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The analysis of ICO and IEO performance in the short- and long-run

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A research report submitted to the Faculty of Commerce, Law, and Management, at the University of the Witwatersrand in partial fulfilment of the requirements for the degree of Master of Commerce (50%) in Finance.

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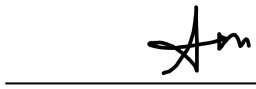
The analysis of ICO and IEO performance in the short- and long-run

Abstract

Initial Coin Offering (ICO) and Initial Exchange Offering (IEO) today present themselves as fast-growing alternatives and innovative ways to raise external financing for entrepreneurial ventures or fintech start-ups through the selling of coins directly to investors. This study analyses both the ICO and IEO in the short-and long-run. Examined are 101 ICOs listed between January 2017 and June 2021, as well as 22 IEOs listed between January 2018 and June 2021. Furthermore, the study explores various ICO and IEO performance determinants using a fixed effects regression model. The variables analysed are proxies for asymmetric information that exists between the issuing firm and investors, size was found to be the only significant variable. More so, the study finds that generally ICO and IEO are over-priced, this eventually results in coins performing poorly following aftermarket performance. Short-run performance seems to play little to no role in determining the long-run performance of newly issued coins. The results of this study suggest that the availability of white paper is not adequate to address the asymmetric information that persists between the issuing firm and investors. Lastly, using a buy-and-hold strategy the study finds that coins underperform in the long-run as given by negative abnormal returns of 35.06% after 3 years.

Declaration

I, Ngonidzashe Nkosikhona Matereke (1746119) declare that this research paper is my work and that I have correctly acknowledged the work of others. It is submitted to fulfill the requirements for the degree of Master of Commerce in Finance at the University of the Witwatersrand, Johannesburg. I declare that this research paper has not been submitted for any other degree or examination in this or any other institution.



Ngonidzashe Matereke

February 2022

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Table of Contents

Abstract ..... **i**

Declaration ..... **i**

Acknowledgments ..... **ii**

List of Figures ..... **v**

List of Tables ..... **vi**

Definition and description of abbreviations, terms, and symbols s ..... **vi**

1 INTRODUCTION **2**

1.1 Background 2

1.2 Research problem 3

1.2.1 Motivation of the study 4

1.2.2 Potential benefits 5

1.2.3 Hypotheses testing 5

1.3 Structure of the study 6

2 LITERATURE REVIEW **7**

2.1 ICO and IEO: An overview 7

2.2 IPOs versus ICOs and IEOs 8

2.2.1 Information asymmetry, under-pricing theories and short-run performance in ICO and IEO 9

2.2.2 Long-run performance 10

2.3 Determinants of ICO and IEO performance 11

2.3.1 Investor sentiment in ICO and IEOs 11

2.3.2 Availability of whitepaper and code availability 12

2.3.3 ICO Characteristics 13

2.4 Summary of literature review 14

3 DATA AND METHODOLOGY **15**

3.1 Data **15**

3.2 Detailed hypothesis and theoretical framework 16

3.3 Methodology 18

3.1 Variable descriptions and source 20

3.1 Summary of data and methodology 20

4 RESULTS AND DISCUSSIONS **21**

4.1 Descriptive analysis 21

4.2 Empirical results 23

4.3 Regression results 27

4.3.1 Correlation matrix 28

4.3.2 Test for Heteroscedasticity 29

4.4 Robustness check 30
4.5 Summary of results and discussion 31
5 CONCLUSION 32
5.1 Limitations 33
5.2 Areas of future research 33
REFERENCES 34
Appendix A: List of ICOs and IEOs 37

List of Figures

Figure 3.1:Success and Failure 18
Figure 4.1:Sample distribution..... 22
Figure 4.2: ICO and IEO raw and adjusted returns 25
Figure 4.3: Bitwise 10 (Crypto Index) vs Renaissance (IPO Index) Overtime 25
Figure 4.4: ICO, IEO, and IPO Indices Over time (Cumulative returns) 26
Figure 4.6:Correlation matrix 27

List of Tables

Table 3.1: Hausman Test 18
Table 3.2: Variable description 19
Table 4.1: Sample ICO composition 21
Table 4.2: ICO and IEO performance over short-and long-run 23
Table 4.3: Breusch-Pagan Test 28
Table 4.4: Regression Results (Fixed effects model) 29
Table A: List of ICOs and IEOs 36

Definition and description of abbreviations, terms, and symbols

1) Initial Coin Offering (ICO): is a smart contract on blockchain used to raise external financing (in the form of either fiat currency or cryptocurrencies) for entrepreneurial ventures or start-ups through the selling of coins or tokens directly to investors (Momtaz, 2018).

2) Initial Exchange Offering (IEO): this is a similar concept to ICO with an additional layer designed to minimise risk and liquidity issues (Miglo, 2020).

3) Initial Public Offering (IPO): refers to the process by which a company raises external capital by offering privately owned shares to the public for the first time in a new stock exchange (Ritter, 1991).

Abbreviation	**Description**
$\bar{R}$	First-day returns (Raw)
$\overline{AR}$	First-day returns (Adjusted)
$\overline{BHR}$	Buy-and-hold returns (Raw)
$\overline{BHAR}$	Buy-and-hold returns
VAR	Realised volatility of $\overline{BHAR}$

1 INTRODUCTION

This chapter introduces the study on Initial Coin Offering and Initial exchange offering and gives context on their similarities and differences and how both compare to Initial public offering and attempt to extend Initial public offering relevant theoretical knowledge to Initial Coin Offering and Initial exchange offering. The chapter is organised as follows: Firstly, the chapter starts by making a case for the study as well as providing some background on the rapidly growing area of Initial Coin Offering and Initial Exchange Offering. Following this will be the main research objective along with three sub-objectives and the problem statement. Lastly, the chapter will formulate the research hypothesis, which will then be followed by the potential benefits of the study and the chapter summary.

1.1 Background

Cryptocurrency can be defined as a decentralised and ungoverned digital currency whose value relies on market sentiments (Chuen, Guo & Wang, 2017). Cryptocurrency solely relies on blockchain technologies to cryptographically secure digital assets and transactions (Joo, Nishikawa & Dandapani, 2019). Reid and Harrigan (2013) define blockchain technology as open technology whereby digital distributed ledgers or databases are used to record and store transactions between two parties in an efficient and verifiable manner. The enormous success of cryptocurrency has led to the creation of many applications and processes despite its short history in the financial economics literature. Initial Coin Offerings (ICOs) and Initial Exchange Offerings (IEOs) form part of the processes which have gained popularity as alternative ways to raise capital for financial technology firms (widely known as fintech) and cryptocurrency start-ups. The terms ICO and IEO are often used interchangeably although there are notable differences. ICOs can be defined as an alternative, innovative way to raise external financing (in the form of either fiat currency or cryptocurrencies) for entrepreneurial ventures or start-ups through the selling of coins or tokens directly to investors (Momtaz, 2018). An IEO is similar to an ICO except that in an IEO, the token sale is overseen and controlled by a cryptocurrency exchange.

Furthermore, ICOs and IEOs have been compared to Initial Public Offerings (IPOs) albeit with a few common differences. Instead of selling a share of the company through an IPO, blockchain technology, start-ups have rather embraced the digital issuance of coins or tokens

through ICOs (IEOs) as a vehicle to raise early funding (Conley, 2017). More so, despite evidence for similar behaviour between ICOs and IEOs on one side and IPOs on the other side, there is, however, not much theoretical application of the IPO literature in the ICO context. For instance, under-pricing in the short-run and underperformance in the long-run are well-documented anomalies for IPOs but not for ICOs. The purpose of this study is to analyse the performance of ICOs and IEOs in the short-and long-run and attempt to extend IPO-relevant theoretical explanations to ICOs to offer concrete justification to the emerging literature on ICOs where there is some IPO resemblance. Moreso, the sub-objectives of the study are:

- To explore the role played by short-run performance in determining the long-run performance.
- To explore the determinants of ICO and IEO performance in the long-run.
- To clearly make a distinction between ICOs and IEOs as these are often conflated, thus resulting in misunderstanding.

1.2 Research problem

The aftermarket performance of newly listed or issued securities is a largely researched area and remains a subject of interest in the world of finance. Unlike IPOs, ICOs and IEOs posit a challenge with regard to the measurement of long-term performance given their recency and data limitations. This study seeks to bridge the gap between findings in IPO literature and empirical findings from the ICO. Momtaz (2018), amongst others, extends the short-run under-pricing phenomenon to ICOs although most of the previous findings on this recent phenomenon diverge from one study to another. According to Fisch and Momtaz (2020), the aftermarket trading of coins or tokens resembles the trading of newly issued shares post-IPO. Given the short life of ICOs, dating only to 2013, and becoming more popular in 2017, previous post-ICO performance studies have heavily relied on IPO interpretations to explain ICO findings. In addition, drawing from the IPO empirical findings, most studies that investigate post-IPO performance typically measure long-term performance using buy-and-hold-abnormal returns (BHAR) over the first three years or more, after initial trading. However, due to limited data points, a few studies done on ICOs and IEOs usually use a window period of six months to measure long-term performance (Fisch & Momtaz, 2020).

In line with IPO literature and the seminal work of Ritter (1991), this study further attempts to provide evidence on the long-run performance of ICOs and IEOs using three-year buy-and-hold abnormal returns as a standard wealth measure for investors who invest in tokens through ICOs and or IEOs and hold these tokens for a certain period of time. The degree of high information asymmetry that exist in the ICO and IEO market continue to limit potential investors who wish to invest in coin and token offerings given minimal disclosure by the issuers. ICO and IEO market is characterised by low degree regulation in contrast to other entrepreneurial finance methods. There is need to formulate regulation framework that will protect investors while promoting the future of the initial or token offerings. Lastly, most studies fail to address pertinent factors that entrepreneurs raising capital should treat with great importance if they are to fundraise successfully through the issuance of tokens.

1.2.1 Motivation of the study

Despite the gradually emerging literature on ICOs and IEOs and soaring number of studies on comparative analysis between ICOs and IPOs, the long-run performance of ICOs and IEOs remain underexplored due to the recency of the ICO and IEO concept which is limited by the availability of its data. Momtaz (2021) provides the first compelling evidence on the long-run performance of ICOs. Unlike most studies which use a period of up to six months to investigate the long-run or aftermarket performance. The study by Momtaz (2021) should be viewed as the first comprehensive set of robust empirical regularities check of the long-run performance in ICOs. Thus, many determinants of long-run performance of IPOs could be extended to ICOs and IEOs. This study seeks to review the robustness of the previous studies as well give a new perspective by extending some of the applicable IPO literature to offer a explanation in the ICO context.

Furthermore, Adhami, Giudici and Martinazzi (2018) argue that ICO projects differ from projects by already established firms as ICOs and IEOs are heavily characterised by asymmetric information and opaqueness. Therefore, investors tend to rely more on limited information disclosed in an authoritative document called a white paper. A white paper is an informational document outlining the problem that the project seeks to solve as well as the team behind the project. It spells out the purpose of the project, how much it seeks to raise and how the proceeds from initial token sale are intended to be used, as well as the risk associated with the project (Adhami *et al*, 2018). The availability of white paper, including its contents,

should help in determining whether investors should invest in an ICO or IEO or not at all. In addition, the short-run returns are likely to set the tone for ICO and IEO long-run performance.

1.2.2 Potential benefits

The number of IPOs has drastically decreased over the years in the United States. Smith (2019), as the CEO of CFA, highlights that on average IPOs experienced a decrease from 700 IPOs a year to barely 100 IPOs a year. The shrinkage of public capital markets, some of it stemming from the decrease in the average number of IPOs has limited the investment opportunities for retail investors. More so, given that it is difficult for retail investors to invest in private markets. The study is likely to be of great interest to retail investors as it gives insights on an alternative way to gain access to private markets through the ICO and IEO. This study seeks to contribute to the existing literature in various aspects and the results are likely to benefit entrepreneurs, who seek to know if a coin offering is a viable option to raise finances, potential investor who are constantly looking for investable opportunities, as well as policy-makers and regulators in trying to develop frameworks that govern the cryptocurrency market. Given the above, the following hypotheses are tested

1.2.3 Hypotheses testing

Primary Hypothesis

H_0: *The short-term returns of Initial Coin Offering play a role in predicting the long-run performance of Initial Coin Offering and Initial Exchange Offering.*

H_1: *The short-term returns of Initial Coin Offering do not play role in predicting the long-run performance of Initial Coin Offering and Initial Exchange Offering.*

Secondary Hypothesis

H_0: *The publishing of a white paper document has a positive impact on the Initial Coin Offering, and Initial Exchange Offering's ability to fundraise.*

H_1: *The publishing of a white paper document does not have a positive impact on the Initial Coin Offering, and Initial Exchange Offering's ability to fundraise.*

1.3 Structure of the study

This research report is structured in five chapters and will proceed as follows: **Chapter 2** will explore the key existing literature on ICO and IEO as well as give a detailed overview of ICO and IEO in relation to IPO. More so, **Chapter 3** will describe the data, variables, hypotheses and methodology used to address the research hypothesis and question. **Chapter 4** shows the empirical results of time series and regression analysis as well as reporting on the overall findings. Lastly, **Chapter 5** will conclude the research report and provide potential avenues for further research.

2 LITERATURE REVIEW

This chapter reviews the emerging literature on ICOs and IEOs and extends relevant findings from some of the well-documented seminal work on IPOs to the ICO context. ICOs and IEOs have recently emerged as a popular funding mechanism for fintech (cryptocurrency) start-ups. According to a study by Ofir and Sadeh (2020) over $10 billion was raised by 2017 and over $21 billion was raised by October 2018 through ICO. These are huge amounts considering that the first token sale held by Mastercoin was in July 2013. This chapter starts by giving a comprehensive overview of what an ICO and IEO are, followed by a detailed comparison between ICOs and IPO.

2.1 ICO and IEO: An overview

Not so long-ago innovators and entrepreneurs began exploring various possibilities of using technology in the financial realm. More so, due to the rapid growth of technology, there has been a rise in a number of alternative assets, currencies, and payment processing mechanism, offering a significant opportunity for most innovators and entrepreneurs. ICOs and IEOs have played an important role in the popularity and success story of blockchain technologies.

There are three major groups of tokens: a security token, cryptocurrency token and utility token. A token is classified as a security token if it derives its value from an external, tradable asset. Security tokens function similar to equity and provide ownership, control and sometimes voting rights in a firm. Generally, security tokens are subject to federal securities regulation in most jurisdictions. A cryptocurrency token functions as a medium of exchange or store of value. Lastly, a utility token is similar to vouchers, it gives the holder the right to redeem and or exchange the token for issuing company's products and services at a future date, but do not entitle token holders to ownership or control rights (Adhami *et al*, 2018; Momtaz, 2018; Felix & Eije, 2019).

According to Howell, Niessner and Yermack (2018), utility tokens constitute by far the largest proportion of all and most well-regarded tokens issued in the ICO market. The reason is that utility tokens are not subject to asset and security laws in most countries. As such, this study will focus on the analysis of utility tokens.

An IEO differs from a typical ICO in the sense that the tokens are issued on the exchange and not directly to investors. In other words, the token sale is overseen and controlled by a

cryptocurrency exchange similar to traditional securities in the IPO setting (Takahashi, 2019). IEOs emerged due to a lack of regulation in the ICO space which makes it difficult for potential investors to distinguish between legitimate offerings and scams. IEO offers an additional layer of security and may boosts an investor's confidence when considering investing in a token (Amsden & Schweizer, 2018).

Most studies have conducted extensive comparisons between ICOs and IPOs. Although there are major differences between IPOs and ICOs, the similarities suggest that an ICO and IEO are a close analogue of an IPO (Beneditti & Kostovetsky, 2018). The section below provides a brief comparison between ICOs and IPOs.

2.2 IPOs versus ICOs and IEOs

The clearest distinction between ICOs and IEOs on one side and IPOs on the other side emerges from the rights conferred to investors. In an ICO and IEO, the token issued to an investor does not represent equity ownership rights, instead a right to redeem the tokens that can be accepted as means of payment for products or services that the token issuer will offer in the near future. This is considerably different from an IPO, where investors get ownership rights, voting rights, and sometimes dividend rights (Momtaz, 2021). In addition to this, given that the token issuance does not give ownership rights, this gives an opportunity to entrepreneurs to raise public capital without diluting their company ownership structure (Ofir & Sadeh, 2020). Apart from relaxed compliance and disclosure requirements, the other novelty of token offerings is that it does not require an underwriting process like an IPO, instead the issuing firm communicates directly to prospects through various social media platforms (Adhami & Giudici 2019; Drobetz, Momtaz and Schroder (2019).

Another noticeable difference between ICOs and IEOs versus IPOs is the measure of success. Amsden and Schweizer (2018) argue that the most meaningful way to measure ICO and IEO success is to assess whether or not the token is subsequently listed on the exchange and not the amount raised. This presents a biased way of assessing ICO success in the sense that some coins may fail to meet their pre-set target or amount of funding during an ICO but eventually are able to list in a crypto exchange. It is important to note that the crypto

exchange provides due diligence for prospective token listing in order to screen fraudulent and poor projects regardless of the amount of capital raised. This is done so as to safeguard the exchange's reputation. Furthermore, utility token listing is said to be a necessary procedure for the ICO project to fully function. This implies that without token tradability, the ICO project may fail in the long-run, regardless of the amount raised. Thus, good long-run returns of coins that are not listed is not robust enough and do not make a good investment for such ICOs characterised by huge asymmetric information. This study only focuses on coins or tokens that were listed on crypto exchange this eliminates issues around the token or coin pricing and enables long-run analysis based on historical data drawn from coin market-cap

2.2.1 Information asymmetry, under-pricing theories and short-run performance in ICO and IEO

A study by Benedetti and Kostovestky (2018) indicate that in the short-run investors should realise abnormal returns. The resounding evidence on the short-run under-pricing phenomenon is well-documented and has become widely accepted in the IPO literature (Dhamija & Arora, 2017). Under-pricing can be defined as the relative difference between the stock's or token's issuing and opening price (Momtaz, 2020). Several authors have attempted to explain this phenomenon using Asymmetric Information Theory. According to Baron (1982) the IPO literature explains Asymmetry Information Theory using the principal-agent problem, where the principal (issuing company) does not have adequate information on the issue price of the share and thus relies on the agent (the underwriter) to determine it. However, this principal-agent problem would be slightly different for ICOs given that the token offering process does not require an underwriting process. Therefore, in the ICO context, asymmetric information exists between the issuing firm and investors with the issuing firm possessing more knowledge than investors.

From the issuer's perspective, under-pricing is a deliberate action used to address the lack of adequate information for investors. More so, theoretical evidence indicates that the underwriter in the case of IPO or the issuing company in the case of IC(E)O will lower the share (token) issue price in order to attract both the informed and uninformed investors for IPOs and IC(E)Os, respectively. Institutional investors have the capacity to critically assess whether the coin offering would be profitable or not in comparison to retail investors. In addition, when the institutional investors invest in the coin offering, this is said to convey a positive message to

other retail investors. This comes as a result of the due diligence done by these professional institutional investors as they are likely to carefully screen investment opportunities, thus minimising asymmetric information gap and, consequently any under-pricing (Chemmanur, Krishnan & Nandy, 2011; Gompers Gornall, Kaplan & Strebulaev, 2020). Furthermore, Momtaz (2020) argue that the ICO market is highly inefficient to an extent that uninformed (retail in most cases) investors are not able to formulate their own opinions beyond what they hear from the issuing company through a white paper disclosure. The inefficiencies, however, slowly disappear aftermarket when investors begin to learn about how much the issuers had exaggerated information in the white paper.

2.2.2 Long-run performance

The empirical evidence on the long-run performance of IPOs is mixed. From the seminal work of Ritter (1991), a number of studies have reported long-run underperformance of IPOs although their reasons for underperformance may have been different (Lee, Taylor & Walter, 1996; How, 2000). Ritter (1991) asserts that firms go public when investors are over-optimistic about the future potential earnings of young growth firms as well as to take advantage of these windows of opportunity. Therefore, investors tend to overpay initially, however, as more information becomes available investors adjust their opinions about IPOs, leading to price drop, ultimately long-run underperformance.

In addition, some researchers have put forward the price support hypothesis which suggests that underwriters have an incentive to keep the initial price above what would otherwise have been the prevailing price in free market trading, in attempt to reduce negative initial returns. Ruud (1993) tested the implications of the price support hypothesis and found that the evidence was partly inconclusive. Furthermore, a study by Ahmad-Zaluki, Campbell and Goodacre (2007) reports that long-run outperformance IPOs widely vary depending on the measure of performance, benchmark used as well as the methodology applied. Kothari and Warner (1997) argue that measuring the long-run performance of event studies has statistical difficulties that tend to weaken their usefulness. Barber and Lyon (1997) postulate that in computing long-run abnormal returns long-run BHARs should be used over cumulative abnormal returns (CARs). CARs are mostly affected by new listing bias while BHARs are predominantly affected by rebalancing and skewness bias. Thus, the computation of long-run

returns using CARs is associated with test statistics that lean towards positive skewness while BHARs tends to be associated to test statistics that are negatively biased.

Assuming common characteristics between IPOs and ICOs, the proposed study seeks to offer a reasonable explanation for ICO long-run performance that could be traced back to the IPO literature. The limited empirical evidence on the long-run performance of ICOs furnish equivocal conclusions. Momtaz (2021) documents positive ICO long-run BHARs for mean measures and negative ICO long-run BHARs based on the median measures. The mean measures report positive returns due to sizeable profitable outliers. Despite these large outliers due to high volume, the empirical evidence thus far suggests ICO long-run underperformance (Lyandres, Palazzo & Rabetti, 2018).

2.3 Determinants of ICO and IEO performance

2.3.1 Investor sentiment in ICO and IEOs

In ICO and IEO, the issuing firm has direct communication with potential investors through various social media platforms. In most cases, this direct communication plays an important role in creating investor sentiment on the ICO offering. Adhami and Giudici (2019) posit that the absence of an intermediary, the lack of regulation as well as the increased level of complexity for blockchain start-ups make sentiment even more important for ICOs and IEOs given that the ICOs are characterised by high asymmetric information. Similar to IPOs, it is expected that positive sentiment will result in high ICO and IEO price offer and when firms decide to list during such period, they increase their chances of maximising on initial gains.

Empirical findings by Drobetz *et al* (2019) suggests that cryptocurrency related sentiment only has an impact in ICO and IEO outcomes, while capital market sentiment is considered irrelevant. This is plausible given that cryptocurrency is an alternative investment, hence the factors that drive the conventional investments markets may not necessarily drive the alternative investment markets. As such, Drobetz *et al* (2019) conclude that cryptocurrency sentiment is less driven by traditional news but rather by social media activity as issuers mainly engage with potential investors using various social media platforms and the decision for the issuing firm to list on a cryptocurrency exchange is strongly determined by investor sentiment

as well as market liquidity. Therefore, it is reasonable to infer that token issuers time the market and are more comfortable to issue tokens when the overall investor sentiment is high and positive as token offerings during less optimistic times decrease chances of ICO growth and increase the failure rate (Momtaz, 2018).

2.3.2 Availability of whitepaper and code availability

White paper is a primary source used to furnish information about the ICO as well as reduce asymmetric information between issuers and investors. The white paper is similar to a prospectus in a regular IPO, however with white paper there is no consistent format and this makes it difficult for investors to compare projects like for like (Siegel, Gramatke, Paulsen, Giessen, Brosig, Heinzelmann, & Kumar, (2017). The availability of white paper is inversely related to project opaqueness and is a crucial component to differentiate between a quality and poor project (Lyandres *et al.*, 2018; Fisch, 2018). It is argued that ICO and IEO high-quality issuers can be signalled by publishing white papers with greater information content characterised by a greater number of pages which give detailed information to potential investors.

In addition, the issuing firm can complement the published white paper by advertising on other various social media platforms such as Twitter, Reddit and LinkedIn. The use of other mediums as alternative platforms enables the issuer to manage investor relations communication, where investors can frequently ask questions and get answers if information on a white paper fails to address the subject matter well (Florysiak and Schandbauer, 2018). Joo, Nishikawa and Dandapani (2019) notes that although white paper is not a requirement as ICOs and IEOs are not regulated, many issuers tend to publish one in attempt to positively build investor confidence.Contrary, the findings by Adhami *et al.* (2018) suggests that the probability of success for an ICO (IEO) is mainly hinged on the availability of programming code source and not whitepaper alone. Amsden and Schweizer (2018) also argue that posting project code and constantly updating it reflects on the initiative and commitment of the issuing team and enables potential investors to audit the code and monitor progress leading up to coin offering as code source the only tangible proof-of-concept. The aforementioned, is said to play a pivotal role in the ICO performance in comparison to white paper which is merely an uncertified and unaudited document.

2.3.3 ICO Characteristics

Lyandres, *et al*. (2018) posit that post-ICO returns decrease in relation to the amount raised during the ICO or IEO. Therefore, this suggests that the amount raised constitutes one of the primary determinants for long-run performance (Beneditti & Kostovetsky, 2018). More so, according to Drobetz, Momtaz and Schroder (2019) the first trading day returns, through the influence of several investor sentiment indexes, can used by investors to predict post-ICO returns.

Issue size

Generally, large successful ICOs and IEOs that are relatively more willing to pay the listing fees and listing tokens in multiple exchanges are positively associated with success. Moreover, the assumption is that a large issuer possesses more information relative to small issuers, whom investors deem uncertain and very speculative (Felix & Eije, 2019).

Expert Rating

ICO and IEO rating takes into account information about quantity and quality of the team, how the product is presented and marketed as well as experts' reviews. Adhami and Giudici (2019) found the size of the core team and the size of the advisory network to be positively correlated with the post-ICO performance. Contrarily, Momtaz (2018) indicate that the quality of management team alone and not the size, is rather positively associated with market performance.

Know Your Customer (KYC)

KYC enables the ICO team to monitor where the funds are coming from, and to gather and verify investor's personal information in attempts to prevent potential illegal activities such as fraud and money laundering. Moro and Wang (2019) argue that KYC in the ICO process signals quality, it conveys that the issuer want to finance the project using "good" money and is not desperate for funding. Yadav (2017) found that the KYC process is an important determinant for ICO success.

Restricted areas

Restricted areas refer to countries or areas that have imposed restrictions or bans on particular ICOs and IEOs based on whether a country's policy makers and regulators have inclusive

policies or not with regards to crypto-currencies. Despite the fact that the concept of ICO and IEO seeks to bypass borders and jurisdiction, there appears to be countries where the ICOs and IEOs are prohibited. This is likely to impact the total amount of money raised during the issue. The assumption is the ICO and IEO issues that have restricted areas tend to have negative aftermarket performance.

2.4 Summary of literature review

This chapter gives the reader a detailed overview of ICO and IEO and how both compare to IPO. The chapter begin by highlighting some of the IPO literature that has been successfully extended to the new phenomenon of ICO and IEO as well as highlighting that there could possibly be more explanations for ICO performance that could be drawn from IPO literature. Lastly, the chapter explores the various determinants of ICO performance.

3 DATA AND METHODOLOGY

This section deals with the collection of the data and the research methodology that will be applied in this study in attempt to answer the research question. Section 3.1 outlines the data selection process and data sources used in this study as well as the criteria for the sample selection. Section 3.2 discusses the proposed study hypotheses in detail and formulates a theoretical framework on short-and long-run determinants for ICO and IEO performance. Section 3 explains the methodology used in the study along with a table with variable explanations and lastly the limitations of the sample.

3.1 Data

The sample data consist of completed 101 ICOs and 22 IEOs between January 2017 and June 2021. This time period will allow for the investigation of the long-run performance of the coin offerings, especially ICOs given they have existed longer than IEOs. In total, the ICO sample consist of a total of 101 coins of which 97 coins (96.04%) start-ups met their soft cap target and only 4 start-ups failed to reach their soft cap target. The information on ICO and IEO listing, amount of capital raised, token price is gathered from the *icodata.oi* database, a widely used ICO data source due to its merits over other databases. *Icodata.oi* provides comprehensive information on various token issue characteristics as well as data on failed ICO launches, thus reducing possibilities of survivorship bias mostly present in many databases (Lyandres *et al* 2019; Fisch & Momtaz, 2020). The historical price data and whitepaper information is curated from the *Coinmarketcap* database while issue ratings data is from the *ICORATINGS* database. More so, various other ICO aggregators will be used to supplement and validate ICO data collected from the main sources as there appear to be quality inconsistences across different data sources when it comes to amount raised and issuing firm characteristics information (Ofir & Sadeh, 2020). Lastly, data on Bitwise 10, a crypto index and the Renaissance IPO index is collected from the Bloomberg Terminal.

3.2 Detailed hypothesis and theoretical framework

In order to achieve the objectives of this study, the analysis will consider whether or not the issuer reached the soft cap, which is the minimum amount the issuer intended to raise. Token tradability or listing in an exchange will be used to compliment soft cap as a measure of ICO success. A detailed picture of a successful ICO (IEO) is given by the following equation:

$$S_{ICO} = \alpha + \beta_0(Initial\ returns) + \beta_1(Issue\ size) + \beta_2(Availability\ of\ white\ paper) + \beta_3(Code\ source) + \beta_4(Expert\ rating) + \beta_5(KYC) + \beta_6(Restricted\ country\ ) + e \quad (1)$$

The regression model seeks to determine the impact that independent variables have on the dependant variable. The dependant variable S_{ICO}, is a binary variable which denotes ICO success and takes a value of one if the ICO was considered a success and zero if otherwise. Success is defined by the ability of the issuer to meet their pre-determined soft-cap. *Initial returns* is a dummy variable that takes a value of one if the initial returns were positive for the first six months and a value of zero if returns are negative. *Availability of white paper* is dummy variable used to capture whether the ICO has an informative white paper or not. The variable takes a value of one if ICO or IEO published the white paper and a value of zero if otherwise. *Code source* is a dummy variable that takes a value of one if the issuing firm disclosed its code on GitHub and zero if otherwise. *Expert rating* is a dummy variable that takes a value of one if the issuing firm had a rating above the sample mean rating as per ICObench rating, zero if otherwise. *KYC* is a dummy introduced to capture the effect of issuing firm using KYC to identify and verify investors. The variable takes a value of one if the issuing company uses a KYC process and zero otherwise. *Restricted country* is a dummy variable that takes a binary value of 1 f the ICO or IEO had countries that it banned or restricted and zero if otherwise. Lastly, on the regression, included is the error term.

More so, drawing from the IPO under-pricing literature, ICO issuers use under-pricing to minimise the impact of asymmetric information that exists in the ICO and IEO market. According to Momtaz (2020), ICO under-pricing is more pronounced in the presence of highly asymmetric information between the issuing firm and investors. Adhami and Giudici (2019) posits that issuing tokens at a discount can be viewed as a mechanism used to compensate *guinea pig investors* for bearing high initial risk and also to attract more investors.

Thereof, Momtaz (2021) reports on average ICO under-pricing of 15% and 40% of the ICOs destroy value on the first trading day. The proposed theory hypothesises that asymmetric information can be reduced by under-pricing and availability of whitepaper. The reduction of asymmetric information between ICO issuers and investors give a positive sentiment which consequently affect first day trading performance. In line with Momtaz (2021) ICO under-pricing is defined as the difference between the sum of closing and opening prices of the first-trading day returns of all coins *i,* divided by number of issued coins *n*. The natural logarithm of one plus the first-day return is used to allow continuous return process based on normal distribution. This is mathematically represented by the first-day raw returns ($\bar{R}$). The formula is given as below:

$$\text{First-day return: } \bar{R} = \frac{1}{n}\sum_{i=1}^{n} ln\,(1 + \frac{P_{i1} - P_{i0}}{P_{i0}}) \tag{2}$$

Where P_{i1} represents the closing price of all coins at the end of the first trading day, and P_{i0} is the corresponding opening price.

Moreover, to assess the long-run performance of ICOs and IEOs, raw buy-and-hold returns (BHR) will be used. The BHR is calculated in the same way as the first-day raw returns except that instead of subtracting the first-day opening price from the first-day closing price, it is rather subtracted from the closing price of a specific given period τ. The theory hypothesises that short-run returns predict long-run returns. Therefore, it is expected that the issuers with poor short-run performance will continue to display negative performance even in the long-run. The buy-and-hold formula is as follows:

$$\overline{BHR} = \frac{1}{n}\sum_{i=1}^{n} ln\,(1 + \frac{P_{i,\tau} - P_{i,0}}{P_{i,0}}) \tag{3}$$

Where $P_{i,\tau}$ denotes the closing price of all coins *i* after holding period of τ days, $P_{i,0}$ is the corresponding opening price. To control for bias the above first-day raw returns ($\bar{R}$) and the buy-and-hold returns $\overline{BHR}$ will be adjusted using a market capitalisation-weighted benchmark. This adjustment is necessary since certain coins tend to have extreme daily returns therefore,

using an equal-weighted portfolio can produce spurious results. The following are the adjusted first-day abnormal returns ($\overline{AR}$) and buy-and-hold abnormal returns ($\overline{BHAR}$):

$$(\overline{AR}) = \frac{1}{n}\sum_{i=1}^{n} ln\left(1 + \frac{P_{i,1} - P_{i,0}}{P_{i,0}} - \sum_{j=1}^{n}\left(\frac{MC_{j,t}}{\sum_{j=1}^{n} MC_{j,t}} * \frac{P_{j,t} - P_{j,t-1}}{P_{j,t-1}}\right)\right) \quad (4)$$

The market capitalisation- weighted benchmark is given by the sum of the products of market capitalization of coin *j* at day *t*, over the total market capitalisation *j* on day *t* and the daily raw returns of coin *j* on day *t*. The buy-and-hold abnormal returns is given as follows:

$$\overline{BHAR_{\tau}} = \frac{1}{m}\sum_{i=1}^{m} ln\left(1 + \frac{P_{i,\tau} - P_{i,0}}{P_{i,0}} - \sum_{j=1}^{n}\left(\frac{MC_{j,t}}{\sum_{j=1}^{n} MC_{j,t}} * \frac{P_{j,\tau} - P_{j,\tau-t}}{P_{j,\tau-t}}\right)\right) \quad (5)$$

Lastly, the volatility estimates based on the realised variance of buy-and-hold returns is given by the following formula:

$$\text{VAR} = \frac{1}{m-1}\sum_{i=1}^{m}(BHAR_{i,\tau} - \overline{BHAR_{\tau}})^2 \quad ((6)$$

3.3 Methodology

To determine the most appropriate method to estimate empirical model using panel data, a Hausman test (HT) is conducted so that a choice between fixed effects (FE) and random effects (RE) can be made. According to Moulton (1986) OLS leads to serious mistakes in statistical inference, the standard errors can be very large, which increases the likelihood of finding spurious regression results. OLS standard errors can be substantially high and the estimates tend to be biased. For this reason, this study makes use of fixed and random effects as this model is not biased in estimating standard errors. For fixed effects, it is assumed that

the independent variables represent a good estimate of the entire population of the variables in which we are interested in. On the other hand, a random effects model assumes that the variables used are not of particular interest. There is however, other individual effects that are randomly distributed. The HT determines whether the unique errors are correlated with the regressor. The null hypothesis is that the preferred model is a random effect one (the unique errors are random) and the alternative is that the fixed effects model is the most preferred model (the unique errors are not random). Table 3.1 shows results for an HT done for the stud. According to the table, the p-value for the HT is less than 0.05, thus we reject the null hypothesis which directs the study to using the fixed effects model.

Table 3.1: Hausman Test

Hausman Test (HT)	
Chi-Squared:	23.38
degrees of freedom	1
p-value	0.00

Figure 3.1 represents a pie chart that illustrates the proportion of ICOs and IEOs which were successful in raising their targeted funds in comparison to those that failed to meet their threshold. Out of 101 coins, about 97 of them were successful and 4 were not despite the listing on the crypto exchanges.

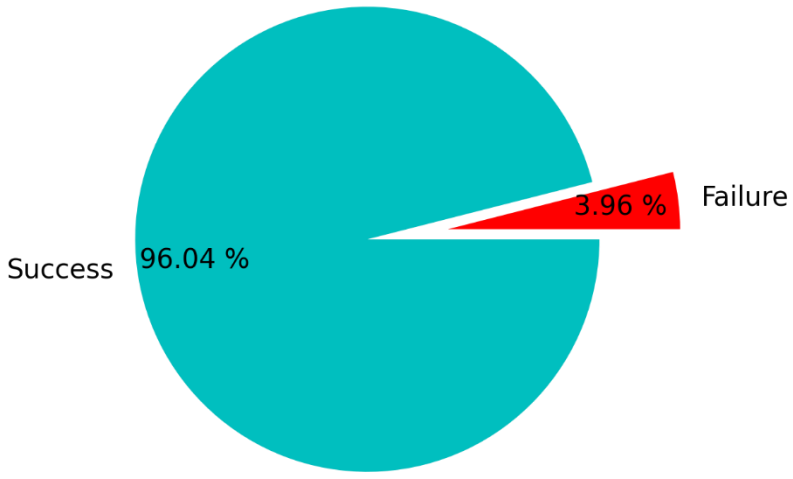


Figure 3.1: ICO and IEO (Success and Failure)

3.1 Variable descriptions and source

The table below shows the variables used, their description, and the source where they are retrieved from.

Table 3.2: Variable description

Variable	Description	Data
Issue size	Total amount of capital raised if in cryptocurrency then USD equivalent.	ICObench
Availability of white paper	Dummy variable equal to one if the start-up had issued white paper, zero otherwise.	ICObench
Code Source	Dummy variable equal to one if the start-up disclosed its project code, zero otherwise.	GitHub
Expert rating	Dummy variable equal to one if the start-up received a rating above sample mean (3.21), zero otherwise.	ICObench
KYC	Dummy variable equal to one if the start-up passed the KYC process, zero otherwise	ICObench
Restricted country	Dummy variable equal to one if the start-up had restricted jurisdiction, zero otherwise	ICObench

3.1 Summary of data and methodology

This chapter focused on the research design and methodology as well as the justification of the various models used in the analysis. The chapter highlights all formulae and specifications of the regression model accompanied by an explanation of the variables used in the regression model.

4 RESULTS AND DISCUSSIONS

This chapter deals with reporting the results and interpretation of the output of the regression for the study. The chapter examines the descriptive analysis of the sample composition as well as decomposing the proportion of each country that constitutes a full sample of where the ICO was done. Furthermore, the chapter will focus on the empirical results and interpretations. Lastly, a brief section on the robustness of the study.

4.1 Descriptive analysis

Table 4.1 presents the number of tokens analysed over the sample period. The total number of observations used in the analysis is 101 ICOs. Not shown in the table is the 22 IEO also used to carry out the study. According to the table below only three coins may have delisted from the crypto exchange as they do not have data that stretch until the end of the sample period. Figure 1 shows the ICO sample distribution according to country. According to Figure 1, about 24.07% of the start-ups are from the USA, 15.74% from Singapore, 7.41% for UK and Switzerland. Furthermore, Russia and Cayman Islands account for about 5.56% and 3.7%, respectively. Lastly, other different countries account for about 36.11%.

Table 4.1: Sample ICO Composition

Year	Number of coins	Proportion of total sample
2017	101	100%
2018	101	100%
2019	101	100%
2020	101	100%
2021	99	98%
Total observations	100	**100%**

Notes: The table above presents the number of tokens each year used on the analysis for the sample period (Jan 2017 -Jun 2021).

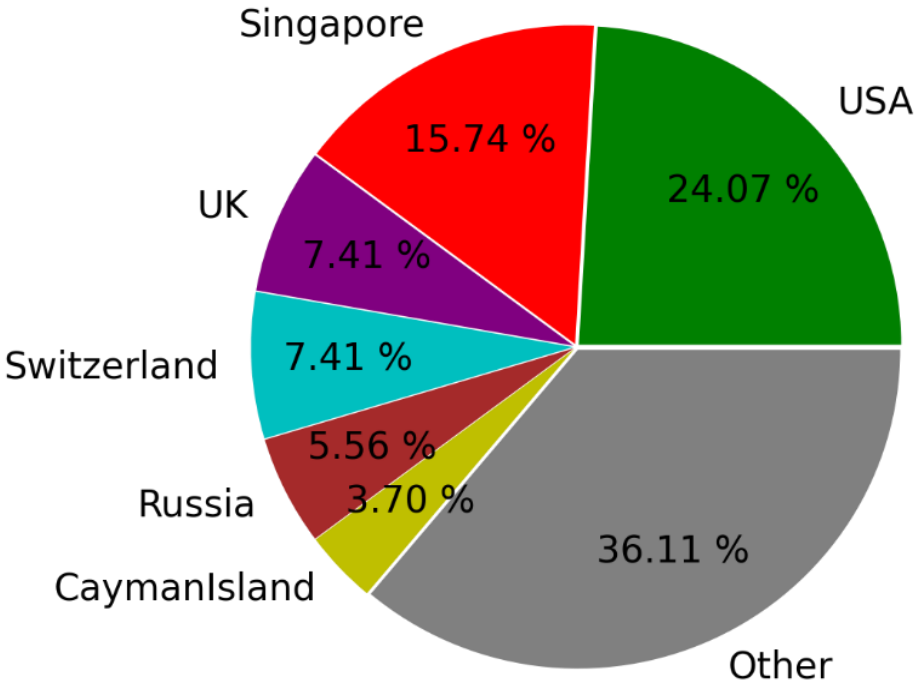


Figure 4.1: Sample Distribution

4.2 Empirical results

Table 4.2 shows ICO and IEO performance over six different investment horizons (1 week, 1 month, 3 months, 6 months, 1 year and 3 years) using a buy-and-hold strategy. Tabulated are the raw (unadjusted) returns, abnormal returns (adjusted for the market capitalisation-weighted benchmark) and volatility as a measure of risk. Using raw returns, the ICO (IEO) had positive returns of 6.3% (9.34%) and 0.31% (1.53%) for the first week and first month aftermarket performance, respectively. The IEO high returns are justifiable given that it offers an additional layer of security to investors which boost investor confidence, leading to better performance. The realised volatility for ICOs and IEOs seems to be consistently decreasing from 1 week to 6 months then start to increase after 1 year holding period. Using adjusted returns, both ICOs and IEOs had negative abnormal returns of 7.95% and 3.82% for the first week's aftermarket performance, respectively. Although after one month, both ICOs and IEOs display better performance, ICOs realise negative returns of 3.6% while IEOs had positive abnormal returns of 0.16%, both statistically significant at the 1% level. Using raw returns, both ICOs and IEOs

continue to display negative returns for month three and six, although IEOs performs better compared to ICOs. Lastly, using both raw and adjusted abnormal returns, ICOs have positive performance for year one and three aftermarket performance and these results are statistically significant at 1% level. IEOs indicate positive performance for year one using adjusted returns.

Figure 4.2 presents information on Table 4.2 graphically. According to the graph, it is evident that, both ICO and IEO had positive returns of 6.3% and 9.34%, respectively. The ICO returns dropped by 10.3% after three months, while IEO lost only about 1.09%. From three months onwards both ICO and IEO seem to recover some of the value lost during the initial phase of trading, with ICO gaining 1.12% at the end of the first year while IEO trims 0.82%. Using adjusted returns, IEO outperforms ICO from the first week to the third month. Thereafter, ICO significantly outperforms IEO as ICO returns jumped from 0.66% to reach about 12% by the end of the first year, while IEO gained 0.62% from 0.43% by the end of the first year. However, despite the outperformance by ICO between the third month and end of the first year, ICO performance dropped drastically between the first and third year, trimming about 35% of the returns.

Table 4.2: ICO and IEO performance over short-and long-run

ICO **(IEO)**	Buy-and-hold raw returns	Buy-and-hold abnormal returns	Volatility
1 Week	0.063*** **(0.0934)*** **	-0.0795*** **(0.0382) *** **	0.0355 **(0.0154)**
1 Month	0.0031*** **(0.0153)*** **	-0.0360*** **(0.0016)*** **	0.0241 **(0.0124)**
3 Months	-0.103*** **(-0.0109)*** **	0.0066*** **(0.0043)*** **	0.015 **(0.0036)**
6 Months	-0.0095*** **(-0.0057)*** **	0.0919*** **(0.0019)*** **	0.012 **(0.0014)**
1 Year	0.0112*** **(-0.0082)*** **	0.1189*** **(0.0105)*** **	0.0107 **(0.0058)**
3 Years	0.0027 ***(--)	-0.3506*** **(--)**	0.0179 **(--)**

Notes: This table presents buy-and-hold raw returns (unadjusted) and abnormal returns (adjusted using market capitalisation-weighted benchmark). The market capitalisation-weighted benchmark is explained in Chapter 3. The three and two asterisks (***and **) denotes statistical significance at 1% and 5% level, respectively

Figure 4.3 depicts the performance of Bitwise 10 a crypto index fund that tracks 10 highly valued cryptocurrencies by market capitalisation and represents more than 70% of the total crypto market. Displayed also on the graph is the Renaissance IPO index which follows the largest most liquid newly-listed IPOs. The graph provides evidence that the crypto index consistently outperformed the IPO index significantly. Figure 4.4 shows cumulative returns which represents the total change in investments over three and half years. Using adjusted returns, it is evident that the IPO index consistently outperforms the sample of ICO and IEO over time. In addition, the graph shows that IEOs underperformed ICOs for the first 6 months although the underlying performance determinants seems to be not so different as the performance behaviour seem to closely mimic each other. Thereafter, IEO sample consistently performs better in comparison to ICO sample although outperformed by the Renaissance IPO index.

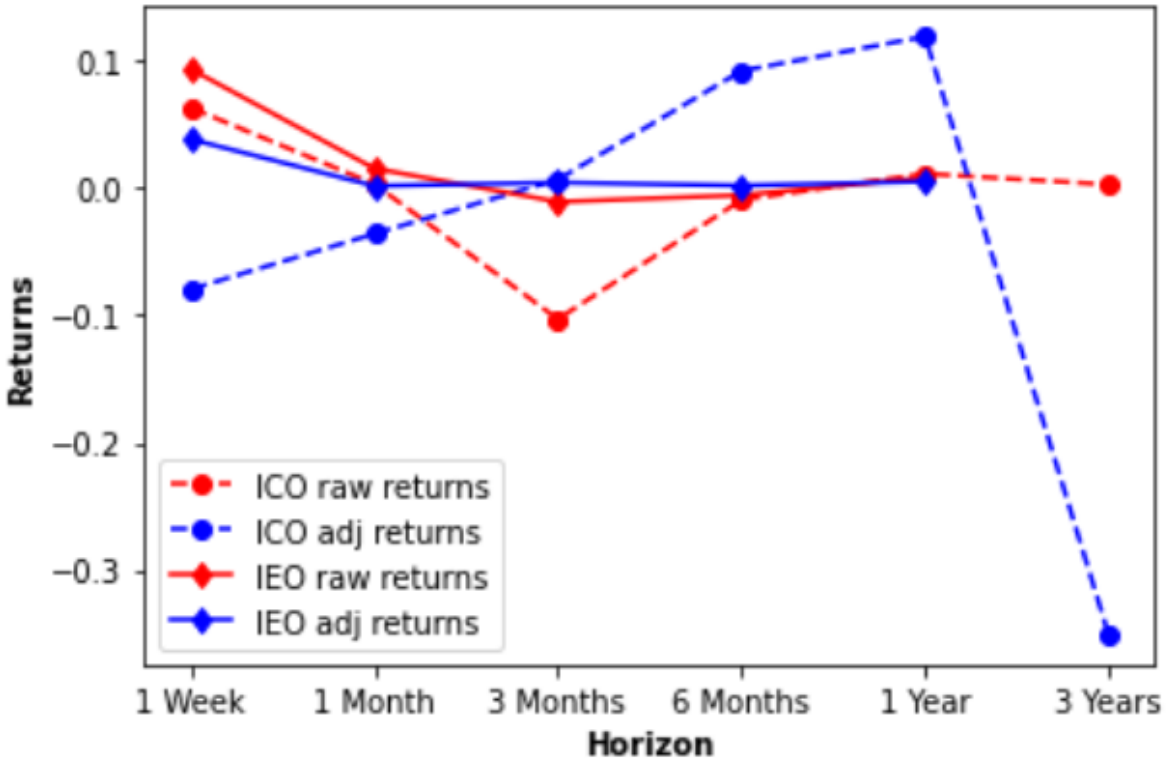


Figure 4.2: ICO and IEO raw and adjusted returns



Figure 4.3: Bitwise 10 (Crypto Index) vs Renaissance (IPO Index) Over time



Figure 4.4: ICO, IEO and IPO Indices Over time (Cumulative returns)

4.3 Regression results

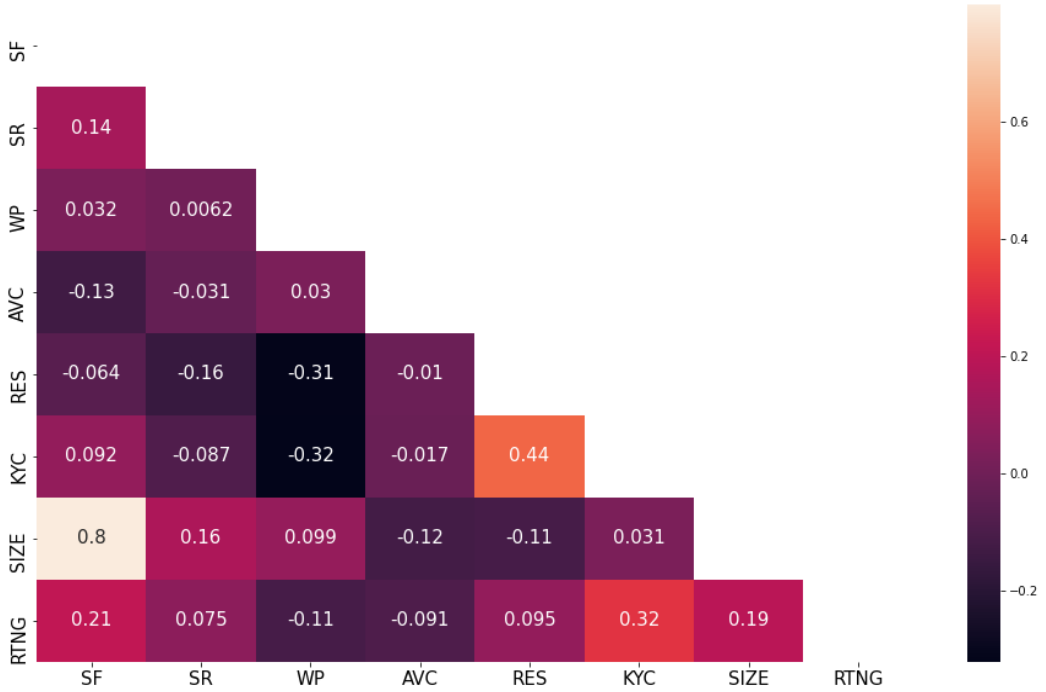
Table 4.4 shows regression results. According to the results, both the R-squared and adjusted R-squared are as high as 0.9854 which suggests that the fixed effect model is a good fit and all the independent variables are relevant in predicting the dependent variable (Success or Failure). Given a p-value of 0 and high F-statistics, we reject the null hypothesis that there is no evidence that there is a linear relationship between independent variables and the dependent variable.

Initial returns have a positive influence on the long-run performance of ICO and the IEO although not statistically significant at the 5% level, thus we reject the null hypothesis that short-run returns do predict long-run returns. In addition, the white paper also has a positive influence on the outcome of an ICO, albeit statistically insignificant at the 5% level thus initial returns play a very limited role in determining long-run returns. More so, availability of code, country restrictions, KYC, and expert rating have p-values greater than 0.05, therefore are

insignificant in ICO outcomes. Lastly, only size has a p-value less than 0.05, this indicates that size does in fact have a positive impact on the ICO outcome.

4.3.1 Correlation matrix

The heatmap on Figure 4.6 shows pairwise correlation coefficients for the variables used in this study. The success of the Initial Coin Offering and Initial Exchange Offering is strongly positively related to the size of the issuer. Expert coin rating, availability of KYC, the whitepaper, and short-run returns are all positively correlated to the success of the ICO, and IEO albeit with low correlation coefficients. White paper, availability of KYC, and coin restrictions are negatively correlated. The negative association is an intuitive finding as issuers with white papers who have passed the KYC phase are less likely to be restricted in certain to raise funds in certain countries. As expected, the availability of a KYC is positively correlated to the rating that the experts will give to the coin. However, on the other hand, the negative association between expert rating and availability of the code for the project is negatively correlated. This may imply that expert ratings is not highly value the importance of the project code.



FFigure 4.6: Correlation matrix

4.3.2 Test for Heteroscedasticity

To test whether the OLS regression assumes the residuals have a constant variance, a Breusch Pagan test is run in python. The Breusch–Pagan test measures how errors increase across the explanatory variable. The test assumes the error variances are due to a linear function of one or more explanatory variables. The availability of heteroscedasticity which is explained by constant variance, in the regression analysis makes results less reliable making them difficult to trust. The Lagrange multiplier statistic for the test is 10.43 and the corresponding p-value is 0.1076 which is greater than 0.05 thus we fail to reject the null hypothesis that homoscedasticity is present, and error variances are all equal. We do not have evidence to say that heteroscedasticity is present in the regression model thus the regression results can be reliable.

Table 4.3: Breusch-Pagan Test

Lagrange multiplier statistics	10.433
p-value	0.10755
F-Statistics	1.7540
F statistics p-value	0.107329

Table 4.4: Regression results (Fixed effects model)

Dependent Variable: ICO Success or Failure
Method: Panel OLS (Fixed Effects model)
Sample (adjusted): 2018- 2021
Periods included: 4
Cross-sections included: 78
Total panel (unbalanced) observations: 404

Variable	Coefficient	Std. Error	t-statistic	P-value.
IR	0.0075	0.0207	0.3625	0.7172
WP	0.0051	0.0155	0.3268	0.7440
AVC	0.0057	0.0167	0.3401	0.7340
RES	0.0098	0.0222	0.4401	0.6601
KYC	0.0294	0.0182	1.6172	0.1066
SIZE	0.05868	0.0014	42.233	0.0000*****
RTNG	0.0145	0.0252	0.5739	0.5663

Estimation Summary	
R-squared:	0.9854
R-squared (Between):	0.9854
R- Squared (within):	0.0000
Log-likelihood:	288.52
F-statistic:	4472.8
Prob(F-statistic):	0.0000

Note: This table presents results for fixed effects model. The effect of various variables on ICO outcome is analysed on the sample period from January 201 to June 2021. One asterisks (*) represents significance at the 5% level

4.4 Robustness check

A stepwise regression (forward and backward method) was performed for robustness check in order to determine how the regression coefficient estimates of the independent variables would react when the regression model specification is changed. According to Leamer (1983) the fragility of regression coefficients is indicative of specification error and sensitivity analysis could help diagnose these misspecifications. Firstly, with the forward method, the author attempted to add more variables and the R-squared (within) dropped significantly indicating that these variables were not useful variables to the model. With the backward method, the author removed variables from the regression model to determine the impact on the sign and significance of the explanatory variables. The sign and statistical significance of the regression coefficients remained unchanged with a slight but insignificant change on the p-values. The stepwise regression done and the findings justifies the robustness of the model used in this study. More so, using Bitwise 10 index to calculate abnormal returns yield more similar results to using

market capitalisation weighted benchmark. This clearly indicates that the first set of results were not by chance. The robustness check performed demonstrates that the regression coefficients are plausible and robust, which gives credibility to the findings of the analysis.

4.5 Summary of results and discussion

This chapter analysed the performance of ICO and IEO in both the short-and long-run using a buy-and-hold strategy. The analysis focuses on the abnormal returns (adjusted for market capitalisation-weighted benchmark). The chapter made use of both time-series analysis as well as panel data to provide somewhat reliable and trustworthy results. More so, to check for the robustness of the results the study makes use of the crypto index (Bitwise 10) which presents identical results to market capitalisation-weighted benchmark.

5 CONCLUSION

The main objective of this study was to analyse the short-and long-run performance of ICOs and IEOs. This study is one of the few done that seeks to investigate the long-run ICO performance over a period of 3 years. It is also the first to consider extending IPO literature to both ICOs and IEOs. A few studies that have looked into post-ICO performance only limited their analysis to six months due to inadequate data. The results of this study provide evidence that supports that ICO and IEO are overpriced in an attempt for start-ups (coin issuers) to reach their pre-set soft cap. Under-pricing would result in start-ups leaving money on the table thus not meeting their targeted soft caps. On the other hand, overpricing would allow start-ups to quickly meet their soft cap target, however, the pricing inefficiencies slowly disappear aftermarket when investors begin to learn about how much the issuers had exaggerated information in the whitepaper and thus coins begin performing poorly following the ICO.

Moreover, the short-run performance seems to play little to no role in determining the long-run performance of newly issued coins, thus we reject the null hypothesis that short-run returns do predict long-run returns. The very same factors that seem to be predicting short-run performance fail to consistently predict long-run performance. These findings are in line with the finding of Momtaz (2021) who found most large ICOs are overpriced and thus they tend to initially destroy investor value in absolute terms. Figure 4 shows how the cumulative returns fall drastically following the aftermarket performance of ICO and IEO. The study also finds evidence that suggests that ICOs underperform in the long-run. This could be a function of the lack of an additional layer of security offered by IEO in an attempt to boost investor confidence.

In addition, the white paper has a positive influence on the outcome of an ICO, albeit statistically insignificant at the 5% level. Despite the evidence that white paper plays an important role in determining the performance of ICO, its existence, however, does not adequately address the asymmetric information that persists between the issuing firm and investors. However, the performance of IEO in comparison to ICO indicates that asymmetric information is minimised for IEO as the crypto exchange which oversees the sale of coins has minimum disclosure they require from the start-ups before they can list their coins on the exchange. This tends to reduce the asymmetric information that may exist between the issuing firm and investors. We fail to reject the null hypothesis that the publishing of a white paper has a positive impact on the success of Initial Coin Offering, and Initial Exchange Offering to fundraise.

5.1 Limitations

One major limitation on this study is the issue of data inconsistencies across different ICO aggregators (Lyandres *et al* 2019). Information on various ICO characteristics may not be up to date and contain errors while some aggregators do not contain or include all the ICOs. This may have slightly compromised the quality of the data used as well as the results of the study. To reduce this impact, the study only considered high-quality data sources that are mostly used by previous researchers due to their broader ICO coverage and coherent data ICO variables. Aggregators such as *ICObench* eliminate most fraudulent token sales from their platform *ex-post*. As much as this may sound good, it introduces a survivorship bias that may also impact the results of the study as data on failed ICO is usually removed from various databases. Furthermore, the IEO data used in this study starts from 2018 and the data source only had adequate information on a few IEOs. Given the recency of ICOs and IEOs, recent studies on the matter suffer from limited data as a result this reduced sample size, especially for long-run analysis. This study was no exception, as the final sample size was reduced significantly.

5.2 Areas of future research

One of the limitations of this study included a relatively small sample size for IEOs. The study analysed 101 ICOs and only 22 IEOs due to data limitations. It may be worth considering a bigger sample size as the data trickles in. Further studies may look into the long-run performance of IEOs and contrast that with the performance of ICOs and IPOs. More so, with the recognition of crypto as a currency by countries like Russia and El Salvador, further research may look into how best regulators can formulate cryptocurrency regulation such that it can be complemented by ICOs and IEOs as a viable way of raising capital for small fintech start-ups. A regulatory framework is likely to improve the performance of ICOs and IEOs such that competitive entrepreneurs are able to raise capital and investors can have a conviction that they are giving capital to start-ups that can generate the expected returns they are looking for.

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Appendix A: List of ICOs and IEOs

Table 0: List of ICOs and IEOs

	Short Name	Full Name	ICO date	Total amount raised (USD)
1	1WO	1World	5th Oct 2017 - 6th Nov 2017	$ 5 000 000
2	KWATT	4New	1St Jun 2018 – 10th Aug 2018	$ 42 100 000
3	ABDT	ADBANK	15th Dec 2017 – 14th Jan 2018	$ 15 000 000
4	ADX	Ambire AdEx	30th Jun 2017 – 30th Jun 2017	$ 10 000 000
5	ADS	Adshares	07 July 2017 – 12 Jan 2018	$ 11 900 000
6	ADT	Dot Arcade	26th Jun 2017 – 26th Jun 2017	$ 10 000 000
7	ARNX	Aeron	19th Sep 2017 – 30th Oct 2017	$ 5 688 853
8	AE	Aeternity	29th May 2017 – 19th Jun 2017	$ 24 426 689
9	AID	Aidcoin	16th Jan 2018 – 1st Feb 2018	$ 15 854 305
10	AIX	Aigang	15th Nov – 15th Dec 2017	$ 5 000 000
11	ABL	Airbloc	19th Jun 2018 – 29th Jun 2018	$ 2 300 000
12	AST	AirSwap	10th Oct 2017 – 11th Oct 2017	$ 36 000 000
13	ADL	Adelphoi	1st May 2017 – 31st May 2017	$ 1 672 391
14	ALMT	AMLT	15th June 2017 – 15th Jun 2017	$ 6 000 000
15	APPC	AppCoins	13th Dec 2017 – 20th Dec 2017	$ 15 300 000
16	ABM	Ambrosus	22nd Sept2017 - 22nd Oct 2017	$ 30 000000
17	ABT	Arcblock	3rd Feb 2018 – 3rd Feb 2018	$ 11 000 000
18	AR	Arweave	6th Aug 2019 – 24th Aug 2019	$ 5 000 000
19	ATL	ATLANT	7th Sep 2017 – 1st Nov 2017	$ 6 500 000
20	AUC	Auctus	10th April 2018 – 20th April 2018	$ 3 770 005
21	REP	Augur	17th Aug 2015 – 1st Oct 2015	$ 5 000 000
22	BAX	BABB	6th Feb 2018 – 6th Mar 2018	$ 20 000 000
23	BNB	Binance	31st Dec 2017 - 31st Dec 2017	$ 15 000 000
24	BDG	BitDegree	1st Dec 2017 – 29th Dec 2017	$ 22 500 000
25	BMX	BiMart Token	1st Dec 2017 – 1st Dec 2017	$ 12 086 700
26	BTIX	Blocktix	7th Jul 2017 – 25th Jul 2017	$ 6 981 328
27	BTT	BitTorrent	28th Jan 2019 -28th Jan 2019	$ 7 128 000
28	BMC	Blackmoon	12th Sep 2017 – 12th Oct 2017	$ 30 000 000
29	BCDN	BlockCDN	25th Dec 2017 – 25th Dec 2017	$ 303 000
30	BLOC	Blockchain Terminal	30th Apr 2018 – 30th Apr 2018	$ 21 500 000
31	TIXL	Tixl	17th Jul 2019 – 28th Aug 2019	$ 1 250 000
32	BLT V	BLOCKTV	19th Oct 2017 – 25th Oct 2017	$ 21 500 000
33	BWX	Blue Whale Exchange	24th May 2018 – 23rd Jun 2018	$ 22 700 000
34	BLZ	Bluzelle	18th Jan 2018 – 2nd 2018	$ 19 500 000
35	BON	Bonpay	31st Oct 2017 – 28th Nov 2017	$ 10 000 000
36	BTNY	BitOnyx	24th Oct 2017– 21st Nov 2017	$ 5 000 000

37	BRD	Bread	16th Dec 2017 – 24th Dec 2017	$ 32 000 000
38	CARD	Cardstack	31st May 2018 – 30th Jun 2018	$ 35 000 000
39	CXO	CargoX	23rd Jan 2018 - 4th Mar 2018	$ 6 766 164
40	CV	carVertical	26th Dec 2017 – 4th Apr 2018	$ 6 256 556
41	CAS	Cashaa	6th Nov 2017 – 6th Dec 2017	$ 18 530 000
42	CSP	Caspian	17th Oct 2018 – 19 Oct 2018	$ 19 500 000
43	CCO	Ccore	9th Nov 2017 – 30th Nov 2017	$ 1 400 000
44	CEL	Celsius	16th Mar 2018 – 23rd Mar 2018	$ 50 000 000
45	LINK	Chainlink	20th Aug 2017 -20th Aug 2017	$ 5 000 000
46	DAY	Chronologic	28th Aug 2017 – 4th Sep 2017	$ 7 400 000
47	CND	Cindicator	12th Sept 2017 – 12th Oct 2017	$ 15 000 000
48	CVC	Civic	21st Jun 2017 – 22nd Jun 2017	$ 33 000 000
49	COFI	CoinFi	8th Feb 2018 – 18th Feb 2018	$ 15 000 000
50	COB	Cobinhood	13th Sept 2017 -22 Oct 2017	$ 13 200 000
51	CL	Coinlancer	14th Oct 2017 – 15th Nov 2017	$ 11 000 000
52	DAG	Constellation	20th April 2018 – 20th April 2018	$ 33 700 000
53	COS	Contentos	25th May 2019 – 10th Jun 2019	$ 31 230 000
54	COV	COvesting	24th Nov 2017 -15th Jan 2018	$ 33 241 750
55	CRPT	Crypterium	31st Oct 2017 – 14th Jan 2018	$ 51 656 963
56	CPAY	CopPay	30th Oct 2017 – 30th Nov 2017	$ 52 318
57	PING	Sonar	18th Sep 2016 – 18th Oct 2016	$ 4 700 000
58	CMT	CyberMile	21st Nov 2017 – 21st Dec 2017	$ 30 000 000
59	DTX	Databroker	26th Apr 2018 – 26th May 2018	$ 3 545 000
60	DAT	Datum	29th Oct 2017 – 29th Nov 2017	$ 7 200 000
61	DCT	Decent	11th Sept 2016 – 6th Nov 2016	$ 4 186 933
62	MANA	Decentraland	8th Aug 2017 – 8th Aug 2017	$ 24 000 000
63	DML	Decentralised Machine Learning	22 Apr 2018 – 22 Apr 2018	$ 10 425 492
64	DTH	Dether	7th Feb 2018 – 9th Feb 2018	$ 12 117 300
65	EVE	Devery	18th Jan 2018 -19 Jan 2018	$ 10 000 000
66	DAO	Dao Maker	8th Nov 2017 - 8th Dec 2017	$ 5 000 000
67	DNT	District0x	18th July 2017 – 1st Aug 2017	$ 9 000 000
68	DMT	DMarket	17th Aug 2017 – 15th Nov 2017	$ 19 069 000
70	MTX	Matryx	13th Sept 2017 – 12th Oct 2017	$ 4 000 000
71	MCO	MCO	18th May 2017 – 18th Jun 2017	$ 26 700 000
72	PKT	PlayKey	1st Nov 2017 – 1st Dec 2017	$ 10 512 361
73	PLBT	Polybius	31st May 2017 – 30th Jun 2017	$ 31 000 000
74	PRE	Presearch	25th Jul 2017 – 31 Oct 2017	$ 16 000 000
75	QTUM	Qtum	12th Mar 2017	$ 15 000 000
76	RTH	Rotharium	13th Dec 2017 – 14th Jan 2018	$ 5 000 000
77	STORJ	Storj	19th May 2017 – 25th May 2017	$ 30 000 000
78	STX	Stack	2nd Aug 2017 – 4th Aug 2017	$ 33 000 000
79	PAY	Tenx	24th Jun 2017 – 24th Jun 2017	$ 80 000 000
80	XTZ	Tezos	1st Jul 2017 – 13th Jul 2017	$ 232 000 000
81	TNB	Time New Bank	18th Nov 2017 – 23 Nov 2017	$ 8 000 000

82	TBX	Tokenbox	14th Nov 2017 – 28th Nov 2017	$ 8 000 000
83	TGAME	Truegame	16th Apr 2018 – 30th Apr 2018	$ 3 426 445
84	UBT	Unibright	20th Apr – 20th May 2018	$ 12 604 551
85	UTT	United Treaders	30th Nov 2017 – 24th Dec 2017	$ 32 000 000
86	UTNP	Universa	27th Oct 2017 – 27 Nov 2017	$ 28 800 000
87	UQC	Uquid Coin	2nd Oct 2017 – 7th Nov 2017	$ 17 700 000
88	UKIT	uKit Token	19th Feb 2018 – 1st May 2018	$ 2 500 000
89	VERI	Veritaseum	25th Apr 2017 – 26th May 2017	$ 6 480 882
90	WGR	Wagerr	1st Jun 2017 – 25th Jun 2017	$ 10 000 000
91	WAN	Wanchain	24th Sept 2017 – 3Oct 2017	$ 35 990 000
92	WAND	WandX	27th Oct 2017 – 21st Nov 2017	$ 866 544
93	WAVES	Waves	12th Apr 2016 -31st May 2016	$ 16 000 000
94	WAXP	Wax	1st Jan 2018 -1st Feb 2018	$ 45 000 000
95	ZAM	Zamanat	1st Apr 2018 -16th May 2018	$ -----
96	ZANO	ZANO	1st Mar 2019 – 1st Apr 2019	$ ------
97	ZEBI	Zebi Token	5th Mar 2018 -31st Mar 2018	$ 10 000 000
98	ZPT	Zen Protocol	30th Nov 2017 – 30th Dec 2017	$ 46 000 000
99	ZP	Zeepin	2nd Jan 2018 - 18th January 2018	$ 62 580 000
100	ZLA	Zilla	25th Jan 2018 – 14th Feb 2018	$ -----
101	ZRC	ZrCoin	11th May 2017 – 9th Jun 2017	$ 7 000 000
IEOs				
1	BRD	Bread	16th Dec 2017 – 24th Dec 2017	$ 32 000 000
2	GTO	Gifto	14th Dec 2017 – 15th Dec 2017	$ 30 000 000
3	DUSK	Dusk Network	1st of Aug 2018 – 22nd Nov 2018	$ -------
4	COTI	Coti	28th May 2019 – 3rd Jun 2019	$ 15 000 000
5	AKRO	Akropolis	16th Jul 2019 -17th Jul 2019	$ 12 600 000
6	AZ	Azbit	6th Jun 2019 – 30th Jul 2019	$ 9 000 000
7	VRA	Verasity	1st Mar 2019 – 6th Mar 2019	$ 4 000 000
8	CELR	Celer Network	19th Mar 2019 – 24th mar 2019	$ 3 880 000
9	CTC	Credit Coin	14th Jan 2019 – 30th Sep 2019	$ 2 000 000
10	DOS	Dos Network	11th Apr 2019 – 12th Apr 2019	$ 1 700 000
11	iOWN	iOWN Token	27th Jun 2019 – 30th Sep 2019	$ 1 500 000
12	NEW	Newton	16th Apr 2019 -17th Apr 2019	$ 1 107 000
13	DEEP	Deep Aero	1st May 2018 – 31st Jul 2018	$ -------
14	XPT	Cryptobuyer	9th May 2019 – 30th Aug 2019	$ 436 800
15	ZUC	ZeuxCoin	7th Jun 2019 – 5th Jul 2019	$ 2 671 200
16	IOEX	ioeX	18th Apr 2019 – 19th Apr 2019	$ 27 200 000
17	LOL	Lol Token	16th Sep 2019 – 15th Dec 2019	$ 3 000 000
18	KICKS	Sessia	17th Jul 2019 – 20th July 2019	$ 3 000 000
19	LEVL	Levolution	18th Mar 2019 - 1st Apr 2019	$ 1 883 840
20	TOKO	Tokoin	1st Jun 2018 – 31st Aug 2018	$ --------
21	MLGC	Demole	29th Jan 2018 – 5th Mar 2018	$ 2 667 414
22	XPN	PantheonX	18th Apr 2019 - 28th Apr 2019	$ 18 822