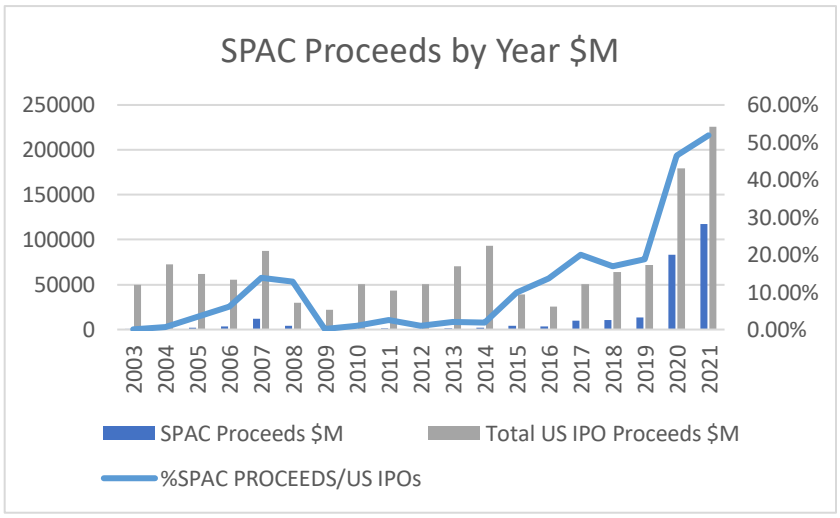
Description: This graph displays the amount of SPAC IPOs per year from 2003 to 2021.

Figure 2. SPACs and Total IPOs from 2003-2021



Description: This graph displays the total amount of SPAC IPOs and the total amount of IPOs, while also displaying the percentage of SPAC IPOs to total IPOs

Figure 3. Gross Proceeds for SPACs and Total IPOs 2003-2021



Description: This graph displays SPACs and Total IPO proceeds, including the relative percentage of SPAC to total IPO proceeds.

Around 99% of the proceeds from the IPO is kept locked in an escrow account, which earns a risk-free rate, typically invested in government bonds. The trust can only be used for a

potential business combination which must meet certain criteria, typically 80-85% of the total trust. The SPAC has a period of 18 months to announce a definitive agreement with a private company and then up to 6 months to close the deal. If a deal is not completed, or the sponsors do not file for an extension period, the SPAC will liquidate. Common shareholders will receive a pro-rata share of the trust, the warrants will become worthless, and the sponsors shares will vanish. SPACs used to be traded exclusively on The American Stock Exchange (AMEX) and Over the Counter (OTC) Bulletin board, however, since 2008, SPAC shares are listed on New York Stock Exchange (NYSE) and National Association of Securities Dealers Automated Quotations (NASDAQ) (Lakicevic et al 2014).

The fundamental structure of SPACs has been changing since the first one in 2003. Lakicevic et al (2014) illustrate key trends in the threshold, warrants per unit, and proceeds in trust. The number of warrants per unit has decreased from 1.63/unit with a strike of 5.29 during the period of 2003-2006 to 0.98/unit with a strike of 9.52 during 2009-2012, which can be associated with a lower liquidation effect post-merger. Furthermore, the threshold to reject an offer has increased from 20.48% between 2003-2006 to 84.23% between 2009-2012, lowering the power of the investors. Finally, the amount of proceeds from the IPO locked up in the escrow account has increased from 93% between 2003-2006 to 101% between 2009-2012, which is more advantageous and risk assuring for investors.

SPACs versus Traditional IPOs

SPACs have grown in popularity because of their ability to allow smaller firms with limited capital to reach public markets in a quicker method. Datar, Emm, and Ince (2012) discovered that 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, and operating cash flow. Furthermore, Kolb and Tykvova (2016) use second generation SPAC data and conjecture that small, levered firms with low growth opportunities tend to use SPACs. Traditional IPOs require firms to pay substantial amounts of capital upfront for road shows, lawyers, underwriters, etc. Moreover, top management wastes a lot of time with filings and financial statement preparation months ahead of time, the opportunity cost is loss of focus on core operations. SPACs on the other hand require top management to simply communicate with the sponsors directly, which means there is no time spends during road shows, or imminent

needs of capital for fees. Additionally, there are lower requirements regarding disclosure of financial statements to the public prior to the merger for the target firm, resulting in higher potential information asymmetry (relative to the IPOs). SPACs not only offer targets the same monetary gain as a traditional IPO, but they also offer experienced managerial support.

Potential investors should be wary as experience in the SPAC industry does not always translate to positive outcomes. Previous literature indicates more experienced managers and boards do not enhance the probability of deal approval (Cumming, Hab, and Schweizer 2014). We interpret this evidence in terms of incentives or need for management to ensure deals are successful: younger managers have massive wealth incentives to ensure a successful voting outcome, while more senior SPAC managers may undertake a SPAC as a hobby investment (Cumming, Hab, and Schweizer 2014). The results indicate that continued involvement of SPAC sponsors as shareholders and board members in the new company positively affects the stock performance (Dimitrova 2017).

Benefits of SPACs for investors

SPACs can be seen as essentially a risk-free investment if you enter at IPO because you have the right to redeem your share at the pro-rata trust value per share (it is the price offered at IPO), plus the interest earned in the investment account, and the value of the warrant. Furthermore, if you were to invest into the SPAC when the share price outstanding is below the pro-rata trust value per share, you could purchase the share and redeem it for a profit. For these reasons alone, we should not observe the share price to be significantly below the trust value per share. However, if the market perceives great value added by the SPAC to the private company through the form of financial and human capital (sponsors), the share price in the market will be higher than the trust value per share but it won't be significantly higher due to the risk of dilution post-merger. Dilution effect can be significant depending on the lock-up period for the sponsors, and the decisions to activate warrants on the effective date.

Disadvantage of SPACs for investors

SPACs may seem like a riskless investment due to forces that push the stock price upwards and downwards in a mean reverting fashion but there is one major caveat, the perverse incentive for sponsors to get a deal done regardless of if its value destroying or value additive.

Sponsors purchase their shares at a fraction of the price, typically around 0.003125$ per share, which is a potential return of around 3,199% (assuming a selling price of 10.00$ and excluding liquidation effect after the effective date) per share after the business combination. Since they receive a proportion of the capital value, they can still make money even if the acquisition is value destroying (Jenkinson and Sousa 2011). Investors do have a voice with the ability to reject the proposed merger and redeem their shares, however, the new generation of SPACs have structures where a minimum of 80% of the shares must be redeemed for the proposed merger to be rejected. Moreover, sponsors and affiliates purchase regular shares in the open market in order to vote in favor of the merger, which essentially covers the voice of the investors. Jenkinson and Sousa (2011) provide evidence that investors who fail to realize they're invested in a value destroying SPAC (Bad deal), their average cumulative return after 26 weeks is -39%, and after one year is -79% on average. Previous literature on the study of 'Good' and 'Bad' SPAC deals concluded that more 'Bad' deals occur on average, however, during this period the number of votes required to nullify a proposed merger was lower than it is today.

Literature Review

The literature review is split up into two sections, one consisting of SPAC related research and the other consisting of a brief understanding of volatility persistence. We want the readers to understand where the SPAC asset lies within the investment industry.

Datar, Emm, and Ince (2012) conducted research on the comparative analysis of SPACs and IPOs. This study was important in establishing a general concept of the reasoning for private companies to veer towards SPACs as opposed to traditional IPO. 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, and operating cash flow. The post-merger SPAC entity demonstrates worse operating and solvency performance relative to the median IPO firm as well. They conclude that SPACs are inferior to their industry peers and to contemporaneous IPO firms in terms of operational performance and stock returns. When the merger occurs, SPACs hold more debt, are smaller, invest less, and have lower growth opportunities than firms that conduct a conventional IPO in the same year. These results match those of Kolb and Tykvova (2016) who use second generation SPAC data (post-financial crisis) and conjecture that small and levered firms with low growth opportunities tend to use SPACs.

These findings demonstrate that the SPAC management on average acquires risk burdened companies. Jenkinson and Sousa (2011) report that SPAC shareholders approve value-destroying deals and propose a merger approval decision rule based on market prices.

Jenkinson and Sousa's (2011) research were meant to advise investors to listen to the market. They created a simple trading strategy, whereby investors would hold their SPAC shares if the TVPS (Trust Value Per Share) was less than the market price of that share at shareholder approval date, and investors should redeem their shares if the TVPS was greater than the market price. The intuition is very straight forward, as the gap between the market price and "Real" price, where the real price equals the common shares outstanding divided by the trust value, widens upwards, this is the market pricing in future growth prospectuses and a strong degree of execution. On the flip side, if the market price is widening below the TVPS, the market does not think this allocation of funds will add value, they think it will be improperly used or it won't be efficiently managed, thus, it sells at a discount. Sousa and Jenkinson (2011) discovered that "Bad" SPAC deals caused investors to lose (-39%) on average after 26 weeks, and (-79%) after 1 year. Furthermore, their results indicate that out of 43 sample SPAC firms, 23 were classified as "Bad", and 20 were classified as "Good". These results are indicative of the belief that SPAC sponsors have a pervasive incentive to let any type of deal go through, and Sousa and Jenkinson (2011) further analyzed this belief by examining the volume of shares purchased a few days before approval date. They determine that a few days before the "Bad" deals there was a huge amount of volume traded, associated with a limited number of larger transactions. Furthermore, they were traded at a price equal to the trust value per share and significantly higher than the prevailing market price, an indication of potential greenmailing and desperation of management and affiliates.

Dimitrova (2017) takes a similar stance as Jenkinson and Sousa (2011) by analyzing the perverse incentives of special purpose acquisition companies. She follows up on the idea that SPAC management has an incentive to push for deal approval because of their large 'sponsor promote' attached to the outcome, but her study analyzes the conflict of interest of underwriters and Target shareholders as well. Dimitrova (2017) finds that there is a cross-sectional difference between SPACs and the contractual features imbedded during the prospectus stage (pre-IPO). Variables such as deferred fees (underwriter incentive), time to acquisition, underwriter is

adviser, ownership of sponsor, etc. were examined. Similarly, to Datar, Emm and Ince (2012), in the long-term SPACs under performs the market, industry, firm matched and IPOs – as well as they significantly underperformed throughout their accounting performance metrics on a relative basis. Their results indicate that continued involvement of SPAC sponsors as shareholders and board members in the new company positively affects the stock performance, which is in line with the hypothesis that SPACs are differentiable by their sponsors experience and knowledge. Furthermore, like Cumming, Hab and Schweizer (2012) and Kolb and Tykvova (2016), Dimitrova (2017) concludes that the ownership of the institutional block holders has a negative effect on performance. A negative coefficient estimate could be due to hedge funds and private equity firms greenmailing sponsors into purchasing their shares at a premium for the merger to occur.

Cumming, Hab and Schweizer (2012) and Vulanovic (2016) both examine institutional characteristics about SPACs, however, the former analyzes their effects on the probability of a successful merger, while the latter analyzes the characteristics on the probability of survival. They define a successful merger as a SPAC merger which gets approved by its shareholders, and an unsuccessful merger as one which gets liquidated. Cumming, Hab and Schweizer (2012) find that: (a) Large board sizes had a positive but insignificant influence on the success of the acquisition, (b) number of sponsors had a negative coefficient (in line with the hypothesis off inefficient signaling), (c) younger SPAC management teams had a higher probability of achieving a successful acquisition, (d) negative coefficient estimate for the number of syndicate members (in line with the hypothesis on signaling – risk sharing). They also find, strong evidence that the limited lifecycle of SPACs and the change in ownership structure have significant impact on approval probability. He finds that warrant purchases by the founder increases the probability of survival, indicative of Leland and Pyle's (1977) study on ownership retention and its impact on firm value. Furthermore, number of underwriters in syndicate has a positive effect on probability, this coincides with the study of DeAngelo (1981) and Shapiro (1983) who demonstrated that larger and more prestigious auditors are more reliable in providing quality service. Finally, bank financing the merger has a positive effect (coincides with previous statement) and the one month after merger return has a negative effect on the survival likelihood.

Lakicevic et al (2014) took a completely different approach in the field of SPACs by analyzing the institutional changes throughout time for Special Purpose Acquisition Companies structure. Their research helped in demonstrating the non-stationarity of the SPAC structure due to management's need to adapt to investors interests. The study examined three separate time periods from 2003-2012, with each regime exemplifying a clear structural shift. The earlier regime (2003-2006) showed that SPACs offered more warrants per unit, had a lower threshold for deal rejection, low warrant exercise prices, low, deferred fees, and a high number of underwriters. These features are not appealing for investors because a low warrant strike price increases the post-merger dilution risk, and lower threshold may cause institutional investors to green mail management with the threat of deal rejection. The 2009-2012 SPAC structure was nowhere near the same, as, on average, the approval threshold rose from 20.48% to 84.23%, the warrants per unit decreased from 1.63 to 0.98, proceeds left in the trust rose from 93% to 101%, deferred fees rose from 1.25% to 2.26%, and the warrant strike price rose from 5.29$ to 10$. These changes demonstrate a clear move towards an investor first mentality and guaranteeing more security throughout the SPAC process as more proceeds are entrusted within the escrow account.

There may not be specific literature on SPAC long-term volatility and risk, but there are commonalities between SPACs post-merger performance and tradition merger performance, which gives us evidence that the relationship between SPAC post-merger volatility and risk may be like volatility persistence after a traditional merger. The evidence on five-year long-run stock returns following M&As suggests that acquirers have significantly negative long-run returns (Loughran and Vijh (1997)). Furthermore, the consensus from event studies is that acquiring firms' shareholders experience significantly negative abnormal returns around the announcement dates. (Bharath and Wu (2006)) These short-term and long-term performance results are very similar to the results on SPACs stock performance reported by (Datar, Emm, and Ince (2012), Dimitrova (2017) and Vulanovic (2016)). The second key evidence connecting SPACs and traditional mergers is the literature on the reasoning of this poor post-merger performance. Bahrath and Wu (2006), and Geppert and Kamerschen (2008) find that mediocre performance can be attributable to over-payment (Roll 1986) and wasteful investment by empire building managers (Jensen (1986)). Roll (1986) and Jensen (1986) argue that top management is at fault, which is a similar theory brought to light by (Jenkinson and Sousa (2011) and Dimitrova (2017),

who derive the theory that SPAC sponsors have an incentive to acquire firms at any cost in order to receive their 'Promote'. Fundamentally, as though traditional mergers and SPAC mergers have similar outcomes and reasonings, which brings up the thought of potentially having the same persistence in volatility and risk over time.

Bharath and Wu (2006) studied the changes in volatility and risk of acquirers around mergers and acquisitions and seek to understand the determinants of those changes. Bahrath and Wu (2006) discovered that there is strong run-up in total volatility before the merger, and a persistent increase in total volatility 1 year after the merger. However, after 1 year the systematic and beta of the acquirer begins to decrease but the total and idiosyncratic volatile persist. Furthermore, size of the target relative to that of the acquirer plays a factor in the persistence of volatility. The larger the target is relative to the acquirer, the longer it takes for total and idiosyncratic volatility to decrease. This result indicates that there is a longer persistence of integration risk because of the difficulty in merging two large companies together.

As seen above, the literature review body was split up into three subcategories: (1) SPACs, (2) Traditional IPO Initial return volatility, and (3) Volatility and risk persistence of traditional Mergers. The companies that SPACs bring public had similar characteristics throughout most of the literature. SPACs have the propensity to bring small, levered and low growth opportunistic companies' public. The operating, and stock performance of the merged companies is well below that of their industry and IPO-matched counterparts, indicating a significant drop in investor's wealth. These value destroying mergers, however, still occur because of the high degree of incentive for SPAC sponsors to push through in order to retrieve their 'promote'. The literature mentioned focused mainly on the institutional characteristics which affected performance, survival, and merger probability.

II. DATA

M&A Data

The data on the specifications of the merger between the SPAC and the target was retrieved from SDC for the time period between January 1^{sts} 2010, to June 19th, 2020. This time frame allows us to capture the early changes to the fundamental structure of SPACs after the financial crisis and gives us the opportunity to understand SPACs prior to the exponential growth

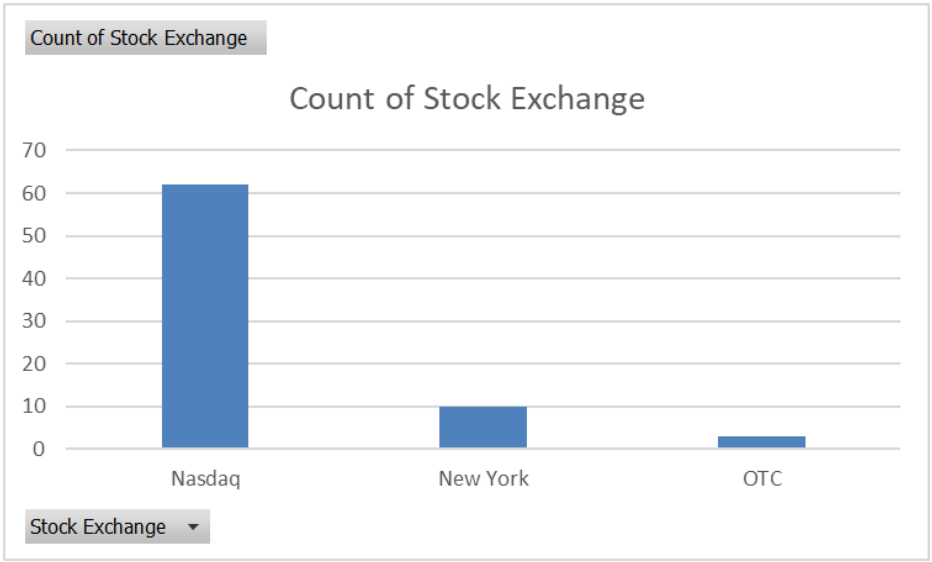
in offerings during 2020-2021. We began our filtering process on SDC by requiring all mergers to have the acquiror be a company from the United-States 'blank check' company– which is defined by EDGAR as a company who has the sole purpose of acquiring/merging with another entity. This first filter retrieved us **202** mergers. Our second filter was to only allow acquirors with primary SIC of 6726, 6799, 6198, and 6733. This was due in part to SDC having historical issues with differentiating blank check companies and other financial vehicle firms. The second filter caused our total mergers to drop to **199**. Our final filter was to only allow targets who are private entities because the main purpose for most SPACs is to give the target a path to public markets. This final filter brought our total amount of mergers down to **167**. We manually searched each merger transaction out of the 167 that were given to us from SDC to be confident that these were SPAC mergers. We used Factiva and credible news outlets online in order to confirm. Upon review, we derived 125 mergers from the SDC list provided, with **101** unique SPAC acquirors. The variables of interest are (1) date announced, (2) date effective, (3) date withdrawn, (4) target name, (5) target industry sector, and (6) acquiror name. There is a difference between the number of total mergers and unique SPACs because our data encompasses successful, terminated, and pending acquisitions.

IPO Data

We retrieved the data on the initial public offering of the SPACs from SDC's public/secondary offering database for the period of January 1st, 2010, to December 31st, 2018. Our filtering process was requiring the IPO to (1) be a blank cheque company, (2) have primary SIC of 6726, 6799, 6198, and 6733, and (3) be incorporated in United States. SDC provided us with **199** unique IPOs, however, we were required to further analyze each company as there were companies who fit the criteria of a SPAC but were not SPACs. Upon researching each company, we eliminated **64** unique IPOs which were not SPACs, leaving us with **134** unique SPACs. Out of the 134 unique SPACs, 47 companies were marked as 'Unavailable' because of the inability to retrieve stock price data for the post IPO period. There were 11 SPACs which were liquidated, and 1 SPAC which merged but the target company waived the agreement to go public, causing them to remain private. This resulted in us having **75** unique SPAC IPOs. Figure 4 displays the breakdown of the stock exchange which was chosen for the SPAC IPO. There is a clear favorite among SPACs, and it is the NASDAQ exchange, this isn't surprising as the NASDAQ allowed

SPACs to use tender offers before any other exchange. Tender offers allow SPACs to bypass the voting process which is an important determinant for management.

Figure 4. Breakdown of the stock exchange for each SPAC IPO



Description: The distribution of the stock exchange of the sample of 75 SPAC firms used. New York is the NYSE, and OTC is Over the counter.

Stock Price Data

In order to distinguish between a 'Good' and 'Bad' SPAC deal we were required to analyze the market value of a share relative to the pro-rata trust value per share during the life of the SPAC post IPO, which meant we were required to use SPAC stock data. Unfortunately, CRSP could only provide us with a few hands full amount of SPAC stock data because SPACs ticker's get replaced once the merger becomes effective, causing databases to not recognize the original SPAC ticker. We found a loophole around this issue by searching the ticker of the merged entity, however, this caused us to look through multiple databases such as (1) seekingalpha.com, (2) Nasdaq.com, (3) yahoo.com/finance, (4) Barchart, and (5) marketwatch.com. In order to get the date 6-months, 12-months, 18-months and 24-months post-merger, we simply added the equivalent number of days to the effective date in order to get the data required. Furthermore, we gathered data for (1) VIX volatility index, (2) TED spread, (3) IPO Renaissance ETF, and (4) Russell 2000, for the period of January 1st, 2010, to July 15th, 2021, for our analysis post-merge analysis. We decided to take the Russell 2000 as opposed to

the SP500 as the market benchmark because the average size of the merged SPAC is closer in size to the median company in the Russell 2000 as opposed to the SP500. We believe the IPO Renaissance ETF is the best comparison to the average SPAC and felt their returns and volatilities should demonstrate similar characteristics. The VIX, TED spread, and variables will be mentioned in greater detail in the methodology section.

Financial statements

To define 'Good' and 'Bad' SPAC deals we required the TVPS (trust value per share) throughout the life of the SPAC. We defined the TVPS as the total outstanding value of the trust (cash + interest earned) divided by the total amount of outstanding common shares (excluding sponsor promote). Unfortunately, Compustat only offered us the total amount of assets for a select number of SPACs, which was nowhere near sufficient. Thus, we were required to us (1) EDGAR, (2) MarketWatch, (3) Fintel, and (4) getfilings, in order to analyze each financial statement to manually extrapolate the total trust value and common shares outstanding for each quarter.

It is important to distinguish between the shareholder approval date and the effective date. The shareholder approval date is the date of the special meeting, in which the shareholders vote to accept or reject the proposed merger, however, the effective date is the date when the final documents are signed and the ticker changes. Our pre-merger analysis ends at the day before the shareholder approval date because this is the final date for which we can determine if the deal is 'Good' or 'Bad' prior to the vote.

III. Methodology

Variables

- **"Good" and "Bad" SPAC portfolio**

We first required to construct two portfolios with equally weighted constituents, one representing all the "Good" SPAC deals and the other representing the "Bad" deals. An equally weighted portfolio was chosen because of our diverse data, varying from size to industry sector, which gave us no motivation to lean towards another weighting method. We define a "Good" SPAC as a SPAC whose common share price in the market is higher than its TVPS one day

before the shareholder approval date, where TVPS is represented by the pro-rata trust value per common share. TVPS is a similar metric to NAVPS (Net asset value per share) because it represents the true monetary value associated on a per share basis. Moreover, we define a "Bad" SPAC as a SPAC whose common share price in the market is lower than its TVPS one day prior to the shareholder approval date. We decided to use the day before the shareholder approval date because this represents the final opportunity cost for a common shareholder before voting. As mentioned earlier, we derived each TVPS from their respective 10-Q statement from altering sources, by gathering the common shares outstanding (excluding sponsor shares) and dividing it by the trust value (inclusive of interest earned).

- **Trust Value**

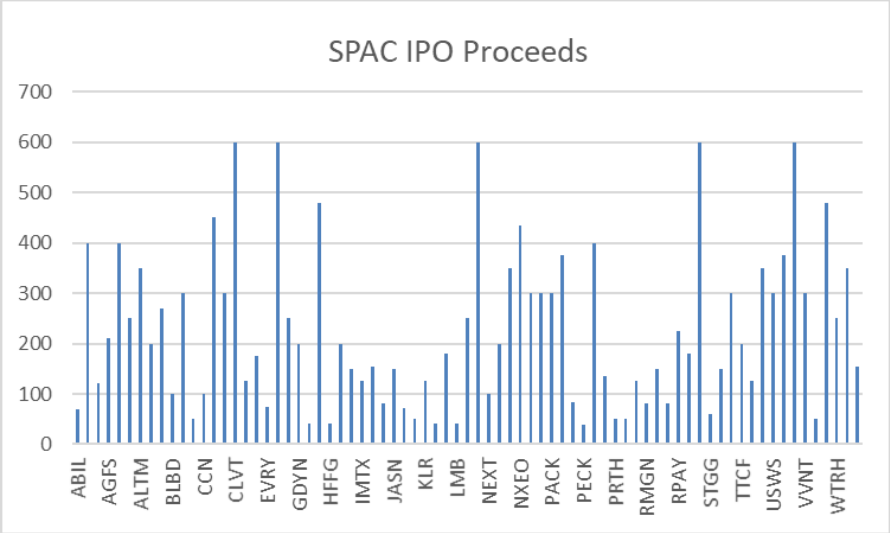
The Trust Value is a predetermined portion of the IPO proceeds that are kept in an escrow account until a potential target has been established and a merger is pending. We posit that a larger trust value will be associated with more "Bad" SPAC deals because sponsors have a higher incentive to get a deal done. Larger trust values cause the sponsors promote to be proportionally larger, thus, they are more incentivized to get a deal done regardless of quality.

- **IPO size**

We define the IPO size as the total amount of proceeds after the initial public offering. As seen in graph (D), the assortment of IPO sizes varies. Cumming et al (2014) maintain that one could argue SPAC managers capital constraints rise regarding purchasing shares in the open market as the IPO size rises, thus, larger IPOs are associated with more "Good" companies because their perverse tactics are diminished. Although SPACs have a finite life, manager's act in a similar stance to those of typical firms who have a strong degree of compensation linked to the size of the entity. Jensen (1985) explain that since managers' claims on the corporation are generally limited to their tenure with the firm, they have incentives to place lower values on cash flows occurring beyond their horizon than is implied by the market value of the entire future stream of the firm's cash flows. The dynamic structure of the SPAC allows for a direct comparison of SPACs management and the description by Jensen (1985) We posit that larger firms at initiation will have an advantage at picking through a higher variety of private companies due to their higher budget. However, having a higher budget may cause management to overpay simply because they can, as opposed to a SPAC who's on a tighter budget which

requires them to conduct further due diligence. We anticipate a negative coefficient estimate for IPO size because the perverse incentives for management to get a deal done, regardless of quality, will outweigh the forces of financial constraint SPAC sponsors and affiliates will endure by repurchasing shares in the open market.

Figure 5. Distribution of SPAC IPO firms used in the study



Description: This figure illustrates the distribution of our sample of 75 SPAC IPOs.

- **Days between announcement and approval**

We utilize the "days between announcement and approval" as a proxy for time given to the market to analyze this potential deal. By analyzing M&A prospectus statements through EDGAR for each SPAC, we were able to extrapolate the shareholder approval date, thus, our variable is in units of days. The intuition for using days is simple, we posit that as the days increase between announcement and approval, markets have more time to fairly price the SPAC. We believe, like previous literature, shorter time frames will cause the level of information asymmetry to rise, and is a good indication that management is attempting to get a deal done as soon as possible. This rush towards a deal will be associated with more "Bad" SPACs than "Good" SPACs, thus, the coefficient estimate should be negative.

- **Days between IPO and announcement**

As previous authors have hypothesized, a larger amount of time could be indicative of poor management capabilities in searching for a potential target. One could make a counter

argument and say longer time should be associated with a greater degree of due diligence and thoroughness by management. Although this argument is true, it does not assume a theoretical theta factor, like the theta of a call option, for the expected return of the sponsors promote. As the days increase, the number of days until potential liquidation decreases, thus, the implied theta factor begins decreasing the present value of the sponsors return. For this reason, we expect a negative coefficient estimate for the days between IPO and announcement due to management being incentivized to get any type of deal done with the limited amount of time on their hands.

- **Nasdaq cumulative return announcement approval**

Unlike previous literature such as Vulanovic (2017), and Cumming et al (2014), we decided to use the Nasdaq index as a proxy for the market during the SPAC pre-merger process. We used the cumulative daily compounded return for the Nasdaq index during the SPACs respected periods, which were (1) IPO to announcement and (2) announcement to approval. Previous literature, such as Kolb and Tykvova (2014), use a market return variable, which reflects the 90-days average S&P 500 return to capture market environment. We decided to further this point by using the NASDAQ, a more speculative and sentiment induced index, as the market indicator for our sample. Based on the percentage of our SPACs who are listed on the NASDAQ stock exchange, we felt there may be a strong relationship with the performance of its core index and the outcome of the SPAC itself. Figure (4) demonstrates the breakdown of the sample by the listing exchanges. For these reasons, we feel that during strong market periods, the probability of the market perceiving the SPAC as "Good" is higher, which is based on the share price being higher than the TVPS.

- **VIX cumulative return announcement approval**

Schwert (2002) argues that economic crisis and drops in stock prices induce market volatility to increase. As this volatility increases, the number of traditional IPOs begins to decrease as the liquidity needs become stronger than the incentive to earn extra returns by institutional and higher tier investors. We posit that this becomes an entry point for SPACs as alternative route for smaller sized firms in need off larger capital inflows. Thus, as the cumulative return on the VIX increases during the announcement and approval period, the probability of SPAC mergers occurring increases. We feel as more mergers occur, there is a

higher chance of bad SPAC deals falling through the cracks, thus, there should be a negative coefficient estimate with the probability of become a "Good" SPAC.

- **Year Fixed Effect**

As we described in our SPAC structure section, there has been an evolutionary change to the institutional aspects of SPACs, thus, we wish to capture that by the year effect. We foresee a negative coefficient for the later years because of the persistent loosening of the threshold requirement and the continued utilization of the tender offer, thus, eliminating the voice of the shareholder to halt potential "Bad" deals.

- **SPAC Search Frequency**

We utilized Google's trend and frequency database in order to gauge market's interest in the area of SPACs. We assume that during periods of high searches for the term SPAC, there should be high returns associated with that, which is dictated by the market's interest. We create two variables, (1) USA and (2) World, which helps us understand the trend on a micro and macro perspective. We are not given an absolute figure for the number of searches; however, we are provided a percentage per month relative to the total amount per year.

- **IPO ETF**

We use the IPO Renaissance ETF, which is an ETF that tracks the most recent IPOs, in order to compare the return and volatility performance of the "Good" and "Bad" SPAC portfolios. Based on Datar et al (2012), SPACs differ from IPOs on almost all metrics such as size of post-merger target, post-merger stock returns, operational efficiency, solvency, and growth opportunities. SPACs can be seen as the little brother of IPOs, however, as seen in figure (3), SPACs should be taken more seriously as their percentage of total IPOs has grown exponentially. Although SPACs are smaller in many metrics relative to IPOs, we expect a positive coefficient estimate based on the fundamental purpose and service they both offer.

- **Russell 2000**

We follow a similar stance as Lakicevic et al (2014), Boyer and Baigent (2008) and Jog and Sun (2007) who use the Russell 2000 index as a benchmark. Based on Elkins et al (2018), SPACs typically target private companies that are at least two to three times the size of the SPAC in

order to mitigate the dilutive impact of the 20% founder shares. For this reason, it is more statistically sound to compare the small cap index with SPACs, since they are inherently the same in size on average after merger.

- **TED spread**

The TED allows us to gauge the solvency of financial institutions, monetary liquidity, and perceived risk of the financial system. Intuitively, we feel when the TED spread is low, there is sufficient liquidity in the market and investors will aim to earn extra return through different vehicles such as SPACs. Institutional investors and private equity funds will feel more secure during strong solvent periods, which should have a positive impact on the total amount of SPACs and their overall return. We posit a positive relationship between the TED spread and the stock return of the individual SPAC.

Hypotheses

Hypothesis 1: We posit that there will be a higher percentage of SPAC firms classified as bad.

Hypothesis 2: The dependent variable (Good Deal) in the logistic regression will have a positive relationship with the market return, the SPACs cumulative return, the trust value per share and a negative relationship with the total days between events, VIX cumulative return, and volatility of the SPAC.

Hypothesis 3: We posit that the daily returns of the "Good" portfolio will have a positive and increasing coefficient throughout time with the Nasdaq, Russell 2000, and IPO ETF, while the negative relationships will be with the TED spread, and VIX.

Hypothesis 4: We posit that the daily returns of the "Bad" portfolio will demonstrate a weak relationship with the market variables such as Nasdaq and Russell 2000, and a similar negative relationship with the TED spread, and VIX, throughout the time intervals.

Hypothesis 5: We posit that the "Bad" portfolio will have a high persistence of volatility, while the "Good" portfolio will have a low to moderate volatility persistence.

Research Method

This thesis aims at creating two portfolios, one consisting of "Bad" SPAC deals and the other containing "Good" SPAC deals and analyzing factors affecting the probability of a firm ending up in either portfolio. As discussed in the variables section, a company is allocated to the "Good" portfolio if their common price in the market is above their TVPS one day prior to approval, and the opposite holds for "Bad" SPAC deals. We estimate the TVPS using the implied rate of return between the most recent 10-Q trust value per share and the TVPS at IPO. Once the implied rate of return is derived, we multiply this by the most recent trust value per share to get the forward-looking value. Equation (2) demonstrates the estimated TVPS.

Equation 1.

Common share price > TVPS (Trust Value per common share) one day before shareholder approval date = Good

Common share price < TVPS (Trust Value per common share) one day before shareholder approval date = Bad

Equation 2.

$$TVPS_{Ti} = TVPS_{Q} * \ (1 + r)^{\frac{t}{365}}$$

where Q is the most recent quarter, t is the difference in days until approval date, T is one day before the shareholder approval date, and i is the specific SPAC.

Our research further aims to analyze, with the help of an OLS regression, logistic regression and GARCH model, to discover firm and market specific factors which are affecting "Good" and "Bad" SPAC deal performance post and pre-merger. Unlike previous literature such as Cumming, Hab and Schweizer (2014), Vulanovic (2017), Mendenhall and Sincich (2014), and Kajerdt et al (2021) who have utilized the logistic regression to determine primarily SPAC specific factors affecting the probability of a successful merger occurring, we attempt to be the first to use the logistic regression to analyze potential factors, deal and market specific, which can help further aid investors in decisions regarding redemption prior to the shareholder approval date. As seen in previous literature, the logistic regression was initially created for application in the survival analysis, where the response variable, i.e., y, is coded (0) or (1), depending on, for

instance, if a patient survives or not (Mendenhall and Sincich, 2014, p.456) As our study focuses on the statistical relationships between a binary variable and independent variables, we felt the logistic regression was appropriate.

We code the "Good" portfolio as 0 and the "Bad" portfolio as 1. We attempt to conduct two separate logistic regression equations with the mindset prior to analysis that the statistical significance may be affected by the number of variables included. Although it may be a common disadvantage to use the logistic regression when your sample is below 100 observations, our 75 sample SPAC mergers for the time period between 2011 to 2020 is still significantly higher than previous papers who have utilized the logistic regression, thus, our confidence remains with its ability to conduct this analysis.

Our logistic regression will consist of common factors that have been analyzed and examined by previous papers, such as (1) days between IPO and shareholder approval, (2) Return on the VIX, (3) days between announcement and shareholder approval, (4) size of the IPO, and (5) market return. Furthermore, we include variables that are specific to the SPAC and market specific because of their fundamental ability to influence the sentiment of discounting, such as (7) Log of trust value one day before shareholder approval, and (8) year fixed effects.

Equation 3. Logistic Regression – Determinants affecting the probability of being a Good Deal.

$$Log\left[\frac{Y}{1-Y}\right] = \alpha + \beta_1 \text{ Cumulative VIX Return} + \beta_2 \text{Days IPO\_Announcement} + \beta_3 \text{Size of IPO} + \beta_5 \text{ Cumulative Nasdaq Return} + \beta_6 \text{ IPO Size} + \beta_7 \text{ Cumulative SPAC Return} + \beta_8 \text{ Log } (TVAp_{t-1}) + \beta k \text{ year fixed effect} + \mu_i) + \beta_9 \text{ Search Frequency}$$

where Cumulative VIX is equal to the total volatility for the VIX from the announcement date to shareholder approval, Days IPO_Announcement is equal to the total amount of days between IPO and Announcement, size of IPO is the total amount of proceeds from the IPO, Market Return is the cumulative Nasdaq return from announcement to approval date, year fixed effect for 11 dummy's, TVAP(t-1) is the trust value one day before approval date, Cumulative SPAC return is the accumulation of Daily SPAC returns from announcement to approval date, and Search Frequency is the percentage of searches relative to the total searches for that year on the approval date.

Furthermore, we created an OLS regression to determine the significant relationships between the daily returns of SPACs in differing portfolios, with market specific factors. We will

be conducting an OLS regression for four-time intervals, (a) 6-months, (b) 12-months, (c) 18-months, and (d) 24-months post-merger, respectively. The goal is to research if the relationships are getting stronger or weaker with market factors as time persists, and as information regarding the merged entity is disseminated into the market. These factors consist of (1) IPO ETF, (2) VIX, (3) Russell 2000, (4) Nasdaq, and (5) TED Spread, which are all represented in daily returns. We wish to understand if "Good" or "Bad" SPACs are more responsive to market movements, or if their relationships are potentially the same. We aim to confirm previous literature regarding the Russell 2000 and SPACs, as this index should have a strong relationship due to its composition of smaller cap firms, which is like most SPAC firms. The TED spread is incorporated to analyze the effects of liquidity towards SPAC investments and market sentiment. Equation (5) demonstrates the dependent and independent variables we analyze.

Equation 5.

$$Y_i = \alpha + \beta_1 \text{ Ted Spread} + \beta_2 \text{ Russell 2000 Index} + \beta_3 \text{ Nasdaq Index} + \beta_4 \text{ VIX Index} + \beta_5 \text{ IPO ETF} + \mu_i$$

where Yi is the daily return for each SPAC, the TED spread is the daily return on difference between the three-month Treasury bill and the three-month LIBOR based in U.S. dollars, the Russell 2000 index is the daily return on the Russell 2000 index, Nasdaq Index is the daily return on the Nasdaq Index, VIX Index is the daily return on the VIX Index, and IPO ETF is the daily return on the IPO ETF, and μ_i is the error.

Our final analysis is on the volatility persistence of the "Good" and "Bad" portfolios. We believe that the inherent uncertainty within a SPAC merged entity will be portrayed by the volatility persistence coefficients derived by the GARCH (1,1) model. We will only be examining 24-months after the effective date because of the 500-observation requirement for the simple GARCH (1,1) model. This causes our sample size to decrease from 75 firms to 54 firms for this specific model. We will be categorizing each SPAC firm within the portfolio based on a scale of (1) Low, (2) Moderate, (3) High Volatility persistence. Our volatility metric is based on the summation of the alpha and beta coefficients and should sum up to but not equal to 1. Low volatility is a total score from 0 to 0.2499, moderate volatility is the score from 0.25 to 0.7499, and high volatility is from 0.75 to 0.9999. This scale has not been utilized by previous research as there is no universal score that indicates "Low" or "Moderate", however, we have scanned through previous research on the topic of volatility persistence and based our scale on results of

others. The volatility persistence of the portfolio is dependent on which group has the majority of SPACs qualitative value within that specific portfolio.

IV. Results

As seen in Table (1), out of the 75 sample SPAC firms that we derived using 10-Q financial statements, 50 SPAC deals were classified as “Good”, while 25 SPAC deals were listed as “Bad”. These results are outstanding because of their 180-degree difference to those of Sousa and Jenkinson (2011) who discovered 20 “Good” deals out of 43 sample SPACs, an increase of about 150% on a relative basis. A potential catalyst for this shift towards more “Good” SPAC deals occurring could be the internal shift of SPAC structures towards making investors more incentivized through increasing the percentage of proceeds allocated to the trust account, decreasing the number of warrants per unit, becoming more transparent regarding target valuation metrics in their financial statements, etc. Furthermore, “Bad” SPAC deals have, one average, around $208 million in their trust account one day prior to shareholder approval date, while “Good” SPAC deals have $244.5 million. These results differ compared to Sousa and Jenkinson (2011), who had results of similar SPAC sizes within the two portfolios. The return on “Good” SPACs on day prior to approval was shown to be very close to zero on average and statistically insignificant, however, “Bad” SPAC deals demonstrated a statistically significant -5.27% return on average. A large correction prior to approval date can be seen as the market attempting to fairly price the SPAC, while a return close to zero for “Good” SPAC deals demonstrate no imminent need for repricing.

The “Bad” portfolio of SPACs demonstrated a mean length of 557 days and 135 days, for the time between IPO to announcement and approval and announcement to approval, respectively. On the other hand, “Good” portfolio SPACs required only 447 days to announce a target, and 133 days to completion the acquisition. Our assumptions throughout the variable section were indeed correct, “Bad” SPACs take longer throughout the overall process which can be associated with the market perceiving desperation within management, as it takes 25% longer to announce a target. Furthermore, a key distinction found was the difference in the Premium/Discount of the market price relative to the TVPS one day before shareholder approval. The “Good” SPAC portfolio had a mean premium of 17.6%, while the “Bad” SPAC portfolio had a discount of 11.15%.

Previous literature has brought to light the mediocre performance (stock returns) of SPACs post-merger on an individual and comparable approach, our results demonstrate a similar pattern. As seen in Table (2), the results are split up into two categories, (1) Bad Portfolio, and (2) Good Portfolio. The "Good" SPAC portfolio illustrates an average return of (-8.23%) after 6-months, while the "Bad" SPAC portfolio has a return of (-7.34%). These figures do not coincide with Sousa and Jenkinson (2011), who found a large decrease of around 29% for "Bad" SPACs after 26 weeks (about 6 months), while the "Good" SPACs had a modest loss of around 6%. Furthermore, our SPAC portfolios, "Good" and "Bad" underperformed their comparable to a similar degree. The Russell 2000 earned 2.5% on average for each comparable "Good" SPAC, while the return was 4.76% for each comparable "Bad" SPAC, thus, the "Good" SPAC had an excess return of (-10.73%), while the "Bad" SPAC had an excess return of (-9.93%), respectively. Our first difference in portfolio's return arrives at eighteen months post-merger, however, this was due in part to an outlier SPAC return. This SPAC gained 1200% post-merger because of a larger sell of a few days prior to approval. We removed this outlier, and the outcome brings us to a similar portfolio return for both "Good" and "Bad," at (-24.41%) and (-27.598%), respectively. The two portfolios diverge after 24-months, when the raw return for the "Good" portfolio is (-25.9%), and (-43.27%) for the "Bad" portfolio. Although there is a marginal difference throughout the first 18 months, and then a drop after 24 months, we feel these two portfolios act in a comparable manner.

A clear pattern is visible in Table (3) regarding the breakdown of "Good" and "Bad" SPACs by year and the cumulative percent for their respective portfolio. The cumulative percent of "Good" SPAC deals up to 2017 was 34% (17 SPAC deals) for their respective portfolio, while the cumulative percent of "Bad" SPAC deals up to 2017 was 56% (14 SPAC deals) for their respective portfolio. These figures dramatically change after 2017 as the cumulative percent of "Good" SPAC deals reach 66% (34 SPAC deals) for their respective portfolio, while "Bad" SPAC deals endure 44% (11 SPAC deals) for their respective portfolio, during the period between 2018 to 2020. These results indicate a clear shift in the regime after 2017 towards more "Good" SPACs being consummated, as the ratio of good:bad deals increase from nearly 6:5 during the period between 2012 to 2017, to above 3:1 between 2018-2020 (the SPAC deals used in this study for 2020 is not exhaustive). These results follow the same equally weighted

portfolio scheme as Sousa and Jenkinson (2011), thus, all the figures that have been provided are averages across groups of deals.

Our next topic of results is the logistic regression in determining those factors, firm and market specific, that are affecting the probability of a SPAC deal ending up in the "Good" or "Bad" portfolio. We were surprised to see the insignificant impact and predictive powers of our market variable, cumulative Nasdaq return, however, this is in line with multiple papers utilizing the logistic regression and ending up with no significant relationship. This gives strength to the efficient market hypothesis, as the noise of the bull or bear market is not affecting investors evaluation towards these unique investments. As seen in Table (6), our variables demonstrate a strong degree of statistical and economic significance, which shall be discussed below.

We will only be discussing those results we feel are important and necessary. Our variables of interest are (1) Log of the trust value one day before approval, (2) cumulative VIX return, (3) Search Frequency, (4) Cumulative return on the SPAC, (5) total amount of days between IPO and announcement, and (6) year fixed effect.

We assumed prior to conducting the analysis that a higher level of trust value will coincide with a negative coefficient estimate because a larger trust value is associated with a larger sponsor promote. This promote will cause the sponsors to have an immense perverse incentive to conduct lower levels of due diligence and a stronger tendency to overpay for targets, in order to receive their promote. As seen in Table 4, our results indicate strong statistical and economical significance (at the 5% level) relationship between the probability of trust value affecting "Good" or "Bad" SPAC deal outcomes, and a negative coefficient estimate. Cumming et al (2014) found a negative coefficient estimate for the SPAC size affecting the probability of success, however, their result was statistically insignificant. Our result does indicate that the markets sentiment towards trust size is negative and managers ability to pick "Good" deals is impaired because of the perverse incentives. Although the trust value is associated with a negative coefficient, the total amount of proceeds raised by the SPAC at IPO has a small positive coefficient estimate and is statistically significant as well. We posit that the market is indifferent regarding IPO size, the fact that a lot of proceeds were raised does not affect the probability of a Good or Bad deal, however, as our results earlier display, the trust value may be affecting the probability because it is associated with structural covenants. In order to understand this effect in

greater detail we would be required to extract the % of proceeds and the % of trust required to complete a merger.

The cumulative VIX return for the period between Announcement and Approval date demonstrated an insignificant, economically (odds ratio of -0.49) and statistically (Pr > 0.92), negative relationship towards the probability of the SPAC deal classification. This finding differs with Kolb and Tykvova (2014) who find a strong statistical significance (at the 1% level) and Lakicevic et al (2014) who find a statistical significance at the 10% level, between the probability of an IPO being a SPAC and market volatility, and the probability of a successful merger and market volatility, respectively. Our results countered the assumptions made in the variable section, where we thought higher volatility would cause more SPACs to enter the market but resulting in worse SPACs to fall through the cracks. On the contrary, the VIX volatility index does not seem to be a factor in the market's valuation metric towards SPAC deals.

The variable we felt the most certain of was the cumulative return during the period of announcement to approval for the SPAC because of its indication of market sentiment towards the deal. Intuitively, if the stock price rises after the information has been distributed into the market, this is a clear signal that a good deal is potentially occurring. For this reason, we felt it was necessary to confirm the theory and market signaling ability. As our results indicate, there is an extremely high statistical (at the 0.5% level) and economically (18.12 odds ratio) positive relationship between the cumulative returns during the negotiation period and the probability of ending up as a "Good" SPAC deal.

We felt it was important to research if the frequency of the word "SPAC" on google was a determinant in a SPAC deal being "Good" or "Bad" because this interest of the market could be associated with overall market optimism. Our results for the SPAC (world) and SPAC (USA), which is simply the search frequency for the total geography and USA, indicate no statistical relationship at all. The coefficient estimates were also opposites, as the SPAC (World) was -0.111 and the SPAC (USA) was 0.1177. These results demonstrate that the frequency of searches during the month of approval does not affect the ability of the market to value a SPAC deal. Thus, we posit that since the overall VIX and individual interest, through total searches, is a

proxy for the noise in the market, SPACs deal quality one day before approval is not affected by noise which should be seen as a benefit for investors.

The final variable of interest for the logistic regression was the year fixed effect because we felt that as the fundamental structure of the SPACs changed throughout our examined time period, we would find significant years of interest regarding the probability of ending up in the "Good" SPAC portfolio, and our results are in line with this belief. The years which demonstrated statistical significance were 2015 (at the 10% level), and 2019 (at the 10% level). The earlier years, such as 2012, 2013 or 2014, may not have had an impact because of the lower level of observations for those periods. These results coincide with our preliminary results where we described a regime shift after 2017, and it's indicated by the strong degree of predictive power with the years 2018 and 2019.

Our OLS regression results, found in the appendix, like the Logistic regression, gave us interesting findings regarding the relationship between SPAC daily returns and market movements. As seen in Table (7), we regressed the daily returns for each individual SPAC within the portfolio "Good" and "Bad" on (a) VIX, (b) Nasdaq, (c) Russell 2000, (d) TED Spread, and (e) IPO ETF, daily returns. For the first six months post-merger, the "Good" SPAC portfolio demonstrated a strong statistical (<.0001) and economically positive sign towards the Russell 2000 and the IPO ETF. Furthermore, the daily returns for the "Good" portfolio had a statistically significant (at the 5% level) and positive relationship with the VIX. Although the coefficient estimate is not exceptionally large, 0.026, this indicates "Good" SPACs soon after merging contain uncertainty which helps them grow during volatile periods. These results do not coincide with those for the "Bad" SPAC portfolio, as that portfolio is only statistically significant up to the 10% level with the VIX and Russell 2000. Based on these results, we posit that in the short term, it is harder for the market to evaluate the merged entity, thus, the relationship with proxies such as IPO ETF, Nasdaq, Russell 2000, will not be strong. Since the relationship is weak with market factors, potentially more firm specific characteristics for "Bad" SPACs may be the reason for their daily returns.

Twelve months post-merger results for the "Good" SPAC portfolio demonstrate an exceptionally strong statistical relationship with the daily returns of the SPAC and the Russell 2000 and IPO ETF, however, the coefficient estimate has decreased for IPO ETF and increased

for the Russell 2000, as can be seen in Table (9). We posit that as the market has more information due to quarterly reports, more time for analysts to disseminate news, the SPAC will converge towards the Russell 2000 because it better represents where the SPAC is today, as opposed to the IPO ETF. The coefficient estimate on IPO ETF for the "Bad" SPAC portfolio became statistically significant (0.025% level) and dramatically increased by nearly 300%, from 0.105 to 0.34.

Our results for eighteen- and twenty-four-months post-merger required us to omit firms from our sample due to minimum thresholds not being met. As seen in Table (10), the eighteen- and twenty-four-months "Good" Portfolio results demonstrate the market further pricing in the information it lacked during the initial stages, as the coefficient estimates for the Russell 2000 index rose to 0.781 (<0.0001) and 1.05 (<0.0001) for eighteen- and twenty-four-months post-merger, respectively. These results were mirrored with the "Bad" portfolio, as the coefficients estimates rose to 0.858 (<0.0001) and 1.023 (<0.0001) for eighteen- and twenty-four-months post-merger, respectively. The coefficient estimates with the IPO ETF for the "Bad" and "Good" SPAC portfolios decreased by almost 50% by twenty-four-months post-merger, indicating further divergence from the newly traded and speculative firms. Both the "Good" and "Bad" SPAC portfolios did not have a statistically significant relationship with the NASDAQ index until twenty-four-months post-merger, where the coefficient estimates stand at –0.299 (0.0001) and –0.29830 (0.0562), for the "Good" and "Bad" portfolio, respectively. These negative, and remarkably similar coefficient estimates for both the "Good" and "Bad" SPAC portfolio demonstrates a clear disconnect between the fundamentals of a SPAC firm and the NASDAQ Index.

The results for the GARCH (1,1) model can be found on Table 12 and 13, for the "Good" and "Bad" portfolio, respectively. The GARCH (1,1) model which was conducted on 54 SPACs in the "Good" and "Bad" portfolio for the 24-months after the effective date gave us mixed results. The "Bad" portfolio's composition was, 1 low, 3 moderate, and 12 highly persistent SPACs, with high levels of statistical significance throughout each observation (***). However, out of 12 highly persistent SPACs, 7 of them had a total volatility coefficient estimate (Alpha + Beta) of 1 or higher. The fact that the sum of the coefficient estimates is over one is not impossible, but it is very unlikely that the model used satisfies the data, thus, we omitted the 7

highly persistent SPACs. This omission caused the distribution to be fairly split in the middle, indicating a moderate level of persistence. This result is causes us to reject the hypothesis that "Bad" SPACs will have high volatility persisting longer due to market uncertainty. Surprisingly, the "Good" portfolio consisted of 2 low, 4 moderate, and 23 highly persistent SPACs. We eliminate 10 SPACs from the 23 highly persistent due to the threshold requirement of 0.9999. These results for the "Good" portfolio indicate that most of the entities have highly persistent volatility, which goes against our hypothesis. We posit that, even though the market may perceive a deal as "Good" they still may not be able to properly value the stock and price in too much optimism early on, which could cause the merged entity to be overvalued from the beginning. As the stock becomes more overvalued, expectations for earnings report will rise at a fast pace. If expectations are not exceeded or met, the share price will be corrected with a strong degree, which seems to be evident with the highly persistent volatility. Moreover, we should further look at the consistency of merged SPACs meeting analysts' expectations, this could give us an idea about markets expectations for "Good" deals.

V. Discussion

Our logistic regression helps us paint a clear picture regarding certain factors that are affecting the probability of a SPAC deal being classified as "Good". The main factors that that are causing the probability to rise are (1) the principal amount of proceeds, (2) Cumulative Return, and (3) the years 2015 and 2019, while (1) Log trust value day before, and (2) days difference IPO and announcement, are causing the probability to decrease. If we assume Sousa and Jenkinson's (2011) simple trading strategy is correct, our results further help investors regarding redemption towards the end of the SPAC. For example, if the investors notices that the return after a SPAC announces a definitive target has been rising, this gives him/her more conviction that it will end up as a "Good" deal. Furthermore, if it took a SPAC awhile to find a target, this causes the conviction of an investor to be negative regarding that SPAC quality. Although our research analyzes very few SPAC specific factors, we feel as though we're opening the gate for future research by being the first to focus on deal quality determinants. There are more and more SPAC deals that are occurring every year and we feel as though investors should begin to care more about the probability of investing in a "Good" deal as

opposed to investing in a deal that has a high chance of occurring, which is what previous literature has analyzed.

As seen throughout the results section, “Bad” portfolios do not seem to be performing or acting in a different manner as compared to the “Good” portfolio. The average raw return for “Good” SPAC deals 6 months after the effective date is (-8.23%), while “Bad” SPAC deals achieve returns on average of (-7.34%). These results do not differ until 24 months after the effective date, where “Good” SPAC deals return (-25.9%), and “Bad’ deals return (-43.27%). “Bad” deals are smaller and take more time than “Good” deals, this coincides with Sousa and Jenkinson (2011), however, that’s really where the differences stop. They both perform poorly compared to the market and the IPO ETF throughout their first 18 months and would both cause investors to lose tremendous wealth if they entered at the effective date. These results demonstrate it is equally unattractive to hold your SPAC shares prior to shareholder approval date, and an investor with a short- or long-term horizon view should redeem their shares. Although the average raw return of our portfolios may seem low, the returns were even lower for Sousa and Jenkinson (2011), around (-26% after 26 weeks and -76% after 52 weeks for the “Bad” SPAC portfolio) which brings to light some slight optimism about the performance of these so called “Bad” SPAC deals in the new generation post financial crisis. The new structures of SPACs seem to have caused the “Bad” deals to be equal to the “Good” deals, which puts a grave amount of doubt in the simple trading strategy hypothesized by Sousa and Jenkinson (2011), which was to sell if the market price was below the TVPS and hold if the market price was above the TVPS prior to shareholder approval date.

Our results further add fuel to the argument of pervasive incentives by management in the world of SPACs because more value destroying deals are being pumped into the public markets regardless of if they’re “Good” or “Bad”, their result is equally negative. The OLS regression throughout the time intervals does help us understand it takes around 2 years before the merged SPAC entity moves in tandem with a market index (Russell 2000), which ultimately tells us that regardless of “Good” or “Bad” quality, the market needs time to properly price and evaluate the SPAC company. Furthermore, our results of extremely high persistence in volatility among “Good” deals are important for option traders who are trying to look for a new niche market to enter. Option traders who are trying to play volatile swings could try to utilize the TVPS metric

and scan SPAC merged entities that seem to be less volatile than the rest. However, we do not encourage average investors to use the TVPS metric in order to decide on selling or holding their SPAC shares before shareholder approval date. On the flip side, since SPACs demonstrate poor returns post-merger, we do acknowledge that an investor could make a risk-free return if they were to purchase the share when the market price is below the TVPS and redeem it at the shareholder vote. This strategy will work to a stronger degree than in years prior to the financial crisis because of the structural shift towards keeping more proceeds in the escrow account.

Unfortunately, our research did not dwell into the SPAC structural characteristics, which could have been another factor in determining a "Good" or "Bad" deal. Furthermore, we should have analyzed the returns of SPACs by determining entry points that was not just the effective date. For example, we could have analyzed tactical allocations into the merged entity once it falls below certain thresholds, such as, 20% or 30% below TVPS because investors are aware of a potential liquidation effect immediately after the effective date. The liquidation effect could be skewing our results downwards, which could be making "Bad" and "Good" days seem the same, however, if a tactical investor were to enter after the liquidation effect, he/she could be repping a large return. Therefore, we suggest further research be conducted on the incorporation of the liquidation effect with "Good" and "Bad" SPAC portfolios. Specifically, an analysis on the percentage of warrants executed within days or weeks of the effective merger.

VII. Conclusion

Special Purpose Acquisition Companies is another route that private companies can use to access public markets. SPACs (Special Purpose Acquisition Companies) are structured in a style that allows management and initial investors to only get paid (Sponsors Promote) once an acquisition occurs. This inherent structure has prompted the idea that management may have an incentive to get a deal done regardless of quality. Cumming, Hab and Schweizer (2012) and Vulanovic (2016) both examine institutional characteristics about SPACs and analyze these effects on the probability of a successful merger, while Vulanovic (2016) analyzes the characteristics on the probability of survival. Previous literature has mainly focused on the causes or relationships with the probability of a merger, however, we are more intrigued about the quality of the deal. Our curiosity was derived from the SPAC paper examining a two-portfolio theory on separating "Good" and "Bad" deals by Sousa and Jenkinson (2011). They

created a metric called TVPS (trust value per share), which is the total trust value divided by the total amount of common shares outstanding (excluding sponsor shares). The TVPS metric is meant to help investors make decisions on if they should redeem their shares at shareholder approval date or hold them through. Their findings illustrate that "Bad" SPAC deals returned (-76%) to their holders only 1 year after the effective date, while "Good" deals lost a fraction of that. This adds evidence to the case that management will let any company crawl through the pipe in order to obtain their sponsor promote. Our focus is on figuring out what are the factors affecting the probability of these "Good" and "Bad" deals, a topic that has still not been examined.

We further add on to the study of Sousa and Jenkinson by utilizing new generational SPAC IPOs between 2011-2018, the time frame that we are examining is very crucial because Lakicevic et al (2014) discovered a clear shift in the fundamental structure of SPACs, while examining three alternative periods, (03-06, 07-09, 10-12). Variables such as (1) gross proceedings, (2) threshold amount, (3) strike price for warrants, (4) deferred fees to approval, all increased, while (1) syndicate size, (2) warrants per unit, decreased throughout the years. One big reason for this shift towards investor's appeal was due in part to the financial crisis which caused investors to be more liquidity burdened. Our curiosity steams from the belief that these changes were pushed by the SEC, who had a mandate to decrease the level of information asymmetry and principal-agent risk. If the SEC did a good job we should see more "Good" deals occurring. However, if the SEC and these structural changes were just a way for SPACs to be perceived as investor friendly, we should see a larger ratio of "Bad" SPACs as opposed to "Good" ones, as the market is indicating that management is simply being desperate and attempting to acquire any available firm. Our sample of 75 SPAC IPO firms was composed of 50 "Good" deals and 25 "Bad" deals, which differs from the study by Sousa and Jenkinson (2011).

The main factors that that are causing the probability to rise are (1) the principal amount of proceeds, (2) Cumulative Return, and (3) the years 2015 and 2019, while (1) Log trust value day before, and (2) days difference IPO and announcement, are causing the probability to decrease. Interestingly, the raw return for the "Bad" and "Good" portfolios did not differ until 24 months after the effective date, at that point, the "Good" portfolio had an average return of (-25.9%), while the "Bad" portfolio had an average return of (-43.27%). Both portfolios

underperformed their market (Russell 2000) and an IPO ETF comparable, with little difference between the two. Our OLS regression demonstrate a weaker relationship in the first six months for the "Bad" portfolio with market factors, such as (1) VIX, (2) Nasdaq, (3) Russell 2000, (4) TED Spread, and (5) IPO ETF, than the "Good" portfolio, who showed a strong positive and statistically significant relationship with the Russell 2000, and IPO ETF. As time persisted, the relationship between the portfolios and the market factors converged to an almost identical coefficient estimate. This evidence, added with the previous results indicate that "Bad" and "Good" portfolios do not seem to differ based on new generational SPAC data. The GARCH (1,1) model for the "Bad" portfolio was inconclusive, however, the "Good" portfolio demonstrated highly persistent volatility for the 24 months after the effective date.

These results bring into question the veracity of Sousa and Jenkinson (2011) simple trading strategy within new aged SPAC data because regardless of quality, an investor will lose at least 25.9% on average investing in a SPAC at the effective date. Thus, the investor is better off redeeming their shares and reentering at a later point in the life of the merged entity. Further research should be done on the effects and presence of liquidation impact after the effective date on the two portfolios. We posit that the liquidation effect may be causing the raw returns to be similar, and future studies could examine entering SPAC merged entities a few weeks or months after the effective date.

Appendix

Table 1. Descriptive Statistics Entire, Good, and Bad Portfolio

Entire sample (Good and Bad Deals)					Meand and Median Significance test between Good and Bad Deals	
Variable	**Obs**	**Mean**	**Median**	**STD**	**T-test (Pr> ltl)**	**Wilcox test (Pr> lzl)**
SPAC return 1-day before SA	75	-0.0167	0.0000	0.1121	0.0487*	0.0004***
TV day before SA $M	75	232.6649	199.7870	182.1378	0.9572	0.6571
Premium/Discount Market share day before SA	75	1.0802	1.0240	0.2398	<0.0001***	<0.0001***
Days diff IPO to Ann	75	496.9200	497.0000	180.0900	0.0209**	0.0288**
Day diff Ann to SA	75	133.4800	122.0000	45.8232	0.8448	0.8794
Principal Amount IPO	75	226.2800	200.0000	157.6937	0.4212	0.5851
Cumulative return VIX	75	-0.3529	-0.0534	0.1502	0.8570	0.9328
Cumulative return SPAC	75	0.0487	0.0133	0.2975	0.0008***	<0.0001***
Cumulative return Nasdaq	75	0.0255	0.0238	0.0357	0.9776	0.4282
Good Portfolio						
Variable	**Obs**	**Mean**	**Median**	**STD**		
SPAC return 1-day before SA	50	0.0012	0.0107	0.0999		
TV day before SA $M	50	244.5647	203.8400	197.1266		
Premium/Discount Market share day before SA	50	1.1760	1.0607	0.4034		
Days diff IPO to Ann	50	466.9400	448.0000	194.3575		*** p<0.01, ** p<0.05, * p<0.1
Day diff Ann to SA	50	132.7400	123.0000	45.0391		
Principal Amount IPO	50	236.7200	200.0000	168.3677		
Cumulative return VIX	50	-0.3752	-0.0409	0.1615		
Cumulative return SPAC	50	0.1157	0.0351	0.3253		
Cumulative return Nasdaq	50	0.0254	0.0216	0.0355		
Bad Portfolio						
Variable	**Obs**	**Mean**	**Median**	**STD**		
SPAC return 1-day before SA	25	-0.0527	-0.0050	0.1278		
TV day before SA $M	25	208.8651	151.2743	153.1251		
Premium/Discount Market share day before SA	25	0.8885	0.9876	0.1942		
Days diff IPO to Ann	25	556.8800	593.0000	131.3727		
Day diff Ann to SA	25	134.9600	122.0000	48.2627		
Principal Amount IPO	25	205.4000	150.0000	134.5975		
Cumulative return VIX	25	-0.0308	-0.0713	0.1274		
Cumulative return SPAC	25	-0.0852	-0.0148	0.1699		
Cumulative return Nasdaq	25	0.0256	0.0274	0.0368		

Description: Where Daily return is the average return one day before the shareholder approval date, TVPS one day before approval is the average estimated trust value per share one day before shareholder approval date, trust value day before is the average estimated trust value one day before shareholder approval, days diff IPO announcement is the average total days between IPO and announcement, days diff announcement approval is the average total days between announcement and approval, principal amount millions is the average amount of IPO proceeds, cumulative VIX ret is the cumulative amount of daily VIX returns from announcement to approval, cumulative ret is the cumulative amount of daily returns for the VIX from announcement to approval, and cumulative nasdaqret is the cumulative amount of daily returns for the Nasdaq Index from announcement to approval, for "Good" SPACs, respectively.

Table 2. Raw returns for the Portfolios

	Good SPAC Portfolio				Bad SPAC Portfolio					
	Mean	Median	STD	N	Mean	Median	STD	N	T-test (Pr > |t|)	Wilcox Test (Pr > |z|)
6 Months										
Raw - SPAC	-0.0823	-0.2099	0.4351	48	-0.0734	-0.1951	0.42	25	0.9329	0.9305
Raw - IPO ETF	0.1201	0.0517	0.2637	48	0.109	0.0738	0.1198	25	0.8103	0.2791
Market Adjusted (SPAC)	-0.1074				-0.121					
12 Months										
Raw - SPAC	-0.096	-0.2033	0.6026	47	-0.1169	-0.3902	0.7575	25	0.9058	0.4059
Raw - IPO ETF	0.2924	0.1917	0.4182	47	0.3019	0.2188	0.3508	25	0.9278	0.6565
Market Adjusted (SPAC)	-0.194				-0.156					
18 Months										
Raw - SPAC	-0.2441	-0.1796	0.5704	39	-0.276	-0.4362	0.5991	24	0.2019	0.4604
Raw - IPO ETF	0.3649	0.2048	0.4314	39	0.3019	0.2721	0.4025	24	0.8225	0.6309
Market Adjusted (SPAC)	-0.3471				-0.156					
24 Months										
Raw - SPAC	-0.259	-0.1841	0.5894	34	-0.4328	-0.4872	0.5232	20	0.1084	0.2427
Raw - IPO ETF	0.5094	0.415	0.4807	34	0.4387	0.2534	0.5652	20	0.6486	0.4173
Market Adjusted (SPAC)	-0.4309				-0.5917					

Description: Where Raw SPAC is the return between P_T and P_0, where T is indicated by the row the variable is in, Raw IPO ETF is the return between PT and P0, where T is indicated by the row the variable is in, and Market adjusted (SPAC) is the raw return adjusted for the return on the Russell 2000.

Table 3. Cumulative Frequency Good and Bad Deals

Good SPAC Deals				
Year	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative percent**
2012	1	2	1	2
2014	3	6	4	8
2015	6	12	10	20
2016	3	6	13	26
2017	4	8	17	34
2018	10	20	27	54
2019	14	28	41	82
2020	9	18	50	100
Bad SPAC Deals				
Year	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative percent**
2012	2	8	2	8
2013	2	8	4	16
2015	1	4	5	20
2016	3	12	8	32
2017	6	24	14	56
2018	5	20	19	76
2019	4	16	23	92
2020	2	8	25	100

Description: This table demonstrates the frequency and cumulative frequency for “Good” and “Bad” SPAC deals by year.

Table 4. SPAC Firm Sample

Company Name	Exchange	IPO proceeds $M	Issue Date	Approval date
ABILRIDGE CAPITAL ACQ CORP	Nasdaq	70	12/17/2013	12/22/2015
AMERICAN VIRTUAL CL TECH INC	Nasdaq	270	7/27/2017	2/27/2020
ATLANTIC ACQUI CORP	Nasdaq	40	8/9/2017	8/10/2018
AVISTA HEALTHCARE PUBLIC ACQ	Nasdaq	300	10/11/2016	12/10/2018
BLACK RIDGE ACQ CORP	Nasdaq	120	10/4/2017	8/9/2019
BOULEVARD ACQUISITION CP II	Nasdaq	210	2/12/2014	7/29/2015
BOXWOOD MERGER CORP	Nasdaq	200	11/14/2018	2/10/2020
Capitol Acquisition Corp II	Nasdaq	180	5/10/2013	7/8/2015
CAPITOL ACQUISITION CORP III	Nasdaq	300	10/13/2015	6/29/2017
CAPITOL INVSTMNT CRP IV	NYSE	350	8/15/2017	7/30/2019
CENTENNIAL RES DVLPMNT INC	Nasdaq	450	2/23/2016	10/7/2016
Chaserg Tech Acq Corp	Nasdaq	200	10/4/2018	3/4/2020
Churchill Capital Corp	Nasdaq	600	9/6/2018	5/13/2019
CONSTELLATION ALPHA CAP CRP	Nasdaq	125	6/19/2017	8/27/2019
DFB HEALTHCARE ACQ	NYSE	250	2/15/2018	11/7/2019
Double Acquisition Corp	Nasdaq	480	9/10/2015	11/16/2017
DRAPER OAKWD TECH ACQN	Nasdaq	50	9/14/2017	12/19/2018
FEDERAL STREET ACQ CORP	Nasdaq	400	7/18/2017	1/3/2019
FGL HOLDINGS	Nasdaq	600	5/19/2016	8/8/2017
FINTECH ACQUISITION CORP	Nasdaq	100	2/12/2015	7/26/2016
FINTECH ACQUISITION CP II	Nasdaq	153	1/19/2017	7/20/2018
FLMNEY ENERGY ACQ CORP	Nasdaq	250	7/20/2017	8/20/2018
FORUM MERGER II CORP	NYSE	200	8/2/2018	10/15/2020
Global defense	Nasdaq	60	10/24/2013	11/12/2015
Global partners acquisition I	Nasdaq	135	7/29/2015	2/2/2018
Gores holding corp i	Nasdaq	350	8/13/2015	11/3/2016
Gores holding corp II	Nasdaq	375	1/12/2017	10/16/2018
GORES HOLDINGS III INC	Nasdaq	375	9/6/2018	2/7/2020
GP INVESTMENTS ACQUISITION	Nasdaq	150	5/19/2015	9/26/2017
GS Acquisition Holdings Corp	NYSE	600	6/7/2018	2/6/2020
GTY TECHNOLOGY HOLDINGS	Nasdaq	480	10/27/2016	2/14/2019
HARMONY MERGER CORP	Nasdaq	100	3/23/2015	7/24/2017
Hennessy Capital Acq Corp I	Nasdaq	100	1/16/2014	2/23/2015
Hennessy Capital Acq Corp II	Nasdaq	175	7/22/2015	1/30/2017
HF2 FINANCIAL MANAGEMENT INC	Nasdaq	153	3/21/2013	3/4/2015
HYDRA INDUSTRIES ACQUISITION	Nasdaq	80	10/24/2014	12/7/2016
IMTXSciences Acquisition Corp I	Nasdaq	125	10/4/2018	6/29/2020
INFINITY CROSS BORDER ACQ CP	Nasdaq	40	7/19/2012	4/11/2014
JENSYN ACQUISITION CORP	Nasdaq	39	3/2/2016	6/19/2019
JETPAY CORP	Nasdaq	72	5/9/2011	12/11/2012
JWC Acquisition Corp	OTC	125	11/17/2010	8/16/2012
Kaleyra	NYSE	125	12/8/2017	11/22/2019
KAYNE ANDRSN ACQ C	Nasdaq	350	3/29/2017	11/6/2018
KERNH ACQUISITION CORP	Nasdaq	50	1/29/2018	6/17/2019
KLR ENERGY ACQUISITION CORP	Nasdaq	80	3/10/2016	4/26/2017

Landcadia Holdings Inc I	Nasdaq	250	5/25/2016	11/15/2018
LAZYDAYS HOLDINGS INC	Nasdaq	40	11/24/2015	3/15/2018
Levy Acquisition corp	Nasdaq	150	11/13/2013	6/30/2015
LF CAP ACQ CORP	Nasdaq	225	6/18/2018	7/10/2019
LIMBACH HOLDINGS INC	Nasdaq	40	7/15/2014	7/19/2016
LPROLA ACQUISITON CORP	Nasdaq	250	1/9/2018	6/9/2020
M I Acquisition	Nasdaq	50	9/13/2016	7/19/2018
M III ACQUISITION CORP	Nasdaq	150	7/7/2016	3/21/2018
Matlin & Partners Acq Corp	Nasdaq	300	3/10/2017	11/2/2018
MODERN MEDIA ACQ CORP	Nasdaq	180	5/11/2017	8/28/2019
MOSAIC ACQ CORP	NYSE	300	10/18/2017	1/17/2020
Mudrick Capital Acquisition	Nasdaq	200	2/7/2018	5/29/2020
OneSpaWorld Holdings	Nasdaq	300	10/24/2017	3/6/2019
Pac Special Acq Corp	Nasdaq	50	10/14/2015	8/10/2017
PACE HOLDINGS CORP	Nasdaq	400	9/10/2015	3/1/2017
PLTNM EGLE ACQSTON CRP	Nasdaq	300	1/11/2018	3/6/2019
QUARTET MERGER CORP	Nasdaq	84	10/28/2013	9/10/2014
QUINPARIO ACQUISITION CORP 2	Nasdaq	350	1/15/2015	7/11/2017
Quinpario Acquisition Corp I	Nasdaq	150	8/8/2013	6/30/2014
RANPAK HOLDINGS CORP	NYSE	300	1/17/2018	5/28/2019
RLJ Acquisition Inc	OTC	125	2/15/2011	9/20/2012
ROI Acquisition Corp i	Nasdaq	75	2/24/2012	5/21/2013
SCG Financial Acquisition Cor	OTC	80	4/12/2011	4/5/2013
SIMPLICITY ESPRTS AND GAM	Nasdaq	50	8/17/2017	11/20/2018
SOCIAL CAPITAL HDA HDG	NYSE	600	9/13/2017	10/23/2019
TPG Pace Energy Holdings Corp	NYSE	600	5/4/2017	7/17/2018
TPG PACE HOLDINGS CORP	NYSE	400	6/27/2017	11/15/2019
TRINITY MERGER CORP	Nasdaq	300	5/15/2018	11/12/2019
VectoIQ Acquisition Corp	Nasdaq	200	5/15/2018	6/2/2020
WL Ross Holding Corp	Nasdaq	435	6/5/2014	6/8/2016

Description: This table demonstrates the company name, stock exchange, IPO proceeds, IPO date and Shareholder Approval date.

Table 5. Independent Variables for Logistic Regression where dependent variable is (Good SPAC Deal)

Independent Variables	Description
Log_TV_day_before	Log of The Trust Value one day before shareholder approval date
SPAC_world	The total amount of searches for the word SPAC during the month of the shareholder approval date
SPAC_USA	The total amount of searches for the USA SPAC during the month of the shareholder approval date
Cumulative_VixRet	The cumulative daily returns of the VIX Volatility index from announcement to shareholder approval
Principal_Amount_Mil	The total amount of proceeds from the IPO of the SPAC
Cumulative nasdaqret	The cumulative daily returns of the Nasdaq index from announcement to shareholder approval
Cumulative Ret	The cumulative daily returns of the SPAC from announcement to shareholder approval
Days_diff_IPO_Announ	The total amount of days between IPO and Annoucement for the SPAC
Fixed-Year-effect	A dumby variable was used for T-1 year to capture the year effect

Table 6. Logistic Regression for The Dependent Variable (Good SPAC Deal)

Analysis of Maximum Likelihood Estimates			
Parameter	**Estimate**	**Standard error**	**Pr > ChiSq**
Intercept	65.4133	25.1165	**0.0092*****
Log_TV_day_before	-3.4264	1.4315	**0.0167****
SPAC_world	-0.111	0.5245	0.8324
SPAC_USA	0.1177	0.2911	0.686
Cumulative_VixRet	-0.4947	5.0541	0.922
Principal_Amount_Mil	0.0124	0.00748	**0.0977***
Cumulative_nasdaqret	-25.5834	22.6804	0.2593
Cumulative_Ret	18.12	6.047	**0.0027****
Days_diff_IPO_announ	-0.0077	0.00335	**0.0216****
dumby_2013	-13.2086	551	0.9809
dumby_2014	12.4212	442.3	0.9776
dumby_2015	3.9133	2.1673	**0.071***
dumby_2016	-0.0127	2.1349	0.9953
dumby_2017	2.2781	2.0294	0.2616
dumby_2018	2.4947	2.0018	0.2127
dumby_2019	4.6258	2.3634	**0.0503***
dumby_2020	3.0665	2.4458	0.2099

***p<0.01, **p<0.05, *p<0.1

Pseudo R^2 = 0.4915
Observations = 75

Testing Global Null Hypothesis: BETA=0	
Test	Pr > ChiSq
Likelihood Ratio	**<.0001*****
Score	**0.0177****
Wald	0.6168

Description: This table displays the coefficient estimates and standard errors for the independent variables that were researched. Where estimate is the coefficient estimate for the parameter, standard error is associated with the parameter and Pr> is the p-value associated with the parameter.

Table 7. Independent Variables for each OLS regression regarding 6-mont, 12-mont, 18-mont, and 24-month Intervals

Independent Variables	Description
TED	TED is the difference between the interest rates on interbank loans and on short-term U.S. government debt
VIX	The VIX is the VIX Volatility Index
Russell	Russell is the Russell 2000 Index for Small Cap Companies
Nasdaq	Nasdaq is the Nasdaq 100 Index for large-cap growth companies
IPO ETF	IPO ETF is the IPO renaissance ETF which tracks recent IPOs

Table 8. OLS Six Months after effective date

	Six-Months Bad Portfolio	Six-Months Good Portfolio
	(1)	(2)
VARIABLES	Daily Returns	Daily Returns
TED	0.0061	-0.0007
	-0.0173	-0.0078
VIX	**0.0441***	**0.0260****
	-0.0252	-0.0128
Russell	**0.4091***	**0.6109*****
	-0.2171	-0.0837
Nasdaq	0.3604	-0.0978
	-0.2899	-0.1266
IPOETF	0.105	**0.4029*****
	-0.1886	-0.079
Constant	-0.0009	**-0.0007****
	-0.0007	-0.0003
Observations	2,413	5,470
R-squared	0.0192	0.0648

Description: This table demonstrates the coefficient estimates and standard error for the parameters examined. This table focuses on the 6-month interval post-merger.

Standard errors below Coefficient estimate
*** p<0.01, ** p<0.05, * p<0.1

Table 9. OLS twelve Months after effective date

	Twelve-Months Bad Portfolio	Twelve-Months Good Portfolio
	(1)	(2)
VARIABLES	Daily Returns	Daily Returns
TED	0.0078	-0.0027
	-0.0106	-0.0049
VIX	0.024	0.0138*
	-0.0156	-0.0082
Russell	0.5891***	0.6328***
	-0.1193	-0.0531
Nasdaq	-0.0383	-0.0732
	-0.1696	-0.0814
IPOETF	0.3399***	0.3481***
	-0.1066	-0.0493
Constant	-0.0012***	-0.0008***
	-0.0004	-0.0002
Observations	5,072	10,916
R-squared	0.0344	0.0813

Description: This table demonstrates the coefficient estimates and standard error for the parameters examined. This table focuses on the 12-month interval post-merger.

Standard errors below Coefficient estimate
*** p<0.01, ** p<0.05, * p<0.1

Table 10. OLS Eighteen Months after effective date

	Eighteen-Months Bad Portfolio	Eighteen-Months Good Portfolio
	(1)	(2)
VARIABLES	Daily Returns	Daily Returns
TED	0.01	0.0061
	-0.0091	-0.0049
VIX	0.0149	0.0075
	-0.0133	-0.0078
Russell	0.8579***	0.7807***
	-0.1013	-0.0544
Nasdaq	-0.1824	-0.0478
	-0.1432	-0.0807
IPOETF	0.2457***	0.1708***
	-0.0886	-0.0494
Constant	-0.0011***	-0.0007***
	-0.0003	-0.0002
Observations	7,394	13,462
R-squared	0.041	0.0723

Description: This table demonstrates the coefficient estimates and standard error for the parameters examined. This table focuses on the 18-month interval post-merger.

Standard errors below Coefficient estimate
*** p<0.01, ** p<0.05, * p<0.1

Table 11. OLS Twenty-Four Months after effective date

	Twenty-Four Months Bad Portfolio	Twenty-Four Months Bad Portfolio
	(1)	(2)
VARIABLES	Daily Returns	Daily Returns
TED	0.0109	0.0018
	-0.0094	-0.0047
VIX	0.0183	0.0062
	-0.0136	-0.0075
Russell	1.0225***	1.0501***
	-0.1199	-0.0521
Nasdaq	-0.2983*	-0.2994***
	-0.1562	-0.0776
IPOETF	0.1693*	0.1940***
	-0.0976	-0.0474
Constant	-0.0014***	-0.0007***
	-0.0003	-0.0002
Observations	8,202	15,563
R-squared	0.0272	0.0816

Description: This table demonstrates the coefficient estimates and standard error for the parameters examined. This table focuses on the 24-month interval post-merger.

Standard errors below Coefficient estimate
*** p<0.01, ** p<0.05, * p<0.1

Table 12. GARCH (1,1) Good Portfolio

GARCH (1,1) Model Good Portfolio - 24 Months After Effective Date					
Ticker	**α1**	**β1**	**Total**	**T-value α**	**T-Value β**
ABIL	0.1502	0.4386	0.5888	4.54 (***)	4.19 (***)
BLBD	0.144	0.7106	0.8546	3.99 (***)	13.19 (***)
CLVT	0.5218	0.4483	0.9701	9.25 (***)	9.41 (***)
DSKE	0.1203	0.8514	0.9717	5 (***)	31.2 (***)
FGL	0.1516	0.5848	0.7364	3.22 (***)	5.83 (***)
FLMN	0.0924	0.8734	0.9658	5.73 (***)	39.07 (***)
GTYH	0.1006	0.8726	0.9732	5.78(***)	41.85 (***)
IMXI	0.188	0.7741	0.9621	5.79 (***)	20.65 (***)
KERN	0.6536	0.192	0.8456	14.08 (***)	3.76 (***)
LAZY	0.1734	0.5413	0.7147	3.56 (***)	4.51 (***)
LIND	0.0944	0.6448	0.7392	2.93 (***)	5.48 (***)
MGY	0.1359	0.826	0.9619	4.82 (***)	21.69 (***)
PACK	0.0331	0.2085	0.2416	0.85	0.23
PRTH	0.0863	0.8867	0.973	6.24(***)	48.21 (***)
ROSE	0.1838	0.0429	0.2267	2.74(***)	0.24
RPAY	0.2166	0.7625	0.9791	8.85 (***)	30.23 (***)
TWNK	0.5346	0.4019	0.9365	5.7 (***)	5.17 (***)
USWS	0.3461	0.5682	0.9143	5.81 (***)	9.31 (***)
VRRM	0.1714	0.8065	0.9779	6.17 (***)	31.29 (***)
WINR	0.3751	0.3761	0.7512	5.95(***)	4.43(***)

*** p<0.01, ** p<0.05, * p<0.1

Description: Where **α1** is equal to the ARCH1 effect, **β1** is equal to the GARCH1 effect and Total is equal to the summation of α1 and β1.

Table 13. GARCH (1,1) Bad Portfolio

GARCH (1,1) Model					
Bad Portfolio - 24 Months After Effective Date					
Ticker	**α1**	**β1**	**Total**	**T-value α**	**T-Value β**
ALTM	0.1352	0.7761	0.9113	4.43(***)	17.10 (***)
CISN	0.1306	0.2306	0.3612	2.33 (**)	1.01
INSE	0.152	0.745	0.897	4.39(***)	16.43 (***)
LMB	0.4064	0.2985	0.7049	5.7 (***)	3.93 (***)
NXEO	0.0553	0.027	0.0823	1.86 (*)	0.06
PLYA	0.1649	0.7317	0.8966	3.31(***)	9.9 (***)
RBZ	0.9653	0.0143	0.9796	13.95(***)	0.8
RLJE	0.1281	0.8254	0.9535	5.06(***)	23.92 (***)
STGG	0.114	0.5074	0.6214	4.39 (***)	7.46 (***)

*** p<0.01, ** p<0.05, * p<0.1

Where **α1** is equal to the ARCH1 effect, **β1** is equal to the GARCH1 effect and Total is equal to the summation of α1 and β1.

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