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An empirical study on value drivers of the next generation of Special Purpose Acquisition
Companies (SPACs) in the United States

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Abstract

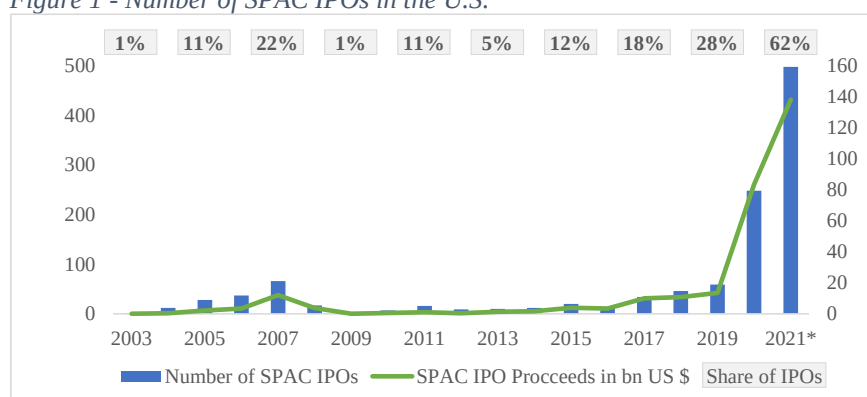
SPACs are one of the most discussed investment opportunities of the last years. In the meantime, a lot has changed: Media coverage, public interest, regulation, and their reputation. In this Master Thesis the performance of the latest SPAC generation is analysed at the three most important stages: IPO, merger announcement and the short-term after announcement window. The results get compared with the literature in IPOs, M&A and private equity as well as current research about previous SPAC generations. The results show: Pre-merger and merger performance is positive while post-merger performance is better than expected.

Keywords: Special Purpose Acquisition Companies (SPACs), Mergers and Acquisitions (M&A), Initial Public Offering (IPO), Under-pricing

1. Introduction

SPACs have become one of the most controversial topics in finance over the past three years. However, many researchers have ambivalent opinions of the emerging investment vehicle. Vulcanovic (2017)), for example, comments: “Investing in a SPAC is like flipping a coin, where only half of them are shown to be value-creating”. SPACs are like “writing a management blank cheque” (Jog and Sun (2007)) and investors are “betting on a jockey” (Heyman (2007)). Nevertheless, as the figure 1 shows, the numbers of SPAC Initial Public Offerings (IPOs) have quadrupled in the last five years. At their peak before the financial crisis, SPACs accounted for 22% of the total IPO market. By 2020 SPACs have become a huge success, as they already represent 55% of all U.S. IPOs. In 2020 alone \$ 83.4 billion were raised through SPAC IPO proceeds, which is more than the total IPO proceeds in all years since their invention in 2003.

Figure 1 - Number of SPAC IPOs in the U.S.



A literature review shows that two decades after the first papers on SPACs appeared, the legal and financial literature have elaborated on their historical development, the institutional characteristics as well as the conflict of interest. In addition, researchers analyse the performance at the IPO, the acquisition announcement as well as the returns to key stakeholders. A few papers concentrate on the performance of subsamples with a geographic or industrial focus. In addition, most studies do not use large sample sizes due to the smaller number of SPAC IPOs at that time. As both the relevance of the topic and the regulatory environment have changed, it is an imperative to examine the latest generation in more detail. In this context, the following three research questions are intended to shed light on the topic: What has changed

and causes the negative opinions of the authors quoted? How does the latest generation of SPACs perform? Can the chosen SPAC, Deal, and Market independent variables explain the merger performance? The thesis is not only interesting for the academic world but also for financial advisors who want to take companies public by the vehicle of a SPAC. Finally, it especially targets retail investors, who will learn first-hand investment rules and return characteristics.

In the first part, the theoretical foundations are laid to understand the SPAC mechanisms and conflicts of interest of the stakeholders involved. Subsequently, the reader is provided with a brief literature review of the three key lifecycle stages: IPO, merger announcement, and short-term post-announcement performance, so that literature-based hypotheses can be derived. Event studies, under-pricing analyses, and multivariate regression models are performed to substantiate the findings with statistically powerful analyses. Finally, the results are discussed in the context of previous research in the fields of SPACs, IPOs, M&A as well as Private Equity.

2. Theoretic Foundations

2.1 Definition and Mechanics of SPAC's

A SPAC is a clean investment vehicle that has completed an IPO with no operating assets. The sole purpose is to use the IPO funds to finance the acquisition of an unlisted operating business. For this reason, SPACs are considered either as a "blank check" or a "shell company" (the SIC code "6770") under US regulation (SEC (2020)). Upon completion of the transaction, the SPAC is usually listed under the name of the target company, which consequently changes the ticker (Gahng, Ritter, Zhang (2021)). SPACs are therefore also an alternative, new form to a traditional IPO or direct listing. The SPAC is founded by (a group of) mostly well-known managers and has no target to acquire at the founding stage (Shachmurove, Vulcanovic (2017); Jenkinson, Sousa (2009) Jog, Sun (2007)). Most of the IPO proceeds, typically between 85% to 100%, are held back in trust accounts and can only be used when an acquisition is imminent (Klausner et al. (2021); Gosh, Gosh (2017)). While the SPAC managers are looking for targets,

the trusts are mostly invested in short-term securities and thus generate interest (Tran (2016); Lewellen (2009)). During the target search, the management usually does not receive any compensation or fee (as is common for private equity or venture capital funds) (Kolb, Tykvova (2016)). In return, the management receives a substantial part of the equity, which they acquire at the nominal price (Gahng, Ritter, Zhang (2021)). Usually, the management holds about 20% of the total outstanding shares after the IPO (Jenkinsion, Sousa (2009); Lewellen (2009)). The exact amount depends on the underwriters' stakes. However, this can be, even for a value-destroying deal, a profitable investment for the management because their remuneration is based exclusively on the completion of a transaction. (Jenkinson, Sousa (2009)).

2.3 Life cycles of a SPAC

The life cycle is usually defined over a total of 24 months. In addition, SPACs have “build-in extensions”, which can extend the life by up to 12 months in case of an unsuccessful target search (Shachmurove, Vulcanovic (2017)). Usually, managers use 18 months from IPO date to find a suitable target company and propose the investment opportunity to public shareholders. The transaction should then be completed within the next six months. (Kajerdt, Rydberg (2021); Jog, Sun (2007)). A SPAC can be assigned to one of **four mutually exclusive periods**:

Period 1: Formation and IPO - Before the SPAC IPO can be issued, the managers are raising funds to finance the public offering and the managers' nominal shares. The majority of investors are hedge funds, private equity funds, and pension funds (Aktas, Andres, Ozdakak (2017)). Here, the founders lay the groundwork to position the SPAC. Investment guidelines such as focus industry and region as well as governance structures will be defined (Lewellen (2009)). Most of the financial resources are sourced through units issued during the IPO. A unit is a financial product consisting of a common share and a warrant. A warrant is an instrument similar to a call option which gives the holder the right, but not the obligation, to acquire a portion of a share at a predefined exercise price within a predetermined maturity after the completion of the SPAC acquisition (Gahng, Ritter, Zhang (2021)). After a successful IPO, the

fair market valuation, due to the missing operating business, equals to the invested funding (Gahng, Ritter, Zhang (2021); SEC (2020); Jenkinson, Sousa (2009); Lewellen (2009)).

Period 2: Target Search and Negotiations - this phase starts with the managers searching for one or more targets. According to regulatory requirements, a SPAC must invest at least 80% of the trust volume at a fair value market price (Lewellen (2009)). In practice, the SPAC management often identifies targets that are four to eight times larger than the trust value to facilitate the dilutive effects of management shares (Lenahan et al. (2020)). When searching for a suitable target, the firm should be, but is not mandatory, in line with the predefined investment criteria (SEC (2020)). However, U.S. regulations prohibit finding a suitable target company even before going public (Gahng, Ritter, Zhang (2021)). The costs incurred for pre-M&A activities such as screening and due diligence are primarily financed by the management's funds and the interest earned (Shatalov (2021)). Once the most promising option has been found, the management starts the negotiations. The management discusses various scenarios of the transaction with the target and performs further detailed due diligence. A company valuation is carried out to agree on a fair value purchase price (SEC (2020)). In the next step, the defined merger agreement is signed by both parties and the transaction is announced to the public.

Period 3: Merger announcement, Shareholders' approval, Redemptions - Once the agreement has been completed, the information gets published. Depending on the governance, the process can take one of three forms: proxy-, information-, or tender offer statement. The proxy statement is sent to shareholders when the SPAC requires shareholder approval. In the next step a shareholder vote is held (Lewellen (2009)). The information statement will be sent if the SPAC requires shareholder approval, but the management has enough shares to approve the deal. If the shareholders no longer need to give their approval, a tender offer is sufficient (SEC (2020)). In the scenario of a negative vote, the SPAC has the option to renegotiate the deal (Caselli, Negri (2021); Centato (2019)).

Period 4: Merger approval/ Withdrawal/ Liquidation - The final stage in the life cycle can take three different forms, depending on the outcome of the previously described paths: In **scenario A - the Merger approval** -, the investment proposal is, if necessary, approved by the shareholders and sufficient capital is available to finance the transaction. The transaction can be completed (Gahng, Ritter, Zhang (2021)). Shareholders who wish to redeem their shares get liquidated. Their shares are converted (usually pro-rata) as assets into trust accounts (Shachmurove, Vulcanovic (2017)). New shareholders receive their shares. Consenting shareholders become owners of the publicly traded company and the SPAC loses its characteristics as a traded investment vehicle (Gahng, Ritter, Zhang (2021); Cenzato (2019)).

In **scenario B - the withdrawal** -, the acquisition proposal gets rejected, and/or the SPAC fails in raising the required financial resources. Nonetheless, there is time to close another SPAC deal (Cenzato (2019)). Depending on the deal-breaker, SPAC managers can now seek new financing, renegotiate with the target, or look for a new investment opportunity. Depending on the governance structure, the build-in extension time can be claimed by a shareholder vote (Gahng, Ritter, Zhang (2021)). The share redemption is synchronous as described above.

Scenario C - the liquidation - takes place when there is no time left for the managers to find a suitable investment opportunity and at least one of the criteria elaborated in scenario A is not met. The shareholders get back the remaining funds plus the generated interest earnings (Cenzato (2019); Jog, Sun (2007)). In most cases, the cash back is lower than the capital raised in the IPO, as the costs for screening, negotiation and the IPO process had to be funded. The shareholder share redemption is carried out on a pro-rata basis (Shachmurove, Vulcanovic (2017); (Rodrigues, Stegemoller (2013)). The management lose its initial investment and will not receive a remuneration. All warrants will become worthless. (Gahng, Ritter, Zhang (2021)).

3. Overview of current Research

The following chapter summarizes the research in the area of IPO pricing, M&A returns, as well as post-announcement performance and contextualizes those to SPAC-specific research.

IPO under-pricing: Numerous academics have found that on average stocks outperform at the IPO. Already in 1994 Ritter, Loughran and Rydqvist summarized different studies and stated that the outperformance exists in every stock market around the globe. Between 1990-1998 the average IPO under-pricing amounted to 14,8%. During the Dot-Com-Bubble in 1999-2000, the under-pricing went through the roof, reaching 64.6%. Between 2001-2020, first-day returns averaged 16.7%, while a minority of stocks caused the most returns (Ritter (2021)). The under-pricing for SPACs goes in the same way but is lower in magnitude. The first day returns range from 3.8% (Jog, Sun (2007)) to 1.2% (Boyer, Baigent (2008)). The authors Murray (2014), Lakicevic (2013) and Lewellen (2009) confirm comparable levels for the European market.

M&A announcement returns: Before comparing general M&A returns with those of SPACs, it must be emphasized that the two cannot be compared at the same level. M&A transactions have clear motives and corresponding value drivers that can be grouped under three types of synergies: operational, financial, and organizational value drivers (Berkovitch, Narayanan (1993)). In contrast, SPAC managers act as pure financial investors and have no synergies to leverage. It is nevertheless all the more remarkable that, despite associated M&A synergies on average, the buyer's share price experiences a loss (ranging between -2% and 0%) and value gets created for the seller (20% to 30%) regardless of the industry country of origin (Xu (2017); Wang, Lahr (2017); Jaffe et al. (2015); Gregory, Sheila (2014); Danbolt, Maciver (2012); Tuch and O'Sullivan (2007); Masulis et al. (2007); Goergen, Renneboog (2004); Graham et al. (2002)). This difference in value is explained in the literature primarily by the distribution of the jointly achieved synergies. Further, the buyers are prone to problems of adverse selection as asymmetric information prevents acquirers from distinguishing between low- and high-quality targets (Akerlof (1970)). Integration cost, as well as different opinions about the

strategic rationales gets priced by the market. The SPAC mergers, on the other hand, show a positive abnormal announcement return. Various papers find returns ranging from 1.7% to 1.0% (Dimitiva (2017); Howe, O'Brien (2017); Lakicevic, Vulcanovic (2013); Tran (2012)).

In addition, the merger announcement returns can be compared to those of a PE fund, as a SPAC can be seen as a “one-shot” PE-vehicle. However, PE funds (usually) take a public firm private rather than a SPAC the other way around. Achleitner et al. (2008) find that PE investments generate a positive wealth effect of 5.9% (3.27%) in Germany around the event window (-1,0) ((0,+2)). In total, short-term gains of 14.95% are achieved over the window (-20,0,+20). Goergen and Renneboog (2004) find comparable results of 5.95% (window (-1,0)) for Europe.

Post-merger announcement performance: Although a SPAC, unlike a regular M&A activity, does not require a comprehensive post-merger integration, research shows that many value-destroying deals are signed. Until 2017, a common finding among researchers on SPACs that went public between 2004-2012 was that, on average, many value-destroying deals were signed (Dimitrova (2017); Kolb, Tykvová (2016); Lakicevic, Vulcanovic (2013); Datar et al. (2012); Jenkinson, Sousa (2009); Jog, Sun (2007)). The underperformance as a financial asset ranges between -5.4% and -24.0% for a half-year holding return during the post-acquisition window.

What has changed since then? Do the results listed here still apply to the latest generation of SPACs? This is to be investigated in the following using the research approaches selected here.

4. Research based hypothesis development

In the following, hypotheses are developed for the 3 dependent variables. Hypothesis type 1 refers to the SPAC IPO performance, type 2 pertains to the cumulative abnormal returns (CAR) on the merger announcement date and type 3 examines the short-term post-merger performance.

1. Hypothesis – IPO Performance

As described in the literature review, IPOs are generally under-priced. Most authors see Information Asymmetries and Signaling Theories as primary reasons for an under-pricing, both

can also have an influence on SPAC IPOs. Accordingly, even for a SPAC as a pure financial IPO, one can assume positive returns and thus under-pricing in the first trading days.

H₁: 3 Day IPO Buy and Hold return will be positive

2. Hypothesis – Merger Announcement Date Returns

At the time a merger is contractually secured, the SPAC has operational assets and should therefore trade correspondingly to the value of these. A share price movement can be seen as a market assessment of the acquisition (Dimitrova (2017)). If the share price rises (falls), the market considers the merger as more (less) valuable than the cash shell. As seen above in M&A research, on average, 1) the targets share gains at the cost of the acquirer and 2) there exists a disproportionate value distribution between both parties. SPAC mergers in contrast show positive CARs on merger announcement days. This leads to the second hypothesis that:

H₂: SPAC announcement CAR is positive

2.1. Hypothesis

It is undisputed that underwriters play an important role for SPACs, as in 47% of all SPAC deals, underwriters took a leading advisory role (Dimitrova (2017)). Already (since 1988) Carter, Dark and Singh have proven that top tier banks participate in the most successful deals. The same phenomenon can be observed for SPACs. Firstly, Kolb & Tykvová (2016) found that during the period from 2003 to 2010, smaller companies with poorer quality tended to go public via the financial vehicle of a SPAC instead of an IPO. Secondly, Castelli (2009) has shown that, less reputable banks acted as SPAC underwriters. It can therefore be assumed that the top tier investment banks, as closest advisors to the SPAC management, will help to identify and evaluate investment opportunities. Accordingly, one can raise the hypothesis that:

H_{2.1}: Underwriter reputation has a positive impact on announcement CAR

2.2 Hypothesis

In the financial markets, a so-called momentum effect can be observed, which implies that stocks with a strong past performance continue to perform well in the future, whereas stocks with negative returns keep falling (Fama, French (1996); Jegadeesh, Titman (1999)).

Accordingly, investors should react positively for a target in an industry that has outperformed in recent years, as they can expect further positive returns. To the best of knowledge, there is no research on the M&A success of investments in targets trading in a momentum industry. Therefore, it is all the more interesting to hypothesize that:

H_{2,2}: An investment in a momentum industry has a positive effect on the CAR

2.3. Hypothesis

Another factor that may influence the share price performance could be the duration between the IPO and the target announcement date (following “Time to announcement”). Four lines of arguments can be raised: Firstly, Dimitrova (2017) found a negative relationship between returns and the time to announcement as managers risk exiting without significant compensation when they reach the predefined maturity. Therefore, the management could execute the next best rather than the optimal transaction. Secondly, it can be argued that the longer the market screening, the better the possible options from which management can choose. Thirdly, one could theorize that if a target is found very early, the management should be very confident that it has already found an ideal target and will not find a better option through more extensive market screening. Finally, it can be assumed that the closer the liquidation date gets the more investors no longer believe in a successful acquisition. The market will respond accordingly with a share price drop, as a liquidation would be value-destroying due to transaction sourcing and IPO related underwriting fees. The SPAC could achieve a significant positive CAR on the announcement day as a moment of comeback. To sum up, the hypothesis development is ambiguous. Accordingly, the regression is intended to investigate whether the time to announcement has any significant influence at all.

H_{2,3}: Time to announcement has an impact on announcement CAR

3. Hypothesis – Post-Announcement Window Performance

The past underperformance of SPACs in the post-announcement window described above in the literature review is mainly attributed to the managers' misaligned incentives. As the

compensation of managers is based primarily on the performance of a transaction and not on a measure of success. From this follows the hypothesis that:

H₃: Post merger announcement performance is negative

3.1 Hypothesis

According to the semi-strong efficient market hypothesis the merger value effect should fully priced in by the market at the time of announcement (MacKinlay (1997)). Further, Malhotra and Chauhan (2018) found in their study that the M&A announcement response has no predicting ability in forecasting post-merger performance of the acquiring company. Thus, one can raise even for SPACS the hypothesis that:

H_{3.1}: Announcement CAR does not indicate the post-merger performance

3.2. Hypothesis

In line with the hypothesis elaborated above that the market reacts more positively to a proposed investment opportunity when a Top Tier Investment Bank has taken a leading advisory role. A comparable rationale should also apply to the short-term post-announcement performance. From the investors' points of view, there could be a lower risk of negative share price developments after the transaction, if one or more top investment banks were underwriters.

H_{3.2}: Underwriter reputation has a positive impact on post announcement performance

3.3. Hypothesis

As discussed above under hypothesis 2.3., the influence of the time to announcement can be also ambiguous for the investors post-merger announcement return. Therefore, the regression is performed here as well to investigate whether a clear effect can be observed at all.

H_{3.3}: Time to announcement have an impact on post announcement performance

5. Data and Methodology

5.1 Methodology

The Master Thesis identifies three different dependent variables: IPO under-pricing, CARs on merger announcement day and the short-term post-announcement performance.

The **IPO under-pricing** gets derived from the calculation logic: $[(\text{Price}_1 - \text{Price}_0) / \text{Price}_0] \times 100$. The Buy and Hold Return (BHR) is the total return an investor receives by holding the SPAC for the first one to two or three trading days. The BHR is calculated based on the Raw returns (income plus changes in value).

To calculate the **value effects of the SPAC's announcement dates**, the event study method by MacKinlay (1997) was applied. In this method, short-term share price fluctuations can be assigned to a company-specific event and thus conclusions can be drawn about the value effects. Normally, CAPM projected returns are used, while Beta estimates are determined based on the pre-event estimation window. Since SPACs do not have operating assets and, in some cases, not enough historical stock data available during the time to announcement, no sufficient, statistically powerful pricing history exists. In the case of insufficient data, a market-adjusted return model gets performed. This model implicitly assumes an alpha of zero and a beta of one. To calculate the CARs, a fictitious normalized short-term performance around the event was calculated based on one of the following suitable benchmarks. To compare the SPAC price against the risk profile of a globally diversified investor, the MSCI World was used. One can also argue to use a risk-free-two-year US government Bond as a suitable benchmark as the SPAC investor essentially owns by the cash shell a riskless zero-coupon bond with an option for a potential acquisition within the next two years (Lewellen (2009)). For 64 of the SPACs shorter benchmarking periods were used, as these have shorter time to announcement windows. Three different event windows were formed: from (-1,0,1) i.e., 3 days, over (-3,0,+3) with 7 days to (-5,0,+5) with a total of 11 days to reflect the delayed trading due to the low liquidity. To analyse the **SPAC performance in the post-merger announcement window**, cumulative returns (CRs) and, the above mentioned, buy and hold returns (BHRs) were calculated. The CRs represent the sum of the adjusted closing prices of each trading day, while the BHRs account for the correct compounding effect over the entire observation window (Ritter (1991)).

After all three dependent variables have been calculated, they can be studied in more detail for their individual influencing factors in a final step. OLS regression models were used to empirically test which SPAC, Deal and market characteristics drive stock price performance. Finally, in order to test the five assumptions of the linear regression analysis, statistical tests were performed to grant the significance of the effects analysed here.

5.2 Data Set and Variable Construction

The data set consists of 659 different US SPACs for the IPO- and 202 for the merger announcement analysis. In order to avoid a bias towards including only SPACs that found their targets very quick, only those tickers were incorporated which had found and published a target within 24 months, i.e. the usual, above-mentioned lifetime. The SPACs under consideration had their IPO until merger announcement life cycle between 2017-07-06 and 2021-09-20. Accordingly, the data set is the most recent period under consideration and will therefore show the most current research findings. In addition, most academic papers only sample 80-160 SPACs, making the explanatory power of the data in this thesis much stronger. The SPAC ticker list was obtained from the independent SPAC data provider SPACTRAX and verified by cross-checks with other data providers (CapitalIQ, SEC EDGAR Database, Spacinsider, Spacresearch). Incorrect or undetectable tickers were removed. In total the data set includes three categories of data: Market Data, SPAC Characteristics and Additional Regressor Data.

Market Data consists of the respective historical SPAC stock prices from the IPO until 2021-06-10 which were sourced from the Wharton Research Data Service (WRDS) database. Additionally, for the CAR calculation Benchmark Indexes were obtained. The MSCI World prices were sourced via Yahoo Finance. The data for the two-year risk-free US government bond were obtained by the Federal Reserve Bank of St. Louis.

The **SPAC Characteristics** were collected from the SEC's EDGAR database. Here the data could be taken manually from the filings. The S-1 filings offer detailed information about the IPO (Size, IPO Managers, Underwriters, etc.) whereas the DEFM14A filings provide all related

data about the acquisitions and the associated target (Purchase price, Industry, Region, etc.). SPACs for which insufficient data were available were excluded from the data set again.

The Additional Regressor Data were sourced to create independent dummy variables. The first is called momentum industry. Where each target industry was assigned to one of the eleven MSCI's Global Industry Classification Standard (GICS) sectors. In the next step, the ETF Industry Index prices were benchmarked against the MSCI World performance over a period of two years to identify outperforming industries. The following MSCI World ETFs were used: IT, Health Care, Communication Services, Consumer, Financials, Real Estate, Utilities, Industrials & U.S. Transportation. The second dummy indicates whether at least one of the Underwriters is a Top Ranked Investment Bank. Retrieved from the SPAC Research League Table, the total SPAC underwriter volume of the last five years per investment bank was used to create a top 100 ranking of all active investment banks in the SPAC market. Top-tier investment banks were defined as players in the top ten percentile. The third and fourth dummy variables are used for a more detailed analysis of the period between IPO and merger announcement. The dummy variable Quick Found shows all SPACs which spend less than 100 days to find a suitable target. The dummy variable Last Minute takes exactly the opposite position and shows the SPACs that took longer than 620 days.

5.3 Sample Characteristics

Appendix-Tables 1 shows a descriptive summary of the independent and control variables. On average, the SPAC management needs 240 days to propose a suitable target to the shareholders. The periods show several outliers, resulting in a median of 188 days. If one plots the observed variables against the IPO year (see Table 2), one can observe that the newest generation of SPACs finds its targets much faster. For example, the SPAC with an IPO in 2019 required an average of 481 days, whereas the 2020 to 2021 initiated SPACs required only 174 and 132 days, respectively. 14% of the SPACs fulfill the criteria of the dummy Quick Found, whereas only 6% are "Last Minute" target finders. 29% of the SPACs have suggested a target on the

announcement date which is in a momentum industry. In addition, an interesting trend can be observed in the investment profiles. In the IPOs of 2019, none of the 36 target companies met Environment, Social and Governance (ESG) criteria, whereas in the IPOs of 2020 (2021), 12% (17%) of the targets met these. On average, a SPAC has 2.7 underwriters. 40% of the SPACs had one or more top tier investment banks as underwriters for the SPAC transactions. The correlation table including statistical significance levels can be found in the appendix 3.

6. Empirical Findings and Result Discussion

6.1 Hypothesis Type 1 – IPO Under-Pricing

Appendix-Table 4 shows that an investor could earn positive Raw Returns of on average 0.06% and 0.01% in the first two trading days, ranging from -18.0% to 125.9%, respectively. The BHR for the first two trading days amount to 0.07%. 33% of the SPACs were under-priced on the first and 35% on the second trading day. Interestingly, 216 and 197 of the SPACs had no price fluctuations during the first two trading days. Trading day 3, on the other hand, showed small negative returns of -0.06% on average and thus marks a market correction to the first two trading days. Nevertheless, an investor achieves a positive BHR of 0.01% on average and gains a return for 267 of 659 SPACs over the first three trading days. Following once can accept H_1 , that even for SPACs an IPO under-pricing exists. Further, the analysis shows that larger SPACs experience a higher degree of undervaluation than smaller SPACs. This could depend on the investor base, as larger SPAC tends to raise higher shares from larger institutional investors who are in a better position to negotiate more favourable investment terms.

Comparing the results to the SPAC literature, the under-pricing of the newest SPAC generation is lower in magnitude. The well-researched field of the IPO under-pricing puzzle sees mainly information asymmetries as well as signaling effects as explanations. Information asymmetry theories come in various forms, with Kevin Rock's (1985) being the most cited. He theorized that uninformed investors bid without regard to the quality. Informed investors only bid for IPOs which they believe will generate returns. When an IPO performs poorly, only uninformed

investors bid and lose their investments. The losses are large enough for uninformed investors to leave the market. However, IPO firms need them to bid because informed investors are not sufficiently available. To solve this problem, the underwriter reprices the IPO to ensure the bidding of uninformed investors, resulting in under-pricing. Further the Prospect Theory as part of the Information Asymmetry Theory by Loughran and Ritter (2002) can be used to explain under-pricing. It theorizes that the issuer on the IPO day always sees the wealth loss through under-pricing in relation to its total wealth gain which is in relation negligible. The issuer accepts the marked forced under-pricing forced to a certain extent. The Signaling Theory finds the under-pricing as a sign of a firm's quality. Due to the positive IPO experiences, investors are willing to pay higher prices for future issues (Allen, Faulhaber (1989)).

The high magnitude of IPO under-pricing can then be explained by the high information asymmetries. The less is publicly known about an issuer, the greater is the uncertainty about the future stock value. As there is a positive correlation between the degree of uncertainty and the level of under-pricing, stocks face under-pricing. Uncertainties are greatest at the time of the IPO. The asymmetries can then be reduced in the course of the life cycle through numerous publications. Investors can thus better, and better assess a cash flows projection and determine a fair market price. In the case of SPACs in contrast the price building is different. As SPACs do not have an operational business, the stock is for the investors more a bet on the management. No investor can gather more information over time. Returns depend exclusively on the refunds of the future acquisition. Accordingly, SPACs trade – even at IPO date – on a stable level. The only information asymmetries are about the network and the capabilities of the managers. Just in the case of crucial, new information a price correction should take place during the first trading days. Even the Prospect Theory does not apply in the case of SPACs as the management does not earn any money through the IPO, but even destroys value in the event of liquidation.

The only way an IPO under-pricing of a SPAC can be explained is through oversubscription, which can be seen as a part of the Signaling Theory. Oversubscription takes place when there are more investors than investment options (shares). Despite an unpredictable future, investors anticipate such a positive return for the SPAC that they expect more than the - rationally sensible - discounted funds of today's escrow account and pay even higher prices from day one. Additionally, SPAC Managers have a longer industry experience than managers of fast-growing firms for an IPO (Kim (2009)). Accordingly, experienced managers will be more successful in balancing supply and demand in the IPO process.

6.2 Hypothesis Type 2 – CAR on Merger Announcement Date

Appendix-Table 5 shows the results of the event study merger announcement returns. Overall, the market responds positively to the proposed SPAC mergers. On average, a SPAC achieves a positive CAR of 4.3% against MSCI World and 5.6% against the US Bond. Also, within the pre-event window the market reacts positively, with CARs ranging from -0.1-1.6% depending on the benchmark and the observed period length. Looking at the overperformance in the post-event window, even higher returns of 1.3-3.5% can be earned for a buy and hold investor. Interestingly, however, only 54 (27 %) of the SPACs benchmarked against the MSCI World show statistically significant CARs within the 90% confidence interval. The statistically significant SPACs achieve substantially higher abnormal returns of up to 18.7% compared to the MSCI performance. The average CAR of the statistically non-significant SPACs, on the other hand, ranges only from 1.4-4.06%. The CARs thus exhibit a high degree of heterogeneity. Finally, SPACs with the IPO year in 2020 had much higher CARs than SPACs from 2021. This trend and the CARs deviations per benchmark are visualized in appendix figures 3 and 4.

Comparing the CARs of current 2019-2021 issued SPACs with the SPAC-specific research of previous generations, small differences become apparent. The announcement returns are generally, even though they are slightly higher, in line with the SPAC literature. Nevertheless, hypothesis 2 can be accepted, since on average positive abnormal returns are achieved. To

understand where the value creation, as well as the returns variations between different investment periods for SPACs, comes from one should first take the theoretical, argumentative perspective and in a second step the upcoming empirical results under consideration.

In general, if SPAC shareholders expect a higher return from an investment in the proposed target than the IPO proceeds raised, the SPAC share price will rise. Value can be created on the one hand by finding an undervalued target and on the other hand by seeing the potential for operational, financial, and governmental improvements. SPAC managers are industry experts. They are well-informed regarding industry developments and trends and thus should be able to find (undervalued) good-quality target companies and to structure the target deal very carefully. Combined with Lewellen's finding (2008) that SPAC acquisitions use on average a leverage ratio of two, they can create value by pure financial engineering, making the results more comparable private equity funds performance described above. Further, the SPAC management can mitigate at the currently private, and often even family-owned business potential agency conflicts between managers and current owners by increasing disciplinary power of external investors. This finding can be underlined by empirical research of M&A transactions. Fuller et al. (2002) find that acquiring private targets results in a CAR of 2,1% around a five-day event window. Finally, value creation potential can be explained by the following regression analysis.

6.3. Multi-regression Analysis - Hypothesis 2.1-2.3

To understand the SPAC characteristics that could drive the abnormal returns on the merger announcement day 10 OLS regression models (5 per each CAR benchmark) are estimated. The complete models can be obtained from the appendix-tables 6 and 7. The Model tests the impact of top tier investment banks ($H_{2.1}$). It can be assumed that the more stakeholders are involved, the more potential contacts as well as advisors are accessible to the SPAC management for the target search. Thus, it is important to control for the influence of the number of underwriters and managers as well as the Funds raised (SPAC Size). The regression analysis shows that a Top Tier Underwriter has a positive and statistically significant impact at a 99% confidence

level on both benchmarks allowing to accept $H_{2.1}$. Market leading banks have a reputation to lose and will therefore tend to work with SPAC managers who already have a strong track record and/or are more trustworthy investment managers (Heyman (2007)). Investment banks add value as advisors in acquisitions by delivering three types of assistance to the acquirers. Firstly, the underwriter help selecting appropriate targets and structure an acquisition, which lowers the acquirer's transaction costs. Secondly, underwriters can alleviate information asymmetries. Lastly, the underwriter can moderate the above-mentioned conflicts between acquirer management and shareholders through third-party certification (Servaes, Zenner (1996)). It can be assumed that top tier investment banks are more experienced in this role. Accordingly, they are able to reduce transaction costs, information asymmetries and agency conflicts to a greater extent and thus will create value in the SPAC transaction. Further, Riemer (2007) argues that reputational investment banks are better suited to handle SPAC deals as they have a close connection to large institutional investors. Their network can work as a cascade to A) promote shares, raise proceeds and B) to leverage the investor network for the target search. Further the Model test, the impact on the announcement return of an investment in an industry with market outperformance ($H_{2.2}$), while controlling for the pre-announcement window returns as well as the influence of an investment in a sustainable business model to account for different sources of market momentum. The model must control for the ESG factors of the companies, as these factors reinforce the existing overvaluation while minimizing the deviation of undervalued companies from the true value (Bofinger, Heyden, and Rock (2021)). The regression shows that an investment in a Momentum Industry results in a negative impact on the announcement CAR. The effect is statistically significant at a 1% and 5% level respectively. It follows that $H_{2.2}$ needs to be rejected for both CAR Benchmarks. One possible explanation could be that from the investor's point of view, the purchase price and thus the assessment of whether the target is being fairly valued determines the returns. If the target operates in a momentum industry the target is tending to be overvalued, causing the market to react with a

negative CAR as a high purchase price (i.e. overvaluation) should have a negative impact on investors' return in the short term. Lastly the model test the effect of the time to announcement. The absolute time to announcement does have a statistical, but not an economically significant effect on the CARs (please refer to the detailed regression tables in the appendix). Thus, the dummy variables Quick Found and Last-Minute were included. The model predicts a statically negative influence for the Quick Found Dummy variable on the dependent variable at a 5% significance level, while the Last-Minute Dummy does not show any statistically significant impact. Therefore, H_{2.3} can only be approved in part. Only an extremely fast target search has a positive influence on the CARs, which means that the public shows a kind of surprising reaction for the announcement and management receives confirmation of their decisive action.

6.4 Hypothesis Type 3 - Post-Announcement Window Performance

However, it is also important to note that a positive CAR alone does not necessarily indicate a positive view of the market for the proposed acquisition. Rather, an announcement CAR also shows a mixed effect from the evaluation of the target on the one hand and the ex-post market sentiment on the other (Dimitrova (2017)). To analyse the quality of the target, the SPACs' (short-term) performance after the announcement window must be analysed. As appendix-table 8 shows, the SPACs achieved a substantially positive, but on average statistically insignificant RAW return performance for 30 to 120 days after the merger announcement date. For a holding period of 60 (120) days after the announcement, an investor achieves an average cumulative return (CR) of 4.0% (4.9%) and a buy and hold return (BHR) of 4.8% (4.1%). However, the outperformance compared to the MSCI World is negative for both the cumulative returns and the buy and hold returns over a 120-day period. There is a tendency to observe that the longer one analyses the performance after the acquisition, the more negative the performance gets. At this point, the statistical power of the observed data is not strong enough to accept hypothesis 3, that the CAR is negative in the short-term post-announcement window.

If one compares the results of the latest generation of SPACs with those of previous studies, one can observe surprising differences. The literature shows that many value-destroying deals are signed between 2004-2012. At this point, however, the performance is considerably better than described above in the literature. Considering the old SPAC generation, it is indeed surprising that the SPACs generated negative returns in the period after the acquisition has been made. Because first, as described in the theory chapter, in most cases a majority of the investors must agree to the proposed deal or, in an even more drastic case, sell the stock. Thus, it would be irrational for investors to approve a value-destroying deal. In addition, the positive abnormal SPAC performance should already reflect a positive outlook on the future of the target, which is not confirmed on average by upcoming performance. Many researchers explain the negative post-announcement window performance of SPAC by a wrong incentivization of the SPAC management. Jog and Sun (2007) report on the one hand negative BHR returns for shareholders and on the other hand SPAC manager returns of 1,900% for a successful acquisition. Firstly, the management may vote for a low-quality target to avoid the event of liquidation and consequently the missing remuneration. According to Lakicevic, Vulcanovic (2013), any acquisition price higher than one dollar would mean a positive return for the SPAC managers. The actual return for the shareholder play a subordinate role in relation to their remuneration. Second of all, Jenkinson and Sousa (2009) have shown that low quality acquisitions are regularly made because large institutional investors such as hedge funds give an affirmative proxy vote in exchange for additional consideration. Finally, there are also (individual) investors who are interested in short term gains and therefore only bet on the difference between share price and trust account funds. But what has changed? What is now having a positive impact on investors' BHR returns? Since 2005, investors have complained that managers have too little "skin in the game" (Rodrigues, Stegemoller (2012)). Lakicevic, Vulcanovic (2013) support the finding and analysed that between 2003 and 2009, approximately 2.76% of all escrow account funds were raised through up-front purchases by SPAC managers. This rather

small share of total invested assets creates conflicts of interest. Subsequently, as a result of investor pressure managers have increased their stakes which reduces the conflicts of interest. Compliance and incentive issues have been improved to give investors more investment security and better enforcement capabilities (Shachmurove, Vulcanovic (2017)). Further, Rule 419 brought important regulatory changes that have an impact on SPAC performance and especially on the investors' confidence. The following two points are the most relevant. Firstly, a SPAC acquisition is only possible to carry out under the condition of a majority vote. Secondly, there is a so-called general redemption threshold of 20% which immediately causes a proposed deal to fail if one fifth of the shareholders have voted against it (Castelli (2009)). Finally, the legal environment has improved, while the so-called Sarbanes-Oxley Act has made ordinary IPOs more difficult.

Besides regulatory improvements, further various game changing developments have taken place. Before, SPACs were almost exclusively traded Over the counter Bulletin Board (OTC-BB). In the meantime, they are traded exclusively on prestigious stock exchanges such as the AMEX, NYSE or Nasdaq (Castelli (2009)). SPACs have gained a better reputation and more visibility in the finance world. More and more attractive companies see a SPAC as an alternative to the classic IPO. The same phenomenon can be observed for the SPAC initiators as well as the involved investment banks that manage respectively underwrite the SPAC. Famous personalities and prestigious investment banks are putting resources into SPAC products (Lakicevic, Vulcanovic (2013); Scachmurove, Vulcanovic (2017)). Further drivers of the performance will be revealed by the following regression analyses.

6.5. Multi-regression Analysis - Hypothesis 3.1-3.3

Tables 9, 10 and 11 in the appendix show the detailed results for the OLS regression on the after-announcement performance. For hypothesis 3.1 the Models test the impact of the announcement CAR on the post announcement window performance for the two different Benchmarks (2 Year Bond and MSCI World). The models show a positive and statistically

significant impact at the 99% and 90% confidence interval for the US Bond benchmarks on the post announcement window performance for 120 and 60 days. Due to the significant, positive influence of the return on the merger announcement date on the further performance of the SPACs can be concluded that the market on the day of the merger announcement is not yet fully pricing in future expectations correctly. For an investor, the valuable investment rule can be developed that a positive abnormal merger announcement performance on average leads to a positive return over the following 120 trading days. At this point, the Semi-Strong Efficient Market Hypothesis, which theorizes that financial markets immediately price in new information and that neither by fundamental nor technical analysis an over-performance can be achieved, is questioned. This may be due to a limited trading liquidity, which will not be analysed further (MacKinlay, 1997). As a result, $H_{3.1}$ needs to be rejected.

Further the model is testing for $H_{3.2}$ the Top Underwriter effects. The regression results show interesting differences between after announcement windows of 60 and 120 days. For the 120-day observation period the model confirms the hypothesis that a top underwriter has a statistically significant positive impact at a 1% significance level on the post-announcement window. In contrast, the characteristic "Top Underwriter" has no statistically significant effect on the dependent variable 60 days after the announcement date. Accordingly, hypothesis 3.2 can only be accepted for the longer observation period. An even more contradictory effect can also be observed for $H_{3.3}$. For the 120-day observation window, the Quick Found and Last-minute dummy variables have a positive, highly statistically significant effect on the post-announcement window performance, whereas the dummy Last-Minute has a negative effect on the 60-day performance. In particular, the economically very strong positive influence of the Quick Found variable on the 120-day dependent variable should be emphasized. As already assumed during the theoretical, literature-based derivation of the hypotheses, it is difficult to identify a clear effect of the time to announcement and thus the SPACs speed of the target

search on short-term post-announcement window performance. Nevertheless, hypothesis 3.3. can be rejected since the variables have an economically and statically significant influence.

Due to the different regression results over the two observation periods, the models were also calculated with winsorized data to neutralize extreme outliers. Despite the further step of data analysis, different effects remain. The detailed results can be found in the appendix.

7. Limitations

Firstly, since there is no fully comprehensive database that provides information on all available SPACs, data were obtained from the various sources mentioned above. Thus, it is possible that currently running SPACs are not included. To reduce this risk, the data were cross checked across different sources. Secondly, most of the "Additional Regressor Data" were collected manually from the SEC EDGAR database. Manual collections are always subject to human errors. Again, cross checks were performed to minimize errors. Thirdly, the sample in this study is, with 202 (659) SPACs, still rather small which may affect the result credibility. It would only have been possible to extend the period under consideration, which would have reduced the effect of the latest SPAC generation on the results. To avoid further sources of error and distortions due to individually cut observation periods and/or comparison bases, three event windows of different lengths and different benchmarks were used. Finally, all regression models have a rather low R^2 , which implies a low regression model fit for the observed data. Nevertheless, the developed hypotheses can be precisely tested. The regression results should merely not be used for robust return prediction models.

8. Summary

SPACs are an exciting investment opportunity with a changing risk profile. Within their life cycle, they convert from a virtually risk-free zero-coupon bond with a two-year maturity to a stock with an ordinary industry risk profile. The here presented results show an ambivalent but nevertheless significantly better picture of the latest generation of SPACs than previous

literature would have suggested. The latest generation of SPACs show lower but still significant under-pricing at IPO. The merger announcement returns show remarkably good performance compared to previous research in SPAC and M&A literature. Especially top underwriters are a promising return driver. An investment in a momentum industry on the one hand and an above-average long and short target search on the other, is accompanied by negative market reaction on the days around the merger announcement. The post-merger announcement performance is also better than for the SPACs examined so far. A positive market reaction on the target announcement has a statistically strong significant effect on the following 120 trading days. However, the SPAC characteristics about underwriter reputation and targets search duration examined by the regressions do not reveal any clear, statically robust effects for this period. Nevertheless, despite the fact that the period under review is only short, there is a trend for SPACs to underperform over the longer term. The question of how the latest generation of SPACs performs can therefore be answered in twofold terms: Pre-merger and merger performance is positive while post-merger performance is better than expected.

The altered results can mainly be explained by more attention from top investors and underwriters, stronger control rights for shareholders and an increased management equity participation. However, this could not be statistically proven with the available data, but only theoretically derived. Accordingly, there is a possibility for further research approaches in this area. For example, further analyse could question whether SPAC acquisitions are more successful on average when shareholders have greater voting rights. In addition, the same sample of SPACs should be analysed with a longer time lag after merger completion to investigate the actual long-term performance of the now publicly traded targets. Nonetheless it will be exciting to follow how the ever-expanding investment opportunity develops. Will the boom continue and outstrip the usual IPOs and direct listings in the long term? Or will the market boom be superseded by new, different investment vehicles?

Appendix

Figure 2 - Overview SPAC Life cycle

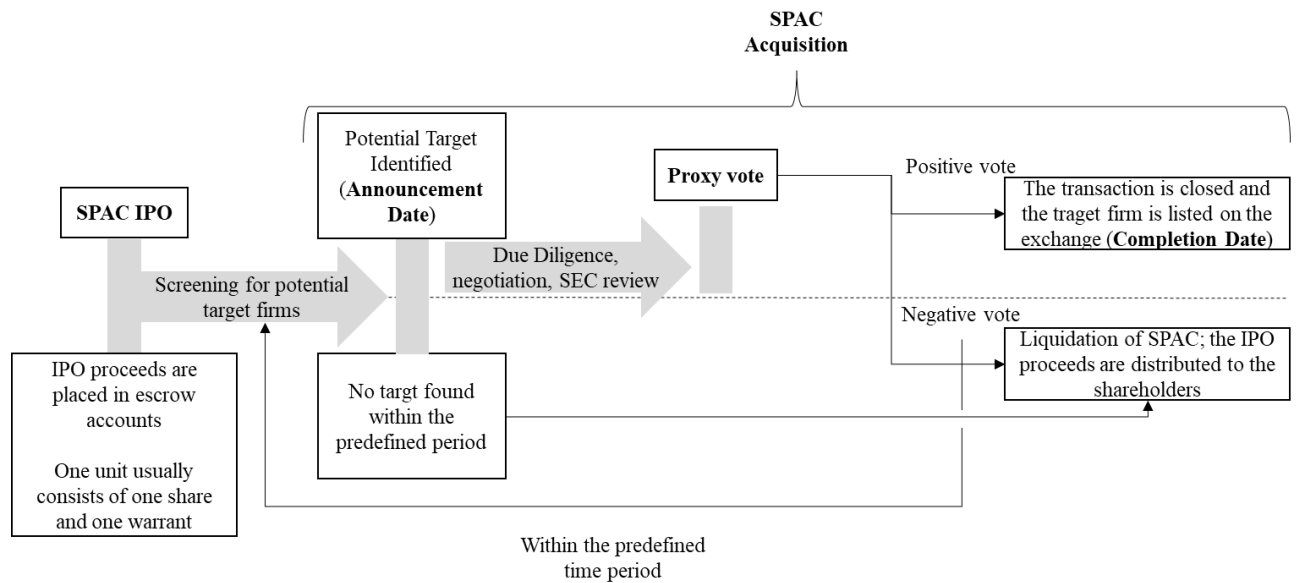


Table 1 -Sample Characteristics

Independent Variables							
	Variable Type	Mean	Median	St. Dev.	Min	Max	N
Time to Announcement	Numeric	239,58	188,00	181,94	61	719	202
Quick Found	Dummy	0,14	0,00	0,44	0	1	202
Last Minute	Dummy	0,06	0,00	0,33	0	1	202
Momentum Target Industry	Dummy	0,29	0,00	0,41	0	1	202
Top Underwriter	Dummy	0,40	0,00	0,51	0	1	202
Control Variables							
	Variable Type	Mean	Median	St. Dev.	Min	Max	N
Funds Raised	Numeric	298,71	249,00	215,70	46	1800	202
Sustainability Dummy	Dummy	0,13	0,00	0,31	0	1	202
# of Target Industries	Numeric	3,10	2,00	2,52	1	13	202
# of Target Geographies	Numeric	1,14	1,00	0,37	1	4	202
# of Managers	Numeric	6,89	7,00	2,19	2	15	202
# of Under Writers	Numeric	2,74	2,00	1,55	1	14	202

Table 2 - Variables per IPO Year

Founds Raised							
Year of IPO	Mean	Median	St. Dev.	Min	Max	N	
2017	100,00	100,0	N.A.	100	100	1	1
2018	178,00	100,0	178,9	46	552	8	8
2019	235,51	231,0	109,0	50	690	36	36
2020	329,48	254,5	254,2	50	1800	101	101
2021	289,88	287,0	159,5	46	977	56	56

Time to Announcement							
Year of IPO	Mean	Median	St. Dev.	Min	Max	N	
2017	719,00	719,0	N.A.	719	719	1	1
2018	714,00	712,0	62,0	623	718	8	8
2019	481,05	471,0	122,8	190	715	36	36
2020	174,18	154,6	88,8	61	494	101	101
2021	132,18	121,2	41,6	67	251	56	56

Sustainability Dummy							
Year of IPO	Mean	Median	St. Dev.	Min	Max	N	
2017	0,00	0,0	N.A.	0	0	1	1
2018	0,00	0,0	N.A.	0	0	8	8
2019	0,00	0,0	N.A.	0	0	36	36
2020	0,12	0,0	N.A.	0	1	101	101
2021	0,17	0,0	N.A.	0	1	56	56

Momentum Target Industry							
Year of IPO	Mean	Median	St. Dev.	Min	Max	N	
2017	1,00	1,0	N.A.	1	1	1	1
2018	0,00	0,0	N.A.	0	0	8	8
2019	0,18	0,0	N.A.	0	1	36	36
2020	0,40	0,0	N.A.	0	1	101	101
2021	0,27	0,0	N.A.	0	1	56	56

Top Underwriter							
Year of IPO	Mean	Median	St. Dev.	Min	Max	N	
2017	0,00	0,0	N.A.	0	0	1	1
2018	0,15	0,0	N.A.	0	1	8	8
2019	0,44	0,0	N.A.	0	1	36	36
2020	0,50	1,0	N.A.	0	1	101	101
2021	0,47	0,0	N.A.	0	1	56	56

Table 3 - Correlation Matrix independent and control variables

Correlation Matrix	Size	# of Managers	Top Underwriter Dummy	Momentum Target	Sustainability Dummy	Pre Announcement Return	Time to announcement	Dummy Quick Found	Dummy Last Minute	After Announcement Return
Size	1									
# of Managers	-0.102***	1								
Top Underwriter Dummy	0.365***	-0.126**	1							
Momentum Target	0.045***	0.114***	-0.018***	1						
Sustainability Dummy	-0.01***	0.016***	0.102***	-0.078***	1					
Pre Announcement Return	-0.094**	-0.122***	-0.128***	-0.136	-0.170	1				
Time to announcement	-0.211	0.001	-0.195	0.014***	-0.041***	-0.049***	1			
Dummy Quick Found	0.03***	0.041***	0.077**	-0.113***	-0.099***	-0.012***	-0.338	1		
Dummy Last Minute	-0.183	-0.037***	-0.230	0.045***	-0.013***	-0.012***	0.684	-0.103***	1	
After Announcement Return	-0.018**	-0.059***	-0.034***	-0.019***	-0.012***	0.013***	-0.049***	0.07***	0.011***	1
# of Underwriters	0.188	0.105***	-0.202	-0.019***	-0.012***	-0.012***	0.136	-0.015***	0.145	0.032***

Table 4 – Results IPO Under-pricing

Summary IPO Under-Pricing											
Returns	Days of Trading	Return	St. Dev.	Min	Max	T.-Stat.	P-Value	# underpricing	# no return	# overpricing	N
Raw Returns	1	0,06%	6,4%	-18,0%	125,9%	0,01	0,99	217	216	226	659
	2	0,01%	5,6%	-24,2%	103,7%	0,00	1,00	229	197	233	659
	3	-0,06%	2,6%	-18,8%	16,2%	0,02	0,98	235	187	237	659
BHR	(0,1)	0,06%	4,5%	-18,0%	125,9%	0,01	0,99	217	216	226	659
	(0,2)	0,07%	4,9%	-24,2%	125,9%	0,01	0,99	238	156	265	659
	(0,3)	0,01%	4,4%	-24,2%	125,9%	0,00	1,00	267	116	276	659

Table 5 - Event Study Results

Raw Returns around Merger Announcement Date											
Event Window		Mean	St. Dev.	Min	Max	T-Stat.	P-Value	# of Stat. Sign. CARs at			N
								10% Level	5% Level	1% Level	
CR (+1,0,-1)	Pre-Event	0,4%	3,3%	-8,8%	58,3%	0,03	0,92	2	1	1	202
	Event	4,5%	3,3%	-17,7%	136,1%	0,36	0,80	23	20	15	202
	Post-Event	3,5%	3,3%	-38,6%	116,2%	0,28	0,77	17	15	11	202
CR (+3,0,-3)	Pre-Event	1,1%	5,6%	-9,7%	59,6%	0,05	0,92	2	2	1	202
	Event	4,5%	3,3%	-17,7%	136,1%	0,36	0,80	23	20	15	202
	Post-Event	3,0%	5,6%	-60,2%	107,7%	0,14	0,80	15	14	10	202
CR (+5,0,-5)	Pre-Event	2,0%	7,3%	-13,4%	61,6%	0,07	0,91	3	2	1	202
	Event	4,5%	3,3%	-17,7%	136,1%	0,36	0,80	23	20	15	202
	Post-Event	3,5%	7,3%	-50,0%	122,6%	0,13	0,82	11	9	3	202

MSCI World Benchmark CARs around Merger Announcement Date											
Event Window		Mean	St. Dev.	Min	Max	T-Stat.	P-Value	# of Stat. Sign. CARs at			N
								10% Level	5% Level	1% Level	
CAR (+1,0,-1)	Pre-Event	0,4%	3,3%	-8,3%	57,4%	0,09	0,68	12	8	5	202
	Event	4,3%	3,3%	-17,6%	136,2%	0,84	0,54	54	45	36	202
	Post-Event	3,5%	3,3%	-38,6%	116,2%	0,77	0,45	72	61	41	202
CAR (+3,0,-3)	Pre-Event	0,8%	5,7%	-10,6%	56,9%	0,03	0,70	10	6	3	202
	Event	4,3%	3,3%	-17,6%	136,2%	0,84	0,54	54	45	36	202
	Post-Event	2,9%	5,7%	-58,9%	108,5%	0,31	0,49	53	37	27	202
CAR (+5,0,-5)	Pre-Event	1,6%	7,4%	-9,3%	60,4%	0,05	0,69	11	8	4	202
	Event	4,3%	3,3%	-17,6%	136,2%	0,84	0,54	54	45	36	202
	Post-Event	3,3%	7,4%	-50,3%	123,3%	0,21	0,54	40	33	24	202

2 Year Risk-Free US Bond CARs around Merger Announcement Date											
Event Window		Mean	St. Dev.	Min	Max	T-Stat.	P-Value	# of Stat. Sign. CARs at			N
								10% Level	5% Level	1% Level	
CAR (+1,0,-1)	Pre-Event	0,6%	10,9%	-31,4%	58,3%	0,05	0,56	24	13	5	202
	Event	5,6%	10,9%	-31,6%	115,9%	0,45	0,56	36	30	21	202
	Post-Event	3,4%	10,9%	-49,1%	137,6%	0,26	0,56	29	22	14	202
CAR (+3,0,-3)	Pre-Event	1,0%	18,8%	-54,6%	114,2%	0,03	0,62	14	11	7	202
	Event	5,6%	10,9%	-31,6%	115,9%	0,45	0,56	36	30	21	202
	Post-Event	1,3%	18,8%	-110,9%	112,8%	0,03	0,58	25	21	14	202
CAR (+5,0,-5)	Pre-Event	-0,1%	24,3%	-58,5%	108,1%	-0,03	0,63	11	9	7	202
	Event	5,6%	10,9%	-31,6%	115,9%	0,45	0,56	36	30	21	202
	Post-Event	1,4%	24,3%	-91,0%	118,4%	0,01	0,57	27	18	11	202

Figure 3 - CARs around merger announcement date per IPO year

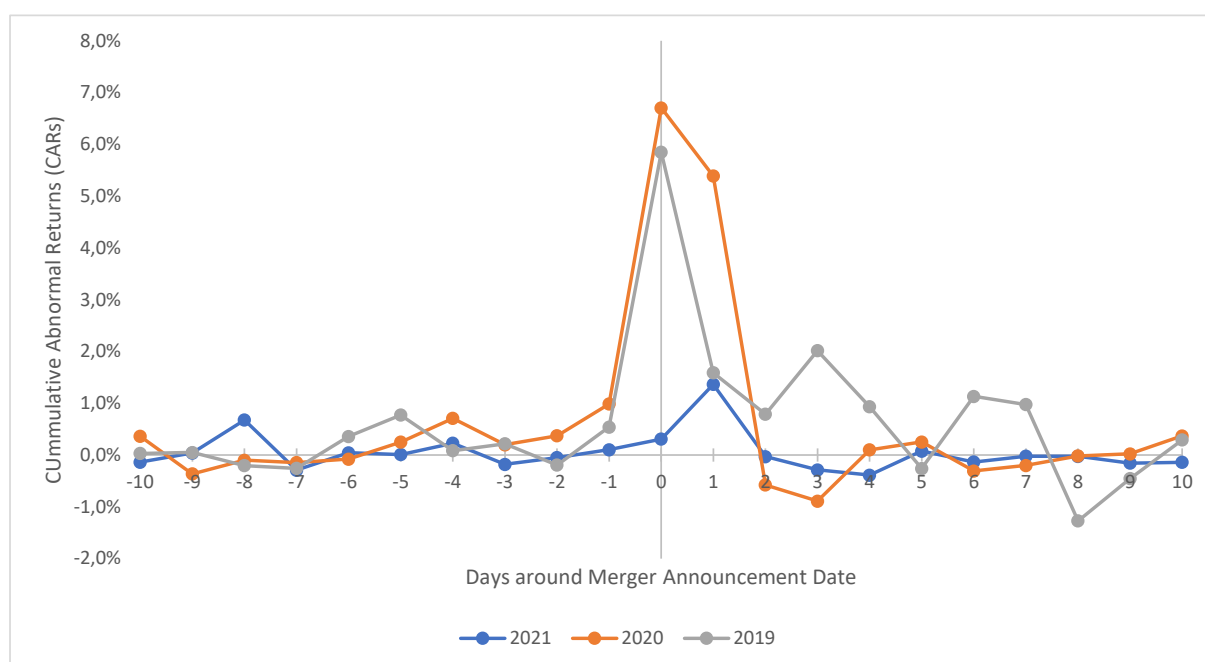


Figure 4 – CARs around merger announcement date per Benchmark

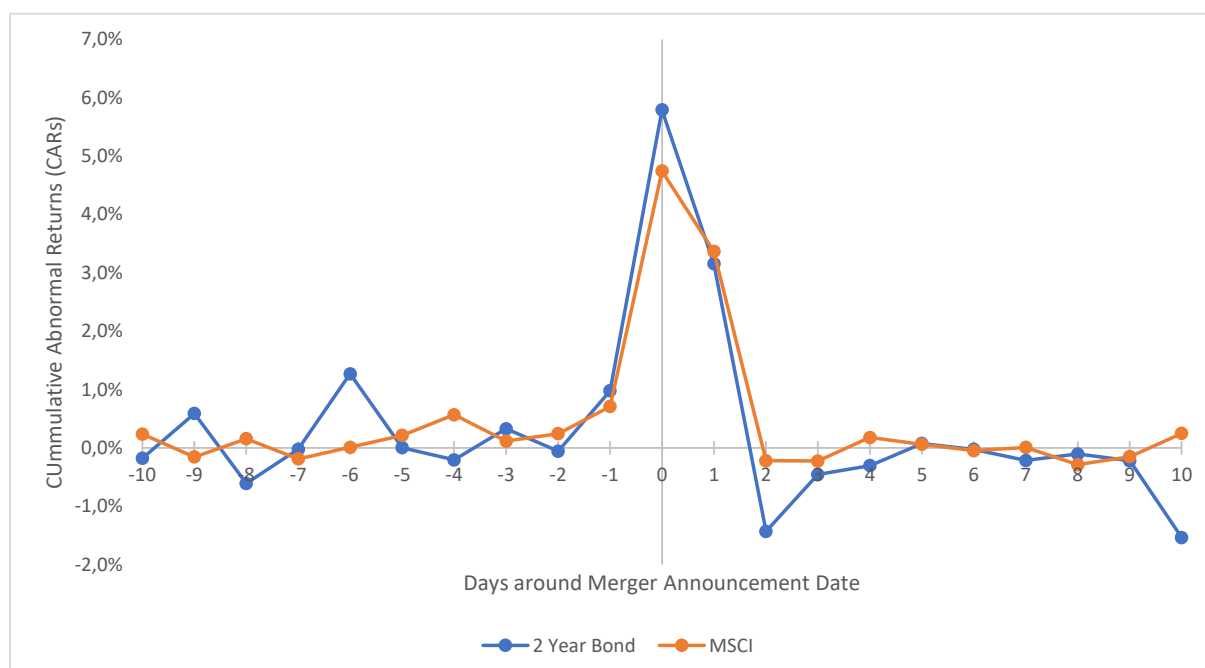


Table 6 - Regression Results Announcement Returns MSCI World Benchmark

	Model 1	Model 2	Model 3	Model 4	Model 5
Dependent Variable: CAR MSCI World					
Intercept	0,0064	0,0167***	0,0154**	0,0166***	0,0087*
Size	0				-0,0011
Number of Managers	-0,001		-0,0003*	-0,0012**	-0,0055
Top Underwriter Dummy	0,0245***				0,0223***
Momentum Target Industry Dummy		-0,0071***			-0,0041***
Sustainability Dummy		-0,0089*			-0,0669**
Pre Announcement Return		0,0025			0,0003
Dummy Quick Found				-0,0151*	-0,0654**
Dummy Last Minute				-0,075*	-0,0056
Time to Annoucement			0,0003**		
Number of Observations	112712	112712	112712	112712	112712
Adj. R ²	0,02%	0,01%	0,01%	0,01%	0,04%

Table 7 - Regression Results Announcement Returns 2 Year Bond Benchmark

	Model 1	Model 2	Model 3	Model 4	Model 5
Dependent Variable: CAR Risk Free US Bond 2 Year Maturity					
Intercept	0,0034	0,0012	0,0003	0,0057*	0,0056
Size	-0,0026				0
Number of Managers	-0,0056		-0,0011**	-0,0002*	-0,0068
Top Underwriter Dummy	0,066***				0,0511***
Momentum Target Industry Dummy		-0,0091**			-0,0221***
Sustainability Dummy		-0,0157**			-0,0056***
Pre Announcement Return		0,0067			0,0002
Dummy Quick Found				-0,007**	-0,0022**
Dummy Last Minute				-0,0033	-0,0035
Time to Annoucement			0***		
Number of Observations	109021	109021	109021	109021	109021
Adj. R ²	0,02%	0,01%	0,02%	0,01%	0,03%

Table 8 - Post-announcement performance

After Annoucement Window - Short Term Performance											
Benchmark	Holding Period	Mean	St. Dev.	Min	Quartil			Max	T-Stat.	P-Value	N
					1st	2nd	3rd				
Raw Returns	CR 30 Days	3,4%	26,1%	-66,7%	-2,7%	0,0%	2,0%	149,8%	0,13	0,90	202
	CR 60 Days	4,0%	33,7%	-86,6%	-2,9%	0,3%	2,2%	184,5%	0,12	0,91	202
	CR 90 Days	5,5%	37,2%	-51,8%	-6,0%	0,5%	2,7%	271,0%	0,15	0,88	202
	CR 120 Days	4,9%	42,8%	-96,8%	-8,3%	0,7%	8,8%	282,3%	0,11	0,91	202
	BHR 30 Days	4,0%	29,5%	-57,4%	-4,3%	0,0%	1,9%	242,1%	0,14	0,89	202
	BHR 60 Days	4,8%	42,9%	-66,2%	-5,7%	0,2%	1,9%	323,2%	0,11	0,91	202
	BHR 90 Days	5,1%	46,8%	-51,0%	-8,2%	0,2%	2,2%	465,6%	0,11	0,91	202
	BHR 120 Days	4,1%	51,3%	-78,3%	-11,1%	0,4%	2,4%	475,8%	0,08	0,94	202
Abnormal Returns MSCI World	CAR 30 Days	1,1%	26,4%	-70,2%	-6,4%	-3,2%	2,0%	149,1%	0,04	0,97	202
	CAR 60 Days	0,1%	33,3%	-88,3%	-9,1%	-4,6%	3,2%	184,5%	0,00	1,00	202
	CAR 90 Days	0,0%	37,1%	-58,7%	-15,2%	-4,4%	3,7%	257,6%	0,00	1,00	202
	CAR 120 Days	-1,9%	43,2%	-112,4%	-17,8%	-3,0%	4,3%	269,4%	0,04	0,96	202
	BHAR 30 Days	1,7%	29,6%	-58,7%	-6,7%	-3,4%	1,0%	240,0%	0,06	0,95	202
	BHAR 60 Days	0,7%	40,8%	-66,7%	-10,1%	-5,1%	2,8%	326,5%	0,02	0,99	202
	BHAR 90 Days	-0,7%	42,4%	-52,4%	-15,2%	-5,5%	2,7%	393,7%	0,02	0,99	202
	BHAR 120 Days	-2,6%	46,6%	-81,1%	-19,9%	-4,7%	2,6%	405,3%	0,06	0,96	202
Abnormal Returns Past 120 Days Trading Average	CAR 30 Days	1,2%	29,0%	-106,3%	-4,5%	0,3%	3,5%	146,9%	0,04	0,97	202
	CAR 60 Days	-0,5%	46,0%	-282,1%	-8,8%	0,4%	5,3%	218,8%	0,01	0,99	202
	CAR 90 Days	-1,5%	60,7%	-474,2%	-14,5%	0,4%	7,2%	334,0%	0,02	0,98	202
	CAR 120 Days	-4,9%	79,1%	-640,8%	-16,5%	1,1%	12,1%	464,7%	0,06	0,95	202
	BHAR 30 Days	2,6%	31,1%	-71,8%	-6,0%	0,2%	3,1%	232,7%	0,08	0,93	202
	BHAR 60 Days	6,5%	69,3%	-95,5%	-10,1%	0,2%	5,1%	756,6%	0,09	0,93	202
	BHAR 90 Days	16,8%	178,1%	-99,4%	-16,8%	0,1%	5,0%	2551,6%	0,09	0,92	202
	BHAR 120 Days	55,8%	621,5%	-99,9%	-21,2%	-0,2%	5,0%	9360,2%	0,09	0,93	202
Abnormal Returns 2 Year Bond	CAR 30 Days	-8,4%	52,6%	-111,5%	-34,1%	-14,7%	14,5%	177,6%	0,16	0,87	202
	CAR 60 Days	-20,6%	72,2%	-137,8%	-53,5%	-29,8%	0,7%	279,5%	0,29	0,78	202
	CAR 90 Days	-34,0%	88,6%	-154,3%	-69,6%	-35,5%	-16,9%	392,7%	0,38	0,70	202
	CAR 120 Days	-45,9%	98,1%	-194,6%	-89,3%	-43,3%	-19,6%	401,1%	0,47	0,64	202
	BHAR 30 Days	-15,5%	46,2%	-80,9%	-43,0%	-21,5%	2,2%	182,2%	0,34	0,74	202
	BHAR 60 Days	-30,0%	75,2%	-86,6%	-57,5%	-40,2%	-21,9%	455,2%	0,40	0,69	202
	BHAR 90 Days	-41,0%	92,1%	-91,1%	-68,6%	-52,8%	-32,1%	806,4%	0,45	0,66	202
	BHAR 120 Days	-50,0%	80,6%	-95,1%	-75,2%	-60,8%	-37,2%	594,5%	0,62	0,54	202

Table 9 - Summarized Regression Analysis Results per post announcement window

Independent Variable	Model 5.1	Model 5.2
	Dependent Variable	
	CR 120 Trading Days	CAR 60 Trading Days
Intercept	0,1182***	0,0893***
Abnormal Return 2 Year Bonds	0,0539***	0,0548**
Pre Announcement Return	0,0012***	0,0564
Number of Managers	-0,0048***	-0,0029***
Top Underwriter Dummy	0,009***	0,0029
Dummy Quick Found	0,1657***	0,0079**
Dummy Last Minute	0,0395***	-0,0655***
Number of Observations	66538	66538
Adj. R ²	0,03%	0,09%

Table 10 - Regression Results post 120 Day Merger Announcement Performance

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Dependent Variable: CR 120 Trading Days after announcement						
Intercept	0,0978	0,0998	0,1313***	0,0824***	0,1867***	0,1182***
Abnormal Return MSCI	0,1238***					
Abnormal Return 2 Year Bonds		0,1715***				0,0539***
Pre Announcement Return	0,0002	0,0012*				0,0012***
Number of Managers			-0,0052***	-0,0063***	-0,0051***	-0,0048***
Top Underwriter Dummy			0,0092***			0,009***
Dummy Quick Found					0,1664***	0,1657***
Dummy Last Minute					0,0412***	0,0395***
Time to Announcement				0,0003***		
Number of Observations	66538	66538	66538	66538	66538	66538
Adj. R ²	0,03%	0,03%	0,03%	0,03%	0,03%	0,03%

Table 11 - Regression Results post 60 Day Merger Announcement Performance

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Dependent Variable: CR 60 Trading Days after announcement						
Intercept	0,0615	0,0656	0,123***	0,1712***	0,1451***	0,0893***
Abnormal Return MSCI	0,027					
Abnormal Return 2 Year Bonds					0,0548**	
Pre Announcement Return	0,0419	0,0269				0,0564
Number of Managers			-0,0089***	-0,0113***	-0,0088***	-0,0029***
Top Underwriter Dummy			-0,0127***			0,0029
Dummy Quick Found					-0,0056*	0,0079**
Dummy Last Minute					-0,0999***	-0,0655***
Time to Annoucement				0,0004***		
Number of Observations	66538	66538	66538	66538	66538	66538
Adj. R2	0,09%	0,09%	0,09%	0,09%	0,09%	0,09%

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