To SPAC or not to SPAC: the Determinants of the Going-Public Decision through Mergers with SPACs

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Abstract: Given the special purpose acquisition companies (SPACs) boom that took place in 2020, this study examines ex-ante firm characteristics that are associated with the going-public decision via SPACs rather than initial public offerings (IPOs). More specifically, I investigate whether foreign firms, compared to their domestic counterparts, are more likely to go public in the United States (US) through SPACs rather than traditional IPOs. In addition, I compare the performance and leverage of SPAC firms with IPO firms. This study uses a sample of 138 SPAC firms and 427 IPO firms that went public during 2016–2021. I find that, compared to US firms, foreign firms are more likely to go public via SPACs than through IPOs. Moreover, results show that SPAC firms are not inferior to conventional IPO firms in terms of their performance. Finally, firms that carry more debt are more likely to go public via a SPAC than through a traditional IPO. Also, additional analyses show that SPAC firms are not more likely to receive a going-concern audit opinion (GCO) in the first two years after going public.

Keywords: Special purpose acquisition company (SPAC), initial public offering (IPO), going public, firm characteristics, going-concern opinion (GCO)

1. Introduction

Although for most people the year 2020 will be notorious due to the COVID-19 pandemic that shut down the world, capital markets will remember the year mostly for the revival of the special purpose acquisition company (SPAC). Simply put, a SPAC is a shell company that raises cash through an initial public offering (IPO) with the only intention to merge with or to acquire another, usually private, company (Blomkvist & Vulanovic, 2020). In 2020, there were 248 United States (US) SPAC IPOs that raised over $83 billion in proceeds, which amounts to an increase of 513% compared to 2019. The Wall Street's SPAC craze does not appear to be slowing down in 2021, since around $97 billion has been raised by 298 SPAC IPOs in the first three months of the year alone (SPAC Analytics, n.d.).

For any company, going public is a huge milestone and marks the beginning of a new phase. The conventional way for a private company to obtain public status is to file for an IPO (hereafter: traditional IPO). However, SPACs are an alternative method that allow private companies to go public, and have become more common over time. For private companies that are looking to go public while raising additional capital, SPACs provide several advantages over traditional IPOs. For instance, proponents claim that merging with a SPAC provides a faster route to the stock market (Klausner, Ohlrogge & Ruan, 2020). Moreover, a SPAC could be attractive for firms that are in their early stages. To illustrate, executives of Clover Health, a start-up company that merged with a SPAC, claim that roadshows for traditional IPOs are not well-suited for younger companies because they cannot provide years of historical financial information to analysts (Beltran, 2021). These advantages are by no means exhaustive, but it does already imply that companies that go public via SPACs could be fundamentally different from companies that opt for a traditional IPO. Moreover, Berger (2008) states that SPACs provide private companies with access to public markets in ways that a traditional IPO often cannot. This suggests that SPACs may attract private companies that are not eligible for a traditional IPO (Klausner et al., 2020). For these reasons, this study aims to relate the likelihood of a SPAC merger, relative to a traditional IPO, to the ex-ante characteristics of the firm when going public. The research question, therefore, is: *"Which ex-ante firm characteristics are associated with the going-public decision via SPACs rather than traditional IPOs?"*.

Firstly, I investigate the propensity of foreign firms (i.e., non-US firms) to go public in the US via SPACs rather than traditional IPOs compared to their domestic counterparts. Cumming,

Haß and Schweizer (2014) show that US SPACs have developed as international SPACs as a significant amount of SPACs merged with a foreign firm. Amongst other reasons, this increasing trend can be explained by the fact that foreign firms experience higher IPO underpricing than domestic firms (Francis, Hasan & Li, 2001). At the same time, these foreign issuers benefit from certain financial reporting exemptions, which usually do not apply to SPAC firms. For these reasons, it is unclear if foreign firms, compared to domestic firms, are more likely to list on US markets via SPACs than via traditional IPOs.

Furthermore, this study investigates the claim that SPACs can be seen as a "backdoor" to enter public markets for firms that are not eligible for a traditional IPO (Brown, Ferguson & Lam, 2013; Klausner et al., 2020). This is empirically tested by comparing the ex-ante profitability and debt ratio of SPAC firms and traditional IPO firms. Earlier research shows that SPAC firms are less profitable and carry more debt than firms that take the traditional IPO route (e.g., Datar, Emm & Ince, 2012; Kolb & Tykvová, 2016). However, these results might be due to the fact that the SPAC and compensation structure of earlier SPACs was not specifically designed to align the interests of SPAC sponsors with those of shareholders[1] (Rodrigues & Stegemoller, 2014), which resulted in SPACs acquiring low-quality firms. Since the institutional environment of SPACs has significantly changed since its inception in 2003, it can be expected that the profitability and debt ratio of SPAC firms and IPO firms has become more similar to each other. Therefore, I hypothesize that there is no significant difference between the ex-ante profitability and debt ratio of SPAC firms and traditional IPO firms.

To empirically test these predictions, I compare the pre-listing characteristics between firms that completed a US SPAC merger[2] (SPAC firms) and firms that underwent a traditional US IPO (IPO firms) during the 2016–2021 period. Firstly, IPO and SPAC firms are identified using the *ThomsonONE Equity* and the *ThomsonONE M&A* database, respectively. This leads to a sample consisting of 138 SPAC firms and 427 IPO firms. Secondly, data on (ex-ante) firm-specific variables is primarily obtained from *ThomsonONE* and *Compustat*, while missing data is hand-

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[1] An imperfect compensation structure induced myopic behaviour from SPAC sponsors. In the past, SPAC sponsors were typically compensated with 20% of the shares outstanding after the IPO, which become valuable in the case of a merger completion. However, they received nothing if the SPAC failed to find a target firm to merge with (Rodrigues & Stegemoller, 2012). Compensation solely based on this aspect created incentives for managers to bring bad firms into the market. I discuss this in more detail in section 2.

[2] SPACs have multiple statuses (e.g., announced merger, completed merger). In this study, the focus is on completed mergers. The reason for this is that announced SPAC mergers are not definite since shareholders (typically) have to approve these mergers. As a result, announced mergers may not follow through.

collected from the Securities and Exchange Commission's (SEC's) *Electronic Data Gathering, Analysis, and Retrieval* (EDGAR) database. While estimating a multinominal logistic regression, I find that, compared to domestic firms, foreign firms are more likely to go public to merge with a SPAC to obtain public status. Furthermore, results show that SPAC firms are comparable to IPO firms in terms of their performance before they go public. Finally, I find that private firms that carry more debt tend to take the SPAC route rather than the conventional IPO route. These results are robust to a change in the measurement period and the use of a matched sample. Also, additional analyses show that SPAC firms are not more likely to receive a going-concern audit opinion (GCO) in the first two years after going public.

This study contributes to the relatively new and underdeveloped literature on SPACs. Existing empirical studies address the stock performance of SPACs (e.g., Dimitrova, 2017; Gahng, Ritter & Zhang, 2021; Klausner et al., 2020; Kolb & Tykvová, 2016) and the determinants of SPAC outcomes (e.g., Cumming, Haß & Schweizer, 2014; Dimic, Vulanovic & Lawrence, 2020). This paper relates to other studies that also investigate the firm-specific variables that are associated with the going-public decision via SPACs rather than traditional IPOs. Datar et al. (2012) and Kolb and Tykvová (2016) compare SPAC firms with IPO firms, and show that SPAC firms are smaller, carry more debt and have lower growth opportunities. However, their investigation period concerns the period 2003–2008 and 2003–2015, respectively. As earlier mentioned, the institutional environment of SPACs has significantly changed to provide investors more protection (Rodrigues & Stegemoller, 2012), causing some practitioners to refer to the post-2015 period as the "SPAC 3.5" generation (Gahng et al., 2021). In light of this, the study of Bai et al. (2021) is probably more suitable. In their study, they obtain SPAC firm data from 2003 to 2020 and show that smaller, riskier and higher-growth companies tend to go public via SPACs rather than via traditional IPOs. However, they measure firm-specific variables after the going public period, which could bias the results.[3] In addition, these results might not reflect the SPACs we are currently seeing because they also include the early SPAC years in their sample. Therefore, this research aims to contribute to the existing literature by focusing on more recent years (i.e., 2016–2021). Finally, to my knowledge, this is the first study that looks at the propensity of a foreign firm to go public via a SPAC rather

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[3] Bai et al. (2021) inferred ex-ante firm riskiness (e.g., firm size, profitability) by using data from the going public year. In contrast, I focus on how the pre-listing characteristics of SPAC firms differ from those of IPO firms. Consequently, different results could be expected since, for example, SPACs commonly use debt financing to complete the merger, while debt financing does not play a role in the traditional IPO process (Kolb & Tykvová, 2016).

than a traditional IPO, relative to their domestic counterparts.

In addition, this study is especially relevant given the recent explosive rise of SPACs, as shown in Figure 1. Moreover, as of May 2021, SPAC proceeds take up 62% of all IPO proceeds, as shown in Figure 2. Because of the increasing impact that SPAC firms have on the economy, research on the quality of SPAC mergers is important since (retail) investors typically bear the cost of the dilution that takes place after the merger[4] (Klausner et al., 2020), while at the same time these investors also typically experience poor post-merger stock performance (Gahng et al., 2021; Klausner et al., 2020; Kolb & Tykvová, 2016). Moreover, this study provides multiple policy implications. These implications are especially relevant since recent statements regarding SPACs made by several SEC's senior officials offer a good window into how the SEC is keeping a close eye on the development of SPACs.[5] Firstly, it can be said that the US is wary of foreign companies listing in their country. This study suggests that attention also needs to be placed on the possibility that these firms use alternative routes, such as SPACs, as a loophole. In addition, one way to counteract this shift towards unconventional paths is to make the IPO process more transparent by improving the price discovery process of IPOs. Moreover, results show that SPACs should be seen as a "backdoor" for firms that are not fit for an IPO. For this reason, the playing field between SPACs and traditional IPOs should be levelled by removing the safe harbor provision for SPACs, which reduces the ability of SPACs to disclose rosy, unrealistic projections. Finally, to further incentivise SPAC sponsors to bring higher-quality firms to the market, a change has to be made regarding the voting and redemption rights of public shareholders. The current situation creates a misalignment issue, since investors can vote in favour of a bad merger but still redeem because they hold warrants. To eliminate this problem, it would be beneficial to remove this SPAC feature. One suggestion could be to bring the two separate decisions back to one decision. Alternatively,

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[4] Founder shares held by SPAC sponsors, share redemptions and the exercise of warrants held by public SPAC sponsors and shareholders are sources of dilution, which takes place after the SPAC merger. Retail shareholders are commonly the ones who pay for the dilution costs, since the main investors in a SPAC IPO are large hedge funds (also known as the "SPAC mafia") that usually exit before the completion of the SPAC merger (Klausner et al., 2020).

[5] On March 10, 2021, SEC's officer of Investor Education and Advocacy Paul Munter cautioned investors not to invest in SPACs based solely on a celebrity's endorsement. On April 8, 2021, John Coates, the Acting Director of the Division of Corporation Finance, warned that the SEC staff are "continuing to look carefully at filings and disclosures by SPACs and their private targets" and reminded SPAC issuers that they are liable for misstatements and omissions in their filings. On that same day, Munter and Coates issued accounting guidance that suggested that SPAC warrants should be classified as liabilities instead of equity instruments. This led to a halt in the SPAC boom, as the number of new SPACs reduced to ten in April (in comparison, there were more than 100 SPAC deals in March).

SPACs should be required that the proposed merger should not go through if more than 50% of the SPAC shareholders redeem.

This study is subject to several limitations. Firstly, it has to be noted that there are relatively few foreign firms for both the IPO and SPAC sample. Neither did this study take other alternative routes to list in the US for foreign companies into account. It might be that these alternative routes are significantly more popular than the routes that were the focus in this study. Secondly, the results are limited to the US market. Given the fact that the listing requirements differ by country, the findings may not translate to other countries.

Looking ahead, more insight into why non-US firms prefer a SPAC to an IPO is needed to extend the explanations that drive the going-public decision of these firms. Furthermore, it would be interesting to examine the ex-ante firm characteristics of firms that go public through SPACs in other countries, since the institutional environment of SPACs in those countries deviates from that of the US. In addition, future research should investigate to what degree US SPAC firms differ from SPAC firms that are listed in other countries, and how this relates to the different SPAC structures.

[Insert Figure 1 and 2 here]

2. Institutional Background

2.1. SPAC's Lifecycle and its Evolution

SPACs are shell companies with no operating history that raise funds through a public IPO. They use these proceeds with the sole purpose to acquire or merge with another (private) company, which takes the private company public (Chatterjee, Chidambaran & Goswami, 2016). Although the recent SPAC boom[6] might make it seem like SPACs are relatively new, fact is that the modern SPAC has been around since 2003 (Dimic et al., 2020) and emerged out of the notorious blank check companies of the 1980s (Cumming et al., 2014).[7] Moreover, while the SPACs we currently

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[6] There are multiple explanations for the SPAC boom. Firstly, the COVID-19 pandemic made the market more volatile and uncertain. While traditional IPOs are sensitive to economic conditions, firms that go public via SPACs are subject to much less valuation uncertainty since the valuation of the target firm is agreed to upfront between the company and the SPAC (Rodrigues & Stegemoller, 2014). Moreover, the low-interest environment may have boosted the popularity of SPACs. For example, Bai et al. (2021) find that the yield-seeking market contributed to the recent rise of SPACs.
[7] Although the differences between SPACs and blank check companies are small, they are usually not the same. Blank check companies of the 1980s had a poor reputation since many were part of fraudulent schemes (Cumming et al., 2014). Consequently, the SEC introduced Rule 419 that led to improved transparency, investor protection and

see on the US market significantly differ from their earlier counterparts and will probably continue to develop, the lifecycle of a SPAC has remained largely the same. As can be seen in Figure 3, multiple stages in the lifecycle of a SPAC can be identified. The various steps and their development will be described below.

[Insert Figure 3 here]

2.1.1. Stage A: Pre-IPO period

Stage A refers to the pre-IPO period of a SPAC, in which a group of managers decide to form a SPAC. These managers typically have backgrounds in private equity, hedge funds or entrepreneurship (Bai et al., 2021). In order to obtain public status, SPACs have to file a prospectus (Form S-1) with the SEC. Among other things, this prospectus outlines management's investment focus (e.g., industry and/or geographic region), expertise of management and the time frame SPACs have to complete a transaction (Cumming et al., 2014).[8] Furthermore, prior to the IPO, these so-called SPAC sponsors usually acquire a 20% interest in the SPAC (Dimitrova, 2017). Initially, SPAC sponsors were only required to pay a relatively small nominal amount (i.e., $25,000) for these founder shares (Rodrigues & Stegemoller, 2012). The proceeds from this sponsor investment were put in a (interest-bearing) trust account and were only released when the SPAC completed a merger. This structure created significant misalignment problems between the SPAC sponsors and investors since it strongly incentivised SPAC sponsors to make a deal, regardless of the quality of the target firm (Rodrigues & Stegemoller, 2012). For this reason, the compensation structure of a SPAC has significantly changed throughout the years. Firstly, since around 2010, SPACs evolved to require its founders to put "skin in the game", which involves purchasing warrants before the IPO, which are also deposited into the trust account (Gahng et al., 2021). On the one hand, this may provide SPAC sponsors with a greater incentive to complete a merger since they expire worthless if the SPAC fails to complete a merger (Rodrigues & Stegemoller, 2014). On the other hand, since these investments can take up to 3% of the IPO proceeds (Berger, 2008), it leads to a

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alignment between management and investors (Kolb & Tykvová, 2016). Rule 419 defines a blank check company as a company that has no specific business plan or purpose or has the intention to engage in a merger or acquisition with an unidentified company and issues penny stock (e.g., when stock trades under $5 per share and when post-IPO total net assets are lower than $5 million) (17 CFR §230.419(a)(2)). Modern SPACs are voluntarily designed to mirror the protective features of Rule 419, but avoid being classified as penny stock so that it is exempt from Rule 419 compliance. For example, shares of a SPAC are allowed to trade after the IPO. In contrast, shares of firms that are subject to Rule 419 do not trade until the acquisition (Rodrigues & Stegemoller, 2012).

[8] The time frame depends on the requirements of the different listing exchanges. Typically, SPACs have a window of 18 to 24 months after the IPO date before liquidation (Kolb & Tykvová, 2016).

significantly higher trust account, which makes redemption[9] more attractive for investors. As a result, it also provides managers with an incentive to propose a value-increasing deal (Gahng et al., 2021). Secondly, a lock-up agreement is another safeguard that is employed in more recent SPACs. This causes founder shares and/or warrants to remain locked for a specific period after the business combination (Klausner et al., 2020; Rodrigues & Stegemoller, 2012). Finally, the most effective way to incentivise SPAC sponsors to propose high-quality mergers is linking compensation to post-merger (stock) performance, which is often done in modern SPACs. For example, some SPACs have a stepwise release of founder shares if certain milestones are reached (for examples, see Gahng et al. (2021) and Rodrigues & Stegemoller (2012)).

2.1.2. *Stage B: The SPAC IPO*

Following the formation, the SPAC IPO issuance takes place (stage B). In its IPO, a SPAC offers units at $10 which consists of a combination of shares and warrants, which can be traded separately (Chatterjee et al., 2016). In early SPACs, the unit consisted of one share and one (or two) in-the-money warrant (Berger, 2008). However, to address the dilutive effect of these warrants[10], modern SPACs either set the exercise price of a warrant at a premium or they offer warrants that only convert to a fraction of a share (Gahng et al., 2021).[11] In addition, offering fewer warrants to public shareholders should also reduce the incentive misalignment problem in which shareholders redeem their shares but still vote in favour of bad mergers because they hold warrants. Consequently, they are more likely to turn down value-destroying mergers which would incentivise SPAC sponsors to merge with higher-quality firms (Gahng et al., 2021). The net proceeds raised by the offering are held in a trust account (Chatterjee et al., 2016), and are invested in low-risk US government securities (Dimitrova, 2017). These proceeds can only be released 1) to complete a merger transaction, 2) to acquire a company, 3) to return to shareholders on a pro-rata basis in the case of liquidation or 4) to redeem shares (Klausner et al., 2020). Prior to 2004, SPACs placed 85% of the IPO proceeds in the trust account. In recent years, more than 100% is held in the trust account

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[9] Shareholders are usually allowed to vote on the proposed merger. Regardless of their vote, they have the right to redeem their shares to receive a pro-rata share of the proceeds in the trust. SPAC sponsors typically try to induce shareholders to not redeem their shares (for example, by proposing a high-quality target firm) because otherwise they would have to raise additional capital in the form of a private investment in public equity (PIPE), which imposes additional costs (Gahng et al., 2021).

[10] When exercised, warrants will become shares, diluting the ownership of existing shareholders (Gahng et al., 2021).

[11] On February 21, 2021, the TortoiseEcofin Acquisition Corp. III became the first SPAC that filed a prospectus stating that public shareholders do not receive any warrants.

(Gahng et al., 2021).[12] Therefore, there is little downside risk for shareholders if the SPAC fails to complete a merger (Rodrigues & Stegemoller, 2014).

2.1.3. Stage C: Search for Target Firm

Once shares are traded in the open market, the sponsors start the search for an appropriate target firm (stage C). These firms are not known at the IPO date, and should have a market value of at least 80% of the IPO proceeds. Moreover, if they fail to complete a business combination within the predetermined time frame, the IPO proceeds are returned on a pro-rata basis to the shareholders (Dimitrova, 2017). Although investors largely depend on the capabilities of the sponsors to find a sound target firm, SPACs lack reputational constraints since sponsors rarely set up multiple SPACs (Rodrigues & Stegemoller, 2012).

2.1.4. Stage D: Target Announcement

When the SPAC identifies a suitable target company to merge with, which is also known as the "deSPAC" transaction, the target is announced to the public via an 8-K filing (Cumming et al., 2014) (stage D). One important feature of a SPAC is that, as opposed to firms that go public via traditional IPOs, they are covered by a safe harbor provided by the Private Securities Litigation Reform Act (PSLRA)[13] which protects them from private litigations related to forward-looking statements (Klausner et al., 2020). Consequently, SPACs have a significant advantage over traditional IPOs since firms can disclose forward-looking information and projections that would normally not be disclosed in traditional IPO filings.[14] This feature is especially valuable for young companies that are still pre-revenue and/or pre-profit.

2.1.5. Stage E: Shareholder Vote or Tender Offer

Stage E refers to the shareholder approval of the announced business combination. Initially,

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[12] The percentage held in the trust can exceed 100% if the amount paid by the SPAC sponsors for the shares and warrants exceeds the amount spent on offering costs. This trend can be explained by the increasing competition between SPACs (Rodrigues & Stegemoller, 2012).

[13] The PSLRA offers listed companies protection from private litigation for forward-looking statements. The safe harbor provided by the PSLRA does not apply to statements made in connection with securities offerings by i) a blank check company, ii) a penny stock issuer, and iii) those made in connection with an IPO (15 US Code § 77z–2 (b)). SPAC sponsors generally operate on the basis that the safe harbor does apply to SPACs since it concerns a merger.

[14] In a statement released on April 8, 2021, SEC's John Coates questioned the view that the safe harbor provided by the PLSRA applies to SPACs. Since the PSLRA does not define an IPO, Coates argues that the "deSPAC" transaction should be seen as the "real IPO". Moreover, Coates emphasizes that the safe harbor only applies to private litigation, and not to SEC enforcement actions. Although this statement only represents the views of Coates and not of the SEC itself, it does suggest that the SEC might consider new guidance for SPACs.

all SPACs required shareholder approval by vote. In addition, the voting and redemption rights of public shareholders became separate decisions in 2010 (Gahng et al., 2021). As a result, the SPAC deal was typically approved by shareholders if 1) a majority of shareholders voted in favour of the proposed merger, and 2) less than a maximum percentage ("the threshold") of shareholders (i.e., 20%) chose to redeem their shares (Rodrigues & Stegemoller, 2012).[15] However, this voting structure got exploited by shareholders with large holdings, usually hedge funds (also known as the "SPAC mafia"), by engaging in greenmailing (Lewellen, 2009).[16] In addition, in practice it became evident that these requirements were an obstacle to acquisition approval. In response to these issues, SPACs restructured the voting mechanism by increasing the threshold level (Rodrigues & Stegemoller, 2012). Nevertheless, many SPACs abandoned the shareholder vote and use tender offers instead[17], which allow shareholders who do not agree with the proposed deal to tender their shares back to the SPAC (Rodrigues & Stegemoller, 2012). Klausner et al. (2020) and Gahng et al. (2021) find that most initial investors in SPACs exit before the merger since, on average, two thirds of shares are eventually redeemed. Therefore, it can be concluded that the actual capital delivered to target firms is significantly lower than what the initial IPO proceeds suggest.

2.1.6. *Stage F and G: Outcome of the Shareholder Vote or Tender Offer*

The final stages of a SPAC's lifecycle refer to the outcome of the shareholder vote or tender offer. Since the amount of cash that is available to consummate the merger is uncertain due to the redemption right of shareholders, target firms often negotiate a minimum amount of cash that SPACs must deliver to them (Gahng et al., 2021). To backstop any redemptions or to meet the cash requirement, SPACs often have to raise further funds to finance the business combination, either through PIPEs or by using debt financing (Dimitrova, 2017; Gahng et al., 2021; Lewellen, 2009). The PIPE transactions can either involve equity or debt securities (Gahng et al., 2021). If the proposed SPAC deal obtains shareholder approval and is able to satisfy the cash requirement, the business combination can be completed, which takes the private company public, and the SPAC usually begins to trade under a new ticker (stage F) (Gahng et al., 2021). On the other hand, if

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[15] Irrespective of their voting decisions, shareholders are allowed to keep their warrants (Dimitrova, 2017).
[16] Greenmailing is a practice in which large shareholders threaten to redeem their shares, which causes SPAC sponsors to give them inducements in return for a vote in favour of the deal or to buy their shares at a premium (Lewellen, 2009). Given the relatively short window to complete a deal, a failure of a shareholder vote is likely followed up with the liquidation of the SPAC. Therefore, the incentive to give in to the wishes of large shareholders is high.
[17] For instance, in 2010, NASDAQ allowed tender offers instead of a shareholder vote (Release No. 34-63607).

shareholders reject the merger proposal or if the terms of the merger agreement cannot be met, the SPAC sponsors can search for another target company, or they can be forced into liquidation (stage G). In case of liquidation, the warrants expire worthless, SPAC sponsors lose their promote and public shareholders are entitled to their pro-rata share of the amount held in the interest-bearing trust account (Rodrigues & Stegemoller, 2012).

3. Literature Review and Hypothesis Development

3.1. Prior Literature on SPAC Determinants

Since the SPAC is a relatively new investment vehicle, literature on SPACs is still underdeveloped. The first financial literature on SPACs emerged in 2007, and since then papers mostly focused on the stock performance of SPACs. In addition, the large majority focuses on the US SPAC market. Since this study examines the determinants of the going-public decision via SPACs rather than traditional IPOs, this section provides a summary of prior literature on the determinants that have already been investigated.

Firstly, Datar et al. (2012) investigate SPAC firm characteristics of 156 US SPACs during the 2003–2008 period and find that these firms are smaller, carry more debt, invest less and lack growth opportunities compared to traditional IPO firms. Kolb and Tykvová (2016) extend these findings by also investigating market- and deal-specific factors that could influence the going-public decision via SPACs rather than traditional IPOs. In addition, Kolb and Tykvová (2016) analyse both first- and second-generation SPACs (i.e., between 2003–2015) and compare them with 1,128 traditional IPO firms. With a sample consisting of 127 US SPACs, their results are in accordance with the previous results since they find that SPACs are mostly adopted by small, levered and low-growth firms. Moreover, using a matched sample, they find evidence that more profitable firms, measured by a firm's return on assets, are more likely to go public via IPOs than via SPACs. Regarding the market-specific variables, Kolb and Tykvová (2016) find that SPACs are an attractive alternative when markets are volatile. Finally, they find that existing shareholders looking to cash out some of their holdings are more likely to go public via a SPAC than via a traditional IPO (Kolb & Tykvová, 2016). Blomkvist and Vulanovic (2020) study 411 US SPAC IPOs between 2003 and 2019 and find, contrary to the findings of Kolb and Tykvová (2016), that their issuance is negatively related to the volatility of the market. Moreover, they show that the SPAC share and volume is lower when overall risk aversion is high (Blomkvist & Vulanovic, 2020).

In contrast to the findings of Datar et al. (2012) and Kolb and Tykvová (2016), which suggest that low-quality target firms typically opt for a SPAC instead of an IPO, the theoretical framework developed by Chatterjee et al. (2016) shows that the SPAC structure is suited for good quality, but risky, firms to obtain public status.[18] In line with this study, Bai et al. (2021) also contend through their theoretical framework that good but risky firms go public in the SPAC market.[19] Moreover, they support this claim with empirical evidence by studying 230 US SPAC firms during the 2003–2020 period. In accordance with their theoretical framework, Bai et al. (2021) find that smaller, riskier and higher-growth companies are more likely to go public via a SPAC rather than a traditional IPO. Finally, they do not find a significant difference between the profitability of SPAC firms and IPO firms (Bai et al., 2021).

3.2. Listing on Foreign Exchange Markets

As of now, literature on the going-public decision by foreign firms via SPACs or traditional IPOs does not exist. Therefore, this section focuses on the outcomes of these listings via traditional IPOs and why SPACs could be an attractive alternative for these firms.

As is the case with domestic firms, non-US firms seeking to obtain public status in the US often issue an IPO. However, this typically comes at a significant cost called underpricing.[20] This can be explained by the notion of Hymer (1960), in which he claims that a foreign company does not only deal with what is called "liability of newness", but also with a "liability of foreignness".[21] These phenomena both stem from information asymmetry, in which the latter is caused by investors' unfamiliarity with the foreign firm (Moore, Bell & Filatotchev, 2010). This "liability of foreignness" seems to affect IPO performance negatively, since research shows that foreign firms seeking to raise capital in the US via IPOs experience a higher level of underpricing than domestic firms (Francis et al., 2001), which makes listing via an IPO expensive for these firms.

In contrast, foreign firms that merge with a US SPAC get to avoid these indirect costs of an IPO since they are subject to less valuation uncertainty because the valuation of the target firm can

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[18] According to Chatterjee et al. (2016), a firm of good quality is determined by the firm's expected cash flows. A firm's riskiness is determined by the riskiness of its cash flows.
[19] According to Bai et al. (2021), good firms have higher expected returns than bad firms. Moreover, risky firms will have a higher return in a favourable scenario but they are also dealing with a lower probability of that scenario.
[20] Underpricing occurs when the first-day closing price is higher than the initial offer price, and represents "money left on the table" (Loughran & Ritter, 2004).
[21] Zaheer (1995, p. 343) defines liability of foreignness as "all additional costs a firm operating in a market overseas incurs that a local firm would not occur".

be agreed to upfront between the company and the SPAC (Rodrigues & Stegemoller, 2014). Moreover, while these foreign firms still have to follow SEC requirements, they do get to skip the complicated IPO process (Heyman, 2007). Finally, another reason as to why foreign firms go public via a SPAC rather than a traditional IPO is that they have special situations that make them unfit for an IPO (Chatterjee et al., 2016). For these reasons alone, SPACs are an attractive alternative for foreign firms to enter the US market. In fact, US SPACs have developed as international SPACs since Cumming et al. (2014) and Gahng et al. (2021) find that about one third of SPACs merged with firms operating in foreign countries, and the majority of these SPACs focused on China. Moreover, Gahng et al. (2021) show that foreign target firms tend to underperform compared to their domestic counterparts in the short term, while three years after the merger it is the other way around.

3.3. Hypothesis Development

3.3.1. SPACs and Foreign Firms

The first firm characteristic that could be associated with the going-public decision of a firm via a SPAC applies to whether a company is foreign or domestic. As has been previously stated, Cumming et al. (2014) and Gahng et al. (2021) show that a significant number of US SPACs merged with non-US firms. There could be multiple explanations for this trend. Firstly, foreign firms seeking to raise capital in the US experience a higher level of underpricing than domestic firms due to the fact that they deal with greater information asymmetry (Francis et al., 2001). As a result, undergoing a traditional IPO is expensive for these firms. In contrast, SPACs offer more valuation certainty to firms (Stegemoller & Rodrigues, 2014). Secondly, merging with a SPAC could not only be a cheaper alternative[22], foreign companies also get to avoid the complex and often difficult IPO process. For instance, certain foreign companies that list in the US have to deal with additional listing requirements, which do not apply to domestic firms.[23]

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[22] Merging via a SPAC is not necessarily a less costly route than an IPO. According to Klausner et al. (2020), the total costs (e.g., sponsor promote, warrants, underwriting fee) of a SPAC are higher than that of a traditional IPO (e.g., underwriting fee, underpricing). However, the big difference is that, unlike in a traditional IPO, firms do not bear these costs themselves. Instead, a large part of the cost of dilution is left with the SPAC shareholders.

[23] Nasdaq wants to impose additional listing requirements for companies that primarily operate in jurisdictions that do not provide the Public Company Accounting Oversight Board (PCAOB). One of the new rules to be adopted requires these companies to raise at least $25 million in their IPO or 25% of the company's post-offering market value of listed securities, whichever is lower (SEC, 2021). Also, on December 18, 2020, the Holding Foreign Companies Accountable Act (HFCA) was signed into US law. This act requires foreign companies that are listed in the US and refuse PCAOB inspections to make additional disclosures (Public Law No. 116-222).

On the other hand, while foreign IPO issuers are usually allowed to use International Financial Reporting Standards (IFRS) or local Generally Accepted Accounting Principles (GAAP) with a reconciliation to US GAAP when preparing the financial statements[24], foreign firms that merge with a SPAC may be required to adhere to US GAAP.[25] Since conversions to US GAAP involve significant time and effort, it imposes additional challenges to foreign firms that go public via US SPACs. In addition, non-US firms that list on US markets via an IPO can qualify as foreign private issuers (FPI), and this status comes with several benefits in the form of financial reporting exemptions. For instance, FPIs are not required to file quarterly reports on Form 10-Q or current reports on Form 8-K and they are exempt from US proxy rules (SEC, n.d.). As a result, these firms can avoid the additional compliance costs of US domestic issuers. All in all, it remains an empirical question if foreign firms, compared to domestic firms, are more likely to list on US markets via SPACs than via traditional IPOs. Therefore, the first hypothesis is:

H_1: Compared to their domestic counterparts, foreign companies are not more likely to go public in the US through a SPAC than a traditional IPO.

3.3.2. *SPACs and Firm Profitability*

SPACs can be seen as a "backdoor" to enter public markets for firms that are not eligible for a traditional IPO (Brown et al., 2013; Klausner et al., 2020). For instance, Kolb and Tykvová (2016) find that first- and second generation SPAC firms show lower profitability than IPO firms. This result can be explained by the fact that, unlike with traditional IPOs, merger rules apply to SPACs, which provides them with a safe harbor to include forward-looking information and projections in their statements (Klausner et al., 2020). This feature should be valuable for companies that are not very profitable at the time of going public. Alternatively, the finding of Kolb and Tykvová (2016) could be driven by the fact that the compensation structure of earlier SPACs was not specifically designed to align the interests of SPAC sponsors and shareholders (Rodrigues & Stegemoller, 2014), which lead SPAC sponsors to bring low-quality firms into the market. Over time, this compensation structure has significantly changed, by means of requiring sponsors to put "skin in the game", lock-up agreements and linking sponsor compensation to post-merger (stock) performance (Gahng et

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[24] *Financial Reporting Manual*, Section 6310.1.
[25] Foreign targets are required to prepare their financial statements in accordance with US GAAP if they merge with a US-domiciled SPAC (*Financial Reporting Manual*, Section 6410.4). If the foreign target merges with a foreign-domiciled SPAC, they may be able to qualify as a foreign private issuer (if they meet certain criteria) which allows the foreign target to use IFRS Standards or local GAAP with a reconciliation to US GAAP.

al., 2021). Moreover, the amount of warrants SPACs offer to public shareholders has dropped over time, which makes it more likely that shareholders reject bad SPAC merger proposals (Gahng et al., 2021). In addition, in recent years, SPACs place more than 100% of the IPO proceeds in the trust account, which makes redemption more attractive (Gahng et al., 2021). These measures should provide SPAC sponsors with additional incentives to expend costly effort and choose a high-quality firm to merge with. In line with this, recent research of Bai et al. (2021) shows that the profitability of SPAC firms is comparable to that of IPO firms during the 2003–2020 period. For these reasons, the second hypothesis is:

H$_2$: There is no significant difference between the ex-ante profitability of SPAC firms and IPO firms for the "SPAC 3.5" generation.

3.3.3. *SPACs and Firm Leverage*

The final hypothesis relates to the capital structure of firms that decide to go public. On the one hand, high-levered firms may have difficulty in undergoing the traditional IPO process since these firms might be too risky for IPO investors. This notion is supported by the finding that, for the first- and second generation SPACs, higher-leveraged firms are more likely to go public via SPACs than via traditional IPOs (Datar et al., 2012; Kolb & Tykvová, 2016). On the other hand, low-levered target firms might be more attractive for SPACs since SPACs are usually forced to raise new capital by means of debt financing or PIPEs, which are either structured in the form of equity or debt, to carry out the business combination due to the right that shareholders have to redeem or tender their shares (Dimitrova, 2017; Gahng et al., 2021; Lewellen, 2009). If the target firm already carries a significant amount of debt, it will be risky to increase the debt ratio even more since it will increase the risk of bankruptcy and the cost of capital (Kolb & Tykvová, 2016). In contrast, debt financing does not play a role in the traditional IPO process (Kolb & Tykvová, 2016).

Initially, only 20% of shareholders were allowed to redeem their shares to complete the merger (Rodrigues & Stegemoller, 2012). Over time, this threshold grew to higher levels (Rodrigues & Stegemoller, 2012), and currently, two-thirds of the initial SPAC investors exit before the merger (Gahng et al., 2021; Klausner et al., 2020). This implies that more recent SPACs have to issue even more additional capital (either equity or debt) to consummate the merger than their predecessors (i.e., first- and second generation SPACs). In addition, the aforementioned change in the incentives of SPAC sponsors could also result in them focusing on a higher-quality

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target firm in terms of their capital structure. For these reasons, it seems like the role of debt of target firms has become more important for the "SPAC 3.5" generation, which should lead to smaller differences between SPAC and IPO firms in terms of their debt. Therefore, I expect that the findings of Datar et al. (2012) and Kolb and Tykvová (2016) do not hold for the SPACs we currently see on the market. Hence, the third hypothesis is:

H_3: There is no significant difference between the ex-ante debt ratio of SPAC firms and IPO firms for the "SPAC 3.5" generation.

4. Sample Selection and Research Design

4.1. Sample Selection

The sample selection procedure for SPAC firms is outlined in Panel A of Table 1. Firstly, I identify 230,862 mergers and acquisitions (M&As) from 2016 and onwards using the *ThomsonONE M&A* database.[26] Secondly, I exclude all SPAC deals that have an acquiror (i.e., SPAC) that does not list on the US market, and M&As without SPAC involvement are also dropped. Next, I exclude SPACs that merged with a financial service firm (SIC codes 6000–6999). Finally, since this study specifically focuses on the "SPAC 3.5" generation, I further exclude 13 SPAC mergers that have an IPO date before January 2016. As a result, the total sample consists of 140 firms that went public in the US through a successfully completed SPAC from 2016 and onwards. Regarding the foreign SPAC firms, I exclude 129 firms from the full SPAC sample that are located in the US. In addition, I drop 2 foreign firms that went public through SPACs that have an IPO date before the year 2016. As a result, there are 22 non-US firms.

The sample selection procedure for IPO firms is outlined in Panel B of Table 1. Firstly, I identify all US common stock offerings over the 2016–2020 period using the *ThomsonONE Equity* database. Next, I remove stock offerings that are not IPOs, which leads to a sample of 1,149 IPO firms. Following Bai et al. (2021) and Kolb and Tykvová (2016), I exclude financial service firms (SIC codes 6000–6999), blank check companies, firms with missing offer prices or IPO proceeds and firms that already have public status prior to the IPO. Consequently, the total IPO sample consists of 442 firms. To derive the number of foreign firms that went public in the US via a

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traditional IPO, I further exclude 401 firms that are located in the US. Consequently, there are 41 non-US IPO firms.

As a final step, I obtain data on firm-specific variables from *Compustat* and *ThomsonONE*. Since pre-transaction financial statement data could be missing, I also manually collect ex-ante financial data from 10-K filings and prospectuses using the SEC's EDGAR database.[27] If data on any of the firm-specific variables is not available, the firm is excluded from the sample. As a result, the final sample consists of 138 (22) SPAC (non-US) firms and 427 (37) IPO (non-US) firms. More detailed information on the ten largest SPAC deals that are included in the sample can be found in Table 2.

[Insert Table 1 and 2 here]

4.2. Research Design

To examine which firm-specific characteristics are associated with the going-public decision via a SPAC rather than a traditional IPO, a multinominal logistic regression will be estimated. A similar empirical approach has previously been used in earlier studies regarding going-public decisions (e.g., Brown et al., 2013; Cumming et al., 2014; Kolb & Tykvová, 2016). The logistic regression is:[28]

$$SPAC_i = \beta_0 + \beta_1 Foreign_i + \beta_2 Return\ on\ Assets_{i,t-1} + \beta_3 Leverage_{i,t-1} + \beta Controls_{i,t-1}$$
$$+ \Sigma_{i=2016}^{2021} \beta Year_t + \Sigma_{i=1}^{9} \beta Industry_i + \varepsilon_{i,t} \qquad (1)$$

where the dependent variable *SPAC* is a binary variable that is equal to one if firm i went public through a SPAC, and zero if firm i went public through a traditional IPO. For H_1, the variable of interest is *Foreign*. This is a dummy variable that equals one for non-US firms, and zero for firms that are located in the US. The predicted sign is $\beta_1 = 0$. Regarding H_2, the variable of interest is *Return on Assets*, which is measured by dividing net income by the total assets of a firm. The predicted sign is $\beta_2 = 0$. Finally, the variable of interest for H_3 is *Leverage*. *Leverage* is measured by dividing the firm's total debt by the total assets. For H_3, the predicted sign is also $\beta_3 = 0$.

Following prior research (Bai et al., 2021; Kolb and Tykvová, 2016), I control for firm-specific characteristics that may affect the going-public decision and the variables of interest. The definitions for these control variables are presented in the Appendix. In addition, I include year-

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[27] I also obtain data on SPAC or IPO firms that have already delisted or went bankrupt. Consequently, survivorship bias does not play a role in this study.
[28] I use t to denote the year when the firm goes public. Therefore, the firm-specific variables are measured in the year immediately before the going-public year.

fixed effects to control for unobservable time-specific effects that may influence the decision between SPACs and IPOs. Moreover, industry-fixed effects are also included to control for unobserved differences in industries that influence the independent variables and the route through which firms go public.

5. Empirical Results

5.1. Descriptive Statistics

Table 3 gives the composition of both the SPAC and IPO sample. Panel A of Table 3 reports the yearly distribution, which shows that only two firms went public via a SPAC in 2016 and 2017. Interestingly, 2020 turns out to be not just a fruitful year for the re-emergence of SPACs, as there is also a peak in the number of IPO transactions. Table 3, Panel B shows the regional distribution of the samples. The SPAC and IPO samples are similar to each other in the way that the large majority of the firms that go public in the US via a SPAC or traditional IPO are located in North America, which is followed by Asia and Europe. Finally, Table C of Table 3 reports the industrial distribution of the samples. While most firms that go public through a SPAC or traditional IPO operate in the manufacturing and services industries (75.37% vs. 87.35%, respectively), it is evident that the industry variation is significantly higher in the SPAC sample than the IPO sample.

Table 4, Panel A provides the summary statistics for the variables used in the regression analyses.[29] In addition, to see if there are any significant differences between the characteristics of SPAC and IPO firms, I run the Mann-Whitney U (MWU) test since the data does not follow a normal distribution. Table 4, Panel A shows that SPAC transactions are more likely to involve foreign firms than the IPO transactions. The mean *Return on Assets* for the full sample is -0.846, which means that firms were fairly unprofitable in the year before they went public. More interestingly, SPAC firms were, on average, less loss-making than their IPO counterparts (-0.636 vs. -0.915, respectively). This difference is significant at the 1% level. The debt ratio *(Leverage)* of SPAC firms is 0.506 and is significantly higher than the debt ratio of 0.335 of IPO firms, which is in accordance with prior research (e.g., Kolb & Tykvová, 2016; Bai et al., 2021). However, in contrast to previous literature, "SPAC 3.5" generation firms tend to be larger than IPO firms when they go public: the mean value of firm size *(LogTA)* is 4.662 for SPAC firms and 4.324 for IPO

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[29] To deal with outliers, the continuous variables are winsorized at the 1st and 99th percentiles.

firms. This difference is significant at the 5% level. Contrary to popular belief, the SPAC sample has a mean *Age* of 14.53 years, which is very close to the mean of 14.49 years for the IPO sample. Hence, this difference is not significant.

Table 4, Panel B reports the correlation matrix. The majority of the correlation coefficients between the control variables are lower than 0.2. As a result, multicollinearity does not appear to be a major concern.

[Insert Table 3 and 4 here]

5.2. Regression Analyses Results

Specification 1 and 2 of Table 5, Panel A present the logistic regression results of the firm characteristics that are associated with the going-public decision via SPACs or traditional IPOs. The McFadden (i.e., pseudo) R^2 of the model is 0.392, which is comparable to the reported levels of Cumming et al. (2014) and Kolb and Tykvová (2016).

Firstly, I find a positive and significant coefficient on *Foreign* (p<0.01). This implies that, compared to firms that are located in the US, foreign firms are significantly more likely to list on US markets through a SPAC than through a traditional IPO. More specifically, when converting the coefficient into an odds ratio, the result suggests that the odds of going public via a SPAC rather than a traditional IPO increases by about 187% if the firm is not from the US. Following this result, H_1 is rejected. A possible explanation for this finding is that foreign firms face several additional challenges in the IPO process, such as higher underpricing and additional listing requirements. In contrast, SPACs offer more valuation certainty and firms get to avoid the complex IPO process. Therefore, it seems like the benefits of the SPAC route weigh higher than the costs associated with it (e.g., mandatory conversion to US GAAP).

Consistent with my expectations, *Return on Assets*, which reflects the profitability of the firm in the year before it goes public, is positive but insignificant (p=0.233). In contrast to the findings of Kolb and Tykvová (2016), who focused on the first- and second generation SPACs, this finding implies that SPAC and IPO firms are similar to each other in terms of their performance in the year before going public for the succeeding generation. Therefore, H_2 cannot be rejected. This result supports the view that changing the incentive structures of SPAC sponsors by altering the compensation and SPAC structure has led to higher-quality target firms in terms of their profitability.

Finally, the coefficient on *Leverage* is positive and significant (p<0.01). This result rejects

the null hypothesis that the leverage of SPAC firms is equal to that of IPO firms. In contrast, firms that carry more debt are more likely to go public via a SPAC than via an IPO. This could be explained by the notion that high-levered firms may have difficulty in using the conventional route of IPOs to go public since they might be too risky for IPO investors, which leaves them with the non-traditional routes. More importantly, despite the fact that more shareholders have redeemed their shares over time, this result implies that the role that debt plays in the "SPAC 3.5" generation can still be considered as negligible.

Regarding the control variables, both *LogTA* and *Age* are negatively associated with the going-public decision via SPACs (rather than traditional IPOs). However, both coefficients are insignificant (p=0.908 and p=0.666, respectively).

[Insert Table 5 here]

5.3. Robustness Checks

5.3.1. Change in Measurement Period

The data that is used in the regression analysis only relates to firm characteristics that are measured in the one year before going public. For robustness, I also perform the logistic regression using data on firm characteristics that is measured two years prior to the going-public year. Since this data is usually missing from databases, I have to manually extract this information from SEC filings using the EDGAR database. Still, some data may be missing. As a result, the SPAC and IPO sample sizes drop by 6% and 4%, respectively.

Specification 3 of Table 5, Panel A reports the results of the regression that is based on firm-specific variables that are measured two years before the firm went public. While the magnitude of the variables *Foreign* and *Leverage* differs slightly, both keep their signs and remain significant. In addition, the sign of *Return on Assets* changes, but still remains insignificant. For this reason, I am confident that the results of the main analysis are not based on the fact that I used data that merely reflect the firm characteristics of one year.

5.3.2. Matched Sample

Another concern is that the descriptive statistics show that the SPAC and IPO firms differ significantly in terms of size and industry. More specifically, SPAC firms are larger and show more industry variation than IPO firms. This is a problem since the firm-specific variables could vary across size and industry. In addition, it is plausible that the choice of firms to choose alternative

paths to go public is driven by macroeconomic forces[30], which might also have a disproportionate impact on firms (e.g., impact of COVID-19). To mitigate these concerns, I match each SPAC firm with the closest IPO firm using a propensity score matching model with replacement.[31]

Following prior related papers (Brown et al., 2013; Kolb & Tykvová, 2016; Lee et al., 2019), the matching procedure is conducted as follows. For each SPAC firm, an IPO firm which went public in the same year, belonged to the same industry and is of similar size (*LogTA*) is chosen.[32] As a result, the matched sample consists of 138 SPAC and 66 IPO firms. Table 5, Panel B reports the summary statistics for the matched sample. The mean value of firm size (*LogTA*) is 4.662 for SPAC firms, compared to 4.668 for the size, industry and time-matched IPO firms. More importantly, the WMU test confirms that this difference is not significant. This result tends to affirm that the two samples are reasonably well matched on size.

Specification 4 of Table 5, Panel A presents the results estimated for the matched sample.[33] Again, the results of the main analysis are confirmed because *Foreign* and *Leverage* keep their signs and remain significant. Moreover, *Return on Assets* is still insignificant, confirming that SPAC firms are comparable to their matched IPO peers in terms of profitability. Therefore, I am confident that the results of the main analysis are not due to the choice of sample selection.

5.4. Additional Analyses

Since this study investigates the determinants of the going-public decision via SPACs rather than IPOs, I also examine one of the possible consequences of this decision. More specifically, I investigate if SPAC firms are more likely to receive a GCO than IPO firms in the first two years after going public. Following prior GCO-related papers (e.g., Kwon, Park & Yu, 2018; Ruiz-Barbadillo, Gómez-Aguilar & Carrera, 2009), I estimate the following multinomial logistic

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[30] As previously stated, SPACs are more common when the market is more volatile and uncertain. While traditional IPOs are sensitive to economic conditions, firms that go public via SPACs are subject to much less valuation uncertainty since the valuation of the target firm is agreed to upfront between the company and the SPAC (Rodrigues & Stegemoller, 2014). In addition, a low-interest environment may boost the popularity of SPACs since Bai et al. (2021) find that the yield-seeking market contributed to the recent rise of SPACs.

[31] Matching without replacement yields bad matches which defeats the purpose of using a matched sample.

[32] Following the matching procedures of Brown et al. (2013), Kolb and Tykvová (2016) and Lee et al. (2019), I estimate the propensity score by running a logistic regression model in which the dependent variable is *SPAC*. Since this is not the correct way of matching, the results should be interpreted cautiously.

[33] To examine the sensitivity of the results to alternative matching procedures, I perform multiple tests (e.g., adding caliper distance restrictions, matching only on size and industry). Untabulated results indicate that similar results are produced, which suggests that the results do not appear to be sensitive to using alternative matching techniques. In addition, I also perform the logistic regression by excluding the matching controls (i.e., *LogTA*, year FE and industry FE) from the regression. Again, untabulated results reveal that the main results remain qualitatively similar.

regression:[34]

$$GCO_i = \beta_0 + \beta_1 SPAC_i + \beta Controls_{i,t} + \Sigma_{i=2016}^{2020} \beta Year_t + \Sigma_{i=1}^{9} \beta Industry_i + \varepsilon_{i,t} \qquad (2)$$

where the dependent variable *GCO* is a binary variable that is equal to one if firm i received a GCO in the first two years after going public, and zero otherwise. The variable of interest is *SPAC*, which is a dummy variable that equals one if it is a SPAC firm, and zero if it is an IPO firm. Following prior research (Kwon et al., 2018; Ruiz-Barbadillo et al., 2009), I include a number of control variables that are associated with the presence of a GCO. The definitions for these control variables are presented in the Appendix. Finally, I also include year- and industry-fixed effects.

Regarding the sample that is used for the regression, SPAC firms that merged in 2021 are excluded, since they have not filed a Form 10-K yet. In addition, firms are dropped if data on any of the control variables is missing.[35] Consequently, the sample consists of 86 SPAC firms and 421 IPO firms, for which the descriptive statistics can be found in Panel A and B of Table 6.[36]

Specification 1 of Table 7, Panel A presents the logistic regression results of the likelihood of receiving a GCO for a SPAC firm, relative to an IPO firm. The results reveal that the coefficient of *SPAC* is positive, but insignificant (p=0.190). This indicates that SPAC firms are not more likely to receive a GCO in the first two years after going public.

Since the descriptive statistics show that SPAC firms significantly differ from IPO firms, I again match the SPAC firms with IPO firms using the propensity score matching technique with replacement.[37] The matched sample consists of 86 SPAC and 47 IPO firms. Table 7, Panel B presents the descriptive statistics for the matched sample. The WMU tests confirm that the differences between SPAC and IPO firms are not significant anymore, with the exception of *Big 4*. Therefore, it can be concluded that the two samples are relatively similar. Specification 2 of Table 7, Panel A presents the results estimated for the matched sample.[38] The results that I reported earlier are confirmed since *SPAC* remains positive but insignificant (p=0.586).

[Insert Table 6 and 7 here]

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[34] The control variables are measured in the first year of going public.
[35] Again, I obtain data on SPAC or IPO firms that have already delisted or went bankrupt.
[36] The continuous variables are winsorized at the 1st and 99th percentiles.
[37] I estimate the propensity score by running a logistic regression model in which the dependent variable is *SPAC*. Following prior research of Kwon et al. (2018), the independent variables are all the control variables that are included in the regression model of equation (2).
[38] Again, I examine the sensitivity of the results to alternative matching procedures by performing multiple tests (e.g., adding caliper distance restrictions, matching on less variables). Untabulated results reveal that the results remain qualitatively the same, which suggests that the results are not sensitive to using alternative matching techniques.

6. Conclusion

This study attempts to answer the research question: *"Which ex-ante firm characteristics are associated with the going-public decision via SPACs rather than traditional IPOs?"*. Firstly, the empirical results show that, compared to US firms, foreign firms prefer SPACs to traditional IPOs to obtain public status in the US. In addition, I find that private firms that merge with a SPAC are not inferior to conventional IPO firms in terms of their ex-ante performance. I also find that firms that carry more debt are more likely to go public via a SPAC than via a traditional IPO. Finally, additional analyses show that SPAC firms are not more likely to receive a GCO in the first two years after going public.

This study provides multiple policy implications. Firstly, given that the US seeks to impose additional listing requirements for foreign companies, it can be said that the US is cautious of foreign firms listing in the US. This study suggests that attention also has to be placed on the possibility that foreign firms go public via SPACs instead of IPOs and use this as a loophole. In addition, one factor that has likely contributed to the shift towards alternative paths to go public is the significant underpricing that is inherent in IPOs. One possible solution to counteract this issue is to improve the price discovery mechanisms in IPOs[39], which should provide more transparency.

Furthermore, the results show that companies that go public through SPACs are comparable to IPO firms in terms of age and performance. However, at the same time they are bigger and carry more debt than IPO firms. For these reasons, SPACs should still be seen as a "backdoor" for firms that are not fit for a traditional IPO. Therefore, the concerns expressed by several SEC's senior officials regarding SPACs are valid. One proposal to improve SPACs from bringing mediocre firms to the market is to eliminate the arbitrary advantage that a SPAC has over an IPO: the safe harbor for forward-looking statements.[40] By eliminating the safe harbor for SPACs, the risk of litigation associated with projections will increase. Consequently, it becomes more difficult for SPACs and their target firms to paint a rosy, unrealistic picture of the company.[41]

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[39] For example, in 2020, Airbnb used a hybrid auction mechanism in their IPO; investors were asked to submit indications of interest that included numbers of both price and quantity, rather than just the quantity (Bary, 2020).

[40] Currently, there is a debate about this protection. On May 17, 2021, the US House Committee on Financial Services released a draft legislation seeking to remove the safe harbor provision for SPACs. Proponents state that many investors exit the market when the SPAC merger is announced, and consequently new capital has to be raised to consummate the merger, the de-SPAC transition should be seen as the "real IPO", not as a merger.

[41] Firms that merged with a SPAC in 2020 projected a yearly revenue growth rate in a range of between 30% and 150% for the first three years. Moreover, about 50% missed their revenue forecasts in their first year as a public company (Silicon Valley Bank, 2021).

Finally, even though significant changes have been made in the SPAC and compensation structure over time, this study shows that the incentives of SPAC sponsors and investors are still not properly aligned since the target firms are often of low-quality. One way to further incentivise SPAC sponsors to bring higher-quality firms to the market is to bring back the voting and redemption rights of shareholders to one decision.[42] Alternatively, it should be required that the proposed SPAC merger cannot go through if more than 50% of the SPAC shareholders redeem.

This study is subject to several caveats. Firstly, it has to be noted that there are relatively few foreign firms for both the IPO and SPAC sample. Neither did this study take other ways to list in the US for foreign companies into account, such as the issuance of level 1 and 2 American depository receipts (ADRs). It might be that these alternative routes are significantly more popular than the routes that were the focus in this study. As a result, the finding that foreign firms are more likely to go public through a SPAC than a traditional IPO might be irrelevant. Secondly, the results are limited to the US market. Given the fact that the listing requirements differ by country[43], the results may not be generalizable to other countries.

Since the literature on SPACs is relatively underdeveloped, there are plenty of interesting questions that could be examined in future research. First of all, there needs to be more insight into why foreign firms prefer a SPAC to a traditional IPO. In this study, several suggestions were put forward which could explain why non-US firms stray away from IPOs. However, there could be other theories that drive the going-public decision of these firms. Furthermore, future research should investigate the ex-ante firm characteristics of SPAC firms in other countries. As previously stated, the institutional environment of SPACs in other countries deviates from that of the US, which could lead to different findings. Finally, it would be interesting to examine to what degree US SPAC firms differ from SPAC firms that are listed in other countries, and how this relates to their institutional environment.

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[42] Despite the fact that SPACs have offered fewer warrants to shareholders over time (which makes redemption less attractive), it would be beneficial to unite the two independent votes to completely eliminate the incentive misalignment problem.

[43] The regulatory environment for European SPACs typically differs from that of the US. One of Europe's largest stock exchanges, the London Stock Exchange, does not require shareholder approval. Also, shareholders are not allowed to redeem their initial investment prior to the completion of the SPAC merger (Financial Conduct Authority, 2021).

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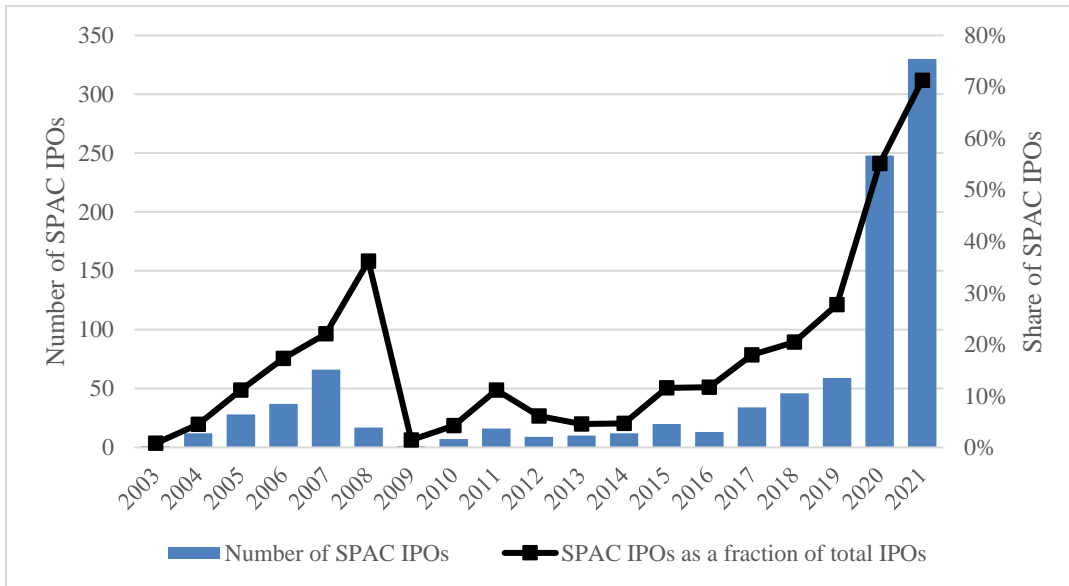
Figure 1. *Number of SPAC IPOs and SPAC share in total IPOs (note: as of May 31ᵗʰ 2021).*
Source: SPAC Analytics
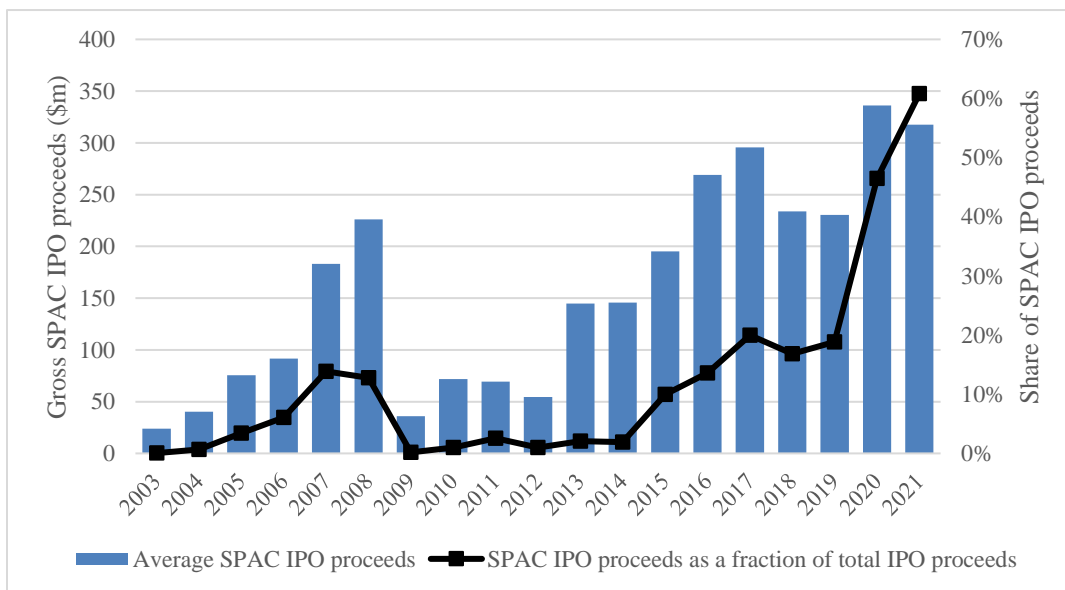
Figure 2. *Average SPAC IPO proceeds and SPAC share in total IPO proceeds (note: as of May 31ᵗʰ 2021).*
Source: SPAC Analytics

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        ┌─────────────────┐
        │  Formation –    │
        │  pre-IPO        │
        │  (Stage A)      │
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        ┌─────────────────┐
        │  SPAC IPO date  │
        │  (Stage B)      │
        └────────┬────────┘
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        │  Target search  │◄──────────────┐
        │  (Stage C)      │◄────────┐      │
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        ┌─────────────────┐     │ No target     │
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        │ Shareholder vote│
        │ or tender offer │
        │ (Stage E)       │
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│ Yes │◄──│ Approved? │──►│ No  │
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   │                         │
   ▼                         ▼
┌──────────────┐      ┌────────────────┐
│Merged company│      │SPAC liquidates;│
│begins trading│      │IPO proceeds are│
│under new     │      │returned        │
│ticker        │      │(Stage G)       │
│(Stage F)     │      └────────────────┘
└──────────────┘
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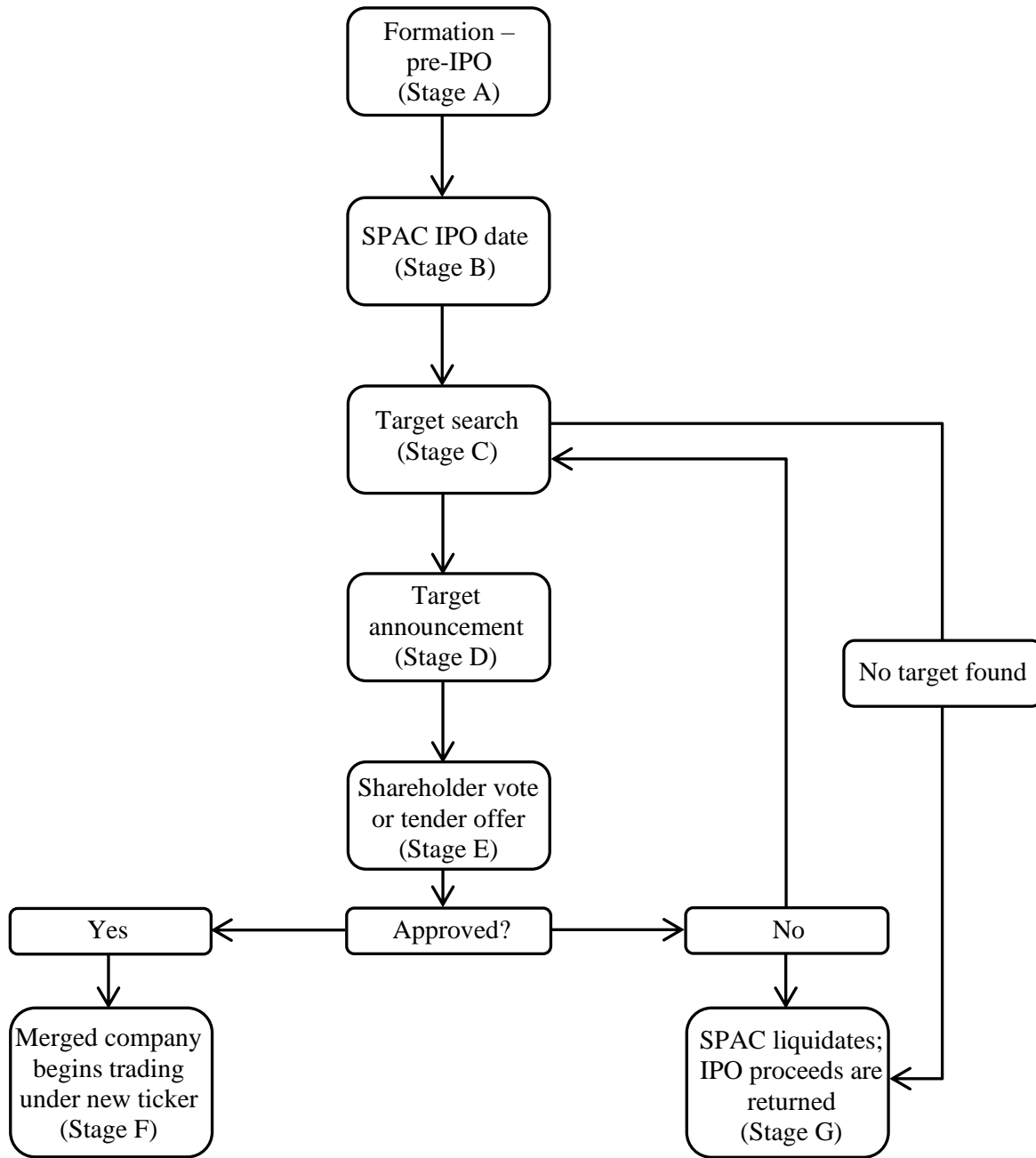
Figure 3. *The Lifecycle of a SPAC.*

Appendix: Variable Definitions

Variable	Source	Definition
Variables Included in the Going-Public Decision via SPACs or IPOs Analyses		
Dependent Variable		
- *SPAC*	ThomsonONE	Dummy variable equal to one if the firm went public via a SPAC, and zero in case of a traditional IPO.
Variables of Interest		
- *Foreign*	ThomsonONE	Dummy variable equal to one if target/IPO firm i is from a non-US country, and zero otherwise.
- *Return on Assets*	Compustat	Net income divided by total assets of firm i as of 31 December of year t-1.
- *Leverage*	Compustat	The current portion of long-term debt plus the long-term debt divided by total assets of firm i as of 31 December of year t-1.
Control Variables		
- *LogTA*	Compustat	Logarithm of total assets of firm i as of 31 December of year t-1.
- *Age*	ThomsonONE/ Company websites	Difference between firm i's founding year and the year of the SPAC merger or IPO.
Variables Included in the GCO Analyses		
Dependent Variable		
- *GCO*	Audit Analytics	Dummy variable equal to one if the firm receives a GCO, and zero otherwise.
Variable of Interest		
- *SPAC*	ThomsonONE	Dummy variable equal to one if the firm went public via a SPAC, and zero in case of a traditional IPO.
Control Variables		
- *Leverage*	Compustat	The current portion of long-term debt plus the long-term debt divided by total assets of firm i as of 31 December of year t.
- *LogTA*	Compustat	Logarithm of total assets of firm i as of 31 December of year t.
- *Age*	ThomsonONE/ Company websites	Difference between firm i's founding year and the year of the SPAC merger or IPO.
- *LogSales*		Logarithm of total sales of firm i as of 31 December of year t.
- *Loss*	Compustat	Dummy variable equal to one if firm i reports a loss in year t, and zero otherwise.
- *Bankruptcy*	Compustat	The Altman Z-score of firm i as of 31 December of year t. The Altman Z-score is equal to 1.2 * (net working capital/total assets) + 1.4 * (retained earnings/total assets) + 3.3 * (earnings before interest and taxes/total assets) + 0.6 * (market value of equity/book value of liabilities) + 0.999 * (sales/total assets). The greater the Altman Z-score, the lower the probability of going bankrupt.
- *Big 4*	Audit Analytics	Dummy variable equal to one if the GCO is issued by a Big 4 auditor, and zero otherwise.

Table 1
Sample Selection

Panel A: Sample Selection for SPAC firms		
	Total firms	Non-US firms
All completed M&As from 01/01/2016 and onwards	230,862	230,862
Less: Acquirors that do not list on the US market	214,666	214,666
Less: M&As without SPAC involvement	16,016	16,016
Less: Target firms in financial service industries (SIC 6000–6999)	27	27
Less: Non-US target firms		129
Less: SPACs with IPO date before 01/01/2016	13	2
Less: Those with a missing value on any of the firm-specific variables	2	
Number of SPAC firms used in the analyses	138	22

Panel B: Sample Selection for IPO firms		
	Total firms	Non-US firms
All US common stock offerings between 01/01/2016 and 31/12/2020	6,214	6,214
Less: Stock offerings that are not IPOs	5,062	5,062
Less: Those in financial service industries (SIC 6000–6999)	240	240
Less: Blank check companies	52	52
Less: Firms with missing offer prices or IPO proceeds	387	387
Less: Firms that already have public status	31	31
Less: Issuers that are from the US		401
Less: Those with a missing value on any of the firm-specific variables	15	4
Number of IPO firms used in the analyses	427	37

Panel A and B detail the sample selection procedure for the SPAC and IPO firms, respectively.

Table 2
The Ten Largest SPAC Mergers that are Included in the Sample

Acquiror (i.e., SPAC)	Nation of Acquiror	IPO Date	IPO Proceeds (Deal Value)	Merger Date	Target (Industry)	Nation of Target
Foley Trasimene Acquisition Corporation II	United States	18-08-2020	$1,300,000,000 ($5,614,000,000)	30-03-2021	Paysafe Group Holdings, Ltd. (Services)	United Kingdom
J2 Acquisition Ltd.	British Virgin Islands	05-10-2017	$1,210,000,000 ($2,316,710,000)	01-10-2019	APi Group, Inc. (Construction)	United States
Churchill Capital Corporation III	United States	13-02-2020	$1,000,000,000 ($5,678,000,000)	08-10-2020	MultiPlan, Inc. (Services)	United States
Silver Run Acquisition Corporation II	United States	23-03-2017	$900,000,000 ($5,148,000,000)	09-02-2018	Kingfisher Midstream, LLC. (Mining) Alta Mesa Holdings, LP. (Mining)	United States United States
Jaws Acquisition Corporation	United States	13-05-2020	$600,000,000 ($3,936,420,000)	21-12-2020	Cano Health, LLC. (Services)	United States
Flying Eagle Acquisition Corporation	United States	05-03-2020	$600,000,000 ($3,500,000,000)	16-12-2020	Skillz, Inc. (Services)	United States
Churchill Capital Corporation	United States	06-06-2018	$600,000,000 ($2,085,830,000)	13-05-2019	Clarivate Analytics, LLC. (Services)	United States
GS Acquisition Holdings Corporation	United States	07-06-2018	$600,000,000 ($1,522,000,000)	07-02-2020	Vertiv Holdings, LLC. (Services)	United States
Social Capital Hedosophia	United States	13-09-2017	$600,000,000 ($1,300,000,000)	25-10-2019	Virgin Galactic, LLC. (Transportation, Communications, Electric, Gas and Sanitary Services)	United States
TPG Pace Energy Holdings Corporation	United States	04-05-2017	$600,000,000 ($2,600,640,000)	31-07-2018	EnerVest Ltd.'s South Texas Division (Mining)	United States

Table 3
Sample Distributions

Panel A: Yearly Distribution of the SPAC and IPO Sample

	SPAC Sample		IPO Sample	
Year	N	Percent	N	Percent
2016	1	0.72	62	14.52
2017	1	0.72	68	15.93
2018	15	10.87	101	23.65
2019	25	18.12	78	18.27
2020	53	38.41	118	27.63
2021	43	31.16	-	-
Total	138	100	427	100

Panel B: Regional Distribution of the SPAC and IPO Sample

	SPAC Sample		IPO Sample	
Region	N	Percent	N	Percent
North America	121	87.68	397	92.97
Europe	8	5.80	11	2.58
Asia	8	5.80	12	2.81
Latin America/Caribbean	1	0.72	6	1.41
Oceania	-	-	1	0.23
Total	138	100	427	100

Panel C: Industrial Distribution of the SPAC and IPO Sample

	SPAC Sample		IPO Sample	
Industry	N	Percent	N	Percent
Agriculture, Forestry and Fishing	1	0.72	5	1.17
Mining	11	7.97	12	2.81
Construction	5	3.62	2	0.47
Manufacturing	49	35.51	184	43.09
Transportation, Communications, Electric, Gas and Sanitary Services	5	3.62	9	2.11
Wholesale Trade	3	2.17	11	2.58
Retail Trade	9	6.53	15	3.51
Services	55	39.86	189	44.26
Total	138	100	427	100

Panel A, B and C provide the yearly, regional and industrial distribution of both samples, respectively.

Table 4
Descriptive Statistics for the Variables used in the Going-Public Regression Analyses

Panel A: Descriptive Statistics for the Full Sample

Variable	Full Sample			SPAC Sample			IPO Sample			MWU Test
	Mean	Std	N	Mean	Std	N	Mean	Std	N	p-value
SPAC	0.244	0.430	565	1	0	138	0	0	427	
Foreign	0.104	0.306	565	0.159	0.367	138	0.087	0.282	427	0.015**
Return on Assets	-0.846	2.350	565	-0.636	1.823	138	-0.915	2.468	427	0.006***
Leverage	0.377	0.741	565	0.506	0.812	138	0.335	0.715	427	0.000***
LogTA	4.407	2.048	565	4.662	1.998	138	4.324	2.060	427	0.023**
Age	14.500	19.196	565	14.530	18.013	138	14.490	19.588	427	0.495

Panel B: Correlation Matrix

Variable		(1)	(2)	(3)	(4)	(5)	(6)
(1)	SPAC	1					
(2)	Foreign	0.10	1				
(3)	Return on assets	0.05	0.05	1			
(4)	Leverage	0.10	-0.07	**-0.30**	1		
(5)	LogTA	0.07	0.01	**0.55**	-0.18	1	
(6)	Age	0.00	-0.01	**0.13**	0.10	0.43	1

Panel A provides descriptive statistics for the variables used in the going-public regression. Panel B presents the correlation between the variables. Correlation coefficients statistically significant at $p<0.01$ are in bold. Variable definitions are included in the Appendix. *, **, *** indicate statistical significance at the <0.10, <0.05, and <0.01 levels, respectively.

Table 5
Regression Results of the Likelihood of Going Public via a SPAC or a Traditional IPO

Panel A: Regression Results

	Dependent variable: *SPAC*							

Variable	(1) Model without Controls Coeff.	p-value	(2) Model with Controls Coeff.	p-value	(3) Two Years Prior Going Public Coeff.	p-value	(4) Matched Sample Coeff.	p-value
Intercept	-1.295	0.000***	-20.756	0.987	-21.024	0.988	0.106	0.999
Foreign	0.723	0.014**	1.055	0.005***	1.070	0.006***	2.205	0.007***
Return on Assets	0.129	0.064*	0.107	0.233	-0.005	0.938	0.098	0.293
Leverage	0.423	0.003***	0.536	0.006***	0.343	0.077*	0.728	0.051*
LogTA			-0.010	0.908	0.110	0.168	-0.062	0.568
Age			-0.003	0.665	-0.006	0.447	-0.007	0.553
N	565		565		542		204	
Pseudo-R^2	0.026		0.392		0.384		0.225	
Year FE	No		Yes		Yes		Yes	
Industry FE	No		Yes		Yes		Yes	

Panel B: Descriptive Statistics for the Matched Sample

Variable	Full Sample Mean	Std	N	SPAC Sample Mean	Std	N	IPO Sample Mean	Std	N	MWU Test p-value
SPAC	0.677	0.469	204	1	0	138	0	0	66	
Foreign	0.118	0.323	204	0.159	0.367	138	0.030	0.173	66	0.008***
Return on Assets	-0.749	2.139	204	-0.636	1.823	138	-0.985	2.684	66	0.088*
Leverage	0.445	0.718	204	0.506	0.812	138	0.316	0.442	66	0.033**
LogTA	4.664	2.086	204	4.662	1.998	138	4.668	2.275	66	0.989
Age	14.760	18.198	204	14.530	18.013	138	15.240	18.711	66	0.763

Panel A reports the regression results of the firm characteristics that are associated with the going-public decision via a SPAC rather than a traditional IPO. The dependent variable *SPAC* is a binary variable equal to one if the firm went public through a SPAC, and zero if it went public through a traditional IPO. *Foreign* is a binary variable equal to one if the firm is located in a non-US country, and zero otherwise. *Return on Assets* is measured by dividing net income by the total assets. *Leverage* is measured by dividing the total debt by the total assets. Specification 1 provides the regression results of the basic model without controls and year- and industry fixed effects using the full sample. Specification 2 reports the regression results of the model including controls using the full sample. Specification 3 provides the regression results using data that is measured two years prior to the going public year. Specification 4 reports the regression results using a propensity score matched sample. Panel B provides descriptive statistics for the variables used in specification 4 (i.e., the matched sample). *, **, *** indicate statistical difference from zero (two-tailed) at the <0.10, <0.05, and <0.01 levels, respectively. Variable definitions are included in the Appendix.

Table 6
Descriptive Statistics for the Variables used in the GCO Regression Analyses

Panel A: Descriptive Statistics for the Full Sample

	Full Sample			SPAC Sample			IPO Sample			MWU Test
Variable	Mean	Std	N	Mean	Std	N	Mean	Std	N	p-value
GCO	0.111	0.314	507	0.093	0.292	86	0.114	0.318	421	0.572
SPAC	0.170	0.376	507	1	0	86	0	0	421	
Leverage	0.150	0.221	507	0.225	0.273	86	0.135	0.206	421	0.001***
LogTA	5.492	1.513	507	5.969	1.500	86	5.395	1.499	421	0.000***
Age	14.850	20.032	507	16.290	21.295	86	14.560	19.778	421	0.559
LogSales	3.131	2.859	507	4.233	2.604	86	2.906	2.860	421	0.000***
Loss	0.819	0.386	507	0.814	0.391	86	0.820	0.385	421	0.904
Bankruptcy	19.440	37.260	507	9.049	15.310	86	21.563	39.981	421	0.001***
Big 4	0.706	0.456	507	0.442	0.500	86	0.760	0.428	421	0.000***

Panel B: Correlation Matrix

Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)	GCO	1								
(2)	SPAC	-0.03	1							
(3)	Leverage	-0.03	**0.15**	1						
(4)	LogTA	**-0.39**	**0.14**	**0.40**	1					
(5)	Age	-0.11	0.03	**0.41**	**0.42**	1				
(6)	LogSales	**-0.24**	**0.17**	**0.55**	**0.65**	**0.50**	1			
(7)	Loss	**0.15**	-0.01	**-0.30**	**-0.29**	**-0.38**	**-0.50**	1		
(8)	Bankruptcy	-0.08	**-0.13**	**-0.30**	**-0.12**	**-0.18**	**-0.33**	0.10	1	
(9)	Big 4	**-0.19**	**-0.26**	0.00	**0.42**	0.06	0.06	0.07	-0.01	1

Panel A provides descriptive statistics for the variables used in the GCO regression. Panel B presents the correlation between the variables. Correlation coefficients statistically significant at $p<0.01$ are in bold. Variable definitions are included in the Appendix. *, **, *** indicate statistical significance at the <0.10, <0.05, and <0.01 levels, respectively.

Table 7
Regression Results of the Likelihood of Receiving a GCO

Panel A: Regression Results

	Dependent variable: *GCO*			
	(1) Model with Controls		(2) Matched Sample	
Variable	Coeff.	p-value	Coeff.	p-value
Intercept	-12.546	0.996	-44.668	0.998
SPAC	0.832	0.190	0.825	0.586
Leverage	1.651	0.140	1.845	0.490
LogTA	-1.042	0.000***	-0.666	0.342
Age	-0.020	0.450	-0.199	0.132
LogSales	-0.193	0.093*	-0.644	0.139
Loss	1.556	0.167	17.160	0.997
Bankruptcy	-0.014	0.081*	-0.202	0.064*
Big 4	0.311	0.534	-2.533	0.153
N	507		133	
Pseudo-R^2	0.334		0.643	
Year FE	Yes		Yes	
Industry FE	Yes		Yes	

Panel B: Descriptive Statistics for the Matched Sample

	Full Sample			SPAC Sample			IPO Sample			MWU Test
Variable	Mean	Std	N	Mean	Std	N	Mean	Std	N	p-value
GCO	0.083	0.276	133	0.093	0.292	86	0.064	0.247	47	0.564
SPAC	0.647	0.480	133	1	0	86	0	0	47	
Leverage	0.232	0.269	133	0.225	0.273	86	0.245	0.266	47	0.450
LogTA	6.062	1.547	133	5.969	1.500	86	6.232	1.632	47	0.350
Age	16.750	20.048	133	16.290	21.295	86	17.600	17.726	47	0.107
LogSales	4.385	2.640	133	4.233	2.604	86	4.664	2.711	47	0.391
Loss	0.805	0.398	133	0.814	0.391	86	0.787	0.414	47	0.714
Bankruptcy	10.307	16.352	133	9.049	15.310	86	12.610	18.052	47	0.221
Big 4	0.504	0.502	133	0.442	0.500	86	0.617	0.491	47	0.055*

Panel A reports the regression results of the likelihood of receiving a GCO for SPAC and IPO firms. The dependent variable *GCO* is a binary variable equal to one if the firm received a GCO in the first two years after going public, and zero otherwise. *SPAC* is a binary variable equal to one if the firm went public through a SPAC, and zero if it went public through a traditional IPO. Specification 1 provides the regression results of the model including controls and year- and industry fixed effects using the full sample. Specification 2 reports the regression results using a propensity score matched sample. Panel B provides descriptive statistics for the variables used in specification 2 (i.e., the matched sample). *, **, *** indicate statistical difference from zero (two-tailed) at the <0.10, <0.05, and <0.01 levels, respectively. Variable definitions are included in the Appendix.