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Assessing the performance of Special Purpose Acquisition Companies (SPACs) in SA and USA: A Comparative Study Treat or Trick?

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Assessing the performance of Special Purpose Acquisition Companies (SPACs) in SA and USA: A Comparative Study

Treat or Trick?

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ABSTRACT

This study aimed to investigate the performance of SPACs that are listed in South Africa and in the USA, with a focus on their long run performance after completing their DeSPAC Transactions. The findings indicate that, like previous generations of SPACs in the USA, Third Generation SPACs exhibit poor long run performance after completing their DeSPAC Transactions. However, in the short run, positive cumulative abnormal returns were observed surrounding their DeSPAC Transaction announcements. In relation to SPACs listed in South Africa, similar results are observed, although SPACs listed in South Africa exhibit smaller positive cumulative abnormal returns surrounding their transaction announcements when estimated over a three-day event window in comparison to their USA counterparts. The study also found that sponsor earnouts had a positive relationship with long run performance, while at-risk capital was found to not be an effective tool to align the interests between SPAC sponsors and investors. Furthermore, no evidence was found that higher redemption rates were associated with poor long run performance, with the study revealing that redemption rates were a function of the market conditions at the time of the DeSPAC Transaction announcement. The study's contributions are providing new insights into the performance and drivers of performance of Third Generation SPACs and offers empirical evidence for regulators and investors to make informed decisions about SPAC investments. Lastly, the findings provide valuable insights for the JSE who are currently updating SPAC regulations in South Africa.

DECLARATION

I, **Maakopi Reason Maredi**, declare that this research article is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Management in Finance and Investment at Wits Business School, University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Maakopi Reason Maredi

Signed at **Fourways**

On the ___ day of ___2023

DEDICATION AND ACKNOWLEDGEMENT

I would like to dedicate this to my loving husband, Lancelord Mongameli Jele, whose unconditional and unwavering support is greatly appreciated, and to my parents, Mashoro Eriel Maredi, Mamahlako Mentholia Maredi and Busi Mabena for their understanding and prayers throughout the past year. ***Bona Ngwana 'a sehlare sa go mmela Maroteng. Ngwana kgoši ya moshabane a' Maredi. Kgetša morwa Mamagase a' tšate. Kgetša a rego ke manyana' marota. A re go nna ga ke lesesane ke lerarana. Nna ke sehlare sa mmela maroteng, ke medile mo bopedi bja mojakgomo ga Mashegwana a' Tubatse.***

To my supervisor, Prof Thabang, thank you for your patience and guidance throughout the research process. To all my dear friends, I am back!!!!!!!! ***At least for now, there are lots of edges to be conquered.***

Lastly, to Legacy Team Cohen, thank you for inspiring the topic.

nna ke a putla mahlo a mahubedu thamaga mereto
nna ke Phiri ya feta metseng,
mo ke fetilego namane le koyana di ya timela

nna ke thamaga ya marulaneng ga rapugo,
ke buwa kuwa sepitsi e rwelego nkatana a kgomo e' etela Mokgodumo,
Ke Mokgodumo wa bana Shikwa ba Nape
ga thaba tše kgolo tsa go ratana - go etelana

nna ka gešo re dika Sepetsi re lla,
re be re e kopane ka megokgogo
a re ke Mokone ke tswa ga Matlala
ke bina tlantlagane

…… In the words of a wise man "***don't be excited, ntwe e boima, it doesn't need chance takers, it doesn't need people who like nice times, nicities, it doesn't need people who get shaken easily, it doesn't need people who become amoebas and people who became shapeless in the process***……..

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LIST OF ABBREVIATIONS AND TERMS

Term	Definition
AMH	Adaptive market hypothesis
DeSPAC	A company that listed as a SPAC and subsequently completed an acquisition or merger with a target company
DeSPAC Transaction	A M&A transaction between a SPAC and third-party private company
EMH	Efficient market hypothesis
GP	General Partner
IPO	Initial Public Offering
JSE Listings Requirements	Listing Requirements of the Johannesburg Stock Exchange
LP	Limited Partner
M&A	Mergers & Acquisitions
OTC	Over the Counter
PIPE	Private Investment in Public Equity
Private Placement	The sale of shares to select private individuals rather than the public
SEC	Securities Exchange Commission
SPAC	Special Purpose Acquisition Company
Third Generation SPACs	SPACs that listed in the USA during the period between 2015 and 2022
Trust Account	The ring-fenced and interest-bearing account in which the public proceeds from the IPO are invested pending the DeSPAC Transaction
USA	United States of America
USA SPACs	SPACs listed in the USA
VC	Venture Capital

CHAPTER 1: BACKGROUND OF THE STUDY

1.1. INTRODUCTION

This chapter introduces the research topic by providing the background of the study, the research problem, research objectives, research questions and a summary of the findings of the study. The chapter is organized into six sections. Section 1.2 provides the background of the study, which is then followed by Sections 1.3 and 1.4 which set out the research problem and the research objectives, respectively. Sections 1.5 provides a summary of the findings of the study. Section 1.6 outlines the structure of the research report and chapter summary concludes the chapter.

1.2. BACKGROUND OF THE STUDY

One of the most important transformational decisions that a private company can make in its corporate lifetime, is the decision to become a publicly listed company, which entails offering its shares to public by listing them on a stock exchange making them publicly tradeable (Ritter & Welch, 2002). One of the most cited reasons and rationale for a company going public is to raise capital to fund future growth opportunities (Ritter & Welch, 2002). In addition to raising capital, the process of going public also creates a liquidity event for the existing shareholders of the private company and makes their investment more liquid (Kolb & Tykvova, 2016). The most traditional and conventional method for a company to go public is by undergoing an Initial Public Offering (**IPO**) where it offers its shares to the public for the first time (Kolb & Tykvova, 2016). The other newer method of accessing public capital markets entails a private company being acquired by, or merging with, a publicly listed cash-shell company known as a Special Purpose Acquisition Company (**SPAC**) (Feldman & Dresner, 2006).

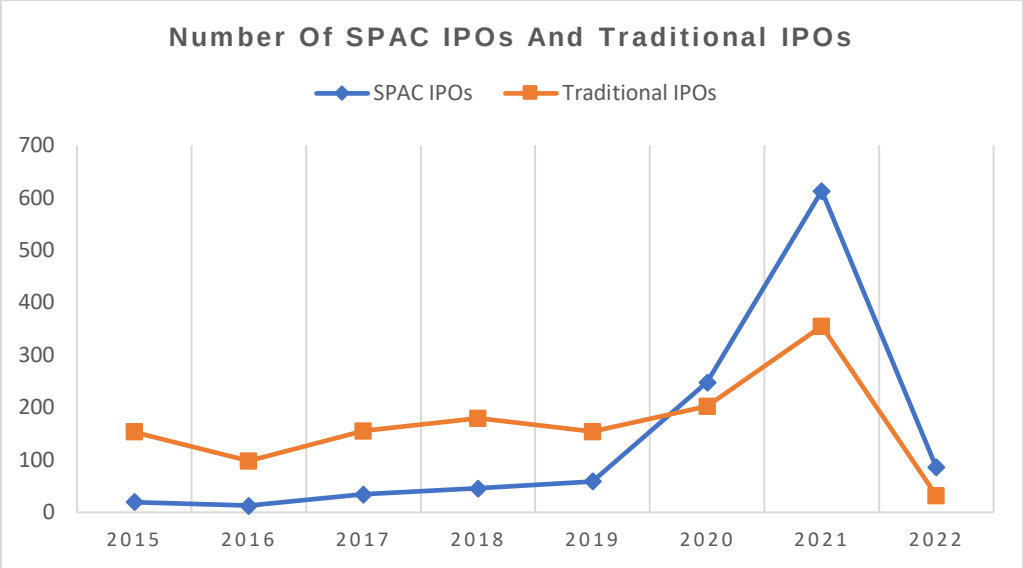
A SPAC is a company with no assets and no operating history (i.e. a shell company) formed by a group of individuals, known as SPAC founders or sponsors, for the sole purpose of raising cash in the primary capital markets to fund an acquisition or merger with an unknown and yet to be identified target company within a prescribed period of time after the IPO (Jenkinson & Sousa, 2011). The IPO proceeds are thereafter, placed in a ring fenced and interest bearing trust account and can only be accessed and used to fund the transaction between the SPAC and the third party private company (**DeSPAC Transaction**), which results in the SPAC no longer being a shell company but being a company with operations and an asset base (**DeSPAC**), with the exception of up to 10 percent of the IPO proceeds, which can be accessed and utilised to pay for the SPAC's operating expenses while it is searching for a target company (Cumming, Haß, & Schweizer, 2014). If the SPAC fails to identify a target company and more importantly, fails to implement a DeSPAC Transaction within the prescribed period of time, the SPAC must be liquidated and the IPO proceeds, including any interest accrued in the trust account, must be returned to investors in their pro-rata proportions (Jenkinson & Sousa, 2011). The implementation of the DeSPAC Transaction is subject to approval by shareholders, and in the context of SPACs listed in the USA (**USA SPACs**), shareholders who do not wish to remain invested in the SPAC after completion of the DeSPAC Transaction are given an option to exercise their redemption right, which, if exercised, gives them the right to sell their shares back to the SPAC by way of a share repurchase, and to receive their *pro-rata* proportion of the value of the trust account in which the IPO proceeds are invested (**Trust Account**) as consideration for the share repurchase (Cumming, Haß, & Schweizer, 2014).

For public investors who opt to invest in a SPAC at IPO, their investment can be understood as an expression of faith in the SPAC sponsor team and that the management possess the requisite deal making skills and experience to find a suitable target and to structure a good DeSPAC Transaction as well as management skills and operational experience to manage the target company and unlock value after the completion of the DeSPAC Transaction.

SPACs are a combination of elements of private equity, equity capital market and mergers and Acquisition (**M&A**) transactions. The parallels with private equity are as a result of sponsors taking a similar role to that of GPs in private equity funds by raising capital and using it to fund investments (Jenkinson & Sousa, 2011). The equity capital markets parallels are as a result of the SPACs directly entering the equity capital markets by undergoing an IPO. In addition to this, once a SPAC has identified a target company for the DeSPAC Transaction, the target company can be thought of as having obtained the status of being publicly listed without the target company necessarily undergoing its very own IPO process (Davidoff, 2008). In this regard SPACs has also been referred to as non-traditional or non-conventional IPOs" for the target companies that are acquired by, or which merged with, the SPACs (Gahng, Ritter, & Zhang, 2021). Lastly, the M&A parallels appear because the sole purpose of a SPAC is to search for a target company and to implement a DeSPAC Transaction utilising the IPO proceeds. Therefore, it naturally invites a consideration of their performance after implementation of their DeSPAC Transactions, and a consideration of the value creation effects of those DeSPAC Transactions.

Although SPACs have existed since the 1990's in the USA, they emerged in their current structural form around the early 2000's and notably in 2003 with the listing of Millstream Acquisition Corporation as a SPAC, which later successfully completed a DeSPAC Transaction through a merger with NationalHealth Inc. (Kolb & Tykvova, 2016). SPACs dominated the USA IPO market between 2003 and 2007 with the number of SPAC IPOs growing from 1 SPAC in 2003 to 62 SPAC IPOs in 2007 (Cumming, Haß, & Schweizer, 2014). In 2007 specifically, SPACs constituted approximately 25 percent of all IPOs in the USA (Rodrigues & Stegemoller, 2012). However, the 2007/2008 financial crises tempered IPO activity across the board and SPAC IPOs likewise also declined, with only 14 SPAC IPOs recorded in 2008 and none recorded in 2009 and 2010 (Cumming, Haß, & Schweizer, 2014). SPAC IPOs that occurred between the 1990 and 1999 are commonly referred to as First Generation SPACs, while SPAC IPOs that occurred between 2000 and 2009 are commonly referred to as Third Generation SPACs (Gahng, Ritter, & Zhang, 2021). When markets improved after the 2007/2008 financial crises, SPAC IPOs also returned to the IPO market and since then the popularity of SPACs in the USA has grown year on year and reached its ultimate peak in 2021 in which we saw 613 SPAC IPOs in the USA. This can be noted from Figure 1 below, which depicts the number of SPAC IPOs in the USA over the period between 2015 and 2022 compared to "*traditional IPOs*".

Figure 1: USA SPAC IPOs v Traditional IPOs



In 2020 and 2021, SPAC IPOs constituted more than half of all the IPOs in the USA (Securities Exchange Commission, 2022). In 2022, there was a total of 86 SPAC IPOs and 38 traditional IPOs in the USA (Huang, Ritter, & Zhang, 2023), which is a substantial decline compared to previous years, but still constitutes a substantial share of the overall IPO market in the USA. SPAC IPOs which occurred from 2010 to date are commonly referred to as Third Generation SPACs (Gahng, Ritter, & Zhang, 2021).

In other developed markets, Europe in particular, SPACs are also becoming popular with European capital markets experiencing an increase in the number of SPAC IPOs, although not matching the numbers seen in the USA (Heredia, Fernandez-Galiano, & Garcia, 2022). Between January 2021 and March 2022, Europe had 38 SPAC IPOs, which is a huge leap considering that only 3 SPACs were listed in European capital markets between 2019 and 2020 (White & Case, 2022). Interestingly, the Netherlands appears to be the go-to-market for SPACs in Europe, with 40 percent of the European SPACs being listed on the Euronext Amsterdam (Freshfields, 2022).

Although USA SPACs have looked towards emerging markets to find targets for their DeSPAC Transactions, only a few emerging markets allow for the direct listing of SPACs in their primary capital markets. The listing of Renergen Limited as a SPAC on the JSE in 2015 marked it as the first SPAC to list on the JSE and in Africa. The process and requirements for listing a SPAC in South Africa were introduced in 2013, and largely follows the structure, processes and requirements of SPACs in the USA (Marx, Haji, Botha, Madikizela, & Madiba, 2021). Furthermore, as recent as October 2022, the JSE announced proposed changes to the JSE Listings Requirements, which included amending certain provisions relating SPACs listings, process and requirement in order to align them with the requirements in jurisdictions where SPACs have "*flourished*" (JSE, 2022). Other emerging markets are also considering introducing SPACs to their primary capital markets. The UAE Securities and Commodities Authority adopted a regulatory framework for SPACs in the first quarter of 2022, which paved the way for the listing of SPACs in the UAE primary capital markets, and this resulted in ADC Acquisition Corporation becoming the first SPAC to be listed in the Middle East, raising $100mn in its listing which occurred on or around May 2022. In Kenya, consideration is currently being

given to introducing SPACs and draft regulations have been proposed by the Kenya Capital Market Authority and are set out in the Draft Capital Markets Regulations (Karumba, 2002).

Prior empirical literature on the performance of SPACs in the USA and in other markets such as Europe and South Korea indicate that SPACs do not perform well in the long run post implementation of their DeSPAC Transactions, indicating that the M&A transactions implemented by SPACs tend to be value destroying in the long run (Kim, Ko, Jun, & Song, 2021). Furthermore, while some of these studies, such as Dimitrova (2017), have also sought to understand the factors that influence the performance of SPACs in the period after completion of their DeSPAC Transactions, the relative infancy of SPACs as investment vehicles at the time these studies were conducted meant that their sample of SPACs that had a sufficiently long post DeSPAC Transaction trading period was limited. The primary purpose of this study is to review, assess and analyse the performance of SPACs listed in South Africa and in the USA, with a particular focus on their performance after implementation of their DeSPAC Transaction. The goal is to determine whether or not the DeSPAC Transactions are value creating or destroying in the long run and what factors explain their performance in the long run.

1.3. RESEARCH PROBLEM STATEMENT

Being a new concept in South Africa and in other emerging markets, there is a dearth of knowledge and literature relating to SPACs as investment vehicles and. The scarcity of comprehensive knowledge and scholarly literature, particularly scholarly literature which is empirical in nature, means that market participants have limited understanding of SPACs as innovative investment vehicles, their performance and the extent to which these investment vehicles can create value for them. Accordingly, there is a need, and a current gap, for scholarly literature and thought leadership on SPACs as investment vehicles in South Africa, which covers their performance metrics and potential value creation implications for investors.

Consequently, this research seeks to bridge the knowledge gap by addressing the aforementioned dearth of literature in South Africa. Furthermore, existing research on SPACs has focused primarily on SPACs in well-established markets such as the USA and Europe. A persistent observation in a overwhelming majority of past literature in these well-established markets is that SPACs tend to underperform in the long run post completion of their DeSPAC Transactions. As such, this study also aims to ascertain whether this trend holds true for South African SPACs.

Drawing upon a sample of USA SPACs, this research also aims to uncover the nuanced factors that influence the long-term performance of SPACs. Specifically, we investigate the potential impact of factors such as the private equity experience of SPAC sponsors and management teams, sponsor compensation structures, and other intervention measures designed to mitigate the agency issues and misaligned incentives that prior researchers have previously argued to be the primary source of the poor long-term performance of SPACs post their DeSPAC Transactions. By examining these factors and their impact of the long-run performance of SPACs, this research also aims to shed light on the effectiveness of strategies that have been introduced in recent times in the USA with the goal of improving the post-DeSPAC transaction performance. Accordingly, this research aims to bridge the current knowledge gap on the effectiveness of some of these mitigation strategies.

In essence, this study addresses the overarching concern of the inadequate empirical literature on SPACs in South Africa. Through a thorough exploration of SPAC performance in USA and the factors influencing it, we aim to offer valuable insights that can guide market participants, investors, and regulators in formulating more informed strategies and policies in this evolving investment landscape.

1.4. RESEARCH OBJECTIVES

In the context of the research problem articulated in Section 1.3 above. The specific objectives of the current study are to:

- *measure the short run performance of SPACs around publication of their DeSPAC Transaction announcements;*

- *measure the long run buy-and-hold abnormal returns experienced by SPACs after completion of their DeSPAC Transactions; and*

- *determine the factors influencing the long run buy-and-hold abnormal returns of SPACs post completion of their DeSPAC Transactions.*

1.5. CONTRIBUTIONS OF THE STUDY

SPAC research is becoming a topic of interest for finance scholars and practitioners due to their growing popularity (Lin, Lu, Michaely, & Qin, 2021). Previous studies have mainly focused on SPACs in the USA, and little focus has been given to SPACs outside of the USA due to the concept being relatively new in other geographies. To the best knowledge of the authors, this study is the first in South Africa to comprehensively and empirically assess the performance of SPACs in South Africa through quantitative research methods. In this regard, this study extended the study by Marx et al., (2021), who conducted a study of SPACs in South Africa using qualitative research methods.

Furthermore, given the structural changes and trends observed in Third Generation USA SPACs when compared to the previous generation of SPACs, this study provides valuable insights on the performance of these newer generation of SPACs when compared to the older generation of SPACs. A few of these structural changes and trends include, among others, the fact that First Generation SPACs only traded on the over the counter (**OTC**) market, while recent SPACs trade on an open market exchange (Gahng, Ritter, & Zhang, 2021). In addition to this, SPAC IPOs that occurred before 2010 tended to be smaller than Third Generation SPACs (Gahng, Ritter, & Zhang, 2021). Furthermore, Third Generation SPACs, unlike the previous generations of SPACs, allowed shareholders to exercise their redemption right even if they did not vote against the DeSPAC Transaction and SPAC sponsors of Third Generation SPACs also started introducing interventions to remedy some of the agency problems and misaligned incentives that were found to be the primary source of the poor performance in literature. Accordingly, this study provides empirical evidence of the effect and usefulness of some of those interventions, which is currently lacking in literature. Moreover, given that regulators in South Africa, and in other emerging markets, are looking towards international markets like the USA when formulating their market regulations of SPACs, an examination of the effect and usefulness of these interventions in Third Generation SPACs gives a good steer to regulators on the correct formulation of the SPAC structure.

1.6 *RESEARCH FINDINGS*

Our study of a sample of Third Generation SPACs that listed in the USA and completed their DeSPAC Transactions between 2015 and 2022 revealed that, like their predecessors, they exhibit poor long run performance post completion of their DeSPAC Transactions. The level of poor performance deteriorated further when assessed over a longer holding period. Similar to their predecessors, positive cumulative abnormal returns are observed in the Third Generation SPAC surrounding their DeSPAC Transaction announcements. In relation to South Africa, a similar finding is made, and our study revealed that they similarly also performed poorly post completion of their DeSPAC Transactions. However, unlike their USA counterparts, they only exhibit positive cumulative abnormal returns surrounding their DeSPAC Transaction announcements when calculated over a three-day event window, while the seven-day event window showed an average negative cumulative abnormal return. Furthermore, the magnitude of the mean positive cumulative returns earned over the three-day event window is substantially smaller when compared to that observed in USA SPACs.

This study found evidence that sponsor earnouts had a positive and statistically significant relationship to long-run performance. However, we found no evidence that at-risk capital (i.e., "*skin in the game*") is an effective tool to align the misaligned interests between SPAC sponsors and investors, and we found no evidence that high redemption rates were negatively

correlated with long-run performance. Regarding redemption rates, the study found that high redemption rates were influenced by market conditions at the time of the DeSPAC Transaction (e.g., high-interest rates and inflation were linked to high-redemption rates). Shareholding by PIPE investors proved to have a positive and statistically significant relationship with long-run performance over the six month and twelve month holding periods, while SPACs with a sponsor and management team with private equity experience had better long-run performance over twenty four month holding period when compared to SPACs whose sponsors and management team had no private equity experience.

1.6. RESEARCH STRUCTURE

This study consists of seven chapters. Chapter 1 introduced the research topic, by providing the research background, problem and objectives, and the subsequent Chapters are structured in the following manner. Chapter 2 provides a review of the relevant empirical literature published in relation to the performance of SPACs. Our hypothesis is developed in Chapter 3, which also sets out all the variables that were used to test our hypothesis. Chapter 4 sets out the research data, together with the methodology used to assess the performance of SPACs in our sample. The findings and results of the study are presented and discussed in Chapter 5. Finally, Chapter 6 provides a conclusion on the research objective and highlights possible areas of further research.

CHAPTER SUMMARY

In this Chapter, we introduced the research topic of SPACs and highlighted the problem of poor performance by SPACs after completing their DeSPAC Transactions. The specific research objectives were outlined, which includes measuring the short and long run performance of SPACs and determining the factors influencing their long run performance. The contribution of the study includes findings on the performance of Third Generation SPACs listed in the USA and on the JSE in South Africa. The chapter concludes with an overview of the structure of this report.

CHAPTER 2: LITERATURE REVIEW

2.1. INTRODUCTION

This Chapter provides a review of published academic literature on the performance of SPACs. The Chapter is organised as follows: Section 2.2 sets out the theoretical underpinning of the research and Section 2.3 provides a review of empirical literature on the short and long run performance of SPACs.

2.2. THEORETICAL UNDERPINNING

The main purpose of this study is to assess the short and long run performance of SPACs which successfully completed their DeSPAC Transactions before the DeSPAC deadline, with the aim of understanding the value creation effects of the DeSPAC Transactions. Accordingly, the two broad theories underpinning this study are the adaptive market hypothesis (**AMH**) and the agency theory.

2.2.1. The adaptive market theory

The AMH was developed by Lo (2004) as an evolution of the efficient market hypothesis (**EMH**) derived from evolutionary principles (competition, mutation, reproduction, and natural selection) linked to behavioural economics. The EMH states that if all information is publicly available, such information will be reflected in the price of a publicly listed security as soon as that information becomes publicly available, which means that all investors have access to the same information and have rationale expectations about future events and the share prices will accordingly reflect the true intrinsic value (Malkiel, 2003). Unlike the EMH, the AMH accepts that markets have irrational investors, and that emotions and behavioural biases play a role in investment decisions (Lo, 2004). In essence, the AMH enables market efficiency and inefficiencies to co-exist in an intellectually consistent manner (Urquhart & McGrouarty, 2016). Under the AMH, market efficiency evolves over time because of natural selection, and as investors adapt to the changing environment, conditions and to new information, they rely on heuristics (mental short-cuts) to make investment decisions (Lo, 2004; Zhou & Lee, 2013). The AMH has two main implications, firstly that market efficiency is a characteristic that varies over time and secondly that market efficiency is highly context dependent (Lo, 2004).

There has been a growing body of empirical literature on AMH (see Urquhart & Hudson, 2013; Zhou & Lee, 2013; Smith & Dyakova, 2014; Noda, 2016; Urquhart & McGrouarty, 2016 among others). These studies have generally found evidence that supports AMH in that market efficiencies are adaptive over time. Furthermore, in the African context, empirical studies found evidence of AMH (Smith & Dyakova, 2014; Obalade & Muzindutsi, 2020). Given the findings of these empirical studies above, AMH is becoming a more accepted hypothesis in explaining market efficiency than the EMH.

The current study extends the AMH by showing the integration of AMH and EMH in the decisions and reactions of SPAC investors. In this regard, new public information in the form of DeSPAC Transaction announcements is reflected in the price of SPAC securities, which we observe in the share price movements surrounding the DeSPAC Transaction announcements, and which is a sign of an efficient market. However, the study shows that the aforementioned share price movement tends to have an element of irrationality that is driven by an overreaction and sometimes an overconfidence to the DeSPAC Transaction announcements by SPAC

investors. This overreaction and overconfidence is observed from the poor long-run performance of the SPAC after completion of the DeSPAC Transaction, and accordingly proves that rationality and irrationality can coexist.

2.2.2. The agency theory

A company or corporation is a separate legal entity that has two main organs: its board of directors and its shareholders, who are the owners of the company. The board of directors oversees the management and control of the company and has the authority to exercise all its powers and functions, except those limited by law or by the company's governance framework, such as the articles of association or memorandum of incorporation, which may reserve certain substantive decisions for the shareholders to decide on. The separation of these two main organs creates a conflict of interest between management and shareholders because although the board of directors is responsible for the management and control of the company, it is the shareholders who bear the wealth consequences of the decisions made by management during the course of operating and managing the company (Denis, Denis, & Sarin, 1999). This conflict of interest is a natural consequence of the agent-principal relationship that is present between management/board of directors (who act as agents) and shareholders of the company (who are the principals) and is referred to as the agency problem. The agency problem arises from the theory and belief that agents are likely to make decisions that maximize their own personal utility rather than decisions that maximize the utility of their principals (Denis, Denis, & Sarin, 1999)

Within a legal and incorporated company or corporation, these decisions could present themselves in various ways, including management paying excessive salaries to managers or rejecting value-creating takeover bids due to the fear of losing their management positions after the takeover (Denis, Denis, & Sarin, 1999). There are various strategies that can be employed to mitigate the agency problem, including performance-based management compensation; structuring incentive compensations that align management and shareholder interests; monitoring the conduct of management by giving shareholders predefined control rights in relation to certain company decisions, and relying solely on the fact that management may face bad repercussions for poor performance of a company they manage and control (Denis, Denis, & Sarin, 1999).

This study extends the agency theory by showing that in a SPAC, agency problems are likely to arise because various key role players are involved in a SPAC throughout its different phases, and these role players have different incentives (and disincentives) for participating in the SPAC (Chong, et al., 2021). As a result, there is an inherent agency problem, conflict of interest, and divergence of interests between the SPAC sponsors and investors during certain points of the SPAC to DeSPAC process (Varottil, 2022). For example, the main incentive for SPAC sponsors is to conclude a DeSPAC Transaction before the DeSPAC deadline to avoid a liquidation of the SPAC. Apart from the reputation damage that sponsors could suffer for failing to find a suitable target for the DeSPAC Transaction, the SPAC sponsor promotes shares, which represent the sponsor's main compensation for their efforts in setting up the SPAC, generate no value for the SPAC sponsor if the SPAC is liquidated (Varottil, 2022). In contrast, upon the liquidation of the SPAC, investors receive their *pro-rata* proportion of the Trust Account (Dimitrova, 2017). This situation results in a clear misalignment of interests and incentives between the two parties regarding whether to proceed with a DeSPAC or to liquidate the SPAC. From the perspective of the sponsors, any DeSPAC Transaction (no matter how value-destroying it is to other investors) is better than a liquidation of the SPAC because any

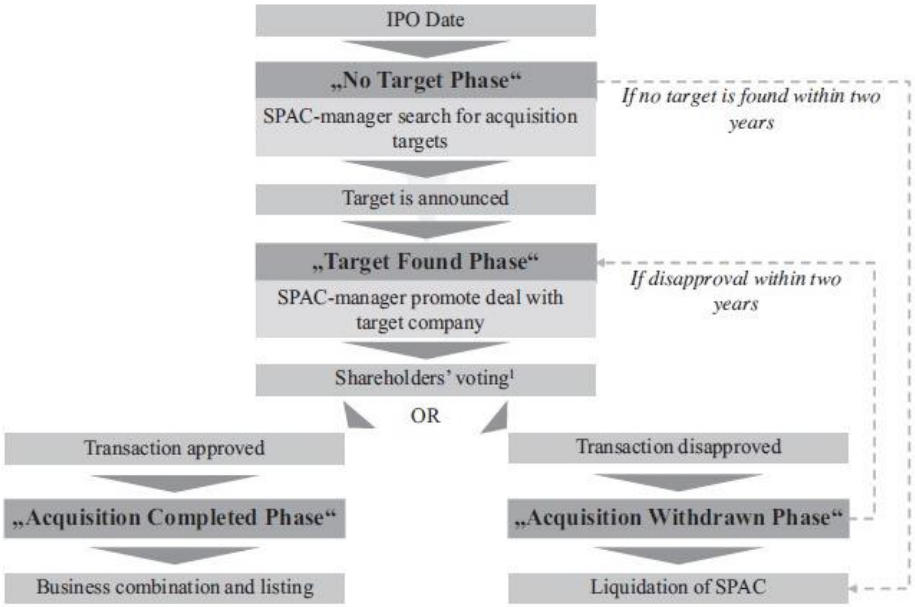
share price higher than the nominal price they paid for the sponsor promote shares results in a positive return for them (Lakicevic & Vulanovic, 2014).

2.3. EMPIRICAL EVIDENCE ON SPACs

2.3.1. The SPAC Transaction Process

The journey of a SPAC from IPO to DeSPAC can be summarized by the below graphical depiction adopted from Cumming et al., (2014).

Figure 2: SPAC to DeSPAC Process



A SPAC is formed by the sponsors before the IPO, during which they appoint legal and transactional advisors to assist with the listing process (Klauser, Ohlrogge, & Ruan, 2022). At this stage, SPAC sponsors are issued with sponsor promote shares for a nominal fee, which shares equate to about 20 percent of the total issued shares in the SPAC post-IPO. If the SPAC is successful in completing a DeSPAC Transaction and does not liquidate, the SPAC sponsors are almost certainly guaranteed to make a positive return on their sponsor promote shares, irrespective of the SPAC's post-transaction performance (Lakicevic & Vulanovic, 2014). This is because any post-DeSPAC Transaction share price above $1 means a positive return for the SPAC sponsors, given that the sponsor promote shares were a "free carry" in the SPAC (Lakicevic & Vulanovic, 2014).

Before listing on a stock exchange, SPAC sponsors usually present the SPAC to institutional investors such as pension funds during various roadshows aimed at securing their investment in the SPAC (Klauser, Ohlrogge, & Ruan, 2022). On the IPO date, the SPAC issues units or shares, and the proceeds raised are invested in a risk-free interest-bearing trust account, accessible only to fund the DeSPAC Transaction. However, up to 10 percent of the funds can be accessed to cover the SPAC's operating expenses while it searches for a target (Shachmurove & Vulanovic, 2018).

Between the IPO date and the date before the announcement of the DeSPAC Transaction, the SPAC is regarded as being in a "*target search phase*" or a "*cash shell phase*" (Lewellen, 2008). During this phase, the sponsors are actively searching for a target company to conclude DeSPAC Transaction before the deadline. Both Jenkinson & Sousa (2011) and Lewellen (2008) argued that because the SPACs only asset are the IPO proceeds held in the ring-fenced interest bearing trust account, provided that there is no leak in information, the value of the SPAC shares at any point during this phase must resemble the value of the IPO proceeds held in the trust account (i.e. the trust value), assuming a constant rate of growth of the IPO proceeds at the implicit risk-free rate. Furthermore, they argued that the share price of the SPAC should theoretically not fall below this trust value nor should be significantly higher that this trust value since nothing in known about the SPAC. Both Jenkinson & Sousa (2011) and Lewellen (2008) postulated that from the perspective of investors, their investment in the SPAC can be understood as an investment in a government bond because the IPO proceeds (which is their investment in the SPAC) is invested in a risk-free Trust Account and they have the opportunity to redeem their shares in the SPAC and get their *pro-rata* proportion of the Trust Account.

Once a target has been found for the DeSPAC Transaction, it is publicly announced by the SPAC, and the implementation and thus completion of the DeSPAC Transaction is subject to approval by the shareholders of the SPAC. According to Dimitrova (2017), the trading behaviour of a SPAC's share price after the DeSPAC Transaction announcement indicates the value that investors are ascribing to the proposed DeSPAC Transaction relative to their own expectations, and therefore she did not believe that the trading behaviour was instructive as to the true value or merits of the DeSPAC Transaction. However, Jenkinson & Sousa (2011), on the hand, believed that trading behaviour of the SPAC during the DeSPAC Transaction announcement was indicative of the value creation or destruction of the DeSPAC Transaction to investors and argued that investors can make decisions based on the trading behaviour of the shares during this phase.

After announcement of a DeSPAC Transaction, investors in USA SPACs have the option to redeem their shares and receive a pro-rata proportion of their IPO proceeds in the trust account. The possibility of shareholders exercising their redemption rights, means that the value of the IPO proceeds that will be available to fund the DeSPAC Transaction may decrease and to counter for this, it is common for sponsors to raise additional funding through from Private Investment in Public Equity (**PIPE**) investors (also known as Private Placements in South Africa) during this phase (Shachmurove & Vulanovic, 2018). While PIPE funding ensures that the SPAC has sufficient capital to fund the DeSPAC Transaction, it has a dilution impact on investors who choose not to redeem their shares, as the PIPE funding is in the form of share issuances to the PIPE investors.

The decision date represents the date on which the SPAC shareholders must vote to either approve or reject the proposed DeSPAC Transaction. As mentioned above, Jenkinson & Sousa (2011) believed that the trading behaviour of the SPAC during the DeSPAC Transaction announcement phase was instructive as to how investors must respond to the DeSPAC Transaction and how they should vote on the decision date. In this regard, Jenkinson & Sousa (2011) argued that shareholders should assess the share price of the SPAC around the decision date, and if the share price is equal to or even below the actual trust value per share, then rationale public shareholders must reject the proposed DeSPAC Transaction and liquidate the SPAC and have their trust monies returned because the market would be evaluating the DeSPAC Transaction as a value destroying transaction.

If the proposed DeSPAC Transaction is approved by the shareholders, the SPAC proceeds with implementing the DeSPAC Transaction, to the extent that no other regulatory approvals are required for the purposes of implementing the DeSPAC Transaction. The implementation of the DeSPAC Transaction implies that the SPAC ceases and transforms into a company with operating assets. If the proposed DeSPAC Transaction is not approved, the sponsors must start the search process again, and should the DeSPAC deadline expire before implementation of a DeSPAC Transaction, the SPAC is liquidated, and IPO proceeds are returned to investors in their pro-rata proportion. Should the SPAC fail to complete a DeSPAC Transaction before the deadline, the proceeds from the trust account are distributed exclusively to the public investors, and the sponsors of the SPACs do not receive any share of the proceeds. Previous literature has cited this as misaligned incentive, which leads to the sponsors completing a transaction, regardless of merits and quality, for the sake of avoiding a liquidation.

When viewed from the perspective of the target company, which is a counterparty on the other side of the DeSPAC Transaction, the DeSPAC Transaction is a way of obtaining a status of being "*publicly listed*" without undergoing a rigorous IPO process, which it would have otherwise been subjected to if it went public independently. As noted by Kolb & Tykvova (2016), DeSPAC Transactions provide a path for private companies to enter the public markets when it does not satisfy the requirements of the traditional IPO process. Furthermore, they found that private companies that go public through a DeSPAC Transaction are low growth opportunity private companies had it remained a private company, which would have been unlikely to receive any investments from private equity funds, which they cited as a possible explanation for the poor post DeSPAC Transaction performance experienced by SPACs. In this regard, they concluded that the "*frog does not turn into a prince*" post implementation of the DeSPAC Transaction (Kolb & Tykvova, 2016).

2.3.2. Private Equity Parallels

There has been a few parallels drawn between SPACs and private equity (**PE**) funds, with SPAC sponsors being seen as the equivalent of general partners (**GPs**), who in the private equity model raise funds from limited partners (**LPs**) for the purpose of making investments in portfolio companies, which they will manage and nature in order to create positive returns for LPs (Gahng, Ritter, & Zhang, 2021). According to Rodrigues & Stegemoller (2012), the general features of private equity can be summarised as the following one, LPs committing capital to the fund; two, GPs managing the fund and deploying the committed capital toward investments in portfolio companies; three, GPs contributing approximately 1 percent of the total committed capital by the LPs (i.e., "*skin in the game*") as a means of ensuring that the GPs also have downward risk exposure in the fund if it does not perform; and four, the GPs receiving a percentage of the committed capital as management fees for managing the fund and receiving a percentage of the profits generated by the fund, normally in the range of 20 percent of the profits of the fund (i.e., "*the carry*" or "*the carried interest*"), as a means of aligning the interests of the GPs and the LPs and to incentive the GPs manage a performing and profitable fund.

Rodrigues & Stegemoller (2012) argued that the above features were adopted by SPAC sponsors, with certain adjustments to make them fit public markets. In this regard, Rodrigues & Stegemoller (2012) noted that SPAC sponsors effectively act as managers of a SPAC, akin to GPs in a PE fund, while public shareholders take the role of investors and do not manage the SPAC, making then akin to LPs in a fund. However, unlike in a private equity fund, SPAC shareholders have a stronger say on the identity of the individual investment made by sponsors

using their funds, which is through the shareholder approval vote that is required for the DeSPAC Transaction (Rodrigues & Stegemoller, 2012).

As a consequence of SPACs operating in primary capital markets, unlike with private equity, its investor base is not limited to wealthy and accredited individual investors (Rodrigues & Stegemoller, 2012). Therefore, SPACs are theoretically able to attract a diverse range of investors, which led to Dimitrova (2017) referring to SPACs as a poor man's private equity fund for its ability to attract a diverse pool of investors. Moreover, since SPAC raise capital to fund a single investment in the form of a DeSPAC Transaction, unlike with private equity investments where multiple investments are made forming various portfolio companies, it was described as a one-shot private equity fund by Kolb & Tykvova (2016). Lastly, as noted by Thompson (2010), although the sponsors do not receive a management fee while searching for a target for the DeSPAC Transaction, they are compensated through the sponsor promote shares, which can be thought of as their carried interest. However, some have objected to the parallels that have been drawn between SPACs and private equity, notably Klausner & Ohlrogge (2020) who argue that the notion of a "poor man's private equity fund" does not necessary hold because SPACs had a lot of institutional investors.

2.3.3. Performance of SPACs

Most research on the performance of SPACs was carried out in the USA. Gahng et al., (2021) investigated the performance of SPACs IPOs that listed in the USA between 2010 and 2022, investigation their performance during what they called the "*SPAC Phase*" (i.e., period between IPO and before the DeSPAC Transaction and/or the liquidation); and "*DeSPAC Phase*" (i.e., the period after completion of the DeSPAC Transaction). With respect to the "*DeSPAC Phase*", they found that the average one year buy-and hold-returns were negative for common shares. Kiesl et al., (2022), who studied SPACs that listed in the USA and completed their DeSPAC Transactions between January 2012 and June 2021, found that the SPACs had positive short-term abnormal returns surrounding their DeSPAC Transaction announcements, but had negative abnormal returns in the long run post completion of their DeSPAC Transactions. Klauser et al., (2022) study of 47 SPACs that had completed their DeSPAC Transactions between January 2019 and June 2020 also revealed that the three month post DeSPAC returns were negative and this trend continued when assessing it the performance over a six month holding period and over a 12 month holding period. In another recent study, Lin et al., (2021) found that SPAC sponsor and management teams which had experience in private equity generated better long run performance when compared to SPAC sponsor and management teams that did not have any private equity experience.

The aforementioned findings made by the above researchers in respect of the short run and long run performance of their sample of Third Generation SPACs is consistent with the findings of previous researchers who studied the performance of First and Second Generation SPACs. Jog & Sun (2007) and Baigent (2008) were among the first to conduct empirical research on the performance of SPACs. When assessing the differences in returns earned by SPAC sponsors and other investors, Jog & Sun (2007) found that sponsors received a superior return in comparison with other SPAC investors. Specifically, they found that while other shareholders earned a negative 3 percent annualised abnormal returns for the entire SPAC phase, sponsors earned a positive 1900 percent annualised returns.

Lewellen (2008) analysed a sample of 158 SPACs that went public in the USA during the period between 2003 to 2008 and found that during the DeSPAC Transaction announcement phase,

shareholders experienced positive average returns. However, when Lewellen (2008) analysed the returns of the SPACs post implementation of the DeSPAC Transactions, they found that the SPACs that had successfully completed their DeSPAC Transactions exhibited significant negative average excess returns. Jenkinson & Sousa (2011) focused their study on the share price performance of SPACs that went public during 2003 and 2006 and observed their performance in June 2008 to allow for a minimum post DeSPAC Transaction trading period of six months for the SPACs. They found that investors experienced negative average cumulative returns six months post implementation DeSPAC Transaction, and that the magnitude of the negative returns increased when analysing the performance over a one-year period after completion of the DeSPAC Transaction.

When Lakicevic & Vulanovic (2013) conducted a study of 161 SPACs that had IPOs during the period between 2003 and 2009, they were interested in observing the differences in performance among the different type of securities issued by SPACs. Lakicevic & Vulanovic (2013) found that although SPACs experienced positive returns around the DeSPAC Transaction announcement phase, which is consistent with the findings of Lewellen (2008), the degree of the positive returns was different among the different classes of securities, with warrants experiencing the highest positive returns post-merger announcement. Consistent with the findings of Lewellen (2008) and Jog & Sun (2007) in relation to returns on completion of the DeSPAC Transactions, Lakicevic & Vulanovic (2013) found that investors experienced negative returns on the DeSPAC Transaction completion date, and when observing this performance in the ten trading days after the DeSPAC Transaction completion date, investors experienced negative cumulative abnormal returns.

Dimitrova (2017) was one of the first researchers to examine the contractual features of SPACs and how they affected the performance of SPACs. In their sample of 73 SPAC IPOs occurring between 2003 and 2010, Dimitrova (2017) found that the SPACs exhibited poor long term share price performance and poor operating performance. They found that after implementation of their DeSPAC Transactions, SPACs had negative buy-and-hold-returns, while companies that went public through a traditional IPO in the same period had exhibited positive buy-and-hold returns. Dimitrova (2017) further found that long term operating performance of SPACs was significantly lower when compared with other firms in their industries, their matched peers and newly public companies. Most importantly, when examining the contractual features of SPACs and their impact on performance, Dimitrova (2017) found that performance of SPAC was worse for SPACs that (i) announced their acquisitions closer to the deadline; (ii) for acquisitions with deferred initial public offering underwriting fees; and (iii) for acquisitions with market value was close to the required 80 percent threshold of the IPO proceeds.

Vulanovic (2017) studied the post DeSPAC Transaction performance of a sample of 105 SPACs that listed from August 2003 to 2013, but in addition to this, he also sought to understand if certain institutional features of SPACs determined their post DeSPAC survival. Vulanovic (2017) confirmed the finding by Dimitrova (2017) in relation to the levels of negative buy and hold abnormal returns experienced by shareholders post implementation the DeSPAC Transactions. After observing SPACs that successfully completed their DeSPAC Transactions by 2013 and which had a post implementation trading period of at least three years, Vulanovic (2017) found that they experienced negative buy-and-hold-returns.

Studies by Cumming et al., (2014) and Lakicevic & Vulanovic (2014) added a different element to the empirical literature by moving away from studying SPAC performance and investigating

the factors that influence the approval of the DeSPAC Transaction by shareholders on decision date. In their sample of 139 SPACs for the period 2003-2010, Cumming et al., (2014) found that the probability of a DeSPAC Transaction being approved by shareholders at the decision date is enhanced by the presence of a young management team in the SPAC and was oddly not enhanced by the presence of an experienced management and board. Cumming et al. (2014) also found that probability of approval decreased as the number of underwriters increased and the greater the presence of hedge funds and private equity funds in the ownership of the SPAC.

In their larger sample of 163 SPACs for the period 2003 to 2012, Lakicevic & Vulanovic (2014) found that contrary to Cumming et al., (2014), the choice of an underwriter and the geography of the target were important determinants of the approval of a DeSPAC Transaction. This was contrary to the findings by Cumming et al., (2014), who found that the presence of a reputable and glamour underwriter decreased the probability of merger approval. Lastly, Lakicevic & Vulanovic (2014) found that the experience of the SPAC management team in private equity and venture capital did not impact DeSPAC approval.

In other markets outside of the USA where SPACs are listed, there is very limited empirical research into the performance of SPACs. In the European market, where SPACs have been listed on their stock exchanges since 2013, according to Ignatyeva et al., (2013) before they published their research paper in 2013, there had been no previous study which analysed European SPACs in any great detail. In their study, they sought to, among other things, understand the performance of all the European SPACs that listed from 2005 to 2011 and the potential factors influencing such risks and returns. Ignatyeva et al., (2013) found that that during "*cash shell phase*" SPACs had positive returns, which is consistent with other literature on this point and which, like other researchers, they attribute the positive returns to the risk-free nature of the investment during the cash shell phase because of the interest earned on the IPO Proceeds while held in escrow. During the DeSPAC Transaction announcement phase, they also found that the SPACs had positive average returns, which was consistent with the performance of USA SPACs during this period as reported by Lewellen (2008) and Lakicevic & Vulanovic (2013). Furthermore, when assessing the post DeSPAC Transaction performance over a six month and twelve month they found that that the SPACs had negative returns, which was also similar to the performance of USA SPACs post acquisition.

In South Africa, Marx et al., (2021) found that the average decrease in share price of SPACs since listing amounted to 29.92 percent (as of 06 February 2020) and that this was largely different from the average increase in the JSE All Share Index of 44.70 percent.

CHAPTER 2 SUMMARY

This chapter provided a review of the academic literature on the performance of SPACs. We commenced by grounding the study on AMH and agency theory. Then subsequently reviewed literature on SPACs and found that literature lays bare the agency problems and misaligned interests embedded in the SPAC structure and reviewed some of the solutions employed by some sponsors to mitigate these problems. Lastly, we provided a detailed review of empirical literature on the short and long run performance of SPACs, with a focus on the value creation effects of DeSPAC Transactions. Overall, the chapter provided insights into the factors that influence the performance of SPACs and highlighted the need for further research to fully understand the dynamics of these unique investment vehicles

CHAPTER 3: HYPOTHESES DEVELOPMENT

3.1. INTRODUCTION

The current chapter develops a testable hypothesis to address the research gaps and to answer the research questions. We leverage previous literature to systematically develop the hypotheses for the study. The chapter is structured as follows: Section 3.2 described our hypotheses for short term performance around the DeSPAC Transaction announcements. Section 3.3 describes our hypothesis for long run performance after completion of the DeSPAC Transactions. Lastly, Section 3.4 describes our hypothesis for the factors that affect the long run performance and the chapter summary concludes the discussion.

3.2. SHORT TERM PERFORMANCE OF SPACs

A SPAC spends an average of 24 months in the target search phase during which its only asset is the value of the trust account holding the IPO proceeds (Jenkinson & Sousa, 2011). The share price movement of the SPAC during the "*target search phase*", in the absence of any leak of insider information or price sensitive information, ought to resemble the value of the trust account since nothing is known about the SPAC (Lewellen, 2008). The public announcement that a SPAC has identified a suitable candidate for the purposes of implementing a DeSPAC Transaction is the first time that investors receive tangible information which could move the share price away from the value of the trust account. As previously noted by Dimitrova (2017), the movement of the share price post this announcement indicates the value that investors are ascribing to the proposed DeSPAC Transaction relative their own expectations. In line with past studies, we hypothesise that investors have a positive sentiment towards the DeSPAC Transactions upon their announcement. Based on the preceding literature, the first hypothesis for this research is stated as follows:

H_1: SPACs have a significantly positive cumulative abnormal returns around the DeSPAC Transaction announcements

3.3. LONG TERM PERFORMANCE OF SPACs

Recent studies which assessed the performance of a sample of Third Generation SPACs, like studies by Gahng et al., (2021) and Kiesl et al., (2022), have all found that Third Generation SPACs exhibit poor long run performance after completion of their DeSPAC Transactions. This finding is consistent with the findings of previous studies, which investigated the performance of previous generation of SPACs in the USA. Ignatyeva et al., (2013) and Kim et al., (2021) investigated the performance of SPACs listed in Europe and Korea and found that that they similarly performed poorly in the long run. Based on the preceding literature, the second hypothesis for this research is stated as follows:

H_2: SPACs experience negative buy-and-hold abnormal returns post completion of the DeSPAC Transactions

3.4. FACTORS INFUENCING LONG RUN PERFORMANCE

One of the main objectives of this study is to establish the factors that influence the long-run performance of SPACs. The factors that are considered are the short run performance around

DeSPAC Transaction announcements, redemption rates, the level of PIPE ownership, the sponsor compensation structure and SPAC sponsor and management tea experience and the timing of the DeSPAC announcements.

The reviewed literature revealed that there are misaligned incentives and interests between SPAC sponsors and investors on the decision to proceed with a DeSPAC or to liquidate the SPAC (Lewellen, 2008). These misaligned incentives and interests stem from the fact that upon liquidation of the SPAC, investors receive their *pro-rata* proportion of the Trust Account, (i.e., the value of the trust account on liquidation date), while SPAC sponsors do not receive any distribution or return for their efforts in setting up the SPAC. It has been argued that as these misaligned interests and incentives diverge further with an increase in the days to announcement (Lewellen, 2008), and that SPAC sponsors may present a low quality DeSPAC Transactions to avoid a liquidation as the days to announcement increase.

Public SPAC investors in the USA are given a redemption right, which can be viewed as a right and/or strategy aimed at safeguarding the interests of public investors by mitigating against the agency problem created by the DeSPAC deadline and the SPAC sponsor promote shares, both of which have been argued to be encouraging SPAC sponsors to present a bad DeSPAC candidate in order to avoid a liquidation where their SPAC sponsor promote shares become worthless (Gahng, Ritter, & Zhang, 2021). The redemption right effectively entitles an investor to receive their initial investment back if they do not want to remain invested in the SPAC after completion of the DeSPAC Transaction. In this regard, if an investor exercises their redemption right, they will receive a *pro-rata* proportion of the Trust Account from the SPAC as consideration for the buy-back of their shares in the SPACs. Prior to 2010, the redemption right could only be exercised if the investor also voted against the DeSPAC Transaction at the merger vote date (Gahng, Ritter, & Zhang, 2021). However, this requirement was done away with because combining the redemption right to a no-vote on the DeSPAC Transaction gave rise to potential abuse by large hedge funds, holding significant shareholding in the SPAC, who would demand payment in exchange for their "*yes*" vote on the DeSPAC Transaction (Rodrigues & Stegemoller, 2012). As noted by Gahng et al., (2021), as currently structured, investors have an incentive to approve a bad deal and redeem their shares, while prior to 2010, they had the incentive to vote against a bad deal so that they could redeem their shares. Nevertheless, it is reasonable to expect that investors will exercise their redemption rights in the context of a poor quality DeSPAC Transaction.

Accordingly, based on the preceding literature on days to announcement and redemption rates, the third hypothesis for this research is stated as follows:

H_3: Longer days to announcement and redemption rates negatively affect the long-term performance of SPACs

A consequence of the redemption right is the SPAC sponsors often have no sense of the amount of the cash available in the Trust Account to fund the DeSPAC Transaction. Therefore, the DeSPAC Transaction is often in conjunction with another capital raise so that the SPAC can raise additional funding to offset the reduction of the trust account resulting from shareholders exercising their redemption rights (Gahng, Ritter, & Zhang, 2021). The additional capital raise is often raised from PIPE investors, who are usually institutional shareholders who take a large block shareholding. High PIPE shareholding in a SPAC can signal a quality DeSPAC Transaction because PIPE investors given their level of sophistication would not opt to invest in a bad DeSPAC Transaction. Furthermore, given that PIPE shareholding is usual a

large block shareholding, having a higher percentage of PIPE ownership in a SPAC increase the ability of shareholders to effectively monitor the actions of management and results in a better coordination of shareholder control rights than in SPACs which have a fragmented shareholder base leading them suspectable to the "*free-raider*" problem.

SPAC sponsors play a critical role in sourcing, structuring, and presenting a DeSPAC Transaction to investors. At IPO, the SPAC has no operational history which can be used to determine the value of the SPAC; therefore, investors are actually investing in the SPAC sponsor and management team and are trusting their ability to source, structure and present a quality DeSPAC Transaction before the DeSPAC deadline that will create value in the long run. There have been parallels drawn between SPACs and PE/VC funds given that SPAC sponsors play a similar role to that played by GPs in PE/VC funds (Rodrigues & Stegemoller, 2012). GPs in PE/VC funds raise capital from LPs and are tasked with finding suitable portfolio companies to add to their investment portfolio for the investment period of the fund (Rodrigues & Stegemoller, 2012). Similarly, SPAC sponsors are tasked with a similar undertaking, albeit that their task is to find a single company, which will be held continuously by the SPAC. It is mainly this features that has led to researchers referring to SPACs as "*single shoot private equity"*. In a recent study, Lin et al., (2021) found that the private equality experience of the SPAC sponsor and management team had a positive impact on long run performance

Accordingly, based on the preceding literature on private equity experience and PIPE ownership the fourth hypothesis for this research is stated as follows:

H_4: Private Equity experience and PIPE ownership are positively correlated to long term performance of SPACs transactions

As a mechanism to deal with the misaligned interest between SPAC sponsors and investors caused of the SPAC compensation structures, which according to the literature is cited as the main cause of the poor long run performance, SPAC sponsors looked to the private equity playbook, and became investing an "at-risk capital" portion to the SPAC by way of subscribing for shares or warrants at a non-nominal price in order to ensure that sponsors have "*skin in the game*" in the same manner that GPs are expected to have "skin in the game" in private equity funds (Varottil, 2022). This "*at-risk capital*" ensures that sponsors also experience a downside risk exposure if they propose a low quality DeSPAC Transaction that results in poor long run performance (Rodrigues & Stegemoller, 2012). Another mechanism employed by SPAC sponsors to align the interests is through sponsor earnout provisions, which subject the SPAC sponsor promote shares (i.e., "*the free-carry*") to forfeiture if post completion of the DeSPAC Transaction, the DeSPAC'd entity fails to meet the specified share price targets before the earn-out expiry date (Gahng, Ritter, & Zhang, 2021).

Accordingly, based on the preceding literature on at-risk capital and sponsor earnout provisions, the fifth hypothesis for this research is stated as follows:

H_5: Sponsor earnout and at-risk capital are positively correlated with long-run DeSPAC performance

CHAPTER SUMMARY

In this chapter, we used past literature to systematically develop testable hypothesis along the three main areas of the study which are: short-term performance of SPACs, long-term performance of SPACs and factors that influence long-run performance of SPACs. The developed hypothesis are as follows: (i) H_1: SPACs have a significantly positive cumulative abnormal returns around the DeSPAC Transaction announcements, (ii) H_2: SPACs experience negative buy-and-hold abnormal returns post completion of the DeSPAC Transactions, (iii) H_3: longer days to announcement and redemption rates are negatively correlated to post completion of the DeSPAC Transactions, (iv) H_4: Private Equity experience and PIPE ownership are positively correlated to post completion of the DeSPAC Transactions, and (v) H_5: Sponsor earnout and at-risk capital are positively correlated with long-run post DeSPAC performance.

CHAPTER 4: METHODOLOGY AND DATA

4.1. INTRODUCTION

The current chapter presents the methodology used in the current study to achieve the objectives set out in Chapter 1. Section 4.2 presents the data used and its sources. Section 0 outlines the research design and methodology used to calculate the short run and long run returns. Section 4.4 presents that estimation models used to determine the factors that influence the long performance of SPACs after completion of their DeSPAC Transactions.

4.2. DATA AND DATA SOURCES

The study investigates the SPACs transactions listed in the USA and South Africa that successfully completed their DeSPAC Transactions between 2015 and 2022. Only SPACs that have all the required data for purposes of this study were included in the analysis. The list of USA's SPACs was obtained from Capital IQ and cross checked against the list maintained by dedicated SPAC databases such as SPACResearch, pitchbook and SPACInsider for consistency. The SPAC information was found to be consistent across all databases. The data relating to our independent variables was retrieved from the SEC's EDGAR database and from SPACResearch and SPACInsider, while the stock price and market information were obtained from CRSP daily stock through WRDS.

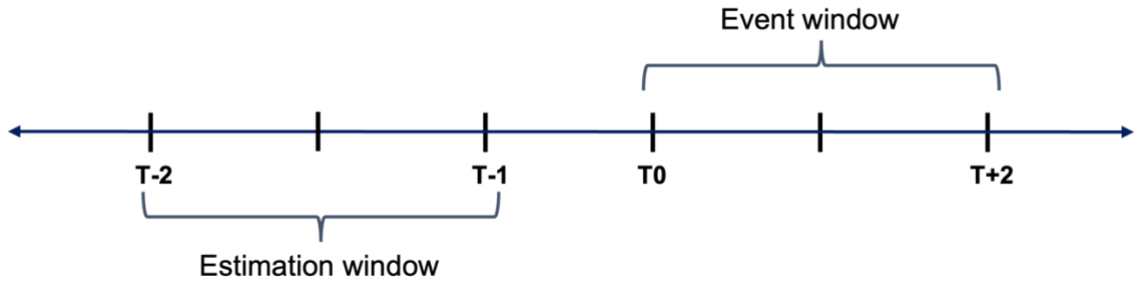
The intention of the study is to assess the long run post DeSPAC performance of the SPACs. Therefore, we assess their post DeSPAC performance over different holding periods, starting with six months after completion of the DeSPAC Transaction, followed by twelve months, eighteen months and twenty-four months. The sample size differs across the different holding periods because some SPACs do not have a trading history during the relevant holding periods, especially given that our sample consists of recent SPACs.

4.3. ASSESSING SHORT AND LONG SPACs PERFORMANCE

The event study methodology is used to assess the short-run and long-run performance of SPACs. The event study is used to measure the effect of a specific event, on the share price of a company over a specific period, which is referred to as the event window (Khothari & Warner, 2007). To measure this effect, the abnormal returns of the company are calculated as the difference between the actual returns of the company over the event window and the normal returns of the company over the event window (Mackinlay, 1997). As Khothari & Warner (2007) noted, event studies are useful because the extent of abnormal returns gives us an indication of the impact of the event on shareholder's wealth.

Figure 3 present the estimation and event window for short-term market reaction to DeSPACs transactions.

Figure 3: Event Study Timeline



The estimation window is the number of days before the event of interest, and it is used to estimate the normal returns, which are the returns that would have been earned in the absence of the event of interest, in other words the expected returns (Mackinlay, 1997). The length of the estimation window is often a balancing act between selecting a long period and a short period. As noted by Armitage (1995) although a longer estimation window cancels out the effects of temporary fluctuations, it comes at a cost of having outdated beta and alpha coefficients. Mackinlay (1997) notes that generally, in order to avoid the event of interest influencing the estimation results, the estimation window should not include the event window period.

In event studies literature, the common ranges of an estimation window are between 120 and 250 trading days. However, given that SPACs have to complete their DeSPAC Transactions in or about 24 months after listing, it is not practical to have an estimation window on the upper band of the common ranges because some SPACs find their DeSPAC target companies and issue their DeSPAC Transaction announcement on shorter periods (Dimitrova, 2017). Accordingly, in this study we use 100 trading days as our estimation window, which is constituent with the estimation window used by other researchers who have studied the performance of SPACs using event studies.

The event window is used to calculate the actual returns that are earned surrounding the event window. Within the field of M&A literature, there are various arguments about the appropriate length of an event window. However, Mackinlay (1997) points out that the chosen event window should be sufficiently long enough from the announcement date in order to capture the whole effect of the announcement, he believes that the reduction in the power of the estimation model due to a long event window is worth it if it means that the researcher is able to capture the whole effect of the announcement by giving the market appropriate time to react to the announcement. In this study we will measure the effect of the DeSPAC Transaction announcement over a seven-day event window, denoted by [-3,3]. However, heading the advice from Armitage (1995) that the shorter event window the more power the estimation model has, the seven-day event window will be supported by a three-day event window, denoted by [-1;1].

There are various models used to estimate normal returns and these can be categorized into statistical or economic models (Mackinlay, 1997). Statistical models, on the one hand, rely only on statistical assumptions relating to the behaviour of returns and do not rely on any economic arguments, while economic models, on the other hand, rely on assumptions that are not

statistical in nature, but on assumptions relating to the behaviours of investors (Mackinlay, 1997).

The capital asset pricing model (**CPAM**) and arbitrage pricing theory are common economic models often used in event studies to estimate the normal returns. However, economic models are difficult to use in relation to SPACs because before their DeSPAC Transactions, SPACs have no operating assets and thus have no relevant pricing history. Accordingly, the use of economic models for the estimation of normal returns presents a difficultly. In SPAC literature, the common statical model used for the estimation of normal returns usually uses the market model (e.g., Dimitrova (2017) or the market adjusted model (e.g., Jenkinson & Sousa (2011). The market return model estimates the normal returns of a security with reference the return of the market, and the marked adjusted model, on the other hand, assumes that the expected return of a security is determined by the return of a market portfolio (Mackinlay, 1997).

In this study, we use market adjusted model for the estimation of the normal returns, the S&P500 as the reference index for SPACs listed in the USA and with the JSE All Share Index as the reference index for SPACs listed in South Africa.

In order to conduct the event study, we commence with computing individual stock returns for the SPACs as follows:

$$r_t = 100\% * In\left(\frac{p_t}{p_{t-1}}\right) \quad (1)$$

Where:
r_t *is the individual stock return at time t,*
p_t *is the stock price at time t; and*
p_{t-1} *is the closing stock price at time t – 1 (i.e., the previous period closing price).*

We then compute the market returns, for the USA we used the S&P 500 closing price as the proxy, and for SA, we used the JSE all share index as a proxy. The market returns were calculated as follows:

$$R_{m,t} = 100\% * In\left(\frac{P_{m,t}}{P_{m,t-1}}\right) \quad (2)$$

Where:
$R_{m,t}$ *is the market return at time t, and*
$P_{m,t}$ *is the market index closing price at time t and*
$P_{m,t-1}$ *is the market index closing price at time t – 1.*

We calculate our abnormal returns, as any returns that are in excess of market returns as follows:

$$AR_{r,t} = r_t - R_{m,t} \quad (3)$$

Where:
$AR_{r,t}$ *is abnormal return at time t;*
r_t *is the individual stock return at time t;*
$R_{m,t}$ *is the market return at time t*

Following on from Equation 1, abnormal returns observed were aggregated to arrive at the cumulative abnormal return, which was determined through the following equation:

$$CAR_{rt,} = \sum_{t=1}^{T} AR_{r,t} \quad (4)$$

Where:
$CAR_{r,t}$ *is cumulative abnormal return at time t;*
$AR_{r,t}$ *is abnormal return at time t;*

For the purposes of studying the long run abnormal returns, we utilise the Buy-and-Hold Abnormal Returns, using the event-time approach. As advised by Barber & Lyon (1997), the BHAR for security *i* will be determined as the simple BHAR of the sample firms less the simple BAHR of our reference benchmark

$$BHAR_{it} = \prod_{i=1}^{T}(1 + r_t) - \prod_{i=1}^{T}(1 + R_{m,t}) \quad (5)$$

4.4. FACTORS THAT INFLUENCE LONG TERM PERFOMANCE OF SPACS

The novelty of this study is in the approach employed to assess the factors that impact long-run performance. The study divides the factors into three buckets, the first is the sponsor compensation structure, the second is the non-compensation structure factors, the last one, is the economic factors that are used to test whether the economic conditions at the time of DeSPAC Transaction drive redemption rates versus the merits of the DeSPAC Transaction.

4.4.1. Sponsor Compensation Structures and the Moral Hazard

Equation (6) below, presents the regression model used to assess sponsor compensation related factors and whether they drive long-run performance of SPACs, where the independent variable is the Buy-and-Hold-Abnormal-Returns ($BHAR_{it}$), and this is estimated for the six to twenty four months holding period.

$$BHAR_{it} = \alpha_i + \beta_1 AT_RISK + \beta_2 SP_PROM + \beta_3 DAYS_TO_ANNOUNCEMENT + \beta_4 S_EARN + \beta_5 CONTROLS + \varepsilon \quad (6)$$

AT_RISK
At-Risk is measured using the variable *AT_RISK* and it is calculated as the proportion of the total capital supplied by SPAC sponsors to the SPAC in exchange for shares (i.e., At-risk capital) to the total IPO proceeds raised by the SPAC at IPO. The At-Risk variable represents the level of "*skin in the game*" that sponsors have, which exposes them to the downward risk if they propose a low quality DeSPAC Transaction that results in poor long run performance. We hypothesised that this exposure aligns the interests of the SPAC sponsors and other investors and would incentive sponsors to find good DeSPAC Transaction that will perform well in the long run because they stand to lose the At-Risk Capital if there is poor performance,

unlike with the sponsor promote shares which have value to even if a bad DeSPAC Transaction is concluded.

SP_PROM
SP_Prom is the sponsor promote shares in percentage, which tell us the proportionate shareholding held by the sponsor in the form of sponsor promote shares. As described in the previous section, these shares are "*free carry*" meaning that the sponsors get these shares at nominal value (i.e., essentially for free).

DAYS_TO_ANNOUNCEMENT
Days to announcement is measured using the variable *DAYS_TO_ANN* and it is calculated as the number of days between IPO listing date and the date of the DeSPAC announcement. We use this variable to test for the moral hazard that that investors are exposed to as a result of the misaligned incentives and interests between SPAC sponsors and investors on the decision to DeSPAC or liquidate the SPAC (Lewellen, 2008). We hypothesise that as the DeSPAC deadline draws nearer with longer days to announcement, sponsors are likely to present low quality emergency DeSPAC Transactions in order to avoid the liquidation of the SPAC, which would result in their SPAC sponsor promote shares being worthless

S_EARN
Sponsor earnouts is measured using the variable *S_Earn* and it is calculated as the number of years that the SPAC sponsors promote shares are subject to earnout provisions. Earnout provisions subject the sponsor promote shares to forfeiture if the post implementation of the DeSPAC Transaction, the DeSPAC'ed entity fails to reach certain share price targets. We hypothesised that sponsor earnouts have a positive impact on the long run post DeSPAC performance because the possible forfeiture of the sponsor promote shares incentives sponsors to look for, and present, quality DeSPAC Transactions which will perform well after completion.

CONTROLS
These are the controls we use in our estimation model. The model controls for the sector of the DeSPAC Transaction, geography of the DeSPAC Transaction and deal value of the DeSPAC Transaction.

4.4.2. Non-compensation related factors

Equation (7) below, presents the regression model used to assess non sponsor compensation related factors and whether they drive long-run performance of SPACs. Similar to the previous model, $BHAR_{it}$ is used as the dependent variables.

$$BHAR_{it} = \alpha_i + \mu_1 CAR + \mu_2 REDEM + \mu_3 PIPE_OWN + \mu_4 DUMMYPE + \mu_5 CONTROLS + \varepsilon \quad (7)$$

CAR
The variable *CAR* is the cumulative abnormal returns measured using a seven-day event window surrounding the date on which the DeSPAC announcement is made using the S&P500 as a reference index and using the market-adjusted model. These returns constitute our proxy for the market's reaction towards the DeSPAC Transaction. Following Jenkinson & Sousa (2011), we interpret positive CARs around the DeSPAC announcement as signalling a good

and quality DeSPAC Transaction and we therefore expect that this positive reaction is positively correlated with the long run post DeSPAC performance.

REDEM

Redemption rate is measured using the variable *REDEM* and it is calculated as the proportion of the total shares that are redeemed by investors after the DeSPAC announcement. When exercising their redemption rights, investors receive a *pro-rata* proportion of the value of the Trust Account and walk away from their investment in the SPAC before completion of the DeSPAC Transaction. Accordingly, we hypothesised that a decision to exercise the redemption right signal a dissatisfaction with the DeSPAC Transaction presented by the SPAC sponsors. We therefore expect a negative relationship between redemption rates and the long run post DeSPAC performance, where a high redemption rate is synonymous with poorer long run performance.

PIPE_OWN

PIPE ownership is measure through the variable *PIPE_OWN* and it is calculated as the shareholder percentage held by PIPE investors in the SPAC post DeSPAC Transaction. We hypothesised that since PIPE investors are sophisticated investors who take a block shareholding in the SPAC after announcement of the DeSPAC Transaction, PIPE ownership in the SPAC would be positively correlated with long run post DeSPAC performance.

DUMMYPE

The private equity experience of the SPAC sponsor team is represented by the variable *DUMMYPE,* which is a binary variable taking the value of 1 if the sponsor team have previous PE/VC experience and taking the value of 0, in the absence of such experience. We expect to find better long run post DeSPAC performance for SPACs led by sponsors with PE/VC experience over those that are no led by sponsors with such experience.

4.4.3. Redemption rate drivers

The last estimation model estimates the drivers of redemption rate and is shown in equation (8). This equation was developed to test whether macro-economic conditions influence redemption rates.

$$AV_RED_{it} = \alpha_i + \theta_1 INFLATION + \theta_2 EFF_INTEREST_RATE + \theta_3 CBEO_VOL_INDEX + \varepsilon \quad (8)$$

Where, AV_RED measures the average redemption rates for the year, *INFLATION* measures the corresponding annual inflation rate, *EFF_INTEREST_RATE* measures the effective nominal interest rates and *CBEO_VOL_INDEX* is the US stock market volatility index for the corresponding period.

CHAPTER SUMMARY

In this chapter, we outlined the methodology as well as the estimation model used. In Table 1 below a summary of the models estimated in this study is set out, while Table 2 sets out a summary of the key variables.

Table 1: Summary of the estimation models used in this study

Sponsor Comp Structures and Moral Hazard	$BHAR_{it} = \alpha_i + \beta_1 AT_RISK + \beta_2 SP_PROM + \beta_3 DAYS_TO_ANNOUNCEMENT + \beta_4 S_EARN + \beta_5 CONTROLS + \varepsilon$
Non Sponsor Comp	$BHAR_{it} = \alpha_i + \mu_1 CAR + \mu_2 REDEM + \mu_3 PIPE_OWN + \mu_4 DUMMYPE + \mu_5 CONTROLS + \varepsilon$
Redemption Rates Drivers	$AV_RED_{it} = \alpha_i + \theta_1 INFLATION + \theta_2 EFF_INTEREST_RATE + \theta_3 CBEO_VOL_INDEX + \varepsilon$

Table 2: Summary of variables in the regression models

Variable	Variable Description
BHAR	Buy and hold abnormal returns following completion of the DeSPAC Transaction using the S&P 500 as the reference index.
CARs	Cumulative abnormal returns surrounding the DeSPAC Transaction announcement measured over a seven-day event window using the S&P 500 as the reference index and using the market adjusted model
DAYS_TO_ANN	The number of days between the SPAC IPO date and the DeSPAC Transaction announcement
AT-Risk	Proportion of at-risk capital to the total IPO proceeds
S_Earn	Number of years that the sponsor promote shares are subject to earnout out
SP_PROM	Percentage shareholding held by the sponsors in the form of sponsor promote shares
Redem	the proportion of the total shares that are redeemed by investors after the DeSPAC announcement
PIPE Own	shareholding percentage held by PIPE investors post DeSPAC Transaction
DUMMYPE	Dummy variable taking the value 1 if the SPAC sponsor and management team have private equity/venture capital experience, and taking 0 otherwise
DEALVALUE	The value of the DeSPAC Transaction measured as enterprise value divided by total funding sources
DUMMYTECH	Dummy variable taking the value 1 if the sector of the target company for the DeSPAC Transaction is technology sector, and taking 0 otherwise
DUMMYGEO	Dummy variable taking the value 1 if the geographical location of the target company for the DeSPAC Transaction is outside of the USA (i.e. cross boarder transaction), and taking 0 otherwise
INFLATION	Annual inflation rate in the USA
EFF INFLATION RATE	Annual effective interest rate in the USA
CBO_VOL_INDEX	The stock market volatility index
AVE_REDE	Average yearly redemption rate for SPACs

CHAPTER 5: RESEARCH RESULTS

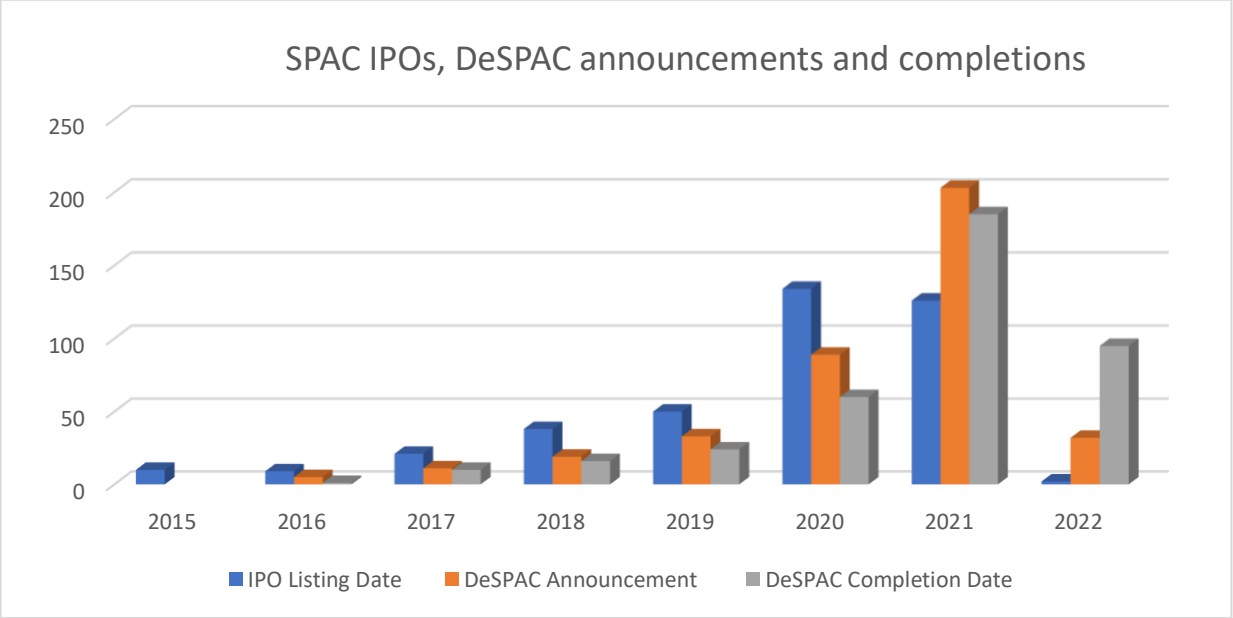
5.1. INTRODUCTION

In this chapter, we present the results of our study. Section 5.2 presents the descriptive statistics. Section 5.3 presents the results of our short-term performance of SPACs as measured by CARs in the USA and South Africa. Section 5.4 presents the results of our long-term performance of SPACs as measured by BHARs, post completion of the DeSPAC Transaction for the different holding periods. Section 5.5 presents the results of our regression test for the factors that influence the long run performance of SPACs. Lastly, the summary chapter concludes the chapter.

5.2. DESCRIPTIVE STATISTICS

A complete sample of SPACs that listed in the USA and completed their DeSPAC Transactions during the period between 2015 and 2022 is graphically illustrated in Figure 4 below.

Figure 4: SPAC IPOs, DeSPAC Transaction announcements and DeSPAC Transaction completions



From the above Figure 4 we see that number of SPAC IPOs have been on the increase since 2015 and that most of the SPACs in our sample were listed in 2020 in which year we saw 134 SPAC IPOs in the USA. In relation to DeSPAC completions, we note from Figure 4 that 2021 contributes more than other years to our sample for the long run post DeSPAC performance, which we measure as the performance after completion of the DeSPAC Transaction. In this regard, 2020 contributes 203 SPACs followed by 2020 with 89.

Table 3 below presents the descriptive statistics of the factors that influence the performance of SPACs. The SPACs in our regression sample had an average redemption rate of 50 percent, while the highest redemption rate was 99 percent, which was the DeSPAC Transaction between 890 5th Avenue Partners and BuzzFeed. However, this substantial funding gap was

cushioned by debt financing. The average redemption rate is higher than that reported by Gahng et al., (2021). However, this is explained by the fact that their sample cut of year was 2020, which was the year prior to the record high redemptions in the USA. Sponsors promote shares is an average of 24 percent, which is slightly higher that the average 20 percent cited in older studies, while the "*skin-in-the-game*" ranges between 2 percent and 8 percent, with an average of 3 percent. In relation to shareholding post DeSPAC, PIPE investors hold an average of 10 percent of the shares in the SPACs post completion of the DeSPAC Transaction. The sponsor earnout years varies significantly in our sample, from zero for SPACs with no sponsor earnout mechanisms to a ten year sponsor earnout period, while the average is a one year period.

Table 3: Descriptive statistics

Variable	Mean	Median	Max	Min	Std Dev	N
SP_ Shares (in %)	0.24	0.25	0.49	0.02	0.05	133
At Risk (in %)	0.03	0.03	0.08	0.02	0.01	133
CARs	0.041	0.003	0.717	-0.471	0.148	133
Days_To_Ann	409	400	1 106	9	216	133
Redem	0.50	0.61	1.00	0.00	0.38	133
PIPE Own (%)	0.10	0.08	0.48	0.00	0.10	133
S_Earn	1.20	0.00	10.00	0.00	2.30	133

Table 4 and Table 5 presents the correlation tables for our chosen variables and indicate the correlation and direction of the relationship between the variables. As it can be noted from the tables below, none of our variables are perfectly or strongly correlated with each other.

Table 4: Factors influencing the performance of long run performance of USA SPACs

Variables	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
[1] 3DAY_CARS	1.00							
[2] AT_RISK	0.08							
[3] LDAYS_TO_ANN	0.19	1.00						
[4] LDAYS_TO_COMP	-0.01	-0.35	0.55	1.00				
[5] LS_EARN	-0.25	-0.33	0.32	0.15	1.00			
[6] REDEM	-0.21	-0.17	0.24	0.21	-0.16	1.00		
[7] PIPE_OWN	0.02	-0.06	-0.03	-0.23	0.10	-0.24	1.00	
[8] SP_PROM	-0.02	0.16	-0.15	0.07	0.13	-0.11	0.01	1.00

Table 5: Drivers of redemption rates

Variables	[1]	[2]	[3]
[1] CBEO_VOLATILITY_INDEX	1.00		
[2] EFFECTIVE_INTEREST_RATE	-0.21	1.00	
[3] INFLATION	0.36	0.18	1.00

5.3. SHORT RUN PERFORMANCEOF SPACs

Table 6 presents the short run performance of SPACs listed in the USA over a seven day event window being three days before the DeSPAC Transaction announcement and three days after the DeSPAC Transaction announcements, while
Table 7 presents the results over a three day event window, being one day before the DeSPAC Transaction announcement and one day after the DeSPAC Transaction announcement. A graphical representation of these results is presented in Figure 5 and. Our results are consistent with the findings of other researchers in the past and present, such as Dimitrova (2017) and Kiesel et al., (2022) who reported positive CARs post the DeSPAC merger announcements. In their sample of 375 DeSPAC Transaction announcements for SPACs that completed their DeSPAC Transactions during January 2012 and June 2021, Kiesel et al., (2022) found that the CARs over a 3-day event window of (-1;1) was an average of 6.67 percent when using the market return model and Russel 2000 as the reference index. Our average is lower at 5.5 percent which could be explained by the fact that we used the market adjusted model and the S&P500 as our reference index.

The Russel 2000 index is an index of 2000 small capitalised (small cap) companies, while the S&P500 is an index of 500 large capitalised (large cap) companies. Fama & French (1992) found that small cap companies earn higher returns than large cap companies, this implies that abnormal returns calculated using the Russel 2000 as the benchmark would be smaller than the ones calculated using the S&P 500. The findings of this study do not support the findings of Fama & French (1992), and the plausible explanation could be the impact that the Covid-19 pandemic had on small cap vs large cap companies. This rationale is supported by Shu et al., (2021) and Harjoto et al., (2021) who both found that small cap companies suffered greater losses than large cap companies during the Covid-19 pandemic. This would result in large cap companies performing better than small cap companies. Accordingly, abnormal returns calculated using the S&P500 as the reference index would be smaller for a period that include the Covid-19 pandemic, and the sample of this study heavily weighs on this period.

Table 6: USA CARs (-3,3)

Event Days	Mean CARs	t-statistics	z-statistics	Mean CARs at End of Event Window
-3	0,0402%	0,4309	-0,3293	4,95%
-2	0,0193%	0,0869	0,7305	4,95%
-1	0,4086%	1,4541	1,7716	4,95%
0	5,5349%	6,6617	58,2720	4,95%
1	5,4517%	6,6277	3,9535	4,95%
2	4,9181%	5,9452	-4,1926	4,95%
3	4,9495%	5,8421	0,7607	4,95%

Table 7: USA CARs (-1,1)

Event Days	Mean CARs	t-statistics	z-statistics	Mean CARs at End of Event Window
-1	0,4363%	2,0021	5,9117	5,50%
0	5,5121%	6,7639	91,7475	5,50%
1	5,5032%	6,6849	14,2664	5,50%

Figure 7: USA CARs (-3,3)

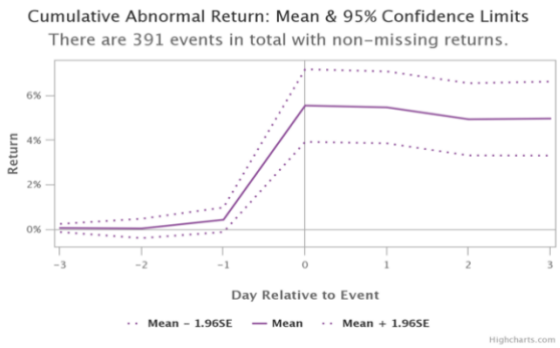


Figure 6: USA CARs (-1,1)

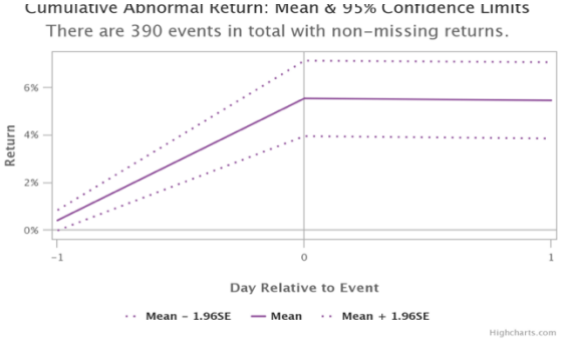


Figure 9 and Figure 8 presents graphically the short-term performance of SA SPACs surrounding the DeSPAC Transaction announcements, calculated using on a seven-day event window (-3;3) and a three-day event window (-1;1). The results were calculated and on a three-day event window (-1;1) using an estimation window of (-100; -2) and show that the South African results are distinguishable from their USA counterparts in that there is only a positive market reaction at the end of the three-day event window, while at the end of the seven-day event window the SPACs experience negative cumulative abnormal returns. Furthermore, the extent of the positive cumulative abnormal returns over the three-day event window is substantially lower that with their USA counter parts, with the USA SPACs earning an average of 5.45 percent and the South Africa SPACs experience a low average of 1.44 percent.

Table 8: SA SPACs CARs (-3,3)

Event Days	Mean CARs	Mean CARs at the End of the Event Window
-3	-0,0118%	-1,92%
-2	-0,0116%	-1,92%
-1	-0,0072%	-1,92%
0	**0,0171%**	-1,92%
1	0,0028%	-1,92%
2	0,0079%	-1,92%
3	-0,0163%	-1,92%

Table 9: SA SPACs CARs (-1,1)

Event Days	Mean CARs	Mean CARs at the End of the Event Window
-1	0,4322%	1.44%
0	2,8694%	1.44%
1	1,4400%	1.44%

Figure 9: SA SPACs CARs (-3;3)

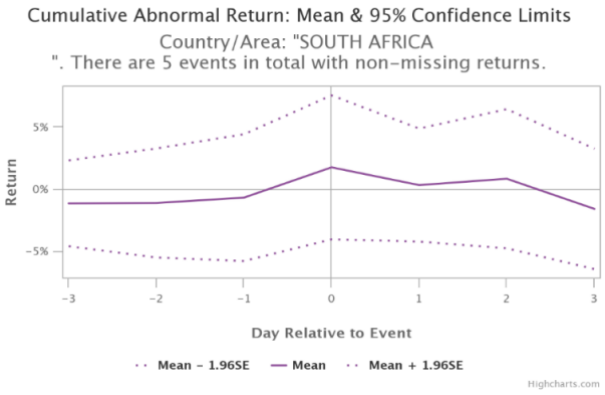
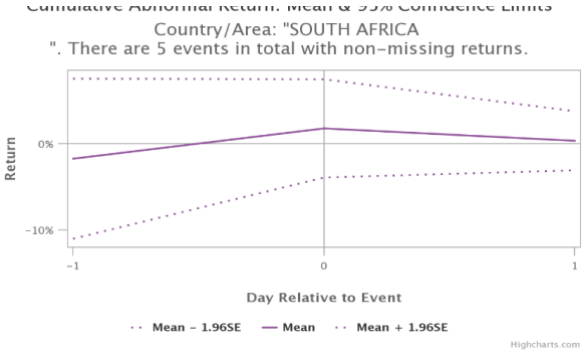


Figure 8: SA SPACs CARs (-1;1)



5.4. LONG RUN PERFORMANCE POST DESPAC TRANSACTION

Empirical studies on the long-run performance of SPACs are all at idem, with several studies, like Dimitrova (2017), (Lewellen, 2008) and more recently Kiesel et al., (2022), revealing that SPACs exhibit poor long run performance. As to the magnitude of the poor performance, this varies from study to study depending on several factors, including the benchmark return model and market index employed by each researcher in their study.

Another important factor to consider for the purposes of comparison with our study is that past studies on SPAC performance have often failed to measure long run performance over a long-term period using large samples because of the limited number of completed DeSPAC Transactions at the time of their study. Furthermore, upon a close examination, one finds that they measure the long-run abnormal performance from the DeSPAC Transaction/merger announcement and not from the completion date (i.e., the effective date) of the DeSPAC Transaction. Therefore, their results for the holding periods, particularly for the shorter holding period, often includes a premerger period because in most cases the DeSPAC Transactions would not have been completed as they await shareholder approvals and other regulatory approvals, which could take a few months to obtain, and to accordingly bring the DeSPAC Transaction to a complete financial and legal close (Kiesel, Klingelhofer, & Schiereck, 2022). In our sample, the average number of months between the DeSPAC Transaction announcement and DeSPAC completion announcement is approximately 6 months, which is in line with the 5-month period cited by Gahng et al., (2021) for their sample SPACs which went public between January 2010 and December 2019.

below shows the BHARs during various holding periods after completion of the DeSPAC Transactions and reveals that investors who acquired shares in the SPAC at the start of the second day of trading after completion of the DeSPAC Transaction, and held those shares for the various holding periods, experienced negative BHAR. The average BHAR is -22.18 percent for the 6 holding month period, -32.94 percent for the 12 holding month period, and -30.54 percent and -52.30 percent for the 18 month and 24 month holding period.

Table 10: Buy-and-Hold Abnormal Returns post completion of DeSPAC Transactions – USA

Period (Post DeSPAC)	N	Mean	Median
6 Months	133	-22.18%	-30.45%
12 Months	131	-32.94%	-44.25%
18 Months	107	-30.54%	-46.80%
24 Months	80	-52.30%	-59.64%

When comparing our results to the more recent studies of long-term performance, we see a similar trend to that of Lin et al. (2021), who used the S&P500 as the reference index when studying the post DeSPAC performance of SPACs which listed and completed their DeSPAC Transactions between 2003 and June 2020. They reported an average BHAR of -22.87 percent for the 12-month holding period and an average BHAR of -41.92 percent for the 24-month holding period, while Gahng et al., (2021) found that the average BHAR was -24.6 percent for the 12-month holding period with the average BHAR deteriorating to an average BHAR of -40.4 percent for the 36-month holding period return when using the Russel2000 as the reference index for the 114 SPACs in their sample. In another study, Chamberlain (2021) reported average BHAR of -32.60 percent for the 36-month holding period when using the Nasdaq index as the reference index for SPACs which listed and completed their DeSPAC Transaction during the period between 2016 and 2018, while Klauser et al., (2022) reported an average BHAR of -50.9 percent for the 12-month holding period when using the IPO index as the reference index.

However, a recent study by Kiesel et al., (2022) reported lower underperformance compared to the aforementioned studies in their study of about 182 SPACs that listed and completed their DeSPAC Transaction between 2012 and June 2021. They reported an average BHAR of -18.7 percent and -18.53 percent for the 6 month holding period and 12 month holding period post DeSPAC completion when using the Russel2000 index as the reference index. Even more startling, they reported an even lower underperformance of an average BHAR of -6.88 percent and -13.45 percent for the 18 month holding period and 24 month holding periods. However, the result for these holding period returns were not statistically significant.

Lastly, in comparison with older studies, Dimitrova (2017) reported an average BHAR of -39.7 percent and -57.7 percent for the 12-month and 24-month holding period for the 73 SPACs which listed and completed their DeSPAC Transactions between 2003 and 2010, using the Russel2000 as the reference index, while Kolb & Tykvova (2016) reported an average BHAR of -29 percent for the 6-month holding period and an average BHAR of -46 percent and -59 percent for the 12-month and 24-month holding period returns, using the Russel2000 as the reference index. However, it should be noted that Dimitrova (2017) starts his calculation of the BHAR from the DeSPAC Transaction announcement, which means that his 12-month holding period is concentrated with a significant pre-merger period.

The South African SPACs are also not immune to underperformance experienced by SPAC post completion of the DeSPAC Transactions. Their results are set out in Table 11, and similarly they exhibit negative abnormal returns.

Table 11: Buy-and-Hold Abnormal Returns post completion of DeSPAC Transactions –South Africa

Period (Post DeSPAC)	N	Mean	Median
6 Months	5	-27.87%	-27.16%
12 Months	3	-46.4%	-50.4%
18 Months	1	-56%	-56%

In summary, it appears that the underperformance of SPACs is still a continuing trend even with the Third Generation SPACs, and even in the case of South Africa SPACs, despite some of the structural change and mitigation strategies that have been introduced to curb some of the agency problems embedded in their structure. In the next section of this study, we aim to understand the determiners of post DeSPAC performance in an effort to understand how we can construct a better SPAC that can perform better in the long run.

5.5. REGRESSION ANALYSIS RESULTS

5.5.1. DIAGNOSTIC TESTS AND DIAGNOSTIC REMEDIES

Prior to estimating our model, The first test conducted was to establish whether or not our dependent variable was normally distributed. Using the Jarque-Bera, it was established that the dependent variable was not normally distributed and to remedy for this we Winsorized the dependent variable at 2.5 percent to make our dependent variable normally distributed while avoiding a reduction in our sample size given that it was already limited. Table 20 sets out the effect of this transformation through a before and after view.

We then proceeded to conduct diagnostic tests to determine whether or not the OLS assumptions as satisfied. Accordingly, we tested for heteroscedasticity, non-normality, multicollinearity and non-linearity.

To test for heteroscedasticity, we conducted the White's tests, and the results are set out in Table 15. As it appears more fully from the results, the p-values are significant. Accordingly, we cannot reject the null hypothesis of homoscedasticity. For the non-linearity test, the Ramset RESET test was conducted and we found no omitted variables. These results are set out in Table 16. To detect non-normality, the Jarque-Bera test was conducted, and the models were found to be normally distributed. These results are set out in Table 17. Lastly, we tested for multicollinearity using the variance inflation factor, and as it appears more fully from the results are set out in Table 18, the variables are not highly correlated.

5.5.2. FACTORS INFLUENCING THE LONG TERM PERFORMANCE OF APACs

In this section we present the results of our estimation models for the determination of the factors that influence the long run performance of SPACs post completion of their DeSPAC Transactions and for the drivers of redemption rates. The estimation models for the determination of the factors that influence the long run performance of SPAC was run using the six month to twenty-four month holding period returns as our dependent variables, while the estimation for the drivers of redemption rates was run using the average yearly redemption rate as the dependent variable.

Table 12 presents the results for the sponsor compensation factors that influence the long run performance of SPACs in the USA.

Table 12:Regression Results for the sponsor compensation factors model

MAIN VARIABLES	6 MONTHS	12 MONTHS	18 MONTHS	24 MONTHS
LS_EARN	0.2686**	0.4194***	0.6511***	0.5509**
	(2.0678)	(2.9282)	(3.3679)	(2.2917)
AT_RISK	1.3774	6.3039	9.6505	26.0328
	(0.1457)	(0.589)	(0.444)	(1.0116)
LDAYS_TO_ANN	0.0304	0.0512	0.2422	0.0791
	(0.3592)	(0.5406)	(1.4300)	(0.1860)
SP_PROM	-0.8614	-2.5279	-4.1818**	-4.0682
	(-0.5432)	(-1.4457)	(-1.84)	(-1.0401)

DVALUE	0.0429 (0.5830)	0.0926 (1.0964)	0.2517** (1.9055)	0.3851** (2.3708)
DUMMYGEO	-0.0541 (-0.2254)	-0.3724 (-1.40)	-0.2465 (-0.7662)	0.0209 (0.0643)
DUMMYIND	-0.05353 (-0.3333)	-0.0510 -(0.2873)	0.0411 (0.1709)	0.3121 (0.9722)
C	-0.6562 (-1.0070)	-0.928 (-1.2886)	-2.4401** (-1.9426)	-2.2598 (-0.9191)
R-SQUARED	**0.23**	**0.38**	**0.50**	**0.71**

****ρ<0.01** ****ρ<0.05** ***ρ<0.1, T-statistic is the value in parenthesis ()**

Table 13 presents the results for the non-sponsor compensation factors that influence the long run performance of SPACs in the USA.

Table 13 Regression Results for the non-sponsor compensation factors model

MAIN VARIABLES	6 MONTHS	12 MONTHS	18 MONTHS	24 MONTHS
CARS	-0.1929 (-0.8855)	-0.1606 (-0.5952)	-0.2593 (-0.8065)	-0.6449 (-1.1796)
REDEM	-0.1664 (-1.6711)***	-0.1367 (-1.1036)	-0.0174 (-0.1154)	0.0170 (0.0998)
PIPE OWN	1.2238*** (3.5876)	1.2373*** (2.9280)	0.6794 (1.3705)	0.4445 (0.83)
DUMMYPE	0.0389 (0.5813)	0.0814 (0.923)	0.1661 (1.5658)	0.2757*** (2.4123)
DVALUE	0.1135*** (2.9698)	0.1591*** (3.3356)	0.0958*** (1.7265)	0.1101*** (1.9715)
DUMMYGEO	-0.0824 (-0.8600)	-0.2315** (-1.9432)	-0.2672*** (-1.9158)	-0.1535 (-1.1285)
DUMMYIND	-0.2400*** (-2.7771)	-0.1883*** (-1.7586)	-0.2748** (-2.0902)	-0.2375 (-1.3407)
C	-0.4202*** (-4.7131)	-0.6168*** (-5.5743)	-0.5910*** (-4.5618)	-0.8281*** (-6.2834)
R-SQUARED	**0.175**	**0.159**	**0.150**	**0.212**

****ρ<0.01** ****ρ<0.05** ***ρ<0.1, T-statistic is the value in parenthesis ()**

Table 14 presents the results for the drivers of redemption rates in USA SPACs.

Table 14:Regression results for Yearly Redemption Rates

Independent Variable	**Estimation model**
CBEO_Volatility Index	0.0048 (0.943)
Effective Interest Rate	0.1544** (4.2155)
Inflation	0.0479** (3.7217)
Constant	0.1007 (0.9474)
Observations	7
R-Squared	0.9395

****ρ<0,05** *, T-statistic is the value in parenthesis ()*

CHAPTER 6: DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

6.1. INTRODUCTION

This chapter discusses the results presented in section 5.5 and concludes the our research. The chapter is structured in the following manner: Section 6.2 presents a discussion of our regression results for the factors influencing the long run performance of SPACs post completion of their DeSPAC transaction. Section 6.3 provides a conclusion for the research. Lastly, Section 6.4 and Section 6.5 provides suggestions for future research on SPACs and sets out the limitations of the study.

6.2 DISCUSSION

With respect to the compensation related factors, our results as presented in Table 12 reveal that the coefficient of *LS_Earn* is positive and statistically significant across all the holding periods, which supports our hypothesized relationship that sponsor earnouts have a positive impact on the long run post DeSPAC performance. However, the coefficient of *AT_RISK* is positive but not statistically significant, which leads us to conclude that higher *AT_RISK* is not positively associated with better post DeSPAC performance. Therefore, the results prove that the private equity concept of "*skin in game*" does not mitigate against the agency problem. This confirms the fears that some researchers like Thompson (2010) have previously expressed in on this mitigation strategy by arguing that At-risk capital only serves to exacerbate the agency problem and does not curb it.

The days to announcement are used as a proxy for the moral hazards that investors are exposed to because of the misaligned incentives and interests between SPAC sponsors and investors on the decision to DeSPAC or liquidate the SPAC (Lewellen, 2008). In this regard, we had hypothesised that longer days to announcement was negatively correlated with long run performance. Our results show that the coefficient of *LDAYS_TO_ANN* is positive and not statistically significant across all holding periods, disproving our hypothesized relationship. Intuitively, it is not difficult to accept that longer days to announcement does not result in poorer long-run post DeSPAC performance because there are many plausible and good reasons why SPAC sponsors would take a long time to find and present a DeSPAC candidate to investors. For example, a longer day to announcement could be a function of the SPAC sponsors being prudent and taking the requisite amount of time to conduct comprehensive due diligence into the affairs and the businesses of their DeSPAC candidates before agreeing on terms and presenting the transaction to investors.

Furthermore, the days to announcement could be longer as function of SPAC sponsors looking for a cross-border DeSPAC targets. On the one hand, shorter days to announcement could be a function of the SPAC having set a clear DeSPAC Transaction scope on IPO, with regards to industry and geographical location that they intend to pursue, and accordingly conforming to the scope, and therefore making their search for a DeSPAC target more efficient and announcing earlier than the SPAC that did not have a clear DeSPAC Transaction scope. In addition, the experience of the SPAC sponsor team could also account for the varied days to announcement, in their study Lin et al., (2021) found that SPAC sponsors who have a quality networks and connections, especially in the PE and VC space, took less time to find DeSPAC targets and therefore completed their DeSPAC Transactions quicker than other SPAC sponsor teams. When testing for this relationship in our sample, we find that, consistent with Lin et al.,

(2021), SPACs with PE or VC sponsors have shorter days to completion, which means that they complete their DeSPAC Transactions quicker than SPACs with no PE or VC sponsors.

In summary, with respect to the compensation related factors and moral hazards, we do not find evidence that longer days to announcement result in poorer long run post DeSPAC performance because the timing of the DeSPAC Transactions is potentially multifaceted. Accordingly, there is no evidence to support the theory that the risk of investors being exposed to the moral hazard of sponsors presenting a low quality DeSPAC Transaction for the sake of avoiding a liquidation increases as the SPAC deadline approaches. Lastly, we find evidence that sponsor earnout aid the long run performance, while the at-risk capital does not aid the long run performance of SPACs.

Our second estimation model tested the non-compensation related factors and their impact on long run performance of SPACs post the DeSPAC transactions. With respect to the relationship between CARs and long-run post DeSPAC performance, we sort to determine whether the market sentiments and reactions around the DeSPAC announcements are instructive as to long-run performance of the SPACs. In line with the theory developed by Jenkinson & Sousa (2011), we hypothesised that there is a positive correlation between CARs and long run post DeSPAC performance. However, we find that the coefficient of *CARs* is negative across all holding periods indicating that CARs have a negative relationship with long run post DeSPAC performance. In this regard, we fail to reject to null hypothesis that CARs are not positively correlated with the long-run post DeSPAC performance. There is very limited empirical literature on the relationship between CARs and long run post DeSPAC performance. However, our findings confirm the view expressed by Dimitrova (2017) that CARs are not indicative of the merits of the DeSPAC Transaction because CARs only reflect the value that the market attributes to the DeSPAC Transaction relative to their own expectations. This finding also shows that there tends to be an overconfidence and overreaction by investors and the market towards the DeSPAC Transaction upon announcement.

Upon announcement of the DeSPAC Transaction, public investors in the USA SPACs can exercise their redemption rights, which give investors a right to redeem their shares in the SPAC at after announcement of DeSPAC Transaction if they do not wish to remain invested in the SPAC post completion of the DeSPAC Transaction. The result of our non-compensation factors estimation model shows that the coefficient of *REDEM* is negative and not statistically significant for all the holding periods, save for the 24-month holding period where it is positive but not statistically significant. Accordingly, across all the holding periods, we find no evidence of our hypothesised relationship. Our finding is different from that of Gahng et al., (2021) who found that the coefficient of *REDEM* was negative and statistically significant for the 12-month holding period and the 36-month holding periods in their study. According to the results of Gahng et al., (2021), a DeSPAC Transaction with a 5% redemption ratio will have a 50,9 percent better 12-month BHAR than a deal with a 95 percent redemption ratio. However, it is worth pointing out that the sample assessed by Gahng et al., (2021) consisted of 114 DeSPAC Transactions that were completed between January 2010 and September 2020, which is a period prior to the staggering high redemption rates experienced after 2020 when the USA economic climate was defined by high inflation and high interest rates resulting in liquidity constraints for investors. This is also the case with the sample assessed by Klauser et al., (2022), which consisted of 47 DeSPAC Transactions that were completed between 2019 and 2020 where they found a negative and significant correlation between redemption rates and post DeSPAC returns.

Given the *money-back-with-interest-guarantee* nature of a redemption right it is conceivable that investors would exercise their redemption rights for reasons not related to the actual merits of the DeSPAC Transaction, especially in an unfavourable economic climate where investors may opt for extra liquidity. To test for the relationship between redemption rates and economic factors, we ran Equation (8) to understand the relationship between redemption rates, inflation, interest rates and stock market volatility. The average yearly redemption rate was set as the dependant variable, with inflation rate, interest rate and stock market volatility set as the independent variables. The results of Equation (8) show that there is a positive and significant relationship between redemption rates and inflation and the real effective interest rates, which proves that redemption rates are driven by the economic conditions at the time of the DeSPAC Transaction more than the actual quality or merits of the DeSPAC Transaction. In this regard, public investors are redeeming for liquidity reasons than they are for protection against a bad DeSPAC Transaction.

Through the same model, we examined the effect of PIPE ownership on post DeSPAC performance to test the hypothesized relationship between the PIPE ownership and post DeSPAC performance. Our results show a positive and significant relationship between PIPE ownership and post DeSPAC performance for the 6 and 12 months post the DeSPAC which proves the hypothesised relationship during these post DeSPAC periods. However, it is insignificant in the 18-month period post DeSPAC period.

The last analysis, examined the relationship between sponsor experience and long run performance, and we find that the coefficient of DUMMYPE is positive but not significant during the 6 months to 18 months holding period but is positive and significant during the 24-month holding period. Although this means we fail to reject the null hypothesis that PE/VC sponsor do not have better performance than sponsors without PE/VC experience in relation to the 6 to 18 month holding period, we reject the null in relation to 24 month holding period.

A plausible explanation for this different finding across the different holding periods is that the effects of operational improvements require a longer horizon to begin reflecting in the stock price of the entity. Our findings in this regard, are consistent with the findings by Lin et all. (2021) who found that the long run post DeSPAC performance of SPACs was statistically different between SPACs with a sponsor team with a high PE network and those without. They found that the on standard deviation increase in the PE network of sponsors leads to a 2.1% higher post-merger monthly Fama-French three-factor alpha during the 2-year period after a business combination, which indicated that the PE network of SPAC sponsors was positively related to the long run performance.

6.3 *CONCLUSION*

In this study we analysed the performance of USA SPACs that listed and successfully completed their DeSPAC Transactions during the period between 2015 and 2022, with the primary objective of determining their long run performance post completion of their DeSPAC Transactions. The question of long-term performance of SPACs is an area of active research, and it accordingly evolves with time. In this regard, our study of the Third Generation SPACs was motivated by the evolution and changes in the SPAC model that are found in Third Generation SPACs, and which broadly speaking are aimed at aligning the interests of sponsors and investors and aimed at increasing the probability of better long-term performance of the SPACs post completion of the DeSPAC Transactions.

In conclusion, the results of the analysis of compensation related factors show that sponsor earnouts have a positive impact on the long-run post DeSPAC performance while at-risk capital does not mitigate against the agency problem. On the other hand, the timing of the DeSPAC transactions is potentially multifaceted, and there is no evidence to support the theory that longer days to announcement result in poorer long-run post DeSPAC performance. With regards to the non-compensation related factors, the results indicate that CARs are not positively correlated with long-run post DeSPAC performance, and there tends to be overconfidence and overreaction by investors and the market towards the DeSPAC Transaction upon announcement. Lastly, there is no evidence that the exercise of redemption rights by investors has a significant impact on the long-run post DeSPAC performance. The findings provide insights into the factors that affect the long-term performance of SPACs post the DeSPAC Transactions and have implications for SPAC sponsors, investors, and policymakers.

6.4. SUGGESTIONS FOR FUTURE RESEARCH

Building on the insights gained from this study, there are several avenues for future research that could provide a deeper understanding of the performance of SPACs and its implications. Firstly, it would be valuable to conduct a comparative analysis between SPACs and publicly listed investment holding companies that are private equity backed. This investigation could shed light on whether the performance of SPACs is fundamentally distinct from other investment vehicles with similar financial backing. By exploring the differences and similarities in their performance trajectories, the suggested research could provide valuable insights into the long-run performance of SPACs in comparison to other investment models, which are private equity backed, especially in light of the similarities that have been drawn between SPACs and private equity funds.

In addition, an area of research that could shed further light on the challenges faced by SPACs in achieving better long run performance, would be to examine of the accuracy and reliability of the information presented to shareholders regarding the target company during the shareholder approval process for the DeSPAC Transaction. What would be of particular importance would be the examination of the financial projections and valuations of the target companies and the extent to which these projections hold true post implementation of the DeSPAC Transactions. An examination of this nature could offer a comprehensive understanding of whether investor decisions are influenced by overestimated projections that are presented to investors during the shareholder approval process by SPAC sponsors and management. This line of research would require an examination of the accuracy of the financial information and projections that form the basis for shareholder approval. By investigating any disparities between projected and actual performance, researchers can uncover the role of financial projections and information transparency and accountability in SPACs' outcomes.

6.5. LIMITATIONS

Our research is limited by the sample size which is relatively small. Furthermore, we only analysed SPACs that listed and completed their DeSPAC Transactions, and which continue to be publicly traded, which exposes the study to survival biases. Furthermore, a lot of the data on the variables was manually sourced and although it was cross checked across various databases and sources, it exposes the study to missed observations.

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ANNEXURE A: DIAGNOSTIC TESTS

Table 15: Heteroskedasticity: White's Test

H_o: The variance of the errors is consistent: Homoskedasticity

	BHAR6		BHAR12		BHAR18		BHAR24	
	F-statistic	**P-Value**	**F-Statistic**	**P-value**	**F-Statistic**	**P-Value**	**F-Statistic**	**P-Value**
Equation 6	0.3507	0.9216	0.3507	0.9216	1.1760	0.3691	1.4708	0.3272
Equation 7	0.2315	0.9770	0.3415	0.9333	0.4111	0.8934	1.3760	0.2286
Equation 8	1.2015				0.4418			

Table 16: Non-linearity: Ramsey RESET Test

H_o: The Model has no omitted variables

	BHAR6		BHAR12		BHAR18		BHAR24	
	F-statistic	**P-Value**	**F-Statistic**	**P-value**	**F-Statistic**	**P-Value**	**F-Statistic**	**P-Value**
Equation 6	0.1037	0.7503	0.1037	0.7503	1.2539	0.2804	3.0154	0.1430
Equation 7	2.3496	0.1279	0.9968	0.3201	0.1019	0.9191	0.7792	0.3804
Equation 8	0.6987				0.4912			

Table 17: Non-Normality: Jarque-Bera Test

H_o: The Skewness and the excess Kurtosis are zero

	BHAR6		BHAR12		BHAR18		BHAR24	
	F-statistic	**P-Value**	**F-Statistic**	**P-value**	**F-Statistic**	**P-Value**	**F-Statistic**	**P-Value**
Equation 6	0.5592	0.7561	0.5592	0.7561	0.3651	0.8331	0.7558	0.6853
Equation 7	1.2440	0.5369	1.8506	0.3964	1.4538	0.4833	2.5857	0.2745
Equation 8	0.4423				0.8016			

Table 18: Variance Inflation Factor

Equation 6 Centered VIF

	6 months	12 months	18 months	24 months
LS_EARN	1.642117	1.639229	1.539525	1.756391
AT_RISK	1.474802	1.517845	1.212216	1.128690
LDAYS_TO_ANN	1.389609	1.426551	1.664009	4.159852
SP_PROM	1.150899	1.149501	1.350325	3.873392
LDVALUE	1.069583	1.084765	1.266435	1.680085
DUMMYGEO	1.081191	1.087890	1.097283	1.120857
DUMMYTECH	1.262858	1.261261	1.321435	1.502377

Equation 7 Centered VIF

CARS	1.113227	1.112559	1.088368	1.422356
REDEM	1.533088	1.515845	1.559779	1.650619
PIPE_OWN	1.342965	1.332861	1.342818	1.382672
DUMMYPE	1.038406	1.040019	1.041756	1.094871
LDVALUE	1.797466	1.771878	1.814962	1.890112
DUMMYGEO	1.105984	1.113336	1.135426	1.155294
DUMMYTECH	1.074170	1.071470	1.109716	1.451546

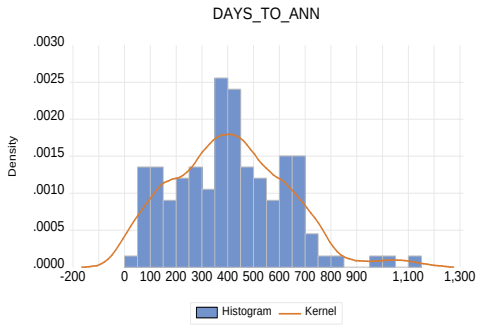
Equation 8 Centered VIF

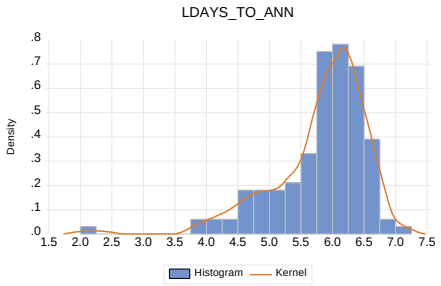
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EFFECTIVE_INTEREST_RATE	1.138947
INFLATION	1.253044

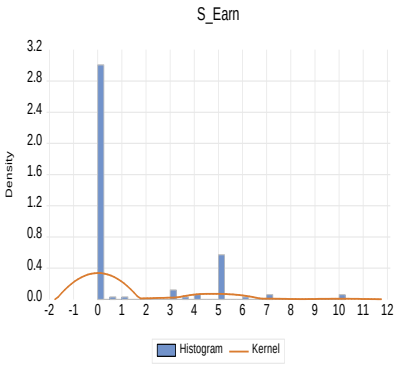
ANNEXURE B: DIAGNOSTIC REMEDIES

Table 19: Before and After Log-Transformation of variables

Before log-transformation **After log-transformation**







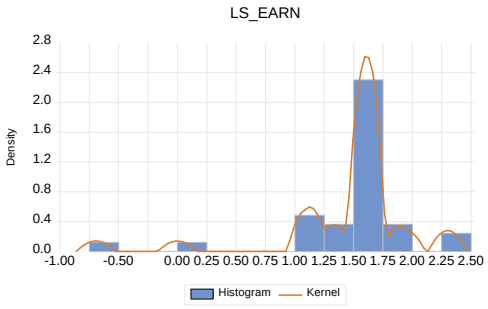


Table 20: Before and After Winsorising

Before Winsorising							**After Winsorising**					
Variable	Obs	Mean	Std Dev	Min	Max	P-value	Obs	Mean	Std Dev	Min	Max	P-value
6BHAR	133	-0.22	0.46	-1.36	1.45	0.00	133	-0.25	0.38	-1.03	0.47	0.31
12BHAR	131	-0.33	0.53	-1.36	1.98	0.00	131	-0.35	0.46	-1.31	0.63	0.21
18BHAR	107	-0.31	1.17	-1.54	9.93	0.00	107	-0.43	0.51	-1.43	0.57	0.45

ANNEXURE C: LASSO REGRESSION RESULTS

The below tables set out the results of the lasso regression, based on these results we conclude that our regression results were robust because there was minimal changes to the size of the coefficients for our main variables and all the directional relationships for our main variables were maintained

Table 21: Lasso Regression Parameter Results

	BHAR:6 MONTHS	BHAR:12 MONTHS	BHAR:18 MONTHS	BHAR:24 MONTHS
LS_EARN	0.277537	0.419424	0.609465	0.514269
AT_RISK	1.301080	6.304026	9.576943	25.97398
LDAYS_TO_ANN	0.035667	0.051193	0.167748	0.038920
SP_PROM	-0.963089	-2.527910	-3.614271	-3.624770
LDVALUE	0.009074	0.092598	0.164476	0.357152
DUMMYGEO	0.000000	-0.372234	0.000000	0.000000
DUMMYTECH	0.000000	-0.050998	0.000000	0.218670

	BHAR:6 MONTHS	BHAR:12 MONTHS	BHAR:18 MONTHS	BHAR:24 MONTHS
CARs	-0.192926	-0.160806	-0.259348	-0.646720
REDEM	-0.166449	-0.134566	-0.017399	0.017360
PIPE_OWN	1.223877	1.234108	0.679415	0.443807
DUMMYPE	0.038914	0.082367	0.166102	0.275792
LDVALUE	0.113574	0.157398	0.095802	0.109939
DUMMYGEO	-0.082324	-0.222515	-0.267170	-0.152730
DUMMYTECH	-0.239994	-0.181720	-0.274743	-0.236079