ERASMUS UNIVERSITY ROTTERDAM
ERASMUS SCHOOL OF ECONOMICS
Bachelor Thesis Economics & Business
Specialization: Financial Economics

SPACology : An analysis in the functioning of SPACs

Author: Aaditya Mehta
Student number: 617493
Thesis supervisor: Doctor Farbrizio Core
Second reader: Doctor Francesc Rodriguez Tous
Finish date: 8th June, 2024

The views stated in this thesis are those of the author and not necessarily those of the supervisor, second reader, Erasmus School of Economics or Erasmus University Rotterdam.

ABSTRACT

Special Purpose Acquisition companies have been the trend in the new offerings markets for a while now, with SPACs accounting for almost 75% of IPOs in 2022. This paper aims to explore the post-listing performance of SPACs across different countries (China and United Kingdom) and uncover what factors affect a firm's decision to opt for SPAC. The paper begins with running linear regressions to check the effect of SPACs and developing countries on stock performance post-listing across the different time frames. The paper then checks for the existence of an interaction effect between SPACs and developing countries. Lastly, the paper builds on previous studies which have attempted to motivate a firm's decision to go public via a SPAC by exploring the effect of a new variable: Under-pricing in the previous year based on industry and country.

The study shows that being in a developing country is associated with better post-performance returns, and that going public through a SPAC is associated with lower returns than a traditional IPO. Exploring the interaction effect reveals that SPACs in developing countries observe a lower performance than SPACs in developed countries. The logit model suggests that under-pricing is a statistically significant factor that should be considered by companies when deciding whether to go public using SPAC, while other factors such as Size and Debt Ratio display the same behaviour as established by previous studies.

Keywords: Initial Public Offering, Special Purpose Acquisition Vehicles (SPAC), Under-pricing, Long-term performance, Blank Check Company

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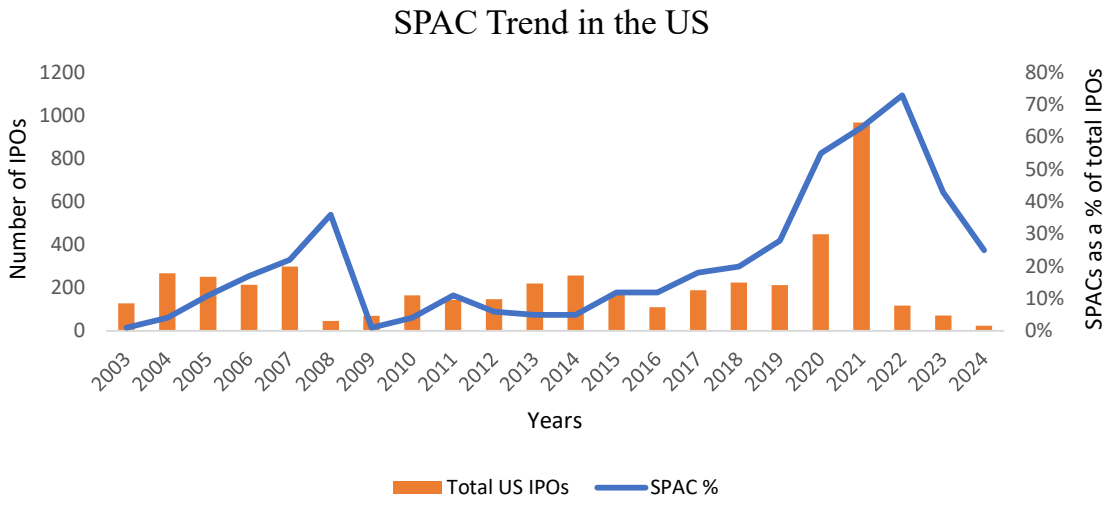
CHAPTER 1 Introduction

In May of 2023, Vin Fast, a leading electric vehicle company announced that it will be going public. Unlike its peers from other countries, such as Tesla in the United States and BYD in Mainland China, Vin Fast decided to go public via the Special Purpose Acquisition Company (SPAC) method instead of a traditional Initial Public Offering (IPO). This caught the eye of many retail and institutional investors due to the value of the deal. The 23-billion-dollar deal was the second biggest deal of 2023, and was completed in August of 2023 (Nazir & Mantone, 2023). While the SPAC method has existed since the 1990s, it has been gaining a lot of traction since mid-2000s, and has it booms and busts. In 2007, SPAC IPOs accounted for 22% of all IPOs in the United States and this number rose to 36% in 2008 *(SPAC analytics - home*). SPAC activity fell post 2008 but has bounced back since 2018. In fact, 2020-2022 were record years for SPAC IPOs where they accounted for more than 50% of IPOs. SPAC accounted for 50% in not just the deal count but also the proceeds from the IPOs (*SPAC analytics - home.*).

Figure 1: *This graph shows the trend in SPAC IPOs in the US over the past 20 years.*



Source: Data for this figure was collected from SPAC Analytics

A few papers have investigated the post-listing performance of SPACs and compared them to the traditional IPO performance. Kolb and Tykvová (2016) discussed the long-term performance of companies that went public through the special purpose acquisition method in the United States in the time frame 2003 to 2015. They find that, on average, SPAC IPOs are associated with severe underperformance in comparison to the similar/comparable IPO firms and the market (Kolb & Tykvová, 2016). Some of the possible explanations for this according to the author include the likely possibility that the companies that choose this route of listing are highly levered and have low growth opportunities.

Despite previous research in this topic, there has been no recent study which also considers the SPAC boom of 2020-2022.

There have been various studies that explore the short-term performance of IPOs in different countries. A study by Jenkinson et al. (1990) compared the 1 week performance in different countries to see if there was a global trend and if there were any differences in the magnitude of the same[1]. The study took the United States, United Kingdom, and Japan as countries of focus, and found that while under-pricing takes place in all 3 countries, there were significant differences in the extent to which it occurs. It is found that the companies in the United States and the United Kingdom saw, on average, a 10% and a 7% increase in their share prices respectively after 1 trading week. On the other hand, Japan on average witnessed a 55% increase in share prices after the same period. While there has been comparative research on different countries regarding IPO short-term performance, there is no significant comparative research between traditional IPOs and SPACs with regards to this variable. It is important to study this due to the significant contrast in the way traditional IPOs and SPACs operate.

Regardless of the differences between the two methods, both are subject to mispricing of the offer price. This is because at the time of offering, the price does not fully capture the market valuation and sentiment of the company, and it is not possible to do as well. Typically, the offer price is below the closing price on the first day of trading. This means that the investors of the company who issued the shares via the IPO did not receive the actual value of those shares. This is called 'money left on the table due to IPO under-pricing'. Since all companies want to avoid this and not be subject to under-pricing, significant research has been done on this topic, with papers dating back to 1970s, that pinpoint the cause of this mispricing and possible solutions to the same.

While there is previous research on traditional and SPAC IPOs, most of the studies are old and focus on the United States. Almost all studies exploring the long-term performance of SPAC IPOs post listing are before the SPAC boom in 2020-2022. Hence, it is important to do more recent research with a bigger sample size to see if the findings of previous papers still hold. Furthermore, most research papers look at the performance of the companies post-listing from a long-term aspect or under-pricing for a specific route (either traditional IPO or SPAC IPO). This paper aims to merge multiple dimensions of research and make a comparative analysis between SPACs and traditional IPOs at 3 different time periods (immediate, short-term, and long-term) and hope to provide insights to companies, and investors with regards to the consequences of the method of going public. Unlike majority of the past studies, including the study by Kolb and Tykvová (2016), which focus on United States (likely due to high data availability), this paper will focus on less researched countries. It will be interesting to conduct this study

[1] Short-term period considered in this paper is 1-week.

in the United Kingdom because of the unique nature of SPACs combined with the ongoing IPO market complication faced by the country (Vanya & Duqiatan, 2024). In addition to the United Kingdom, the study will also focus on China due to a lack of research in that region. A combination of United Kingdom and China, which can act as proxies for developed and developing economies respectively, will also facilitate a comparison to understand whether the effect of SPAC IPOs varies between countries based on their economic maturity. Considering the multidimensional aspect of this paper, the primary research question that is raised is:

"Does going public through the SPAC route have any significant impact on the post-listing performance of the company and whether that effect varies between developed and developing economies?"

A study by Boyer & Baigent (2008) finds that engagement in SPAC IPO typically witnesses a significantly lower under-pricing as compared to the general companies (1.23% to 26%) when comparing SPAC IPOs and traditional IPOs in the United States between 2004-2006. Similar results are obtained by Lewellen (2009). This raises question whether the under-pricing trend in the previous years is a factor that is considered by companies in deciding whether to go public through the special acquisition method. Upon analysing existing papers and studies, no significant explicit research has been found on this topic. Hence, this paper also considers a second research question:

"How does the under-pricing in previous years affect the usage of SPACs?"

The rest of the paper is structured as follows: Section 2 provides background information on this topic and discusses past studies and their findings. Section 3 outlines the data collection and the summary statistics of the obtained data. The paper then proceeds to explain the research method for the analysis in Section 4. Section 5 presents the results obtained from the analysis and discusses their implications. Lastly, Section 6 summarizes the findings of this paper and tries to answer the research questions. It also discusses the limitations of this study and possibilities for future research.

CHAPTER 2 Theoretical Framework

2.1 Traditional IPO

2.1.1 Structure

As a private company grows/matures, it becomes more interested in going public, i.e. offer the public an opportunity to invest in the company in exchange for shares. Going public offers the company significant benefits including, but not limited to, access to additional capital, an elevated public profile, and greater bargaining power with the banks (Pagano et al., 1998). The most common way to do so is through an IPO (Initial Public Offering), where the company goes through multiple stages and processes before going public.

The first step is to engage an underwriter. An underwriter acts as the intermediary between the company seeking to issue shares to the public and the investors who wish to buy the shares. The role of the underwriter is to identify with the appropriate IPO price based on the responses received from the market research that they conduct. It has been established in previous studies that the reputation of the underwriter plays a role in the extent of under-pricing the company experiences (Carter & Manaster, 1990). After the underwriter fixes the IPO price, the company files for approval from regulatory authorities. To receive the approval, the underwriter publishes the Red Herring Prospectus post which they allow investors to start subscribing for the shares. In case of over-subscription, shares are typically awarded on a pro rata basis[2]. On the date of the IPO, the investors provide the capital to the company, which is recorded as shareholders equity, and receive the shares in exchange.

While an IPO has many advantages, it also comes with significant costs. The first cost is the underwriter fee which the issuing company pays to the bank they engage for underwriting their IPO. On average, the underwriter charges 7% of the IPO proceeds as fees based on data of IPOs between value $20 million and $100 million (Busaba & Restrepo, 2022). Additionally, the company also must pay legal fees. Going public through a traditional IPO is also associated with indirect costs. The first is the time taken to go public. A study of IPOs reports a median of 104 days from draft registration statement (DRS) to listing (Chaplinsky et al., 2017). The time taken to create the DRS may vary depending on several factors including industry of operation, underwriter reputation, and regulatory requirements among others. Another indirect cost that IPOs face is under-pricing, also known as ‘money left on the table’. This affects the pre-IPO owners significantly. This topic is discussed more extensively in the next section.

[2] Red Herring Prospectus is a regulatory filing which reports the company’s functions and operations, and provides potential investors information required to make an investment decision (Sravani & Sekhar, 2021).

2.1.2 Post-Listing Performance

One of the first performance measures of an IPO post-listing is under-pricing, which is the difference between the closing price on the first day and the offer price. This is a popular topic which has been researched extensively. An early study by Loughran and Ritter (2004) highlights the changes that occurred in the under-pricing trend in the United States over a span of roughly 23 years. They found that the average first-day return in the 1980s was 7%, which almost doubled between 1990-1998 (Loughran & Ritter, 2004). The years 1999 and 2000 were subject to under-pricing to a previously unseen magnitude, with the average first-day return being almost 65%. The authors credit this to the internet bubble at that time. However, after the bubble burst, the under-pricing reversed back to pre-bubble levels (12% in the years 2001-2003). This study established that under-pricing has been a trend throughout the years, but the extent of it varies significantly based on market conditions.

The above study showed that the under-pricing varies through time, which raises the question whether it also varies cross-sectionally (across countries). A study by Jenkinson et al. (1990) explores this very question. The study focuses on 3 countries in different parts of the world, United States, United Kingdom, and Japan. Jenkinson looks at the period 1985-1988, where a large number of firms entered the stock-market across all 3 countries. It found that the observed discount on the offer price in the United States and United Kingdom was 10% and 7% respectively. On the other hand, Japanese IPOs were underpriced by roughly 55% in that period (Jenkinson, T. J., 1990).

Looking at developing countries, studies have found evidence in favour of under-pricing prevalence in China and India as well. Ting & Tse (2006) look at the Chinese-A share (primary) market from 1995 to 1998. They find that the average initial return for Chinese IPOs in that period was an astounding 123.59%, which is significantly greater than the observed levels for other developed countries such as the United States and the United Kingdom in that period (Ting & Tse, 2006). The authors highlight 3 possible reasons for this high magnitude of under-pricing: winner's curse, ex ante uncertainty, and signalling. The paper also provides enough evidence to support all 3 theories. Another study looking at China in a slightly bigger time period (1993-1998) finds that the average return on day 1 in the A-share markets is 178% (Chan et al., 2004). Similar trend is found in India, where a study of the period 1999-2011 observes an average first day return to be around 50% (Bansal & Khanna, 2012).

Looking at long-term performance of IPOs, Loughran and Ritter (1995) find that the average IPO underperforms comparable companies which did not go public. This study was conducted on United States data from 1970-1990 and concluded that an investor in a non-issuing firm will have returns 44 times what the investor in IPO realizes at the end of 5 years (Loughran & Ritter, 1995). Chan et al (2004) also conducted a similar study in China to see if there is a difference in the results obtained. The paper

observed that while the returns that the non-issuing firms in China generates are marginally higher than IPO firms, the difference is not statistically significant (Chan et al., 2004).

Based on the literature above, large differences are observed between countries in post-listing performance of IPOs. In particular, results for China vary significantly from the results in US and UK. This raises a question whether being in a developed or developing country has impact on the post-IPO performance of a company. China is considered a developing country, which is supported by the fact that the Chinese equity market is quite young with the exchange gaining development in the early 1990s.

Hypothesis 1: IPOs in developing countries have better post-listing performance.[3]

2.2 SPAC IPO

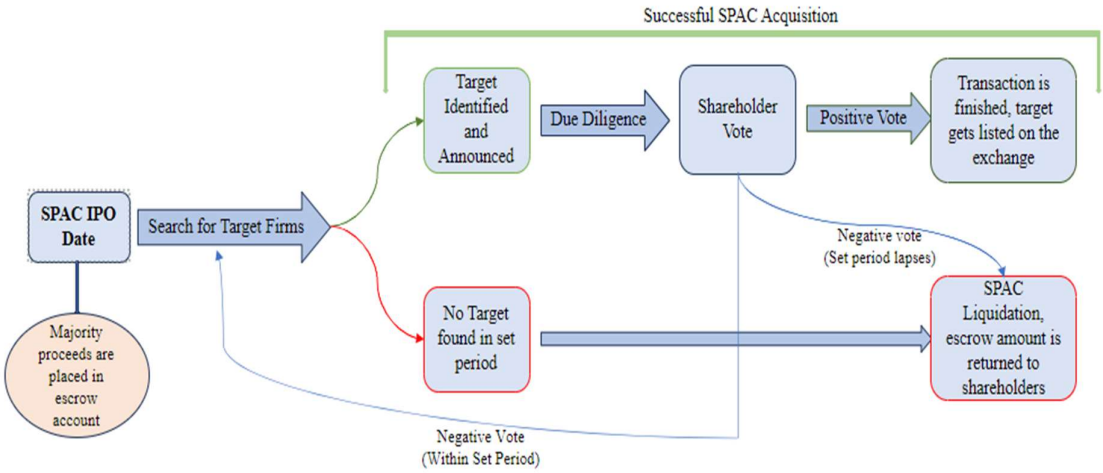
2.2.1 Structure

A SPAC, also known as a blank check company, has a unique lifecycle. One of the most important components of SPACs are sponsors, which are typically specialists or former executives of a particular field.

1. Sponsors place a fee to create the company. This fee is also known as the Sponsor's promote.
2. The SPAC IPO is conducted using sale of units, where 1 unit typically contains one share and one warrant to buy a share at a discounted rate in the future. After deducting the underwriter's fee, usually 5% of the proceeds, the proceeds are deposited in an escrow account where it earns interest rates (Lakicevic & Vulanovic, 2013).
3. The sponsors usually have an 18-month deadline after the IPO to find a target company and the acquisition has to be finished within 24 months of the IPO (Jenkinson, Tim & Sousa, 2011).
4. Upon finding a target company, a shareholder proxy vote takes place where the decision is made whether to accept the target company or reject it.
5. If the proposal is accepted, the SPAC acquires the target, providing it with a listing on the stock exchange.
6. In case of negative proxy vote, and failure to find an appropriate target within the appropriate period, the SPAC gets liquidated with the shareholders getting their investment back after adding the interest. Important to note is that the sponsors do not get back their placement fee, thus incentivizing them to find an appropriate target company.

[3] Hereon referred to as *H1*

Figure 2: *This figure shows the workflow of a SPAC company*



Based on the nature of SPACs, and numerous studies associated with it, it has a few relative advantages as compared to the traditional IPO.

- Traditional IPOs are often very time-consuming processes. Compared to that, SPACs are perceived as a faster way to go public, with deals being completed in as few as 12 weeks (Riemer, 2007).
- SPAC sponsors can be viewed as specialized General Partners (GP) who behave in a Venture Capital format. Investors provide funds to the GP through the IPO and the GP then finds a suitable company to invest in based on his technical specialization. Hence, going public through SPACs could bring additional value to the company due to the business insight offered by the sponsor (Gahng et al., 2023).

While many people cite cost efficiency as another potential benefit of engaging in SPACs (Sisk, 2006), the study by Gahng et al (2023) found that, looking at the median in the database, costs for SPAC are 15.1% of the market cap as compared to the 3.2% for the traditional IPO.

2.2.2 Post-Listing Performance

SPACs, due to its gaining popularity, have been in the spotlight in recent years with significant number of new studies being published regarding it. There have been numerous studies which look at the performance of SPAC companies on both short-term and long-run basis. One such study by Datar et al (2012) discusses the long-term performance of the SPACs created in the United States between 2003-2008. With a dataset of 156 SPAC firms and 794 traditional IPO firms, they find that SPAC firms' operational performance is significantly inferior to industry peers and comparable IPO firms. In the period studied, it was found that the median EBITDA of SPAC firms was $16.9 million less than the

industry median (Datar et al., 2012). The authors also observed that the excess stock returns of the SPAC firms were substantially lower than the excess stock returns for the traditional IPO firms.

Like the study by Datar et al (2012), Kolb & Tykvová (2016) also focus on US SPAC firms but across a longer time period (2003-2015). With a sample size of 127 SPAC IPOs and 1128 traditional IPOs after data-cleaning, the authors implement 2 methods to track long-term performance. The first is the Buy and Hold Abnormal Returns (BHAR) which is calculate for 4-time frames (6 months, 1 year, 2 years, and 5 years). The BHARs of SPACs are then compared to those of traditional IPO firms and the market. The authors observe that, on average, SPACs underperform the market by 59% over two years, and is more severe than the matched traditional IPO firms which underperform by 34% (Kolb & Tykvová, 2016)[4]. Similar results are obtained for all timeframes analysed in the paper. The second method used to track long-term performances is the 5-factor model analysis. The factors that the paper implements are the 3 traditional Fama-French factors (Market, Small-minus-Big, and High-minus-Low) supplemented with the Momentum and Liquidity factors. Just like the results obtained in BHAR, the 5-factor model also suggests that SPACs underperform the market after going public. They also underperform as compared to traditional IPO firms (alpha of -5.2% as compared to alpha of -1.7%).

Just like traditional IPOs, SPACs are also subject to under-pricing. While this topic is not as researched for SPACs as compared to traditional IPOs, there are a few studies which try to do a comparative study between the two. Boyer and Baigent (2008) explore the first-day returns observed by SPAC IPO firms and traditional IPO firms in the United States between the period 2003 to 2006. With a sample of 87 SPAC IPOs, the study looks at both 1-day returns and 1-year returns. For first-day returns, the study finds that the SPAC IPOs earn significantly lower returns than the traditional IPOs. In 2006, SPACs saw a return of 1.23% as compared to a 26% return on first trading day for the traditional IPOs (Boyer & Baigent, 2008). With similar results in 2004 and 2005, this study suggests that SPACs witness significantly lower under-pricing. Studies by quite a few other authors also find similar results. Murray (2014) finds that the under-pricing of SPACs in the United States ranges between -0.9% to 10.4% in the period 2003-2010 (Murray, 2014). Important thing to note is that when not considering over the counter issues (OTC), the range significantly shrinks to -0.9% to 1.62%.

Looking at previous literature, it seems that there is a relationship between the post-listing performance of the company and the method it implements to go public (SPACs vs traditional IPOs). Hence, the second hypothesis is formed as:

[4] Sorted into 100 different portfolios based on their size and book-to-market ratio, or into 49 portfolios based on 4-digit SIC codes (Kolb & Tykvová, 2016).

Hypothesis 2: SPACs are not associated with a difference in post-listing performance of the company.[5]

As noticed in the Post-Listing Performance of Traditional IPOs section, developing economies have different results and observations as compared to the developed economies. Hence, it is important to check whether engaging in SPAC is associated with similar results across different countries. This leads to the formation of the third hypothesis:

Hypothesis 3: Effect of SPACs on post-listing performance does not vary across developing and developed countries.[6]

Based on the literature above, SPACs are associated with a lower degree of under-pricing as compared to the traditional IPOs. Since companies wish to reduce under-pricing, it could be one of the reasons which influence the usage of SPACs and promotes new SPAC IPOs. While there is previous research which tries to explain what factors influence a company's decision to SPAC, there is no literature currently available which explores the relation between the SPAC and previous under-pricing. This study is therefore expanded to check if a relationship exists between the two. Thus, the fourth hypothesis is constructed as:

Hypothesis 4: Under-pricing in previous years has no impact on the usage of SPACs.[7]

[5] Hereon referred to as *H2*
[6] Hereon referred to as *H3*
[7] Hereon referred to as *H4*

CHAPTER 3 Data

3.1 Sample Selection

For the analysis in this paper, various types of data were required. Most data were obtained from the Bloomberg Terminal using its "Advanced Search IPO" function. The below table shows the filters that were used to create the query for the data required for the primary research question/hypothesis 1 & 2.

Table 1: Query Filters for Primary Research Question Data

Category	Search Filter
Time Period	01/01/2000 to 31/03/2024
Region	United Kingdom, China
Deal Status	Completed
Deal Type	IPO, Special Purpose Acquisition Vehicle (SPAC)

For the first hypothesis, data of completed United Kingdom and China IPOs between January 2000 and March 2024. The initial data had a sample size of 9,309 observations, of which 140 were SPACs. However, there were many **o**bservations which had missing data and hence were removed from the sample along with any significant outliers. After cleaning the data, 7,409 observations remained, from which roughly 70 were SPACs. The huge difference in sample size between traditional IPOs and SPACs can be explained since they have not gained as much traction in these countries as in the US. This gap in data also indicates why there is a lack of research on SPACs in the United Kingdom and China.

For the secondary research question, it was decided to include the United States as well to increase the data size. Hence, data for United States was downloaded as well from the Bloomberg terminal. Along with Bloomberg terminal data, United States data was also retrieved from the SPAC Analytics webpage. Data for under-pricing in these 3 countries was extracted from the Refinitiv Eikon database along with the Warrington College of Business IPO webpage. The time frame for this research question was established as 1st January 2000 to 31st December 2023.

3.2 Variables

3.2.1 Primary Research Question

3.2.1.1 Dependent Variables

To analyse the post-listing performance at various stages, this paper will implement 3 dependent variables or time frames. All the three variables are established as Buy and Hold returns like the Kolb

& Tykvová (2016) paper and are automatically calculated by the Bloomberg database. The first dependent variable will be first-day return, which can be calculated as done by (Ljungqvist et al., 2007):

$$Firstday\ return = \frac{Day\ 1\ Close - Offer\ Price}{Offer\ Price} \quad (1)$$

The second time frame will look at the short-term performance of the company post IPO. For this, the dependent variable used will be 1 week returns, i.e. offer price to closing price at the end of 1 trading week. This time frame is similar to the study by Kiesel et al. (2023), where they explore the short-term returns to announcements of SPAC mergers. A period of 5 trading days was implemented by the authors in that study, which is equivalent to 1 trading week which this study will use. This variable is calculated as:

$$Short\ term\ Performance = \frac{Week\ 1\ Close - Offer\ Price}{Offer\ Price} \quad (2)$$

The final time frame focuses on the long-term performance of the company post listing. This will be calculated using a 1-year period (52 trading weeks) post the IPO. While this time period might not be as large as suggested in other papers focusing on long-term performance of IPOs (Chan et al., 2004), it was selected to ensure that the recent boom in SPAC IPOs can also be considered in the analysis. However, only SPAC firms which had acquired a private company (deSPAC) were considered to ensure comparability with the traditional IPO firms in the long run. The variable can be calculated as:

$$Long\ term\ Performance = \frac{Year\ 1\ Close - Offer\ Price}{Offer\ Price} \quad (3)$$

The common practice when looking at the performance of a company using stock returns is to account for the Fama-French factors. However, since we look at China, Fama-French factors are excluded due to empirical proof of their insignificance in explaining returns in the Chinese Stock Exchange (Hu et al., 2019). This may stem from the fact that the Fama-French factors are constructed using data from developed markets/economies, while China is a developing economy.

3.2.1.2 Independent Variables

Following Kolb and Tykvová (2016) paper, one of the main independent variables will be the method of IPO implemented by the company. As such, a dummy variable called *"SPAC"* is created, which takes on a value of 1 when the company uses the special purpose acquisition method, and a value of 0 when the company uses the traditional method.

Since this is a two-fold research with the aim to also explore the differences between developed and developing economy, an additional independent variable based on country will be used. For this purpose, another dummy variable called *"Developing"* is created, which takes a value of 1 when the IPO country is China, and 0 when the country is the United Kingdom.

3.2.1.3 Control Variables

Besides the listed independent variables, there are numerous factors which affect the post-listing performance of a company. Disregarding these factors could lead endogeneity and effect the reliability of the results. It is hence necessary to include control variables to avoid omitted variable bias (OVB) and try to isolate the effect of the independent variables. Following Kolb and Tykvová (2016) paper, Return on Assets (ROA) has been selected as one control variable. Return on Assets is calculated as:

$$Return\ on\ Assets = \frac{Net\ Income}{Total\ Assets} \tag{4}$$

As discussed in the paper by Herawati (2017), a higher Earnings per Share (EPS) at the time of IPO is expected to cause a higher share price and hence affect the performance of the company. As such, the basic EPS has been selected as a control for the study. This variable is calculated as:

$$Basic\ EPS = \frac{Net\ Income - Dividend\ to\ Preferred\ Shareholders}{Weighted\ Average\ of\ Outsanding\ Common\ Shares} \tag{5}$$

3.2.2 Secondary Research Question

3.2.2.1 Dependent Variable

The dependent variable for this research question is whether the company went variable via a SPAC method or not. It is established as a dummy variable which takes a value of 1 when the IPO was a SPAC and a value of 0 when it went public through a traditional route. The data is obtained through SDC platinum.

3.2.2.2 Independent Variable

The independent variable is to be the under-pricing specific to each country in the past. Under-pricing per year is extracted from the Bloomberg database. It is then sorted across industries using the SIC codes. The final specification of the independent variable is the under-pricing in the last year based on the country and industry which a company operates in. Since SPACs could be more popular among a certain industry or a certain industry is associated with a higher under-pricing, this method will isolate such factors and give us more reliable results.

3.2.2.3 Control Variables

The study by Kolb & Tykvová (2016) found that companies that go public through the SPAC method typically have low growth potential and are smaller than the traditional IPO firms. SPAC companies on average also have weaker financials as compared to the firms that go public using the traditional IPO method. Since these are factors that could affect a firm's decision to SPAC, they need to be accounted for in the analysis to avoid omitted variable bias. They also found that Debt Ratio affects the firm's decision to SPAC. Hence the control variables for this analysis are Debt Ratio (Total Debt/Total Assets),

Size (Total Assets) and Return on Assets as established in Equation (4). Following previous studies, and to make the model more reliable, Size will be transformed logarithmically. While there are a few other variables which have been shown to have an impact on a company's decision to SPAC, they are not included in this study due to a lack of access to such data.

CHAPTER 4 Methodology and Validity

4.1 Research Method

For the primary research question, OLS regressions will be used to analyse the data and check for a relationship between the independent variable and the control variable. The analysis will be done for multiple specifications to try and get the most reliable results.

First, a univariate regression will be run for hypothesis 1 & 2 to see if there exists a relationship without any additional effect from other variables. The regressions can be estimated as following:

H1 $$performance_i = \alpha_i + \beta_1(Developing) + \varepsilon_i \quad (6)$$

H2 $$performance_i = \alpha_i + \beta(SPAC) + \varepsilon_i \quad (7)$$

Since our return variable has looks at three different time periods, the above regressions are run multiple times to check relationships at different points in time. In the above regressions, ε_i is the error term and β_1 is the coefficient of interest. Since there are many other factors that affect the performance, univariate specification will lead to omitted variable bias (OVB). Hence, the univariate regression results are displayed in the appendix for reference but are not discussed in the main study.

To account for OVB, we add control variables to the regression to make it a multivariate regression. The control variables for this regression are Basic EPS and Return on Assets. The regression is estimated as:

H1 $$performance_i = \alpha_i + \beta_1(Developing) + \beta_2(EPS) + \beta_3(ROA) + \epsilon_i \quad (8)$$

H2 $$performance_i = \alpha_i + \beta_1(SPAC) + \beta_2(EPS) + \beta_3(ROA) + \epsilon_i \quad (9)$$

For hypothesis 3, which explores whether the effect of SPACs is different for each country, an interaction effect is added into the regression, which is then estimated as:

H3 $$performance_i = \alpha_i + \beta_1(Developing * SPAC) + \beta_2(Developing) + \beta_3(SPAC) + \beta_4(EPS) + \beta_5(ROA) + \epsilon_i \quad (10)$$

For the secondary research question, our dependent variable is a binary variable unlike the continuous variables for the other 3 hypothesis. As a result, it is more appropriate to use a probit or logit model as compared to OLS/Linear Probability model. Since the coefficients of logit models can be interpreted more easily as compared to probit, this paper will make use of the logit model. The model will be

estimated using 5 control variables: Leverage, Debt Ratio, Return on Assets, Basic EPS and Offer Size. The model is estimated as follows:

$$\textbf{H4} \qquad Logit = \alpha_i + \beta_1(Underpricing_{t-1}) + \beta_2(Debt\ Ratio) + \beta_3(Size) + \beta_4(ROA) + \epsilon_i \qquad (11)$$

4.2 Validity Tests

4.2.1 Heteroskedasticity

Heteroskedasticity occurs when assumption 2 of OLS, which says that the variance of error terms is constant, get violated. Existence of heteroskedasticity can lead to unreliability of the estimated standard errors and the p-values. One way of testing for heteroskedasticity is the White test, where the null hypothesis is homoskedasticity.

Table 2: White Test for Heteroskedasticity

Source	Chi^2	df	p
Heteroskedasticity	0.67	8	0.9996
Skewness	3.03	3	0.3868
Kurtosis	2.02	1	0.1557

Notes: Table providing results of White Test for heteroskedasticity. The stars depict the relevant significance levels based on p-values (*$p<0.10$, ** $p<0.05$, *** $p<0.01$)

Based on the above table, we can see that the p-value for heteroskedasticity is greater than 0.05. This means that we do not have enough statistical proof to reject the null hypothesis of homoskedasticity.

An alternative test to the White test is the Breusch-Pagan test. When conducting the Breusch-Pagan test, the results suggest the existence of heteroskedasticity in the sample. Due to the contrasting results obtained from the two tests, it was decided to use robust standard errors to ensure that the results are as optimal as possible.

4.2.2 Multicollinearity

Multicollinearity arises when multiple variables in the regression are highly correlated with each other and cause a perfect linear relationship. The consequence of this is that the standard error of the coefficients increases. Overinflation of the standard errors can lead to variables being classified as statistically insignificant when they should be significant (Daoud, 2017).

To check whether there exists multicollinearity, we create a correlation matrix and check if there are variables which have a high correlation with each other. The correlation is on a scale of -1 to 1, where -

1 represents perfect negative correlation, 0 represents no correlation, and 1 represents perfect positive correlation. For this paper, strong correlation will be established as greater than 0.6 in absolute terms (Akoglu, 2018).

Table 3: Correlation Matrix (H1-H3)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) First-day Return	1.000					
(2) Short-term performance	0.964	1.000				
(3) Long-term performance	0.831	0.891	1.000			
(4) Basic EPS	0.002	0.002	0.003	1.000		
(5) ROA	0.002	0.003	-0.012	0.000	1.000	
(6) Offer Size	-0.023	-0.025	-0.034	-0.008	0.009	1.000

Notes: Variables SPAC and Developing have not been included in this due to their binary nature

From Table 3, we can see that the variables that have high correlation are Under-pricing, Short-term performance, and Long-term performance. This is not surprising since all 3 of them are performance measures which track the same company, and hence should be correlated to each other. This does not affect our analysis since they are dependent variables and only one of them is used in a regression at any given point. We also see that there are no other correlated variables in Table 3, meaning that we do not need to worry about multicollinearity for hypothesis 1-3[8].

Table 4: Correlation Matrix (H4)

Variables	(1)	(2)	(3)	(4)
(1) Under-pricing (t-1)	1.000			
(2) Log (Size)	-0.038	1.000		
(3) Debt Ratio	-0.015	-0.061	1.000	
(4) ROA	0.018	**0.397**	-0.059	1.000

From Table 4, we see that while most variables do not show significant correlation, Log (Size) and ROA are highly correlated. Inclusion of both the variables simultaneously might lead to multicollinearity and hence, these variables will be used in 2 different Logit models for *H4*.

[8] As an additional check, Variance Inflation Factor test was also conducted, and no multicollinearity was found.

4.3 Outliers and Normality

Based on the initial descriptive statistics of the variables, it was noticeable that there were quite a few outliers in the dataset which needed to be accounted for[9]. The most common way to treat outliers without removing them from the sample is the winsorization method. Under this method, the data gets modified to limit the effect of existing outliers. The method converts data points below and above a lower and upper threshold to match the value of the said threshold (Kwak & Kim, 2017). For this paper, winsorization has been carried out at 90%, i.e. top 5% and bottom 5% of the sample has been modified. This has been done for the dependent variables, EPS and ROA. The variable size has been transformed logarithmically due to the nature of the variable.

Table 5: Variable Treatment

Variable	Treatment
First-day Return	Winsorization
Short-term performance	Winsorization
Long-term performance	Winsorization
Basic EPS	Winsorization
ROA	Winsorization
Size	Logarithmic Transformation
Debt Ratio	Winsorization

4.4 Summary Statistics

After treating the variables to remove outliers, new summary statistics are calculated, which are presented below.

Table 6: Summary Statistics for SPAC IPOs (modified)

Variable	Mean	Std. Dev.	Min	Max
First-day Return	22.616	50.463	-5.000	217.467
Short-term performance	28.116	54.157	-12.500	202.123
Long-term performance	19.082	66.987	-63.889	351.096
Developing	0.257	0.440	0.000	1.000

[9] Available in the Appendix

Variable	Mean	Std. Dev.	Min	Max
Basic EPS	-0.019	0.174	-0.290	0.370
ROA	-12.288	19.760	-45.600	13.200
Log Size	3.256	2.839	-6.908	8.705
Debt Ratio	20.698	22.970	0	54.6

Table 7: Summary Statistics for Traditional IPOs (modified)

Variable	Mean	Std. Dev.	Min	Max
First-day Return	46.205	57.808	-9.825	217.467
Short-term performance	58.420	63.401	-14.706	202.123
Long-term performance	60.942	109.885	-63.889	351.096
Developing	0.756	0.430	0.000	1.000
Basic EPS	0.035	0.141	-0.290	0.370
ROA	-2.242	13.996	-45.600	13.200
Log Size	5.774	2.330	-4.273	13.792
Debt Ratio	18.093	16.486	0	54.6

Some insights can be drawn from the summary statistics tables presented above. From the first look itself, it can be noticed that there is a huge difference between the performance of the 2 methods. We can notice that the mean returns for all time frames are more than 2 times for traditional IPOs as compared to SPAC IPOs. Secondly, the variable Developing is a dummy variable which takes a value of 1 when the country is China and a value of 0 when the country is United Kingdom. The mean value of this variable under the SPAC method is 0.257, which means 25.7% of the SPAC IPOs come from China. In contrast, under the traditional IPO method, 75.6% of the IPOs come from China. Such a vast difference between the 2 methods indicates that SPAC method is not as common in developing countries (proxied via China) as compared to the United Kingdom (proxy of developed countries). Lastly, based on the mean values of the variable Log Size, it is evident that SPACs are significantly smaller in size as compared to traditional IPOs. Based on the Debt Ratio, we can also see that SPAC have more liabilities indicating a higher possibility of financial distress.

CHAPTER 5 Results & Discussion

5.1 Primary Research Question

To test the first three hypothesis, linear regression is run on the dataset as indicated in the Methodology. Since we have 3 dependent variables, a total of 9 regressions are run, which are displayed in the tables below.

Table 8: Regression Results for Hypothesis 1

Performance	First-day	Short-term	Long-term
Developing	33.868***	46.246***	48.613***
	(1.240)	(1.326)	(2.512)
ROA	-0.030	0.100*	0.441***
	(0.055)	(0.060)	(0.104)
EPS	18.281***	22.201***	53.122***
	(5.351)	(5.786)	(10.832)
Constant	19.849***	22.788***	23.246***
	(0.973)	(1.033)	(2.089)
n	7446	7346	7447
Adjusted R2	0.068	0.113	0.061

Notes: This table shows 3 different regressions run for hypothesis 1 with dependent variable being performance across three different time frames. The robust standard errors are provided in parenthesis. The stars depict the relevant significance levels based on p-values (*$p<0.10$, ** $p<0.05$, *** $p<0.01$).

From Table 8, we see that the variable Developing has a highly statistically significant coefficient for all three different dependent variables. With a coefficient of 33.868 for under-pricing, the model suggests that an IPO in a developing country is associated with 33.868 percentage points higher return on day 1 as compared to IPOs in developed countries. The results we obtain are consistent with what Ting and Tse (2006) find in their study on Chinese A-share markets. They found that the Chinese IPOs were associated with 126% under-pricing, which was significantly higher than the values found in the United Kingdom and the United States for the same time period (Ting & Tse, 2006).

Performance in China as compared to the United Kingdom is even more profound when considering the short-term (1-week) period. The coefficient suggests that Chinese IPO shares generate a 46.246

percentage points higher return when the shares are bought at the time of offering and are held for 1 trading week post-listing. Similar difference in returns is noticed in a 1 year-period as well, though the magnitude goes up slightly as opposed to the difference in 1-week returns (goes from 46.246 to 48.613).

Other variable that is highly significant is the EPS, which has particularly high positive effect on the performance of the IPO in the long-term. This is in line with what was found by Herawati (2017), where the author discussed factors which affect the initial return of an IPO company based on a sample from 2007-2012. With a coefficient of 53.122, it has the biggest effect on the performance in the Long-term. Contrary to Herawati (2017), who also found ROA to have a significant effect on the first day return of an IPO, this study finds that ROA is not significant in explaining the first-day returns. However, as the time-period increases, ROA becomes significant at 10% in the short-run and 1% in the long-term. In the cases where ROA is statistically relevant, it has positive coefficients, which means that an increase in ROA is associated with a proportional increase in return.

This huge difference can be attributed to multiple reasons. Since the Chinese equity market was established quite late in comparison to the British stock market, it has not matured yet, and is still in the growing phase. In addition, China experienced an average GDP growth rate of 8.433% over the period 2000-2023, as opposed to the 1.72% growth rate observed by the United Kingdom[10]. Factors such as this could be key drivers behind the significantly higher returns associated with the Chinese IPOs. Based on Table 8, **we cannot reject Hypothesis 1**, which states that developing countries are associated with higher post-listing returns, due to a lack of evidence.

Table 9: Regression Results for Hypothesis 2

Performance	First-day	Short-term	Long-term
SPAC	-19.165***	-23.019***	-31.290***
	(6.147)	(6.834)	(9.793)
ROA	0.389***	0.674***	1.072***
	(0.053)	(0.058)	(0.100)
EPS	8.948	9.133	39.335***
	(5.571)	(6.187)	(10.937)
Constant	46.765***	59.647***	61.980***
	(0.730)	(0.806)	(1.376)

[10] Data sourced from the World Bank

Performance	First-day	Short-term	Long-term
n	7446	7346	7418
Adjusted R2	0.013	0.028	0.031

Notes: This table shows 3 different regressions run for hypothesis 2 with dependent variable being performance across three different time frames. The robust standard errors are provided in parenthesis. The stars depict the relevant significance levels based on p-values (*$p<0.10$, ** $p<0.05$, *** $p<0.01$).

Table 9 shows the regression results for the 2nd hypothesis, which states that SPACs are associated with a difference in the post-listing performance of an IPO. We can see from the table, that the SPAC IPOs are associated with a significant negative difference as compared to the traditional IPOs.

When looking at the first-day return, the coefficient of SPAC (dummy variable) is -19.165. This means that when a SPAC company goes public, its first-day return is 19.17 percentage points lower than that of traditional IPOs. The results find a similar relationship that was observed by (Boyer & Baigent, 2008) which found that the SPAC IPOs are associated with a lower degree of under-pricing as compared to the traditional IPOs. Important thing to note here is that this under-pricing is observed by the shell company which has been established. The first-day return faced by the private company which goes public through the said shell company is different from this value. It is also not possible to accurately price under-pricing for the private company since it is acquired by the SPAC. Chatterjee et al. (2016) provide a theoretical proof that the costs faced by a private company upon going public through SPACs is pre-determined, and hence firms can see implicit costs of going public through the different methods. One of the key factors that determine the said costs is the value of the share of the sponsors. This means that higher the initial under-pricing of the SPAC IPO, lower the value of the sponsors share (money lost at the table) and hence higher the costs that private company faces. As a result, a lower front-end under-pricing should theoretically make it cheaper for a private company to go public through SPAC. Even though this coefficient is statistically significant, we cannot claim a causal relationship between engaging in a SPAC and facing lower under-pricing since the test is a linear regression. Other factor that affects SPAC IPO under-pricing is Return on Assets, which has a coefficient of 0.389, implying that a 1 unit increase in ROA is associated with 0.389 percentage point increase in day 1 returns.

Analysing the long-term model, we see that independent variable (SPAC) has a coefficient of -29.24, which is statistically significant at 1%. This means that when looking at 1-year time period, SPACs are associated with 29.24 percentage points lower return as compared to traditional IPOs. This observation is in line with what Kolb & Tykvová (2016) found in their paper. They find that the SPAC companies not only underperform the market, but also significantly underperform as compared to the traditional IPO firms. They observed that over the 12-month period, SPAC firms underperform the benchmark portfolio by 46%, while matched IPO firms underperform by "only" 17%. While they do not do a direct

comparison between the performance of the two methods using a linear regression, the authors conduct a Wilcoxon-Mann-Whitney test to check if the differences between the 2 are significant. As expected by the authors, the results were significant, showing that SPACs underperformed traditional IPOs. Additionally, Return on Assets is significant at a 1% level for the long-term period as well, and has a coefficient of 1.072. In contrast to the 1-day return model, EPS is significant in the long-term. With a statistically significant coefficient at 1%, a one unit increase in EPS is associated with 39.34 percentage points higher return. Based on the results displayed in Table 9, **we can reject Hypothesis 2** that SPACs do not have a difference in their post-listing performance.

Table 10: Regression Results for Hypothesis 3

Performance	First-day	Short-term	Long-term
SPAC	9.624	15.554*	2.297
	(8.026)	(8.456)	(10.848)
Developing	34.322***	46.909***	48.863***
	(1.231)	(1.320)	(2.531)
SPAC × Developing	-59.617***	-79.688***	-48.703***
	(8.245)	(8.768)	(14.520)
ROA	-0.028	0.102*	0.442***
	(0.055)	(0.060)	(0.104)
EPS	17.316***	21.101***	52.311***
	(5.349)	(5.771)	(10.849)
Constant	19.600***	22.372***	23.182***
	(0.958)	(1.021)	(2.105)
n	7446	7346	7447
Adjusted R2	0.070	0.116	0.061

Notes: This table shows 3 different regressions run for hypothesis 3 with dependent variable being performance across three different time frames. The robust standard errors are provided in parenthesis. The stars depict the relevant significance levels based on p-values (*$p<0.10$, ** $p<0.05$, *** $p<0.01$).

Table 10 combines the first 2 hypotheses to explore whether the effect of SPAC is different across countries. The first thing that can be seen from the table is that coefficient of the variable developing is statistically significant across all three time periods and is similar to what was observed in table 7.

Interestingly, when we look at the variable SPAC, it is no longer statistically significant in contrast to Table 8. The only time-period where it has a significant coefficient is in 1-week period where it is significant at the 10% level (15.554). This implies that SPACs are not associated with any significant difference in performance in the United Kingdom. A possible reason for this is that since the United Kingdom has a matured stock market, and SPACs have been prevalent in the country for a while, the information asymmetry and the risk is more likely to have been factored into the offer price. This reduces the difference between the returns that the 2 methods observe.

In the model run for hypothesis 3, an interaction effect was included. The interaction effect is used when both the variables (in our case SPAC and developing) have a value of 1. From Table 9, we can see that the coefficient for this is highly significant across all 3 time periods. The value for 1-week returns is particularly high, with a coefficient of -79.67 percentage points. This implies that as compared to the SPACs in the United Kingdom, SPACs in China are associated with 79.67 percentage points lower return. The same is true for the first day returns and the 1-year period, which have a coefficient of -59.62 and -48.70 respectively. The results obtained in this model also suggest that SPACs in China dominated the dataset when the calculations for the 2nd hypothesis (Table 8) were made, since the results were statistically significant for the effect of SPAC when a bifurcation based on country was not made. A possible way of interpreting this is that the information asymmetry is higher in the developing countries than in developed countries. From the results in Table 10, **we can reject Hypothesis 3** that the effect of SPACs differs across countries.

Based on the first 3 hypothesis, we can see that there are multiple factors which are associated with the post-listing performance of companies. Our primary focus is the SPAC firms, which are associated with significantly lower performance. In previous study by Kolb & Tykvová (2016), they witness similar results, and try to provide some explanations for why this might be the case. According to their research, the companies which engage in SPAC are smaller and have lower growth opportunities. In our study, through the summary statistics, we can notice that the SPAC firms are significantly smaller based on the Offer Size variable. It is also evident that the companies which go public through SPAC have a much lower ROA and EPS, which act as proxies for firm performance. Based on these firm characteristics, Kolb & Tykvová (2016) suggest that the firms which engage in SPAC are also less likely to get funding from Private Equity and Venture Capital. It is plausible that SPACs attract companies which do not have significant growth potential and are financially weak. Because of the way SPACs are structured, it is in the Sponsors' interest to ensure that the SPAC acquires some company, even if it is of "poor" condition. This is because if the SPAC gets liquidated, the Sponsors do not get their promote/placement fee back. A principal-agent issue thus comes into play here. Since there are some distinct characteristics of firms that go public through SPAC, one might wonder if these characteristics are the reason why a company

goes public via SPAC and not through the traditional route. Hence, this paper now looks at factors which affect a company's decision to SPAC, with a focus on the under-pricing of the previous year.

5.2 Secondary Research Question

To test the 4th Hypothesis, a Logit model based on approximately 6000 data points is run. The results are displayed below in Table 11. For robustness, the first model will be constructed using only the dependent and the independent variables. Control variables will be added in the second model. As discussed before, Log (Size) and ROA will be used in different models to avoid multicollinearity.

Table 11: Logit Model

	(1)	(2)	(3)
Under-pricing(t-1)	-3.311***	-4.056***	-4.330**
	(0.427)	(0.977)	(1.942)
Log (Size)		-0.305***	
		(0.054)	
ROA			-0.024**
			(0.012)
EPS			0.000***
			(0.000)
Debt Ratio		0.014*	0.007
		(0.007)	(0.011)
Constant	-2.796***	-1.936***	-5.204***
	(0.105)	(0.236)	(0.466)
Observation	6695	3409	6532
Psuedo R^2	0.048	0.167	0.157
Chi^2 Probability	0.000	0.000	0.000

Notes: This table shows 3 different specifications logit models run for hypothesis 4 with dependent variable being a dummy variable SPAC. The robust standard errors are provided in parenthesis. The stars depict the relevant significance levels based on p-values (*$p<0.10$, ** $p<0.05$, *** $p<0.01$).

From Table 11, we can see that all 3 models have a low Chi-square probability (significant at 1% level), which indicates all 3 model improve the model fitness as opposed to the null hypothesis. When we

conduct the univariate logit model with under-pricing, we get a statistically significant coefficient for the independent variable. This suggests that the under-pricing does have an impact on a company's decision to SPAC. However, since the model could be suffering from OVB, we also analyse models 2 and 3.

In model 2, under-pricing has a coefficient of -4.056, and is significant at the 5% level. This is an increase from model 1, where it had a coefficient of -3.311. However, since this is a logit model, the coefficients cannot be interpreted directly, and it is important to calculate the marginal effects of the model. From Table 14, we see that the marginal effect for the variable under-pricing is -0.076 for model 2[11]. This means that a 1 unit increase in under-pricing in the previous year decreases the likelihood of a company going public through SPAC by 7.6 percentage points. While this number may not seem significant, it's magnitude is much higher to what other studies have established for market-specific factors. The study by Kolb & Tykvová (2016) found that 1 percentage point increase in the market volatility changes the likelihood of a SPAC by 0.77 percentage points. Model 3 sees an increase in the coefficient of the variable; however, its marginal effect reduces from -0.076 to -0.013.

Looking at other control variables, firstly, Log (Size) has a coefficient of -0.305 in model 2 which is statistically significant at the 1% level. The marginal effect of this variable is -0.005, which indicates that a 1 unit-increase in the Log (Size) results in a 0.5 percentage point decrease in the likelihood of a SPAC. An important thing to consider here is that the variable Log (Size) was subject to a logarithmic transformation, which means that the effect of the true variable is not the same as the marginal effect. To get the true variable effect, it must be transformed back to its original form. For instance, if the size of the firm were to increase by 10%, the probability of the firm going public through SPAC would reduce by 2.069 percentage points, which is quite a substantial number[12]. The results obtained are in line with the observations of Kolb & Tykvová (2016), but on a smaller magnitude. While this study found that the marginal effect of Log (Size) is -0.005, they found it to have a marginal effect of -0.053.

Secondly, Debt Ratio gives inconsistent results between the 2 variables. From model 2, it can be seen that the variable has a coefficient of 0.014 and is statistically significant at the 10% level. However, when analysing the third model, it is no longer statistically significant. This could be due to an interaction between Debt Ratio and the new variables that are added in the model. As such, the marginal effect of the variable under model 2 is 0.0003, which suggests that a 10 unit increase in debt ratio increases the likelihood of SPAC by 0.3 percentage points. While this value is significantly lower than what is observed by Kolb & Tykvová (2016), it does have the same sign, indicating that a higher Debt Ratio increases the company's likelihood of SPACing.

[11] Displayed in Appendix
[12] 0.5*log(1+10%)*100

Thirdly, Return on Assets and EPS are statistically significant in model 3 at 10% and 1% respectively. ROA has a marginal effect of -0.001 which means that a unit increase in ROA reduces the likelihood of a SPAC by 0.1 percentage points. This is similar to the results obtained by Kolb & Tykvová (2016), but on a smaller scale. While EPS is statistically significant, its marginal effect is very small, with one unit increase in EPS only having an impact 0.01 percentage points.

The coefficient is statistically significant in all 3 models, which indicates that there are more explanatory variables that are not included in our models. This was expected since many factors influence the company's decision to SPAC, and it is not plausible to assume that this paper can cover all of them. Furthermore, we could not include some variables that have been shown to have an effect on this due to a lack of data. This is reflected in the R^2 as well, which is not that high. Models 2 and 3 can only explain 16.7% and 15.7% of the variation in the dependent variable. Nonetheless, they have a much higher R^2 than model 1, and hence they are the better explanatory models.

The results obtained in the Logit model support studies done in the past in the US. It can be noticed that companies which are larger and have better financial performance prefer to go public through the traditional IPO methods. Additionally, companies with higher debt and leverage are more likely to engage in a Special Purpose Acquisition method. Looking at the newly introduced under-pricing variable, it is statistically significant in all 3 models and influences a company's decision to go public through SPACs. Hence, based on Table 11, **we reject hypothesis 4**, which states that previous under-pricing has no effect on the usage of SPACs.

While we reject hypothesis 4, the impact of under-pricing is opposite to what was predicted in the literature review section. It was expected that a higher degree of under-pricing in the previous year would increase the likelihood of a SPAC merger since SPAC companies face a lower under-pricing at the time of the IPO, and the merger leaves room for negotiation for the private company. However, the results of the analysis do not support this, and there could be multiple reasons for it. This could be an interesting topic for further research.

As an additional Robustness Check, probit models were constructed with the same specifications as the logit model, and they yield similar results[13]. Hence, the previous logit models are robust and valid.

[13] Table in Appendix

CHAPTER 6 Conclusion

Following the SPAC boom in the recent years, SPAC IPOs have increasingly started gaining momentum. In 2022, SPAC IPOs accounted for 73% of all IPOs that took place. With this rising popularity of this alternative method of going public, a need to look at the characteristics of this method rises. Most of the research in the functioning of SPAC takes place based on US firms only. While there has been research in the long-term performance of SPAC firms, there has been no comparative study between different nations across multiple time periods. The primary focus of this paper was to solve this, which raised the main research question as: **"Does going public through the SPAC route have any significant impact on the post-listing performance of the company and if that effect varies between developed and developing economies?".** After looking at the past literature, it was found that SPAC firms are associated with lower-first day returns, i.e. lower under-pricing. It important to see if this was one of the factors that influenced a firm's decision to SPAC, but no previous research was found on this topic. Consequently, a secondary research question was formed as: **"How does the under-pricing in previous years affect the usage of SPACs?".** The main goal of this paper is to assist company executive and decision-makers in making a sound decision after the consideration of the consequences of each method, and to help retail investors make an informed decision as to whether to invest in SPAC companies or not based on their typical characteristics.

The main independent variables were established as SPAC and Developing for the main research question. Both the variables are dummy variables which take a value of 1 if the company went public through the SPAC method and if the company operates in a developing country respectively. Following Kolb & Tykvová (2016) and Kiesel et al. (2023), the dependent variables were established as first-day return, 1-week return, and 1-year return. Control variables were added based on the previous studies, which established other factors influencing the performance of the company, in order to avoid omitted variable bias. For the secondary research question, the main independent variable was established as Under-pricing in the previous year based on country and industry. The dependent variable is SPAC. Previously established factors which impact a company's decision to SPAC are included as controls. The required data for this was acquired through various databases, but majority is sourced through Bloomberg, Refinitiv/Eikon, and SDC Platinum.

The primary research question was analysed using linear regression in three stages. The first model looked at the effect of operating in a developing country on the stock performance of the company post-listing. The model suggests that being in a developing country has a highly significant positive effect on the performance in all 3 time periods and is in line with what hypothesis 1 predicted. The second model looked at the effect of SPAC on the performance, and it was found that a SPAC is associated with significant lower return as compared to a traditional IPO. The last model tested whether the effect of

SPAC differs across countries by adding an interaction effect between the variables SPAC and Developing. While this interaction effect is statistically significant with a negative coefficient, suggesting that SPAC in developing countries have an even lower performance than SPAC in developed countries, the variable SPAC on its own is no longer significant in some time periods. This suggests that SPACs in the United Kingdom do not exhibit significant difference in performance as compared to traditional IPOs. Since there is a difference on the impact of SPAC across other countries, hypothesis 3 is rejected[14]. The general findings on the main research question are in line with what previous studies have established.

The secondary research question was tested using Logit models to see the effect of different characteristics on a firm's likelihood of engaging in SPAC. With the main independent variable being Under-pricing in previous year, the models yielded statistically significant results. Under-pricing was significant across all models, suggesting that it does have an impact on firm's decision to SPAC, but the effect was opposite to what was expected theoretically. These models add to existing literature on determinants of SPAC in the form of a new Market-specific factor, Under-pricing (previous year). As for the control variables, majority of them are firm-specific factors which exhibit the same effect as established in previous studies. As an additional robustness check to ensure reliability of our models, the same relation was tested using the Probit models as well, which gave similar results to the main models. As a result, hypothesis 4 is rejected[15].

In general, the findings of the study are in line with existing literature and suggests that companies that go public through the SPAC method are more likely to have lower growth opportunity and weaker financials. They are also smaller in size and have a higher debt ratio, indicating greater chances of financial distress. It is likely that these companies don't have excess to additional capital in the form of debt or VC/PE backing, and hence engage in SPAC to raise capital.

[14] H3- effect of SPAC does not vary across countries.
[15] H4- underpricing does not impact a firm's decision to SPAC.

CHAPTER 7 Limitations and Further Research

As with all empirical research, this paper is associated with certain limitations and has scope for improvement. Firstly, most of the models have a relatively low R^2, which suggests that there are other factors which affect the dependent variable but are not included in the model. As discussed in the data section, some significant variables established during literature review were not included in the model due to lack of data.

For the primary research question, a relatively shorter timeframe was taken in order to include the SPAC boom companies as well. However, despite this short timeframe, many SPAC were not able to find appropriate target company and complete a successful acquisition at the time of this study. Hence, the dataset of SPAC acquisitions was small, which could have had an impact on the results obtained in the study. For further research in this area, a recommendation would be to redo a similar study in a few years to ensure that the SPAC IPOs of 2020-2022 have underwent an acquisition or liquidated. When doing this study, it would also be more useful to add more control variables such as size of the firm, and the industry in which it operates. More countries should be included in the study, if possible, to increase the sample size and reliability of the results.

For the secondary research question, the main focus was on previous Under-pricing as an explanatory variable, and it was significant through all the models. However, due to lack of data availability, many variables which were established to have an impact on the firm's likelihood for SPAC by Kolb & Tykvová (2016) were not included in the analysis. Hence, it is possible that there is an omitted variable bias and the effect that we have obtained for the variable under-pricing (previous year) is not its true variable. A further study encompassing all the variables is a suggested topic for further research to check the validity of findings of this paper. This could increase the pseudo R^2 of the models as well and increase their explanatory power. Moreover, the analysis suggests that higher under-pricing has a negative impact on a company's decision to SPAC, which can be an interesting relationship to study and explain.

Lastly, this paper uses companies from different countries sourced through different databases. Due to this, there are chances that the industry classification of companies might not be consistent across the sample. Hence, for future research it is recommended to minimize the number of databases used in data sourcing.

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APPENDIX A: Additional Tables

Table 12: Variable Description

Name	Type	Nature	Specification
Underpricing (Company)	Dependent	Continuous	First-day return
Short-term Performance	Dependent	Continuous	First-week return (BHAR)
Long-term Performance	Dependent	Continuous	First-year return (BHAR)
SPAC	Dependent/Independent	Dummy	=1 if IPO through SPAC =0 if IPO through traditional method
Underpricing (Country)	Independent	Continuous	Underpricing in country by industry
Return on Assets	Control	Continuous	ROA at the time of IPO
Basic EPS	Control	Continuous	EPS at the time of IPO
Log Size	Control	Continuous	Total Assets
Debt Ratio	Control	Continuous	Total Debt/Total Assets in %

Source: Bloomberg and Refinitiv/Eikon

Table 13: Preliminary Summary Statistics

Variable	Mean	Std. Dev.	Min	Max	Kurtosis	Skewness
Under-pricing	58.911	328.299	-100	24100	4061.406	58.760
Short-term performance	72.951	386.521	-98.962	25150	3129.529	52.629
Long-term performance	79.114	395.798	-98.910	21550	2115.826	41.107
Basic EPS	-42.544	2949.054	-227692	16761.8	5045.949	-69.048
ROA	-13.162	502.937	-34757.5	9499.5	3357.572	-50.656
Size	6168.02	40954.8	0	976860	267.475	14.464
Debt Ratio	31.650	580.481	0	43256.3	4585.526	65.145

Table 14: Logit Model Marginal Effects

	(1)	(2)	(4)
Under-pricing(t-1)	-0.087***	-0.076**	-0.013**
	(0.012)	(0.020)	(0.007)
Log (Size)		-0.005***	
		(0.001)	
ROA			-0.001*
			(0.000)
EPS			0.000***
			(0.000)
Debt Ratio		0.0003*	0.000
		(0.0001)	(0.000)

Notes: This table shows 3 different specifications logit model marginal effects (calculated by STATA) for hypothesis 4 with dependent variable being a dummy variable SPAC. The robust standard errors are provided in parenthesis. The stars depict the relevant significance levels based on p-values (*$p<0.10$, **$p<0.05$, ***$p<0.01$).

Table 15: Probit Models

	(1)	(2)	(3)
Under-pricing(t-1)	-1.331***	-1.670***	-1.365**
	(0.193)	(0.434)	(0.659)
Log (Size)		-0.146***	
		(0.026)	
ROA			-0.008**
			(0.003)
EPS			0.000***
			(0.000)
Debt Ratio		0.006**	0.002
		(0.003)	(0.004)

	(1)	(2)	(3)
Constant	-1.596***	-1.137***	-2.529***
	(0.050)	(0.112)	(0.151)
Observation	6695	3409	6532
Psuedo R^2	0.047	0.172	0.149
Chi^2 Probability	0.000	0.006**	-2.529***

Notes: This table shows 3 different specifications logit models run for hypothesis 4 with dependent variable being a dummy variable SPAC. The robust standard errors are provided in parenthesis. The stars depict the relevant significance levels based on p-values (*$p<0.10$, ** $p<0.05$, *** $p<0.01$).

Table 16: Probit Model Marginal Effects

	(1)	(2)	(4)
Under-pricing(t-1)	-0.080***	-0.069***	-0.012**
	(0.012)	(0.019)	(0.006)
Log (Size)		-0.006***	
		(0.001)	
ROA			-0.001**
			(0.000)
EPS			0.000***
			(0.000)
Debt Ratio		0.0003**	0.000
		(0.0001)	(0.000)

Notes: This table shows 3 different specifications probit model marginal effects (calculated by STATA) for hypothesis 4 with dependent variable being a dummy variable SPAC. The robust standard errors are provided in parenthesis. The stars depict the relevant significance levels based on p-values (*$p<0.10$, ** $p<0.05$, *** $p<0.01$).