UNIVERSITY OF LJUBLJANA

FACULTY OF ECONOMICS

MASTER'S THESIS

AN ANALYSIS OF THE INITIAL COIN OFFERING MARKET AND ITS RETURNS

Ljubljana, November 2018 VITO PETAN

AUTHORSHIP STATEMENT

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INTRODUCTION

The blockchain is a decentralized, public ledger that records transactions, which are added to it in chronological order. It allows market participants to keep track of transactions without any central authority and is resistant to modification of the data. It can record transactions between two parties efficiently in a verifiable and permanent way (Lakhani & Iansiti, 2017).

Blockchain was invented by Satoshi Nakamoto, a pseudonym for a person or a group that invented Bitcoin and was first conceptualized in 2008 in Bitcoin white paper as a means to allow peer-to-peer money transfers without being diverted into the wrong account and to be incapable of being spent twice by the same person. It became a core component of Bitcoin, the first cryptocurrency when it was launched in 2009.

As of April 2018, there are currently more than 1500 actively traded cryptocurrencies and most derive from Bitcoin, which is still the largest cryptocurrency by market capitalization (CoinMarketCap, 2018b). The second largest cryptocurrency is Ether, whose blockchain is generated by the Ethereum platform. Ethereum held one of the first initial coin offerings ever in 2014 and these days most of the new tokens offered at Initial Coin offerings are built on Ethereum blockchain.

Initial coin offering (hereinafter ICO) is a means of raising funds for a new startup or existing company. In an ICO, a company raises funds, usually cryptocurrencies Ethereum or Bitcoin, in exchange for newly issued tokens, which give its owner the right to use the company's product or service once it is developed or can be exchanged for different tokens or fiat currency on the secondary market (Li & Mann, 2018, p. 2).

As Kaal (2018, p. 2) says, "ICOs provide unprecedented liquidity and efficiency for capital formation while minimizing transaction cost." They are cost-effective, allow companies to avoid sacrificing equity for financing and provide low barriers to entry for a diverse body of investors. They increase the diversity and the heterogeneity of start-up funding while allowing companies to use the proceeds of the ICO exclusively for product development (Kaal, 2018, p. 2).

ICOs enable promoters to bypass the typical fundraising hurdles by directly marketing to investors around the world and provide high liquidity for both investors and promoters. Investors can trade their tokens on the second market almost instantly after the ICO, allowing them to realize the profit on investment much sooner than with traditional capital raising means (Kaal, 2018, p. 2).

Initial coin offering market only really took off in 2017 when more than $6.1 billion was raised by 871 ICOs, a 6,779 % increase from a year earlier (ICOdata, 2018a). By July 2017, ICO funding surpassed angel and seed stage internet venture capital funding globally (Kharpal, 2017). An October 2017 report from Venture Capital firm Mangrove Capital says

average return across 204 initial coin offerings was 1,320 %. There were 225 crypto funds investing in cryptocurrencies and ICOs at the beginning of 2018 managing $3.5 to $5 billion in assets (Williams-Grut, 2017).

Despite all this, countries around the world are still contemplating how to regulate this new type of fundraising. There are still no reliable figures about ICO funding and the actual return on ICO investments. Very little reliable research was done on determinants of ICO success and return.

The purpose of this master's thesis is to contribute to the understanding of the ICO market and its returns.

The aim of master's thesis is to determine the returns of the ICO market and investigate determinants of ICO success and ICO return on the secondary market.

Therefore, the aim is to answer the following research questions of the master's thesis:

1. What is the average ICO return on the secondary market?
2. Which variables significantly explain variability in the success of ICO in raising funds?
3. Which variables significantly explain variability in ICO return?

Variables that are tested are:

- The number of project's Twitter followers
- The number of Telegram users – a messaging application popular in cryptocurrency community
- The number of project's Reddit subscribers
- Alexa website rank
- Percentage of token supply available for sale – it shows how much of the total token supply is available for investors and how much for the team and partners
- The existence of the GitHub code repository – GitHub is a hosting service for computer code where projects can publish their code
- The existence of a prototype or a minimum viable product (MVP)
- Hard cap – the maximum amount of funds the ICO wants to raise
- End date
- USD raised
- Token sale price

This study follows primary and secondary research methods. Primary data about ICOs such token sale price, hard cap, the percentage of token supply available for sale, and other mentioned variables are gathered directly from ICO websites and their whitepapers, my database icodata.io and other internet ICO databases, such as icodrops.com and icobench.com. Data from these sources is gathered, rechecked, and put into a new database.

The first part of the thesis is based on theoretical research and analysis where the secondary sources are used, through which existing literature is revised in order to discuss important aspects of ICOs. Namely, the basic terminology connected to blockchain and ICOs is explained and legal framework and regulations around the world are presented. After that, specific ICO examples and ICO market funding statistics are presented.

In the second, practical part of the thesis, data gathered from both primary and secondary sources are used to try to identify variables that significantly explain variability in ICO success and ICO return.

The first chapter covers a theoretical overview of blockchain and its brief history. Then, its properties, potential use cases, and its disadvantages are presented.

In the second chapter, cryptocurrencies, their history, and associated risks are introduced.

The third chapter covers a theoretical overview of initial coin offerings and its advantages and disadvantages compared to traditional fundraising methods. As mentioned before, ICOs have a lot of advantages over traditional capital fundraising methods, but are also much riskier for investors and still mostly unregulated around the world.

In the fourth chapter, ICO regulations around the world are presented. A study of 25 top ICO jurisdictions by funding found that the majority of the countries examined permit ICO's and cryptocurrencies or do not explicitly prohibit them. Countries are mostly using the existing laws to regulate cryptocurrencies or waiting to see how other countries react (Kaal, 2018, p. 8).

Furthermore, in the fifth chapter, specific successful and unsuccessful ICOs are presented. One of the biggest completed ICOs ever, Tezos raised $230 million in July 2017 and is trading at 672 % return since ICO as of April, despite still having no working product. DAO raised $150 million in May 2016 but got hacked and all investors' funds were stolen. BitConnect, which held and ICO in December 2016 and at one time boasted a market cap of over $2.6 billion, is now worth $18 million after authorities in the United Kingdom and the USA accused a company of running a fraudulent operation and ordered it to shut down its operation.

This chapter also covers Slovenian ICOs. Slovenia is one of the top 25 ICO destinations based on the amount raised (Kaal, 2018, p. 4) and has had numerous successful ICOs, such as Viberate, OriginTrail, and InsurePal.

In the practical part of the thesis, the primary data from hundreds of ICOs are gathered to try to identify variables that significantly explain the variability of ICO success in raising funds and ICO return. First, quantitative data from ICOs believed to be associated with the success and the return of ICO is gathered. Then, regression analysis is used to try to identify variables that are associated with ICO success (percentage of hard cap raised), and ICO return. In conclusion, the results are presented, analyzed, and described.

1 BLOCKCHAIN

As mentioned in the introduction, blockchain is a decentralized, public ledger that records transactions, which are added to it in chronological order. It allows market participants to keep track of transactions without any central authority and is resistant to modification of the data. It can record transactions between two parties efficiently and in a verifiable and permanent way (Lakhani & Iansiti, 2017).

Whenever two parties interact, they announce the transaction to all network participants, who record the transaction into a block. Once the block is full, network participants perform proof-of-work, which is a mathematical operation that is hard to solve, but easily verifiable. These operations force participants or nodes to use processing power, which would be wasted if they include any fraudulent transactions. The first node to solve the operation signals it to the network, which verifies it. Once 51 % of network participants agree, the process repeats itself with a new block (Ammous, 2016, p. 1).

The first node in a network that solves the problem is rewarded with a specific number of cryptocurrency, which gives participants financial incentive to use their processing power to try to solve the problems. This process is called “mining” and individuals or companies that do it are referred to as “miners” (Ammous, 2016, p. 1).

Because verifying the validity of a block’s proof of work is much cheaper and faster than solving it, the process is economical and profitable for the miners involved and honesty is the only strategy for profitability for everyone involved. The outcome is that the record is undisputed by any party without the involvement of a trusted third party (Ammous, 2016, p. 2).

Because problem-solving in proof-of-work calculations requires a large amount of computing power, Bitcoin mining requires a huge amount of power and electricity. In November 2017, it was estimated that the power used by the Bitcoin network was higher than that of the Republic of Ireland (Hern, 2018). The alternative for proof-of-work, which is still used by Bitcoin and most of the other cryptocurrencies, is the so-called proof-of-stake protocol, which would greatly improve energy efficiency. Ethereum, currently the second largest cryptocurrency by market capitalization is scheduled to move to the proof-of-stake protocol by mid-2018 (Buterin, 2018a).

Proof-of-stake attributes mining power to the proportion of coins held by a miner, which means that instead of utilizing energy to answer proof-of-work problems, the weight of each miner's vote depends on the size of its stake in the cryptocurrency. Miners (or validators) take turns proposing and voting on the next block. Proof-of-stake advantages include security, reduced risk of centralization, and energy efficiency (Buterin, 2018a).

Blockchain was first conceptualized in a Bitcoin white paper in 2008, but its use since then expanded much more than just being the underlying technology behind digital currencies. It can be used for smart contracts, database, and record management and transfer of traditional assets such as stocks, bonds, and real estate.

1.1 A brief history of the blockchain

The first known work on cryptographically secured chains of blocks was described in 1991 by Stuart Haber and W. Scott Stornetta, but it was not until 2008 that blockchain was conceptualized in Bitcoin white paper by Satoshi Nakamoto, a pseudonym for a person or a group that invented Bitcoin. The word blockchain itself does not appear in the original paper. Satoshi referred to blockchain as "chain of blocks", but the term was popularized in the years after. The white paper provided a solution to the "double spend" problem that was until then the main roadblock for the use of digital currencies.

On January 3rd, 2009, the first Bitcoin block, known as the Genesis block, was mined. Five days later, on January 8th, 2009, Satoshi Nakamoto announced the first transaction on the Bitcoin network.

A few years later, it became clear that blockchain could potentially be used for more than just simple peer-to-peer transfers, but also to record data and transfer non-native blockchain assets. After the public interest in Bitcoin increased in 2013, corporations and organizations started to inspect blockchain technology, but soon realized that a public distributed ledger it was ill-suited for corporate use and started to explore private, permissioned ledgers (Hileman & Rauchs, 2017).

In 2013, Vitalik Buterin, who was at the time involved in developing Bitcoin, proposed a new type of decentralized platform called Ethereum that would enable not only peer-to-peer transfers but also programmable, self-executing applications, and smart contracts. The development of the Ethereum project started in 2014 and the platform went live in 2015.

Blockchain 2.0

The so-called blockchain 2.0 is a term used to describe a new generation of blockchains, which moved beyond just enabling transactions. They enable users to build all sorts of applications and smart contracts on top of the distributed blockchain database. Blockchain 2.0 allows programmable smart contracts, smart property, decentralized applications, and decentralized autonomous organizations to be built on top of it.

The best-known example of blockchain 2.0 is Ethereum, which is a blockchain-based distributed computing platform and operating system featuring smart contract functionality. Ethereum allows programmers to build decentralized applications and self-executing smart contracts and is the most popular platform for initial coin offerings. Ethereum is currently

using proof-of-work mechanism for confirming transactions but is scheduled to move to more efficient proof-of-stake by mid-2018.

Some other examples of blockchain 2.0 include NEO, a Chinese blockchain and a smart contract platform often called “Chinese Ethereum, and EOS, an Ethereum competitor that launched in 2018 and promises greater scalability. EOS describes itself as “the Most Powerful Infrastructure for Decentralized Applications” and uses a delegated proof-of-stake consensus mechanism, making it more centralized, but in theory faster and more scalable than Ethereum.

1.2 Properties

The blockchain is a distributed ledger where every user in the network has an identical copy of all information stored on the blockchain and can validate transactions. This ensures that information cannot be lost or tampered with as it is not stored on a central server, but on the thousands or millions of computers around the world, depending on the blockchain. As it does not have a single point of failure, successful attack would require a massive amount of computing power. Even if one or more nodes in the network fail, the network will continue to function without disruption.

Blockchain, as a chain of blocks, stores blocks in a chronological and time stamped chain, providing a trail of transactions, meaning that it has complete information on every address balance and transactions from the first block ever mined until the most recent one. It is transparent, allowing anyone to see the transactions on the network, making it difficult for a single bad actor to post fraudulent transactions.

Blocks are cryptographically sealed in the chain when created, meaning that they cannot be deleted, changed or tampered with later. Transactions are secured through public-private key encryption and hash functions that allow anyone to send transactions to any address on the network, but only the owner of that address can access the value with their private key. Combined with the decentralized nature of the blockchain, which is distributed across peer-to-peer networks, this ensures that the data on the blockchain is trustable and immutable.

The blockchain is consensus-based, meaning that transaction can be executed only if the network unanimously approves it. Consensus mechanisms most commonly used are proof-of-work and proof-of-stake (Schumann, 2018).

While blockchain, as envisioned in the Bitcoin whitepaper, was public, they can now be divided into public, private, and hybrid blockchains. The public blockchain is accessible to anyone with an internet connection, while private blockchains are usually run by companies and are therefore centralized and only accessible with permission. In between, there are hybrid blockchains that are partially decentralized and take some properties of both extremes

(Pilkington, 2015). They can be further divided by different permission models: read (who can see the transactions), write (who can generate transactions), and commit (who can update the ledger), so we can segment public blockchains to public permissionless and public permissioned, and private blockchains to consortium and private permissioned (Hileman & Rauchs, 2017).

1.3 Potential use cases

Digital payments are the original use case of blockchain with the invention of the Bitcoin network and are still one of the few actual use cases of blockchain that is used at least by a part of the public. Most other potential use cases mentioned below are still in the development and it is not clear if they will ever be used on a mass scale (Stinchcombe, 2017).

Another potential use case that is gaining adoption is smart contracts, which are program code, programmed to execute a certain action if conditions are met. Smart contracts enable 2 parties to exchange money, shares or any other asset in a transparent way without a trusted third party. Different than normal contracts, they not only define the agreement between the parties but also execute it automatically. Their benefits include speed, autonomy, safety, and backup (it is impossible to lose the contract as it is shared across a distributed ledger).

The next potential use case is identity and personal data management. In theory, identity and data stored on a distributed, cryptographically secured ledger should be more secure than if stored in a centralized, hack-prone server. By controlling the key to their data, users can choose who gets to see (decrypt) their personal data, which could be useful in fields where personal privacy is important, such as in medicine.

One of the most hyped up potential use cases is voting systems. The immutability of data stored on blockchain could provide greater security and transparency over traditional voting systems. A blockchain based system was first used by a Danish political party for internal elections purposes (Borchgrevink, 2014).

DeMuro (2018) included voting on a list of "10 sectors that blockchain will disrupt forever" and wrote that "The application of blockchain technology could eliminate voter fraud, providing a clear record of the votes cast, and preventing any chance of a rigged election."

Besides for digital payments and smart contracts, blockchain could be used in banking and finance for settlement of exchanges. Verified and instantly available data could bring much greater transparency and efficiency to the trading of financial instruments and assets such as stocks and bonds and could prevent front-running.

The blockchain is being increasingly tested by banks for use in interbank transactions, which would reportedly be faster and more efficient by running on a distributed ledger. In

December 2017, The Australian Securities Exchange announced it plans to use blockchain to manage the clearing and settlement of equity transactions (Smyth, 2017).

Many start-ups are developing blockchain based supply chain management solutions. Immutable distributed ledger could help track the goods through global supply chains and provide much-needed transparency and trust. This could be especially useful in the global food industry where fraud is a major issue. Indeed, Chinese e-commerce giant JD.com teamed up with the world's largest retailer Walmart and IBM to launch Blockchain Food Safety Alliance, while another e-commerce giant Alibaba is already using blockchain technology to track, upload, and verify logistical information on imported products (Xiang, 2018).

A study of 200 enterprise distributed ledger technology start-ups, corporations, and central banks found that 30 % of distributed ledger use cases are in the banking and finance sector, followed by government sector with 13 %, insurance sector with 12 %, healthcare with 8 %, and media, entertainment and gaming with 8 % (Hileman & Rauchs, 2017).

1.4 Disadvantages of blockchain

Despite all the recent hype around blockchain, it is still not widely used on a mass scale. While it is true that blockchain is a revolutionary technology that is likely to disrupt a lot of industries, there has not been much talk about its disadvantages and limitations.

Stinchcombe (2017) wrote: "Everyone says the blockchain, the technology underpinning cryptocurrencies, such as Bitcoin, is going to change EVERYTHING. And yet, after years of tireless effort and billions of dollars invested, nobody has actually come up with a use for the blockchain – besides currency speculation and illegal transactions."

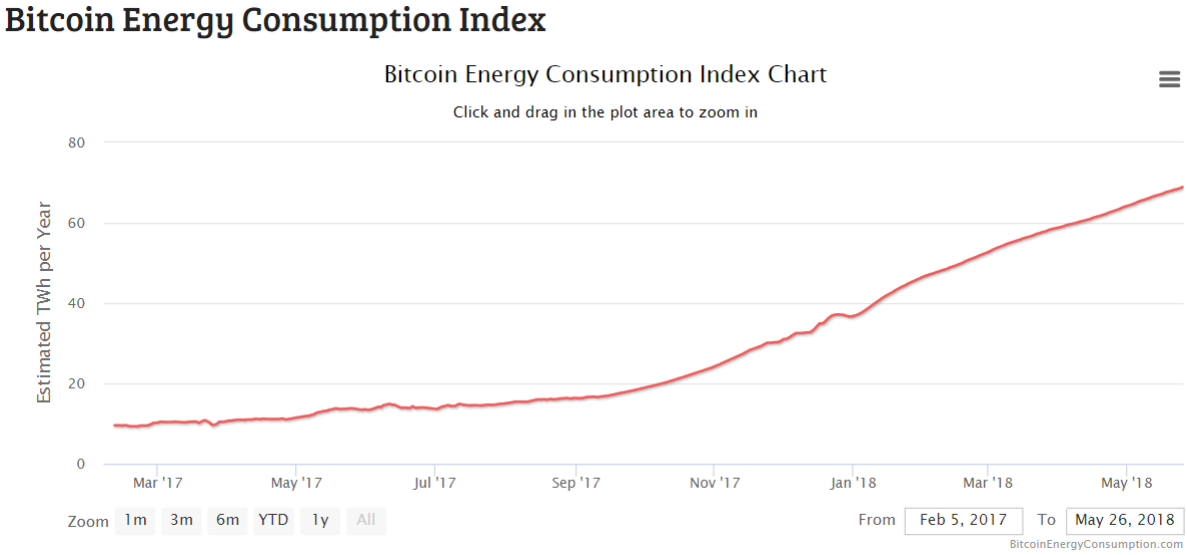
One of the main issues of blockchain is performance. Because of its decentralized nature, it is slower than centralized databases. Unlike a centralized database, blockchain must verify the signature of the transaction and then reach consensus in the network (proof-of-work or proof-of-stake mechanism) when a transaction is processed. Another issue is redundancy. While a centralized database must confirm transaction once or twice, every node in the blockchain network must independently confirm it in order to reach the same end result (Song, Shi, Xu, & Gill, 2016).

The next disadvantage of blockchain is large energy consumption. Bitcoin and other cryptocurrency miners are solving trillions of solutions per second in order to verify transactions, which requires an enormous amount of computing power and electricity.

As shown in Figure 1, Digiconomist's Bitcoin's estimated annual electricity consumption as of May 26th is 68.96 terawatt hours, up from 13.68 terawatt hours only a year ago. As more

Bitcoins are mined, the difficulty of verifying transactions increases, meaning that more computing power is needed with time (Digiconomist, 2018).

Figure 1: Bitcoin Energy Consumption Index



Source: Digiconomist, *Bitcoin Energy Consumption Index*, 2018.

Other potential barriers to mass adoption of blockchain technology are the high cost of initial investment, uncertain regulatory status, and cybersecurity and integration concerns (Song et al., 2016).

2 CRYPTOCURRENCIES

2.1 A brief history of cryptocurrencies

In 2008, a white paper called Bitcoin – A Peer to Peer Electronic Cash System was posted on the cryptography mailing list by Satoshi Nakamoto, a person whose identity is still unknown. On January 3rd, 2009, the first Bitcoin block, known as Genesis block, was mined and five days later, on January 8th, 2009, Satoshi Nakamoto announced the first transaction on the Bitcoin network. In 2010, the first documented purchase of a good with bitcoin took place, when Laszlo Hanyecz purchased 2 pizzas for 10,000 BTC, worth around $41 at the time. Until this day, May 22nd is celebrated in the crypto community as "Bitcoin Pizza day" (Bitcoin Wiki, 2018).

In June 2011, Wikileaks started accepting Bitcoin for donations.

In October 2012, bitcoin payment processing company BitPay announced that 1,000 merchants signed up to accept Bitcoin as payment through their system (Browdie, 2012).

In the second part of 2013, Bitcoin price rallied from around $100 at the end of July, to a then all-time high of $1156 in December. It took it more than 3 years to reach that price again on February 7th, 2017.

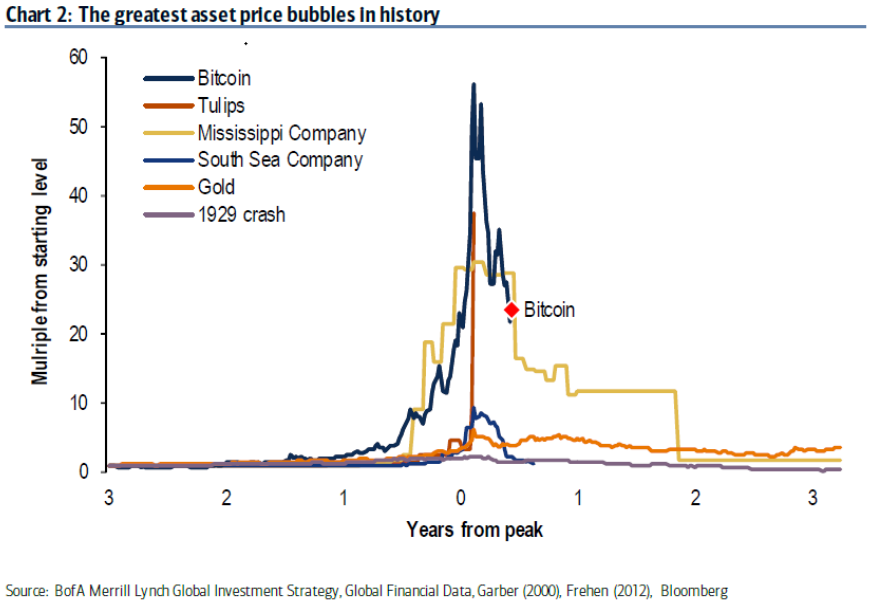
In February 2014, one of the largest Bitcoin exchanges in the world Mt. Gox, suspended withdrawals in what was the first sign that something went amiss. Later in the month, the company filed for bankruptcy, as reportedly 850,000 Bitcoins at the time worth some $460 million were stolen by hackers (McMillan, 2014).

Mastercoin became the first ever initial coin offering in 2013, raising some $500,000 worth of Bitcoin at the end of the sale. What was at the time an obscure idea of sending Bitcoins to a Bitcoin address in order to fund a development of a new protocol being built on top of Bitcoin is now something that is seriously competing with venture capital funding (Shin, 2017).

From July to September 2014, an initial coin offering was held for Ethereum, a blockchain based distributed computing platform and operating system featuring smart contract functionality. It raised $15.571 million and is still the leading blockchain platform for initial coin offerings, with 56.83 % ICOs in 2017 being built on top of it (Darko, 2017).

As of April 16th, there are 1498 ended ICOs according to my website icodata.io, and 1568 cryptocurrencies being traded on cryptocurrency exchanges, with the largest cryptocurrency still being Bitcoin with 42.1 % of the total market capitalization of $326.8 billion (CoinMarketCap, 2018b).

Figure 2: The greatest asset price bubbles in history



Source: J. Wolf, *Bitcoin, the Biggest Bubble in History, Is Popping*, 2018.

Bitcoin price reached its current all-time high of $20,089 on December 17th, 2017 (CoinMarketCap, 2018a). Bitcoin was often referred to as the biggest asset price bubble in history by different banks, media, prominent investors, and economists. The total crypto market capitalization reached an all-time high at the beginning of 2018, when it topped $830 billion, but lost almost half its value by the end of April, when the total capitalization was $430 billion. This led to Bank of America analysts proclaiming that Bitcoin, the greatest asset bubble in history, is popping (Wolf, 2018).

2.2 Risks of cryptocurrencies

The risk for cryptocurrency investors and users could be split into three parts: investment risk, operational risk, and regulatory risk (Paul, 2017).

Most people still regard cryptocurrencies as investments, as opposed to a means of payments or a means of using a specific token-based platform. The problem is that cryptocurrencies are hyper-volatile assets and a high-risk investment, as shown by some 2,000 % rise of Bitcoin price in 2017, and then 60 % fall from the highest price reached in December 2017 to the current price. As of April 16th, bitcoin is hovering around $8,000. As Buterin (2018b), the co-founder of Ethereum put it: "Cryptocurrencies are still a new and hyper-volatile asset class and could drop to near-zero at any time. Don't put in more money than you can afford to lose. If you're trying to figure out where to store your life savings, traditional assets are still your safest bet."

The operational risk exists as holding cryptocurrencies in a cryptocurrency wallet or on exchanges is very risky and hacking attempts are common. Currently believed to be the safest method of holding your coins is in a hardware wallet, essentially a kind of USB stick that is not connected to the internet and is, therefore, less likely to be hacked. More than 980,000 Bitcoins have reportedly been stolen from online exchanges, and very few have been returned, leaving investors with big losses (Finkle & Wagstaff, 2017).

Retail and institutional cryptocurrency investors are exposed to regulatory risk. Cryptocurrency trading tax regulation is still being drafted in a lot of countries, so investors cannot really know how their potential profits will be taxed.

A recent study found that approximately one-quarter of Bitcoin users and 44 % of Bitcoin transactions are associated with illegal activity. Researchers used detection controlled estimation and network clustering data analysis to conclude that an estimated 24 million users use Bitcoin primarily for illegal purposes and around $72 billion of illegal activity per year involves Bitcoin, the number which is close to the whole US and European markets for illegal drugs (Foley, Karlsen, & Putniii, 2018, p. 2).

3 A THEORETICAL OVERVIEW OF INITIAL COIN OFFERINGS

3.1 Advantages compared to traditional fundraising methods

Compared to initial public offerings, ICOs are much more cost-effective for start-ups. It all started with a website and a white paper, but things have become a bit more complicated since. Nowadays, an ICO project requires legal advice, as more and more countries start to regulate the field, and successful ICO requires a sizeable marketing budget. Still, the cost for a company is significantly lower than in an IPO and the promoters can bypass many legal and regulatory hurdles found in the process of IPO.

ICOs allow the team to avoid giving out equity in exchange for financing. Investors only receive tokens which give its owner the right to use the company's product or service once it is developed or can be exchanged for different tokens or fiat currency on the secondary market. This allows the team to keep control of the company and use the proceeds of an ICO exclusively for product development (Kaal, 2018, p. 2).

As Kaal (2018, p. 2) says: "ICOs provide low barriers to entry for a diverse body of investors and thus increase the diversity and the heterogeneity of start-up funding". The field that was until recently open only to institutional venture capital investors, mostly from Silicon Valley and China, is now open to practically anyone with an internet connection. An investor without a bank account in a third world country can invest in a start-up on the other side of the world for the first time in history only with an internet connection and a cryptocurrency. This not only helps investors but start-ups in countries without a well-developed venture capital market, such as Slovenia. Up until recently, the majority of venture capital funding originated in the United States of America, giving US companies power over innovation, with Asia catching up in recent years. As ICOs significantly lower the barrier to entry for start-up funding, start-up funding is now available to a much wider pool of entrepreneurs and investors.

Investors can trade their tokens on the secondary market almost instantly after the ICO, providing them faster liquidity and allowing them to realize the profit on investment much sooner than with traditional capital raising means. Traditionally, it can take years for a venture capital fund to exit the investment in a start-up in a case of an IPO or acquisition (Kaal, 2018, p. 2).

3.2 Disadvantages

One of the major ICO disadvantages is the lack of protection for investors. While this is an advantage to the ICO promoters, ICO investors have no control over ICO promoters and no

say over how the company is run, unlike traditional equity investors. ICO investors have no pre-emptive rights or any other anti-dilution protection, so they may be diluted in the future. They also do not have any liquidity preference that would protect them in the case of bankruptcy. Therefore, ICO investors stand to lose everything in the case of bankruptcy of the company.

The lack of mandatory disclosure standards means that ICO promoters can omit certain information, such as a vesting period of the team tokens or any similar information they may want to keep secret. It also means that after the ICO they are not bound to make regular disclosures about the status of the platform and the financial status of the company. ICO investors therefore almost never get to see the financials of the company and its costs, which can lead to misuse of investors' funds.

While smart contracts are hailed by the blockchain enthusiasts as the future of governance and transparency, and definitely have potential to supplement legal governance in financial contracting, they have not done so yet. In reality, ICO projects often promise to cap the total token supply, vesting periods for the team and unmodifiable initial investors' rights, but do not encode this into the smart contracts. This makes these promises less likely to be enforceable (Cohney, Hoffman, Sklaroff, & Wishnick, 2018).

Out of the 50 largest ICOs in 2017, almost 20 % of them did not even promise any vesting period in their marketing documents and white papers. Vesting period or a lock-up on team's tokens is essential to align team's incentives with those of the project and its investors and prevents insiders from cashing out as soon as the tokens hit the secondary market. Out of 80 % of ICOs that promised a vesting period, the vast majority of them (29 out of 37) did not actually encode it into their smart contracts (Cohney et al., 2018). This shows massive incentive misalignment problem plaguing even big, successful ICOs that is probably much worse at smaller, less known projects.

No protection for investors and lack of disclosure standards lead to high volatility of the tokens after an ICO. This makes investing in ICOs highly risky and often leads investors to sell their tokens immediately after the ICO to protect them against devaluation in the future.

Everything mentioned above makes ICOs perfect vehicles for defrauding investors and indeed, there have been multiple reported exit scams, where ICO promoters took investors' money and disappeared.

As new regulations and disclosure standards around the world are implemented, the situation should improve in the next years and ICOs will become a more legitimate and safe way or raising money.

3.3 DAICO

DAICO takes elements from DAO (decentralized autonomous organization) and ICO. DAO is a decentralized organization structure that is run by rules set in smart-contracts on blockchain (Hertig, 2018).

DAICO proposal would give more power to investors (token holders) and will force a level of accountability on project's developers through a mechanism which gives token holders ability to withhold or refund remaining funds if the project's goals have not been met.

It takes three main elements from DAO:

- Trust is not placed on a centralized team as decisions on releasing the collected funds to the developers are made by the democratic voting system by the token holders.
- Collected funds are not released in a lump sum but spread over time and subject to token holders' approval.
- What is left of collected funds can be refunded to investors if the developers fail to implement the project.

The benefits of DAICO are therefore bigger control of investors, less chance of team running away with collected funds without developing the promised product, and more motivated teams (Pauw, 2018).

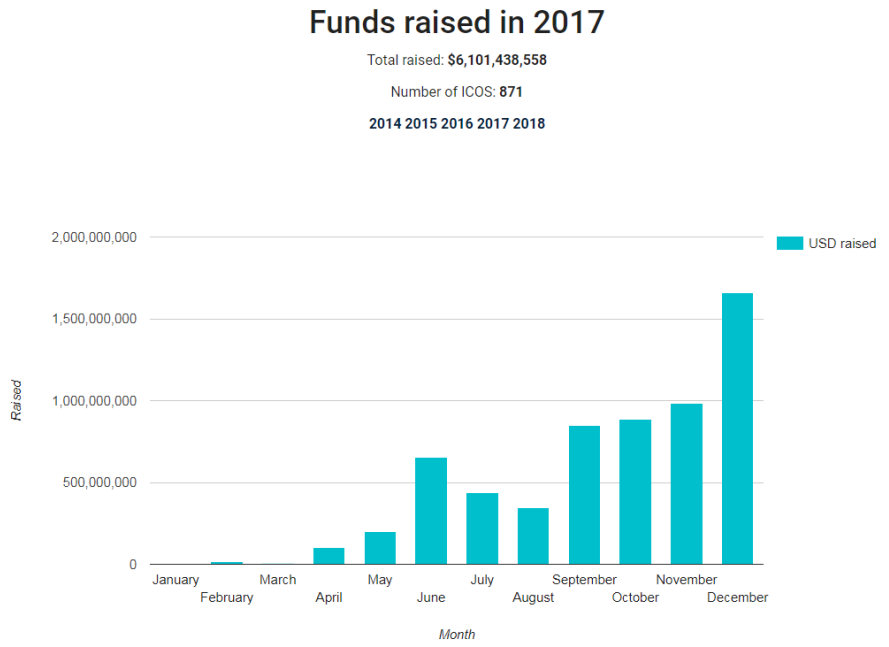
One of the first DAICOs called The Abyss is starting ended on May 16th with $15.352 million raised and only the time will tell if this new model will be successful.

3.4 ICO funding statistics

As of June 2018, $10.610 billion has been raised by ICOs, with the largest chunk of this having been raised in 2017 when $6.05 billion was raised. As shown in Figure 3, ICO funding really took off in the second part of 2017 and was steadily increasing in tandem with the price of Ethereum, which exploded in the second half of the year. The largest month for ICOs so far was December 2017 with $1.65 billion raised. As shown in Figure 4, ICO funding started to decline at the start of 2018, again in tandem with the price of Ethereum.

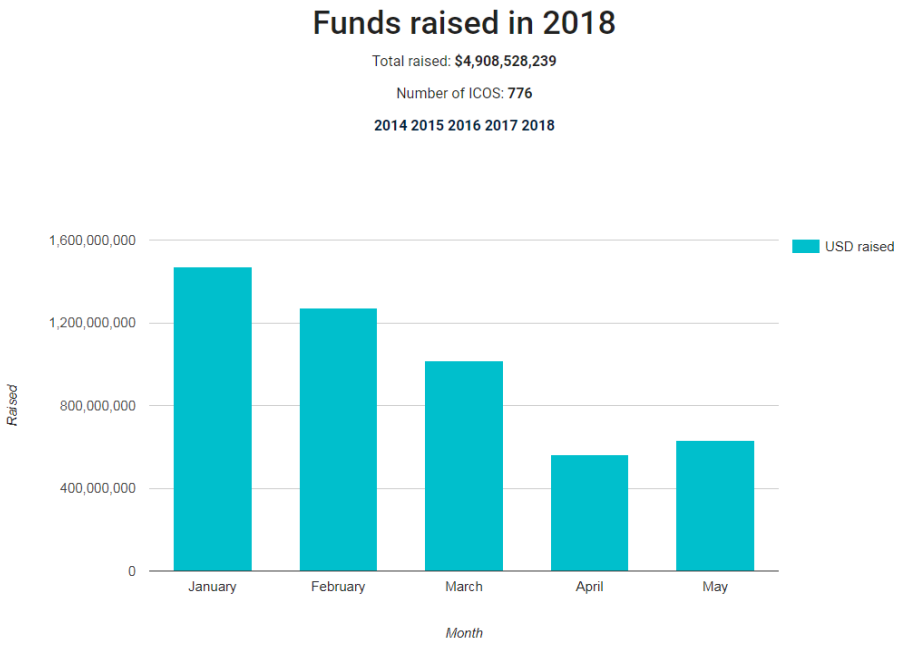
The biggest ICO so far was Dragon Coins that raised $320 million. Telegram ICO reportedly already raised $1.7 billion in private sales, which will make it by far the largest ICO ever when it is completed (Russo & Khrennikov, 2018).

Figure 3: Funds raised in 2017



Source: ICOdata, *Funds raised in 2017*, 2018b.

Figure 4: Funds raised in 2018



Source: ICOdata, *Funds raised in 2018*, 2018c.

4 ICO MARKET REGULATIONS AROUND THE WORLD

As more and more countries are starting to regulate ICOs and cryptocurrencies in general, ICO teams take no chances. These days it is hard to find a legitimate ICO not doing Know Your Customer and Anti Money Laundering procedures and the teams get increasingly serious about compliance with applicable laws. However, it is only a start. Russia recently proposed imposing a capital requirement of $1.7 million for ICO issuers and Christine Lagarde warned that crypto regulation is inevitable (Terenzi, 2018). Even Vitalik Buterin, the co-founder of Ethereum, proposed a new kind of self-governing ICO model called DAICO, which would give more power to investors.

The recent guidelines from the Swiss Financial Market Supervisory Authority which identified 3 types of ICOs were seen as a welcome first step as they removed uncertainty for token issuers. Many countries around the world, such as Belarus, Malta, Switzerland, and Singapore are now vying to become the go-to destinations for ICOs and year 2018 should be the year when regulatory and legislative environments finally catch up with the new model of fundraising.

Slovenia

Slovenian regulators are still contemplating how to regulate ICOs and cryptocurrencies in general. In January 2018, the Securities Market Agency ATVP (2018) issued a consulting document in which it stated that because tokens are not a tradable security, ICO is not regulated as an IPO of a security and warned investors that these sales have no guarantees as is the case with regulated offerings of securities. If a certain token could be defined as a derivative, the issuer needs to have an investment license from the regulator or a banking license. The document further asks ICO market participants and promoters to answer their questions and offer suggestions on how to regulate the market until March 15th, 2018 (ATVP, 2018). In June 2018, the ATVP published the answers to the questions from the consulting document provided by interested parties and called for a better regulation of ICOs. It further stated national-level regulation would not be sufficient to tackle the issue (STA, 2018).

Switzerland

Switzerland is one of the most popular countries for ICOs and the regulators have taken a proactive stance to clarify the rules and attract more companies. In February 2018, the Swiss Financial Market Supervisory Authority FINMA published guidelines on how it plans to apply financial market legislation in the ICO market but did not issue any ICO-specific regulation.

FINMA declared that each case must be decided on its individual merits and that circumstances must be considered on a case-by-case basis.

When assessing different ICOs, FINMA (2018) will focus on the economic function and purpose of the token being issued. They categorized tokens into three types:

- Payment tokens: tokens that have no functions or links to other developed products but will be accepted as a means of payment. For companies issuing such tokens, FINMA will require compliance with anti-money laundering regulations, but will not treat such tokens as securities.
- Utility tokens: tokens intended to provide access to an application or service being developed by the ICO promoters. If a utility token functions solely or partially as an investment in economic terms, it will be treated as security like an asset token.
- Asset tokens: tokens that represent participation in assets such as real estate, companies and earning streams, or an entitlement to dividends or interest payments are regarded as equities, bonds, and derivatives. Asset tokens will have to follow securities law requirements, as well as civil law requirements under the Swiss law.

USA

United States has not passed any new ICO regulation, but have been one of the most aggressive enforcers of the current securities laws in the world. Securities and Exchange Commission has issued a large number of subpoenas to ICO promoters and shut down multiple ICOs. In March 2018, SEC reportedly issued more than 80 subpoenas to ICO issuers in what was described in the media as a "sweeping probe" into the ICO industry. In response to the strict enforcement of regulations, most ICO issuers are now opting to exclude US participants from their offerings (Conheady, 2018).

In the Statement on Cryptocurrencies and Initial Coin Offerings, SEC chairman Jay Clayton (2017) wrote: "I believe that initial coin offerings – whether they represent offerings of securities or not – can be effective ways for entrepreneurs and others to raise funding, including for innovative projects. However, any such activity that involves an offering of securities must be accompanied by the important disclosures, processes, and other investor protections that our securities laws require. A change in the structure of a securities offering does not change the fundamental point that when a security is being offered, our securities laws must be followed."

SEC warned that it will not change securities laws in order to cater to cryptocurrencies and will continue to follow the so-called Howey test when deciding whether or not the investment is considered a security. The U.S. Supreme court ruling SEC v. Howey Co., 328 U.S. 293 (1946) stated: "For purposes of the Securities Act, an investment contract (undefined by the Act) means a contract, transaction, or scheme whereby a person invests his money in a common enterprise and is led to expect profits solely from the efforts of the

promoter or a third party, it being immaterial whether the shares in the enterprise are evidenced by formal certificates or by nominal interests in the physical assets employed in the enterprise."

SEC also warned main-street investors to be careful and do a proper research before investing into ICOs, as invested funds may quickly move out of the jurisdiction of the SEC and may not be recoverable (SEC, 2017).

Singapore

In November 2017, the Monetary Authority of Singapore published a 13-page document titled "A Guide to Digital Token Offerings", in which it wrote that tokens may be regulated by MAS if they qualify as a capital markets product: "Offers or issues of digital tokens may be regulated by MAS if the digital tokens are capital markets products under the SFA. Capital markets products include any securities, futures contracts, and contracts or arrangements for purposes of leveraged foreign exchange trading."

For instance, a token that represents an ownership interest, a debenture, or a unit in a collective investment scheme will be subject to the same regulatory regime under Singaporean law as offers of securities or units in a collective investment scheme.

MAS will examine the structure, characteristics, and rights of the tokens on a case by case basis in order to determine whether the digital token is a type of capital markets products under the Singaporean Law (Monetary Authority of Singapore, 2017).

China

Chinese regulators are probably the stringent cryptocurrency and ICO regulators in the world. Not only did they ban all ICOs in September 2017, they ordered already completed ICOs to refund their investors, closed all cryptocurrency exchanges and even blocked internet access to foreign cryptocurrency exchanges from inside the country (Perper, 2018).

Chinese financial regulator called ICOs illegal and disruptive to economic and financial stability and prohibited any financial institution and non-banking payment institution from providing services to business that deal with token fundraising (Zhao, 2017). Almost $1 billion has been returned to investors of more than 40 ICOs that were held prior to the ban and many Chinese crypto companies have since moved their headquarters outside of the country (Rapoza, 2017).

European Union

The European Union is still debating and is yet to issue any Union-wide ICO regulations. In February 2018, EU regulators issued a warning to ICO investors regarding the risks of buying cryptocurrencies and EU and said that EU-wide regulations could be developed in the following months (De, 2018).

5 PRESENTATION OF SELECTED ICOS

In the following chapter, I present selected ICOs for illustration.

5.1 Successful

Bancor

Bancor ICO was held on June 12th, 2017 and raised $153 million in about 3 hours, becoming one of the biggest ICOs ever. As of April 2018, it is still the 6th biggest ICO by the amount raised.

Bancor is a protocol that enables anyone to build its own smart token, which can hold and trade other coins, enabling direct token conversions with a smart contract without any 3rd party. The smart contract serves as its own market maker, automatically providing price discovery and liquidity to coins in the network.

Approximately six months after their successful sale, the team launched a live product that allows users to trade coins available in the network at prices automatically calculated by the network. As of April 22nd, 2018, Bancor Network saw $8.3 million daily exchange volume, making it the 68th biggest exchange by volume, while Bancor's ICO return is hovering around 0 %.

Tezos

Tezos ICO was held in July 2017 and raised $230 million in 2 weeks in what was then the largest ever ICO. Tezos describes itself as "a decentralized blockchain that governs itself by establishing a true digital commonwealth. It facilitates formal verification, a technique which mathematically proves the correctness of the code governing transactions and boosts the security of the most sensitive or financially weighted smart contracts."

When it is developed, it aims to compete with Ethereum but has some notable differences. In Tezos, stakeholders vote on proposed protocol upgrades and if the proposal gains enough approval, the network is updated automatically, without the need to hard fork. This is

different than in Ethereum, where users can decide whether to follow the upgrade or not, so more versions of the blockchain exist (Ethereum, Ethereum classic, etc.). Tezos will launch with proof-of-stake consensus protocol, while Ethereum is still using proof-of-work protocol, but also plans to move to proof-of-stake in the near future (Breitman, 2017).

After initially planning to launch the blockchain by the end of 2017, it is currently on track to be released in 2018. Despite promising to build a self-governing blockchain, the team had their own governing problems. Arthur and Kathleen Breitman, the founders of Tezos, helped establish a Swiss foundation to handle the ICO and hold the collected funds. They appointed Johann Gevers as the foundation's president, but the trio later fell out and Gevers declined to step down from the foundation which is independent by Swiss law. Gevers finally stepped down in February 2017 and the new board members were appointed, allowing the team to access the funds once again and continue with the development. During the dispute, 4 class-action lawsuits were filed against Tezos Foundation and Dynamic Ledger Solutions, Inc., a US company controlled by Arthur and Kathleen Breitman (Hughes Neghaiwi, Stecklow, & Irrera, 2017).

As of April 2018, ICO investors still have not received their tokens, but they stand to gain a hefty profit once they do, as the tokens currently trade at 672 % based on pre-launch futures.

Filecoin

Filecoin ICO was held from August to September 2017 and $257 million was raised, in what was then again the largest ICO to date. Protocol Labs, the company behind the project developed several successful peer-to-peer projects and the project received investments from several top Venture Capital firms such as Y Combinator, Andreessen Horowitz, and Winklevoss Capital. Filecoin aims to build a decentralized cloud storage network, essentially giving people around the world an option to rent out the unused space on their hard drives and build a peer-to-peer network of storage nodes (Garner, 2018).

As of April 2018, the product has still not been available to the public, but current ICO return is 290 % based on pre-launch futures.

Telegram

Telegram Group Inc., a company operating a messaging app popular in the crypto community that has around 200 million active users, has raised $1.7 billion in the largest ICO so far. It has raised the amount in two private sales to the accredited investors before canceling a planned public ICO due to increasing regulatory pressure on ICOs from the SEC. Telegram raised funds to build a Telegram Open Network, a blockchain platform built on top of its messaging app that would enable micropayments and peer-to-peer transactions, file storage, and other decentralized apps inside the application.

The company outlined its plans in a 132-page whitepaper that was criticized as being full of promises, but short on actual technical details and new ideas. Accredited investors reportedly had to invest at least $20 million with discounts of more than 50 % of the final token sale price, but had a 3 to 18 months lock-up period on their tokens. After the public sale was canceled, it is not known when the Gram tokens will start trading on the secondary market and whether the private investors will be able to cash-out. At the start of May, it was reported that some early investors are selling their tokens in private deals with up to 350 % return

5.2 Unsuccessful

The DAO

The DAO, short for the digital autonomous organization, was a project that aimed to establish a decentralized, investor-directed venture capital fund run on smart contracts and without a conventional management structure. It raised then a record $150 million in an ICO that was held from April to May 2016 and attracted 14 % of all Ether tokens at the time. But only a month later, in June, a third of the funds were stolen by hackers in an attack that exploited vulnerabilities in the DAO code. The bug in the code enabled a hacker to receive unlimited rewards from his proposed split in the code, as the reward balance was not being updated (Daian, 2016). This resulted in an Ethereum hard fork, as the community voted to restore the funds to the original contract, thus creating two separate blockchains, Ethereum, and Ethereum Classic.

The DAO existed as a set of smart contracts on Ethereum blockchain, without physical address and people in management roles. Investors that invested Ether tokens into the fund had the right to vote on where to invest the collected funds.

In July 2017, the SEC concluded that DAO tokens were securities and were subject to US federal securities regulation. It further stated that the founders may have violated the federal securities law, but have decided not to pursue an enforcement action against them. However, they warned that ICO promoters must from then on register sales of such securities unless a valid exemption applies, in what was the first sign that US regulators will strictly enforce existing laws (Tar, 2017).

5.3 Scams

BitConnect

Investment lending platform BitConnect held an ICO in December 2016 and was at one point worth $2.6 billion. The platform promised abnormal returns of 1 % return on investment per day, meaning that investing $1,000 would earn you $50 million in 3 years.

As seen in Table 1, investors that invested $10,010 or more were promised capital back in 120 days. Despite being labeled a Ponzi scheme by critics and media, it was one of the top performing cryptocurrencies in 2017 and was one of the top 20 cryptocurrencies by market capitalization. The company ran aggressive promotions, sponsoring crypto events and employed multi-level affiliate marketers to recruit new investors.

Table 1. BitConnect promised returns

Lending Amount	Interest (Acrued Daily)	Capital Back
$100 - $1000	Volatility Software Interest (up to 40% per month)	After 299 Days
$1010 - $5000	Volatility Software Interest (up to 40% per month) + 0.10% Daily	After 239 Days
$5010 - $10000	Volatility Software Interest (up to 40% per month) + 0.20% Daily	After 179 Days
$10010 - $100000	Volatility Software Interest (up to 40% per month) + 0.25% Daily	After 120 Days

Source: D. Mihov, *How BitConnect pulled the biggest exit scheme in cryptocurrency,* 2018.

The problems started after the British Registrar of Companies in November 2017 threatened BitConnect to shut it down and dissolve its operation unless the company proves that it is not a Ponzi scheme. However, BitConnect continued to aggressively protect its reputation and downplay legal threats, and the Bitconnect's coin price reached an all-time high of $510 in December 2017. It all came crashing down in January 2018, after Texas Securities Board and North Carolina Securities Division sent cease and desist letter to the company, ordering it to shut down its operations and stating that it is running a potentially fraudulent operation. As of January 19th, the price of the coin dropped to $29.74 and as of April 2018, the coin is worth around $1.25 (Mihov, 2018).

Plexcoin

Plexcoin ICO started in August 2017 and reportedly raised up to $15 million from thousands of investors before it got shut down in December by the SEC. The ICO was promising a 1,354 % return per month and using fake experts to legitimize the project. After determining that the promised return could not be delivered, the SEC seized all the collected funds and fined the parent company with $100,000. It also charged the founder of the ICO with violating anti-fraud and registration provisions of the U.S. federal securities laws (Levine, 2017).

Benebit

Benebit ICO reportedly had all the signs of a legit ICO – a moderated Telegram group chat, serious-looking white paper and a marketing budget of $500,000. However, someone noticed that the photos of the team members were taken from a UK school and that all the information about the project's founders is faked. After that, the team quickly deleted the website and their social media accounts, and it is estimated that $2.7 – $4 million was collected before investors noticed anything suspicious (Sedgwick, 2018c).

5.4 Failure rate

There are different definitions of a failed ICO. An ICO can fail if it fails to reach its soft cap or minimum funding goal, in which case it returns the collected funds to the investors or it can successfully raise funds and fail later.

According to an analysis by website news.bitcoin.com, data from Tokendata found that of 942 tracked ICOs in 2017, 142 failed in the funding stage and 276 failed after raising funds, meaning that 46 % of last year ICOs that together raised $233 million already failed. They classified another 113 ICOs as semi-failed because the teams stopped communicating on social media or the project's community is so small that the project has no chance of success (Sedgwick, 2018a).

According to my analysis of the ended ICOs on icodata.io, 758 out of 1611 ended ICOs are listed as having raised no funds, meaning that after the end of ICO the team did not even publish the results of the sale. This means that 47.05 % of ICOs failed in the funding stage. Another 71 ICOs raised less than $10,000, which is most likely not enough for the project to succeed, which means that 51.46 % of ICOs failed already in the funding stage.

5.5 Slovenian ICOs

Slovenian ICOs have so far raised around $130 million, led by OriginTrail that raised $22.5 million.

OriginTrail

OriginTrail held an ICO in January 2018 and raised its hard cap of $22.5 million in minutes. It aims to build a blockchain-based protocol for supply chains, which would ensure trust, transparency, and security. Their app could already be used to track food products from certain Slovenian partners, such as Zelene Doline, prior to their ICO. At the time of the ICO, app version utilized Ethereum blockchain to provide proof of concept and initial

implementation, while OriginTrail Decentralized Network Launch is scheduled for the third quarter of 2018.

Levak (2018) wrote: "On the protocol level, the Trace token serves as means of compensation between supply chain data producers and data consumers on one side and the OriginTrail node holders on the other. It provides the incentive to the nodes in the peer to peer network to perform the system functionalities."

Viberate

Viberate is a crowdsourced live music ecosystem and a blockchain-based marketplace, where musicians are matched with booking agencies and event organizers. The company had an ICO in September 2017 and it raised $10.71 million in 4 minutes and 42 seconds.

Viberate is a database of artists, venues, booking agents and events that enables booking agents to find most popular artists based on their social media statistics and book them right through the platform, enables event organizers to sell tickets, and fans to sell their tickets without intermediaries with blockchain technology. In April 2018, the company announced that it decided to co-invest into a real estate development in Ljubljana, a move that was criticized because it has nothing to do with the original project but was described by the company as a necessary way to hedge against the high volatility of Ethereum.

VIB tokens were sold in an ICO at $0.1 and were trading at end of May trading at $0.134, giving them an ICO return of 34 % (CoinMarketCap, 2018c).

Tokens

Officially registered in London, UK, but founded by Slovenian team, Tokens held an ICO in November 2017 and raised $15 million to build the next generation cryptocurrency trading platform. It was founded by Damjan Merlak, one of the richest Slovenians and the co-founder of Bitstamp, one of the largest and oldest Bitcoin exchanges in the world. Unlike Bitstamp, Tokens will be a crypto only exchange focused on alt-coins (smaller coins). Bitstamp, which is one of the few licensed exchanges in the world and offers fiat currency trading, only offers Bitcoin, Bitcoin Cash, Ripple, Ethereum and Litecoin trading, as they require regulatory approval for every new listing on their exchange.

At the end of April 2018, the beta exchange was released and opened for testing. DTR coins were sold in an ICO for $0.01 and were trading at end of May trading at $0.05, giving them an ICO return of 500 % (CoinMarketCap, 2018c).

6 DETERMINANTS OF ICO SUCCESS IN RAISING FUNDS AND ICO RETURN

6.1 Research hypotheses and variables

To answer my research question about determinants of ICO success, I first test the association between relevant variables and percentage of hard cap raised by ICOs to try to find out determinants of ICO success in raising funds. Then, I test the association between the relevant variables and ICO return.

Hypotheses on determinants of ICOs' success in raising funds

I propose to test the following hypotheses:

- Hypothesis 1: Percentage of hard cap raised is positively associated with Twitter followers.
- Hypothesis 2: Percentage of hard cap raised is positively associated with Telegram group members.
- Hypothesis 3: Percentage of hard cap raised is positively associated with Reddit subscribers.
- Hypothesis 4: Percentage of hard cap raised is negatively associated with Alexa rank.
- Hypothesis 5: Percentage of hard cap raised is negatively associated with the percentage of token supply available for sale.
- Hypothesis 6: Percentage of hard cap raised is positively associated with GitHub account.
- Hypothesis 7: Percentage of hard cap raised is positively associated with prototype/MVP.
- Hypothesis 8: Percentage of hard cap raised is negatively associated with a hard cap.
- Hypothesis 9: Percentage of hard cap raised is negatively associated with the end date.

Hypotheses on determinants of ICO return

- Hypothesis 10: ICO return is positively associated with Twitter followers.
- Hypothesis 11: ICO return is positively associated with Telegram group members.
- Hypothesis 12: ICO return is positively associated with Reddit subscribers.
- Hypothesis 13: ICO return is negatively associated with Alexa rank.
- Hypothesis 14: ICO return is positively associated with the percentage of token supply available for sale.
- Hypothesis 15: ICO return is positively associated with GitHub account.
- Hypothesis 16: ICO return is positively associated with prototype/MVP.

- Hypothesis 17: ICO return is negatively associated with a hard cap.
- Hypothesis 18: ICO return is negatively associated with an end date.
- Hypothesis 19: ICO return is negatively associated with USD raised.
- Hypothesis 20: ICO return is negatively associated with the token sale price.

Independent variables

Twitter followers

Project's Twitter follower count can be a good measure of interest and hype surrounding the ICO. Good ICO projects are regularly communicating with their communities and potential investors through various social media channels and Twitter is definitely one of the most important ones, which is why I expect that a project's Twitter follower count is positively associated with both the percentage of hard cap raised and ICO return. A potential problem might be the widespread buying of fake Twitter followers by brands, celebrities, and ICO projects alike, which might result in Twitter followers' variable not being a true representation of interest and hype surrounding an ICO.

Telegram group members

In the second half of 2018, messaging application Telegram has somehow become the go-to messaging application in the crypto world and a primary way of communication between a team and a project's community and investors. Sedgwick (2018b) called Telegram members "The New Metric for Cryptocurrency Success" and put it this way: "Twitter followers can easily be bought, no one in crypto uses Facebook, so Telegram numbers became a useful metric for gauging a project's support". That is why I expect that a project's Telegram group members count is positively associated with the percentage of hard cap raised and ICO return. A potential problem might be bounty campaigns and airdrops that are widespread among ICO projects, in which anyone can earn free tokens just by joining ICO's Telegram group, which inflates the number of group members in an artificial way. Though a good marketing strategy, handing out free tokens might devalue them in the eyes of investors and might skew the results of the regression.

Reddit subscribers

Reddit subscribers could be an interesting metric of the hype around a specific ICO, as it is a niche website, popular among tech enthusiasts and unlike on Facebook or Twitter, there is no mass buying of fake followers, or in this case, subscribers. As with Twitter and Telegram,

I expect that Reddit subscriber count is positively associated with the percentage of hard cap raised and ICO return.

Alexa rank

Alexa is a website that ranks websites based on popularity. The more visitors a website gets, and the more page views it has, the higher is its rank. The rank is calculated using the data for the past 3 months and is updated daily. I expect that Alexa rank is negatively associated with the percentage of hard cap raised and ICO return.

Percentage of token supply available for sale

Percentage of token supply available for sale is an interesting metric that shows how much of the total token supply is available for investors and how much for the team and partners. Fewer tokens available for sale should mean lower hard cap, so I expect that it is negatively associated with the percentage of hard cap raised. However, more tokens available to the public means fewer tokens kept for the team, which should decrease the dumping of the tokens from the team members. That is why I expect that the percentage of token supply available for sale is positively associated with ICO return.

GitHub account

GitHub is a web-based hosting and software development platform that offers private repositories and free public accounts that are commonly used to host open-source projects. Most good ICO projects have a public GitHub account, where they publish project's current code and let potential investors and interested parties inspect it. This is seen positively by the community, as it provides some degree of transparency about the status and the quality of the project and allows it to inspect the code for potential bugs and flaws. That is why I expect having a GitHub account is positively associated with the percentage of hard cap raised. As higher quality projects often have a GitHub account, I also expect that it is positively associated with ICO return.

Prototype/MVP

Having a prototype or a minimum viable product before the sale is seen as highly positive for the project, as this increases its legitimacy and makes the team look serious. As many ICO projects have nothing but an idea when they start a sale, having a working prototype is a good differentiator for a project. That is why I expect that it is positively associated with both the percentage of hard cap raised and ICO return.

Hard cap

The hard cap is the maximum amount a company wants to raise in an ICO. Naturally, the hard cap should be negatively associated with the percentage of hard cap raised, as ICOs with higher hard cap have a harder task of raising a higher percentage of their goal. I also expect that it is negatively associated with ICO return, as smaller ICOs should have a higher return potential, an effect also observed in the stock market and known as the small-cap effect.

End date

The increased competition that emerged in the second part of 2017 means that more ICOs are competing for investors' funds and attention. That is why I expect that both the percentage of hard cap raised and ICO return are decreasing with time.

When it comes to ICO return, some of the earliest ICOs such as Ethereum achieved abnormal returns, while in the second part of 2017 and in 2018, when ICOs started getting popular and the competition increased, returns expectedly became lower. Another factor to consider when checking returns in USD is the fact that cryptocurrency prices rose abnormally in recent years, so the early ICOs in 2015, 2016, and the first half of 2017 naturally have higher USD returns as the more recent ones.

USD raised

As with the hard cap, I assume that the higher the amount of funds raised, the lower is ICO return. As mentioned before, smaller ICOs should have a higher return potential as bigger ones, an effect known as a small-cap effect. I also expect a strong correlation between the hard cap and USD raised. However, a high amount of funds raised also signal strong demand in an ICO.

Token sale price

ICO investors prefer investing in ICOs with low nominal price, an effect known as nominal price illusion, which is found also in the stock market. I assume that the effect is even bigger in the cryptocurrency market, as there are more retail and less experienced investors than in the stock market. Even though this is irrational from the economic perspective, I expect that preference for buying lower-priced tokens will lead to token sale price being negatively associated with ICO return.

Dependent variables

Percentage of hard cap raised during the sale

Percentage of hard cap raised is calculated by dividing USD raised variable with hard cap variable. I use a percentage of hard cap raised as the independent variable determining the success of ICO in raising funds.

ICO return

ICO return is calculated by dividing current token price with a token sale price. I use ICO return as an independent variable for the second part of my hypotheses.

6.2 Data

Data on 1,611 ICOs was gathered from the icodata.io ended database. Out of those 1,611, 278 are missing all variables and are removed from the dataset. 1,333 remaining ICOs have raised $10.610 billion in total. Out of those, 480 ICOs have no data for the amount raised. This might be due to the fact that they did not reach their soft cap and returned money to the investors, did not announce the amount of funds raised, were scams, or were announced but never actually took place.

Data was rechecked and supplemented with data from ICO websites and their whitepapers, website icodrops.com (percentage of token supply available for sale), icobench.com, foundico.com (prototype/MVP), and ico-check.com (prototype/MVP).

Benedetti and Kostovetsky (2018, p. 13, 14) found my website icodata.io to have the most accurate data from 5 different ICO data sources they used in their research paper.

Data on following ICO variables were collected:

Independent:

- Twitter followers,
- Telegram users,
- Reddit subscribers,
- Alexa website rank,
- % of token supply available for sale,
- GitHub code repository (yes/no),
- Prototype/MVP (yes, no),
- ICO hard cap,
- End date,
- USD raised,

- Token sale price.

Dependent:

- Percentage of a hard cap that was raised during the sale,
- ICO return.

7 DESCRIPTIVE STATISTICS

Descriptive statistics of the whole dataset

Descriptive statistics of the relevant variables from the whole dataset of 1,333 collected ICOs are shown in Table 2. As many variables are missing from the dataset, pairwise deletion method is used in order to minimize the loss that would occur by using listwise deletion method.

Table 2: Descriptive statistics

	N (valid)	Mean	Median	Std. Deviation	0	1
ICO return	358	1,806	44	13,058		
% of HC raised	910	0.370	0.131	0.425		
Twitter followers	1,108	10,950	3,745	25,459		
Telegram members	614	8,852	3,660	14,379		
Reddit subscribers	444	2,322	347	7,233		
Alexa rank	1,279	3,094,709	975,604	4,468,763		
Hard cap	910	35,295,368	21,000,000	52,231,749		
% of tokens available	336	.559	.550	.212		
USD raised	852	12,452,679	4,700,000	24,864,622		
Token sale price	786	246	0.25	6540		
GitHub	1333				0.562	0.438
Prototype/MVP	344				0.567	0.434

The mean of the variable hard cap raised is 37 %. The median is 13.1 % of intended capitalization. Quite a low mean and even lower median suggest that ICOs are overconfident in setting their funding goals.

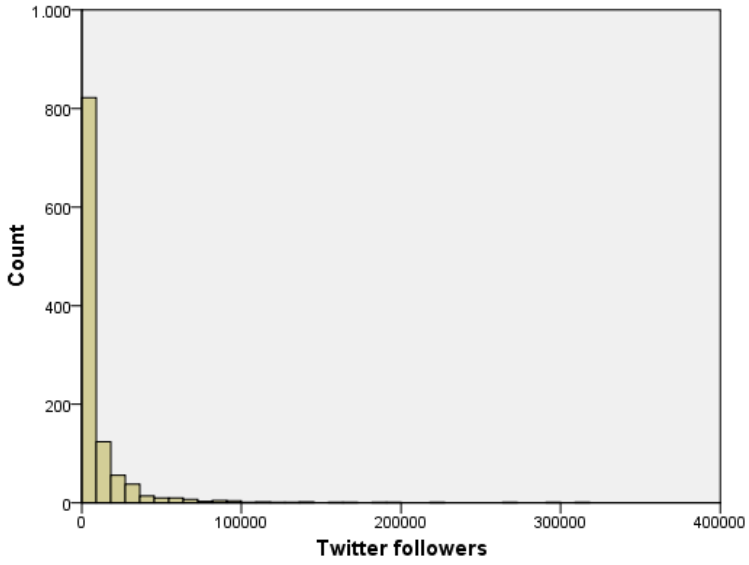
Median is lower than the mean at all variables, showing positive skewness in our data, which suggests that some extremely successful ICOs skew the overall statistics of ICOs. Instead of

those variables that show a high positive skewness, the natural logarithm of the variable is used in the models.

Histograms

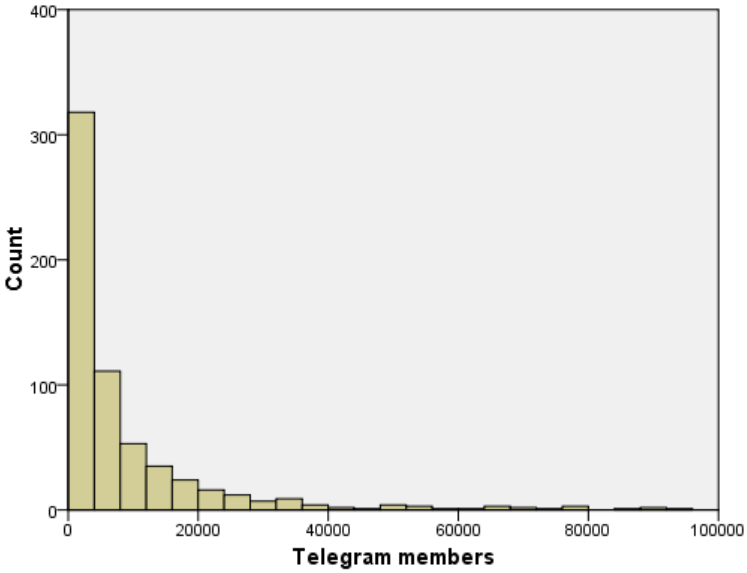
Independent variables

Figure 5: Twitter followers histogram



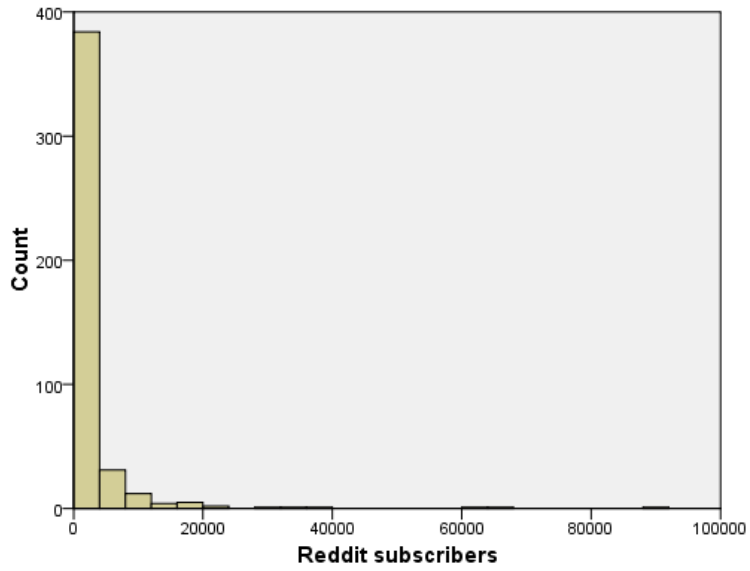
The x-axis in Figure 5 shows the number of Twitter followers and the y-axis shows the number of ICOs. A mean of 10,950 and a median of 3,745 show a high positive skewness.

Figure 6: Telegram members histogram



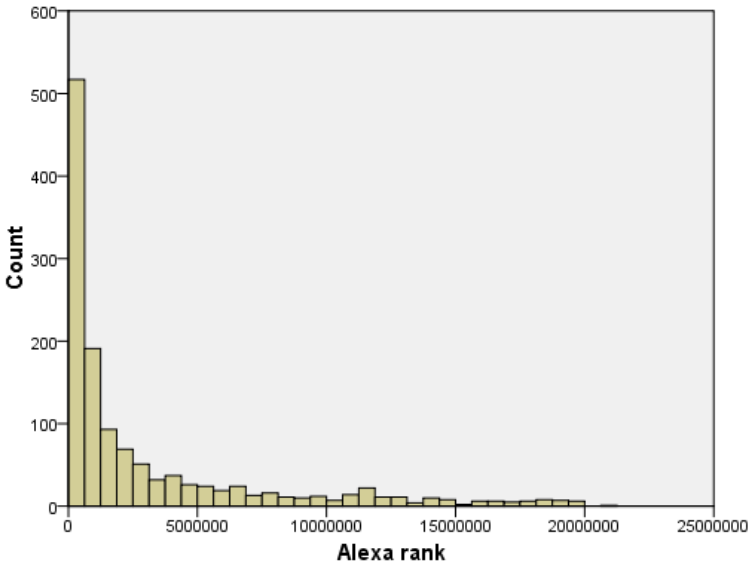
The x-axis in Figure 6 shows the number of Telegram members and the y-axis shows the number of ICOs. A mean of 8,852 and a median of 3,660 again show a high positive skewness.

Figure 7: Reddit subscribers histogram



The x-axis in Figure 7 shows the number of Reddit subscribers and the y-axis shows the number of ICOs. A mean of 2,322 and a median of 347 once more show a high positive skewness.

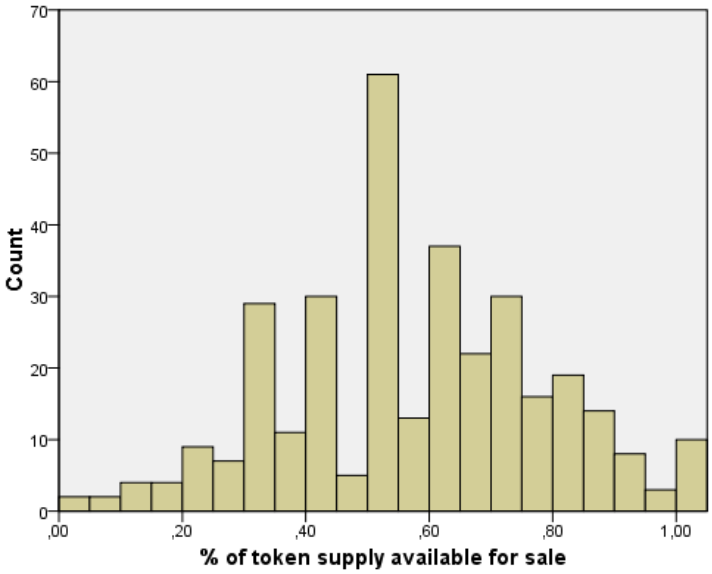
Figure 8: Alexa rank histogram



The x-axis in Figure 8 shows the Alexa rank and y-axis shows the number of ICOs. As with the first three social media statistics variables, a mean of 3,094,709 and a median of 975,604

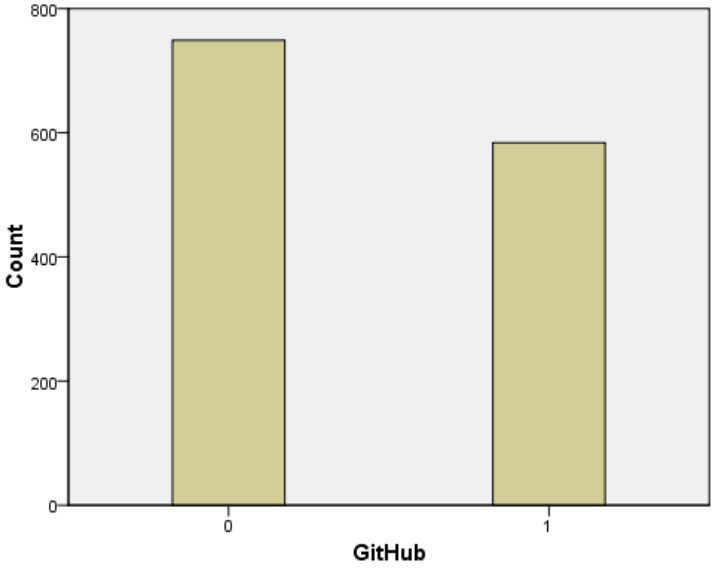
show a high positive skewness. A mean of 3,094,709 means that the website of the average ICO ranks 3,094,709 on the ranking of the most visited websites in the world.

Figure 9: Percentage of token supply available for sale histogram



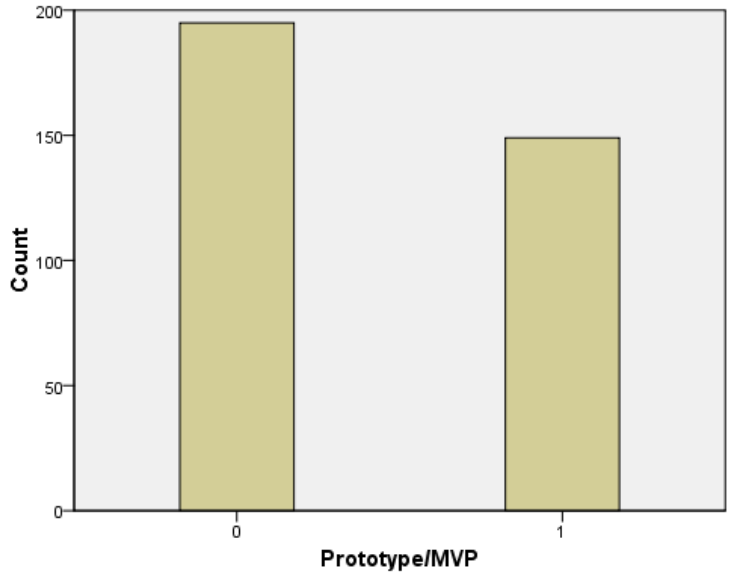
The x-axis in Figure 9 shows the percentage of token supply available for sale and the y-axis shows the number of ICOs. With a median of 55 % and a mean of 55.95 % the distribution of this variable is symmetric and has zero skewness. This means that in the average ICO project, only 55 % of the total token supply is available to the public, while 45 % of tokens remain to the team or its partners.

Figure 10: GitHub histogram



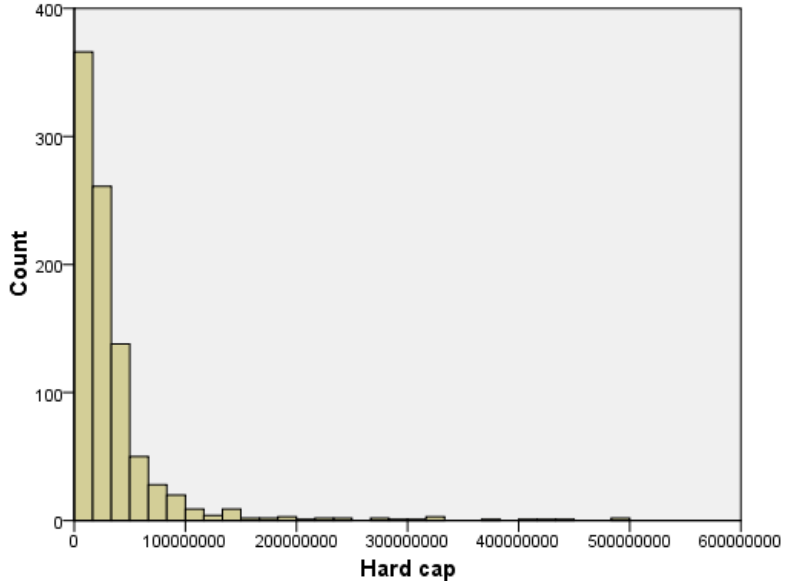
The x-axis in Figure 10 shows whether the ICO has a public GitHub account (1) or does not have one (0). The y-axis shows the number of ICOs. 56.2 % of ICOs do not have a GitHub account and 43.85 do have one.

Figure 11: Prototype/MVP histogram



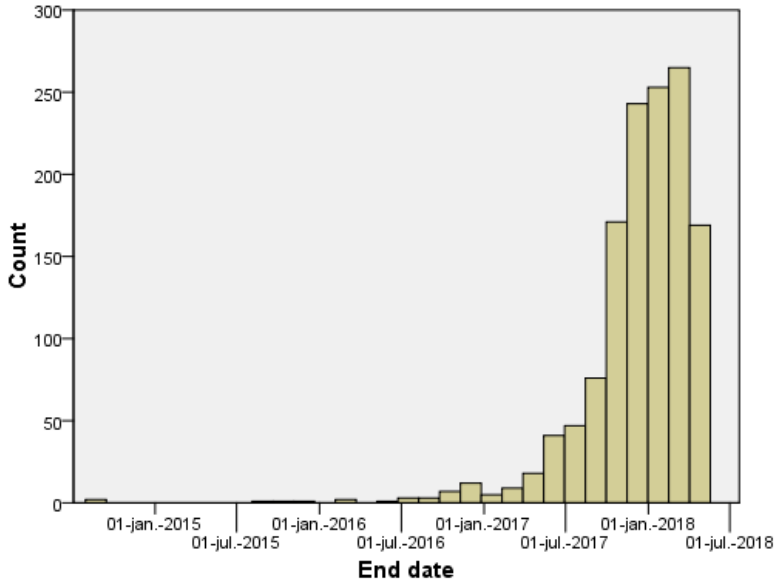
The x-axis in Figure 11 shows whether the ICO has a prototype or a minimum viable product (1) or does not have one (0). The y-axis shows the number of ICOs. 56.7 % of ICOs do not have a prototype or a minimum viable product AND 43.3 % do have one. This shows that the majority of ICOs have nothing but a white paper and marketing material at the time of the sale, showing the high risk and questionable promises of the ICO market.

Figure 12: ICO Hard cap histogram



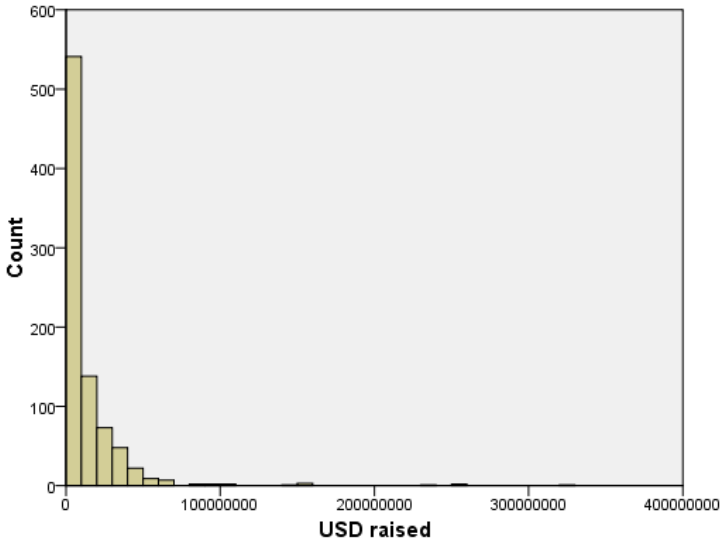
The x-axis in Figure 12 shows the hard cap in USD and the y-axis shows the number of ICOs. With a mean of $35.3 million and median of $21 million, this variable shows a high positive skewness. Outliers with huge hard caps of few hundred million USD show that ICO promoters are sometimes way too optimistic when setting their goals.

Figure 13: End date histogram



The x-axis in Figure 13 shows the end date and the y-axis shows the number of ICOs. The number of ICOs really started to take off in the second half of 2017 and peaked at the start of 2018.

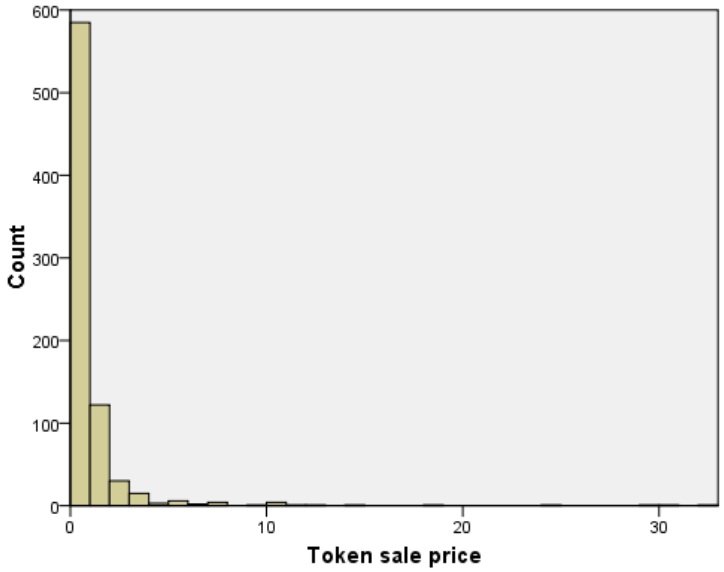
Figure 14: USD raised histogram



The x-axis in Figure 14 shows the funds raised in the USD and the y-axis shows the number of ICOs. USD raised variable shows a high positive skewness, with some outliers having

raised hundreds of million USD. The mean value is $12.5 million, and the mean is only $4.7 million, while most ICOs in the database did not actually raise any money.

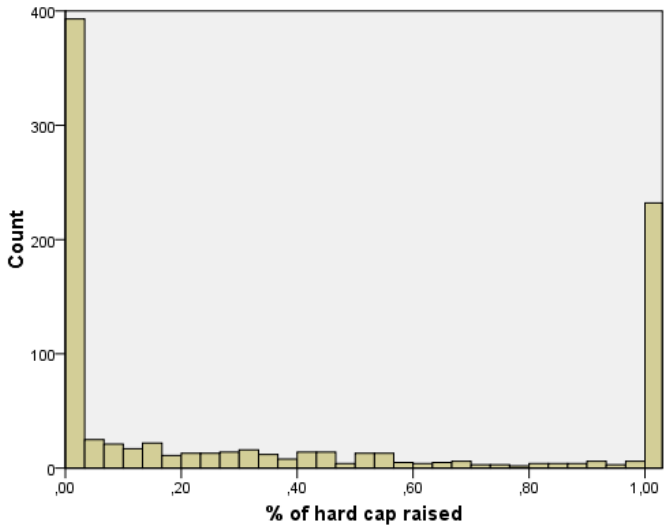
Figure 15: Token sale price histogram



The x-axis in Figure 15 shows the token sale price in USD and the y-axis shows the number of ICOs. I removed 6 largest outliers from the graph. While the mean of the variable is $246, the median is only $0.25, showing a large positive skewness. I calculated token sale price in USD by multiplying the final token sale price in ETH with the closing ETH price in USD on the last day of ICO.

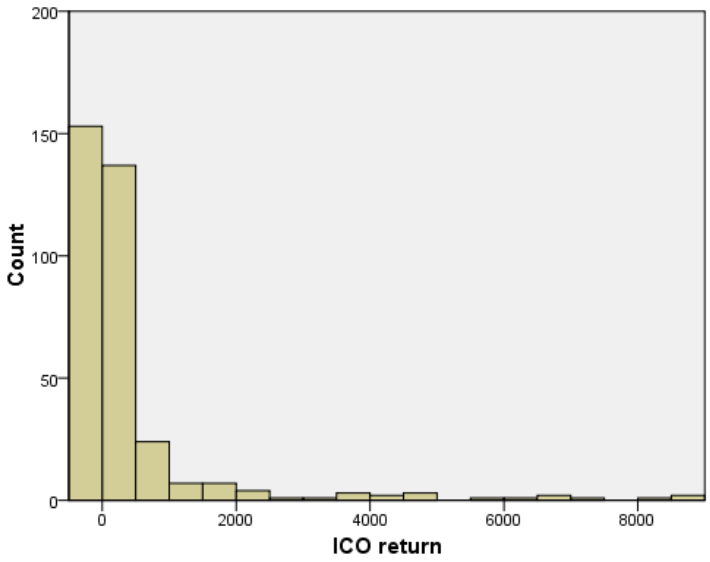
Dependent variables

Figure 16: Percentage of hard cap raised histogram



The x-axis in Figure 16 shows the percentage of a hard cap that was raised during the sale and the y-axis shows the number of ICOs. This variable will be used as a dependent variable determining the success of ICO in raising funds. Most ICOs either raised nothing or hit their hard cap.

Figure 17: ICO return histogram



I gathered ICO return data for 358 ICOs as of May 9^{th,} 2018. The x-axis in Figure 17 shows ICO return in percentage and the y-axis shows the number of ICOs. I removed 8 largest outliers with a return of more than 10,000 % from the graph. ICO with the largest return is Ethereum with a 210,568 % return, followed by Stratis with a 110,412 % return. Mean return value is 1,806 %, while a median value is only 44 %, showing that the return variable has a high positive skewness because of the highly successful outliers. That is why I use the natural logarithm of the variable in my models. 206 ICOs have a positive return and 152 ICOs have a negative return.

Correlations

Table 3: Pearson correlation matrix

Correlations											
		% of HC raised	LN Twitter followers	LN Telegram members	LN Reddit subscribers	LN Alexa rank	LN Hard cap	% of token supply available	Prototype/ MVP	GitHub	End date
Pearson Correlation	% of HC raised	1.000	**.471*** **	**.410*** **	**.560*** **	**-.451*** **	**-.127*** **	**-.100***	.011	**.109*** **	**-.315*** **
	LN Twitter followers		1.000	**.634*** **	**.730*** **	**-.595*** **	**.075***	-.015	.089	**.172*** **	**-.286*** **
	LN Telegram members			1.000	**.459*** **	**-.655*** **	**.083***	**-.159***	**.193****	**.115****	.065
	LN Reddit subscribers				1.000	**-.549*** **	.045	**-.119***	.003	**.080***	**-.403*** **
	LN Alexa rank					1.000	**-.149*** **	**.127***	**-.122***	**-.171*** **	-.011
	LN Hard cap						1.000	**-.154****	.009	.034	**.134*** **
	% of token supply a.							1.000	-.045	.039	**-.246*** **
	Prototype/MVP								1.000	.061	**.155****
	GitHub									1.000	.026
	End date										1.000

Pearson correlation coefficient ranges from -1 to 1 with a value of 0 implying there is no correlation between variables and 1 implying that there is a perfect correlation. Pearson correlation shows a high correlation between social media statistics variables. The highest correlated variables in Table 3 are the natural logarithm of Twitter followers and the natural logarithm of Reddit subscribers at 0.730, followed by the natural logarithm of Telegram members and the natural logarithm of Alexa rank at -0.655.

Table 4: Significance (1-tailed) matrix

Correlations											
		% of HC raised	LN Twitter followers	LN Telegram members	LN Reddit subscribers	LN Alexa rank	LN Hard cap	% of token supply available	Prototype/ MVP	GitHub	End date
Sig. (1-tailed)	% of HC raised	.	.000	.000	.000	.000	.000	.040	.425	.000	.000
	LN Twitter followers		.	.000	.000	.000	.014	.392	.054	.000	.000
	LN Telegram members			.	.000	.000	.028	.013	.003	.002	.055
	LN Reddit subscribers				.	.000	.190	.042	.483	.047	.000
	LN Alexa rank					.	.000	.010	.012	.000	.346
	LN Hard cap						.	.003	.437	.155	.000
	% of token supply a.							.	.207	.240	.000
	Prototype/MVP								.	.131	.002
	GitHub									.	.172
	End date										.

Descriptive statistics of the second, smaller dataset

Table 5: Descriptive statistics of the second dataset

	N (valid)	Mean	Median	Std. Deviation	0	1
ICO return	358	1,806	44	13,058		
% of HC raised	324	0.734	1	0.351		
Token sale price	358	23.451	.130	418		
Twitter followers	339	24,333	10,342	39,826		
Telegram members	207	11,820	6,752	15,088		
Reddit subscribers	219	4,162	1,199	9,789		
Alexa rank	358	347,682	347,682	2,259,953		
Hard cap	324	30,052,232	20,439,000	36,082,436		
USD raised	358	19,639,893	12,772,350	29,306,671		
% of tokens available	336	.559	.550	.212		
GitHub	358				0.394	0.606
Prototype/MVP	344				0.567	0.434

As they are already trading on the secondary market, ICOs features in this second dataset succeeded in raising their soft cap funding amount, which many ICOs do not even achieve. As shown in Table 5, 358 out of 1,333 collected ICOs are listed on coinmarketcap.com, meaning that only 26.86 % of ICO are trading on the secondary market. However, some of the recently ended ICOs might be listed in the future.

By comparing descriptive statistics of the second dataset (ICOs trading on the secondary market) with the descriptive statistics of the whole dataset, it is clear that they are better performing across all metrics, which was expected, as they have already succeeded in raising the funds. They have more Twitter followers (mean of 24,333 and median of 10,342 vs. mean of 10,950 and median of 3,745), more Telegram members (mean of 11,820 and median of 6,752 vs. mean of 8,852 and median of 3,660), more Reddit subscribers (mean of 4,162 and median of 1,199 vs. mean of 2,322 and median of 347), higher Alexa rank (mean of 347,682 and median of 347,682 vs. mean of 3,094,709 and median of 975,604), and raised more percentage of their hard cap (mean of 0.734 and median of 1 vs. mean of 0.370 and median of 0.131).

Correlations

Table 6: Pearson correlation matrix 2

Correlations													
		LN ICO return	LN Twitter followers	LN Telegram members	LN Reddit subs.	LN Alexa rank	% of token supply a.	GitHub	Prototype/MVP	LN Hard cap	LN USD raised	LN Token sale price	End date
Pearson Correlation	LN ICO return	1.000	**.464*** **	-.086	**.532*** **	**-.234*** **	.087	.006	-.082	**-.268*** **	**-.191*** **	**-.319*** **	**-.535** **
	LN Twitter followers		1.000	**.392*** **	**.693*** **	**-.393*** **	-.015	.075	.089	.057	**.213*** **	-.068	**-.251** **
	LN Telegram members			1.000	**.322*** **	**-.459*** **	**-.159***	.094	**.193** **	**.275*** **	**.448*** **	.018	**.425** **
	LN Reddit subscribers				1.000	**-.372*** **	**-.119***	.061	.003	.036	**.208** **	**-.135***	**-.286** **
	LN Alexa rank					1.000	**.127***	**-.092***	**-.122***	**-.216*** **	**-.375*** **	**.098***	-.068
	% of token supply a.						1.000	.039	-.045	**-.154** **	**-.231*** **	**.122***	**-.246** **
	GitHub							1.000	.061	**.099***	.070	.045	.074
	Prototype/MVP								1.000	.009	**.092***	-.035	**.155** **
	LN Hard cap									1.000	**.678*** **	**.168** **	**.291** **
	LN USD raised										1.000	**.200*** **	**.395** **
	LN Token sale price											1.000	.013
	End date												1.000

Table 7: Significance (1-tailed) matrix 2

Correlations

		LN ICO return	LN Twitter followers	LN Telegram members	LN Reddit subs.	LN Alexa rank	% of token supply a.	GitHub	Prototype/MVP	LN Hard cap	LN USD raised	LN Token sale price	End date
Sig. (1-tailed)	LN ICO return	.	.000	.109	.000	.000	.056	.455	.065	.000	.000	.000	.000
	LN Twitter followers		.	.000	.000	.000	.392	.085	.054	.159	.000	.107	.000
	LN Telegram members			.	.000	.000	.013	.090	.003	.000	.000	.401	.000
	LN Reddit subscribers				.	.000	.042	.183	.483	.305	.001	.023	.000
	LN Alexa rank					.	.010	.041	.012	.000	.000	.032	.099
	% of token supply a.						.	.240	.207	.003	.000	.013	.000
	GitHub							.	.131	.037	.093	.198	.081
	Prototype/MVP								.	.437	.045	.258	.002
	LN Hard cap									.	.000	.001	.000
	LN USD raised										.	.000	.000
	LN Token sale price											.	.405
	End date												.

As with the first data set, the Pearson correlation shows a high correlation between social media statistics variables. The highest correlated variables in Table 7 are the natural logarithm of Twitter followers and the natural logarithm of Reddit subscribers at 0.693, followed by the natural logarithm of a hard cap and the natural logarithm of USD raised at 0.678. This confirms my previous assumption that hard cap and USD raised variables are strongly correlated.

8 MODELS ESTIMATION

8.1 Model estimation 1

I start by testing ICO success in raising funds hypotheses (1-9) where the dependent variable is the percentage of hard cap raised. The method used is a standard multiple linear regression (enter method) with pairwise deletion method. The standard enter method enters all the independent variables simultaneously. I chose pairwise deletion method because listwise deletion method would remove all the data of an ICO that has one or more missing values while pairwise deletion method attempts to minimize that loss by measuring the strength of the relationship between two variables on a case by case basis. Natural logarithm of the variable will be used for those variables that do not have a symmetric distribution.

Model 1 – Enter method

Dependent variable:

- Percentage of hard cap raised

Independent variables:

- Natural logarithm of Twitter followers
- Natural logarithm of Telegram users
- Natural logarithm of Reddit subscribers
- Natural logarithm of Alexa website rank
- Natural logarithm of ICO hard cap
- % of token supply available for sale
- Prototype/MVP (yes, no)
- GitHub code repository (yes/no)
- End date

Table 8: Model 1 summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.647[a]	.418	.391	.332

a. Predictors: (Constant), End date, LN Alexa rank, GitHub, LN Hard cap, Prototype/MVP, % of token supply available for sale, LN Telegram members, LN Reddit subscribers, LN Twitter followers

Table 9: Model 1 coefficients

Coefficients[a]							
	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	5.064	1.282		3.951	.000		
LN Twitter followers	-.008	.021	-.039	-.404	.687	.324	3.088
LN Reddit subscribers	.058	.018	.301	3.269	.001	.362	2.762
LN Telegram members	.038	.019	.173	2.054	.041	.433	2.308
LN Alexa rank	-.056	.022	-.205	-2.509	.013	.461	2.171
LN Hard cap	-.062	.021	-.169	-2.965	.003	.943	1.060
% of token supply a.	-.186	.121	-.093	-1.543	.125	.849	1.178
Prototype/MVP	-.015	.049	-.017	-.305	.761	.938	1.067
GitHub	.045	.049	.053	.931	.353	.948	1.055
End date	-2.445E-10	.000	-.217	-3.118	.002	.637	1.569

a. Dependent Variable: % of HC raised

As shown in Table 9, by using the standard multiple linear regression (enter method), I ended up with 5 statistically significant variables that explain the variability of the dependent variable: the natural logarithm of Reddit subscribers, the natural logarithm of Telegram members, the natural logarithm of Alexa rank, the natural logarithm of a hard cap and end date.

When it comes to multicollinearity, the natural logarithm of Twitter followers' variable has the highest VIF of 3.088, followed by natural logarithm of Reddit subscribers with a VIF score of 2.762, the natural logarithm of Telegram members with a VIF score of 2.308 and the natural logarithm of Alexa rank with a VIF score of 2.171. Variance inflation factor or VIF is a measure of multicollinearity (correlation between independent variables) in the model. The moderate collinearity between social media statistics was also seen previously in the correlation matrix.

As shown in Table 8, R square is 0.418, meaning that 41.8 % of the variance in the percentage of hard cap raised can be explained by our model.

Reddit subscribers

Based on the findings, I reject the null hypothesis and accept hypothesis 3. Reddit subscribers are positively associated with the percentage of hard cap raised. In line with my expectations, having more Reddit subscribers obviously signals more interest and hype surrounding an ICO.

What was less expected is the fact that Reddit subscribers are the most significant variable in the model, more than the other social media statistics variables, such as Twitter followers, Telegram members, and Alexa rank. I also did a bivariate regression to map out the relationship between Reddit subscribers and the percentage of hard cap raised.

Alexa website rank

I can reject the null hypothesis and accept the hypothesis 4. Alexa rank is negatively associated with the percentage of hard cap raised. The negative relationship was expected, as better rank means ICO website attracted more visitors, some of which became investors.

Hard cap

I can reject the null hypothesis and accept the hypothesis 8. The hard cap is negatively associated with the percentage of hard cap raised, which makes sense, as ICOs with higher hard cap have a harder task of raising a higher percentage of the hard cap.

End date

I can also reject the null hypothesis and accept the hypothesis 9. End date is negatively associated with the percentage of hard cap raised, meaning that ICOs get less successful with time. This is probably due to the increased competition, as more and more ICOs compete for investors' funds.

Telegram group members

I can reject the null hypothesis and accept the hypothesis 2. Telegram group members are positively associated with the percentage of hard cap raised. The positive relationship was expected, as many investors consider Telegram members the main metric for gauging a project's support and hype surrounding it.

Insignificant variables

Twitter followers

Natural logarithm of Twitter followers is not statistically significant. The hypothesis 1 cannot be accepted. This shows that Twitter followers, which can be easily bought, are not a true representation of the hype surrounding an ICO and are not associated with the success of ICO in raising funds.

Percentage of token supply available for sale

Natural logarithm of the percentage of token supply available for sale is not statistically significant. The hypothesis 5 cannot be accepted.

Prototype/MVP

Prototype/MVP is not statistically significant. The hypothesis 7 cannot be accepted. In my opinion, this proves that ICO investors are not rational and do not put a lot of effort into actually researching the status of the project they invest in. During the second half of 2017, when crypto prices exploded, ICO investors did not really care about the underlying product of the ICOs, as they could easily resell them if only they got into the sale. The so-called greater fool theory states that the price of the asset is not determined by its intrinsic value, but by the beliefs and expectations of the market. As there is no actual intrinsic value in token prices, investors were buying them just to resell them for a profit to the "greater fool".

GitHub

GitHub is not statistically significant. The hypothesis 6 cannot be accepted. As with prototype/MVP variable, this shows that the underlying status of the product and transparency are not important to ICO investors, as they believe they will be able to resell the tokens with a profit anyway.

8.2 Model estimation 2

In this chapter, I will test ICO return hypotheses (10-20) where the independent variable is the ICO return. The method used will be a standard multiple linear regression (enter method) with pairwise deletion method. The standard enter method enters all the independent variables simultaneously. As in the first model, the natural logarithm of the variable will be used for those variables that do not have a symmetric distribution.

Model 2 – Enter method

Independent variable:

- Natural logarithm of ICO return

Dependent variables:

- Natural logarithm of ICO hard cap
- Natural logarithm of USD raised
- End date (time)
- Natural logarithm of the Token sale price
- GitHub code repository (yes/no)
- Natural logarithm of Twitter followers
- Natural logarithm of Telegram users
- Natural logarithm of Reddit subscribers

- Natural logarithm of Alexa website rank
- % of token supply available for sale
- Prototype/MVP (yes, no)

As only 113 ICOs have all the above variables, I chose the pairwise deletion method in order to use more of the collected data. By using the listwise deletion method, I would only end up with 113 ICOs that have all the variables.

Table 10: Model 2 summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the
1	.752[a]	.566	.526	1.238

a. Predictors: (Constant), LN USD Raised, GitHub, Prototype/MVP, LN Token sale price, LN Twitter followers, % of token supply available for sale, LN Alexa rank, End date, LN Hard cap, LN Telegram members, LN Reddit subscribers

Table 11: Model 2 coefficients

Coefficients[a]							
	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1 (Constant)	139.195	39.173		3.553	.001		
LN Twitter followers	.261	.134	.178	1.943	.054	.436	2.295
LN Telegram members	-.169	.112	-.132	-1.509	.134	.474	2.111
LN Reddit subscribers	.330	.104	.290	3.166	.002	.434	2.302
LN Alexa rank	-.240	.109	-.162	-2.199	.030	.668	1.496
LN Hard cap	-.258	.146	-.148	-1.766	.080	.520	1.922
LN USD Raised	-.018	.123	-.014	-.145	.885	.378	2.647
LN Token sale price	-.203	.058	-.227	-3.489	.001	.859	1.164
Prototype/MVP	-.188	.226	-.052	-.830	.408	.936	1.068
% of token supply a.	.431	.551	.051	.781	.436	.865	1.156
End date	-.003	.001	-.292	-3.288	.001	.463	2.161
GitHub	.078	.226	.021	.343	.732	.965	1.037

a. Dependent Variable: LN Return

As shown in Table 11, there is some moderate multicollinearity between the variables, namely between social media statistics variables LN Twitter followers, LN Telegram

members and LN Reddit subscribers, and between LN Hard cap and LN USD raised. The natural logarithm of USD raised has the highest VIF of 2.647, followed by the natural logarithm of Reddit subscribers with a VIF score of 2.302, the natural logarithm of Twitter followers with a VIF score of 2.295 and end date with a VIF score of 2.161.

There were 5 statistically significant variables in our model: End date, LN Reddit, LN Token sale price, LN Hard cap, and LN Alexa rank.

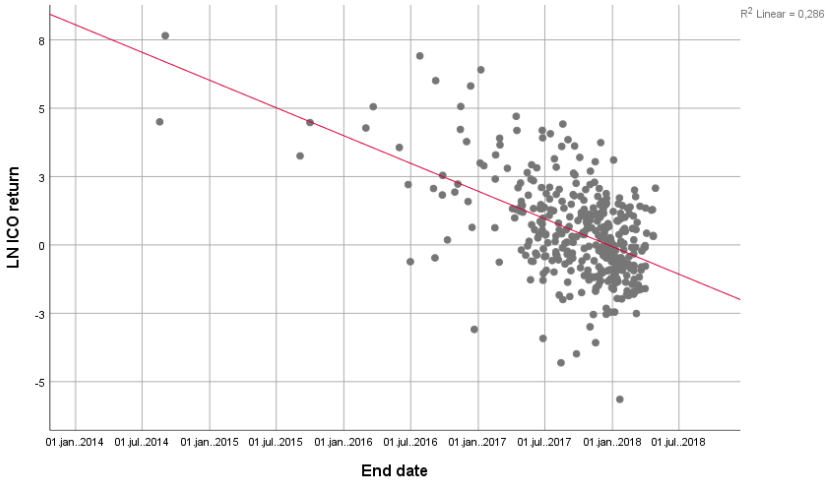
As shown in Table 10, R Square is 0.566, meaning that 56.6 % of ICO return can be explained by our model.

While R square is quite high, more variables would be needed in order to successfully predict ICO return for investment purposes.

End date

I can reject the null hypothesis and accept hypothesis 18. End date is negatively associated with ICO return, confirming that ICO returns have been declining with time, as was the case with the percentage of hard cap raised.

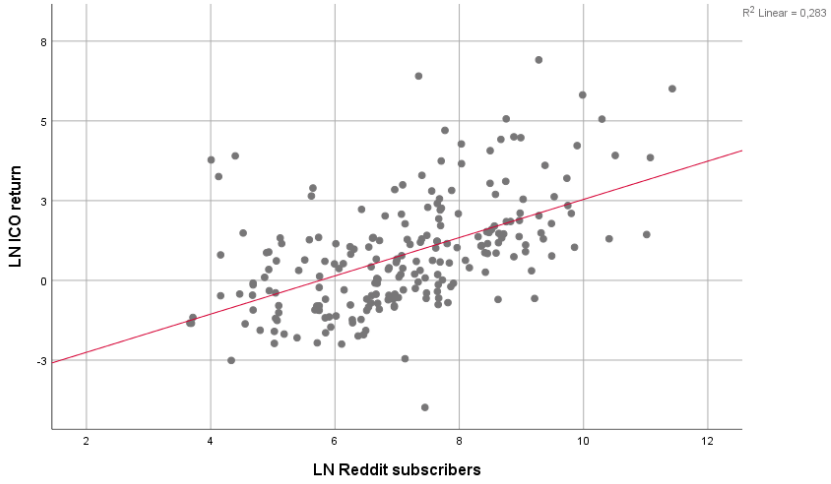
Figure 18. ICOs by End date and ICO return



Reddit subscribers

I can reject the null hypothesis and accept the hypothesis 12. Reddit subscribers' variable is positively associated with ICO return, as was the case with the percentage of hard cap raised. It is also again the social media statistics variable that gives the most statistically significant improvement of the fit.

Figure 19. ICOs by Reddit subscribers and ICO return



Token sale price

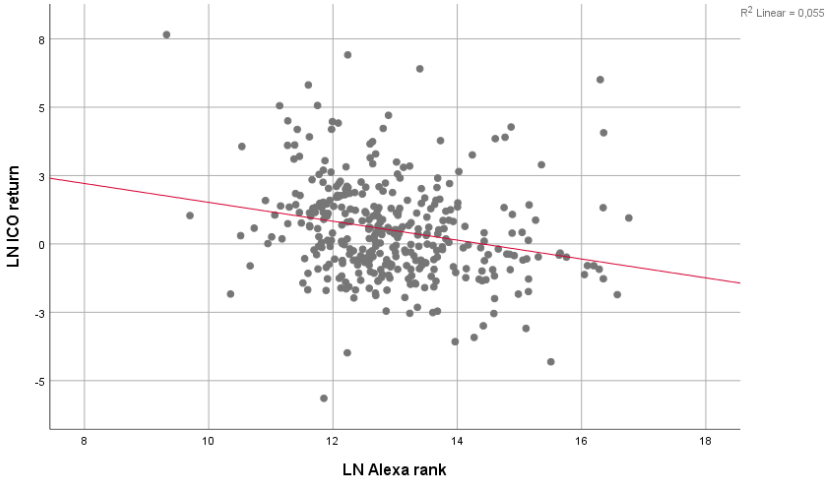
I can reject the null hypothesis and accept the hypothesis 20. Token sale price is negatively associated with ICO return, confirming that investors prefer lower priced tokens, an effect known in the stock market as nominal price illusion.

Figure 20: ICOs by Token sale price and ICO return

Alexa rank

I can reject the null hypothesis and accept the hypothesis 13. Alexa rank is negatively associated with ICO return. ICOs with better Alexa rank attract more potential users and investors to their website, which is a sign of higher demand and interest.

Figure 21: ICOs by Alexa rank and ICO return



Insignificant variables

Telegram group members

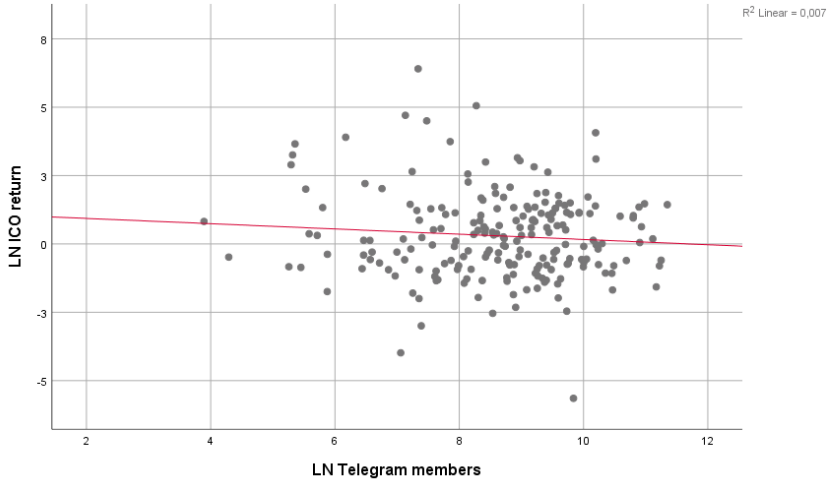
Telegram group members variable is not statistically significant. The hypothesis 11 cannot be accepted. Telegram group members are not associated with ICO return.

Even though Telegram group members' coefficient is not statistically significant at a 90 % confidence interval, it is negative, contrary to all expectations.

This could possibly be explained by bounty campaigns and airdrops. Describing these promotional campaigns, Xiao (2018) wrote: "Called "airdrops," these cryptocurrency freebies are used to incentivize a broad range of user behavior, from joining the company's Telegram community and promoting their project on social media, to actually paying for more of their project's tokens."

Joining a project's Telegram group often earns users a small number of free tokens, while a team benefits from the perceived support for the project. While not statistically significant, my result suggests that this artificial way of boosting a project's popularity may hurt the real ICO investors, as users who receive free tokens are in most cases just waiting to sell them as soon as they begin trading on the secondary market, thus driving down prices.

Figure 22: ICOs by Telegram members and ICO return



Twitter followers

Natural logarithm of Twitter followers is not statistically significant. The hypothesis 10 cannot be accepted. However, it is statistically significant at a 90 percent confidence interval and the coefficient is positive, coming close to my initial hypothesis.

USD raised

Natural logarithm of USD raised is not statistically significant. The hypothesis 19 cannot be accepted. Despite the preference, ICO investors for smaller capped ICOs, USD raised is not associated with ICO return. The small-cap effect found in the stock market does not exist in the ICO market.

Hard Cap

The natural logarithm of a hard cap is not statistically significant at a 95 percent confidence interval. The hypothesis 17 cannot be accepted. However, the variable is statistically significant at a 90 percent confidence interval and the coefficient is negative, coming close to my initial hypothesis.

Prototype/MVP

Prototype/MVP is not statistically significant. The hypothesis 16 cannot be accepted. As was the case with ICO success, the prototype/MVP is also not associated with ICO return. Not only do investors not care about the status of the product they invest in during the sale, they apparently also do not care about it once the tokens hit the market, confirming the irrationality of the market.

GitHub

GitHub is not statistically significant. The hypothesis 15 cannot be accepted. As was the case with ICO success, GitHub is also not associated with ICO return. The performance of the tokens on the market is not associated with having a public code. The fact that ICOs which published their code do not outperform those who did not is again the proof of irrationality and unpredictability of the market.

Percentage of token supply available for sale

Percentage of token supply available for sale is not statistically significant. The hypothesis 14 cannot be accepted. Percentage of token supply available for sale is not associated with ICO return, showing that the dumping of tokens from the team is not putting a lot of pressure on the price of the tokens. Perhaps the more tokens a team keeps for itself, the more its incentive aligns with that of the investors and they work harder to make the project a success.

CONCLUSION

As it was somehow expected, the hype seems to be the most important determinant for both the success of the ICO itself and ICO return on the secondary exchanges. When it comes to fundraising, project's social media statistics, such as Telegram group members and Reddit subscribers are positively associated with the percentage of hard cap raised by an ICO, while Alexa rank is negatively associated (the lower the number, the better). Twitter followers are not significantly associated with the percentage of hard cap raised, perhaps due to mass buying of fake Twitter followers by ICOs. Between 9 % and 15 % (up to 48 million) of active Twitter accounts are reported to be bots, designed to artificially boost the popularity of certain accounts or themes (Varol, Ferrara, Davis, Menczer, & Flammini, 2017). Anyone can easily buy thousands of fake Twitter followers for as little as few USD and the practice is widespread among ICO projects and brands in general.

More interestingly, GitHub account and project's prototype or MVP are not associated with the percentage of hard cap raised, implying that ICO investors do not really care about the actual status of the product they invest in and whether its code is public. This is reminiscent of irrational speculative activity by investors during the time of previous major speculative asset bubbles, such as during the South Sea Bubble in the 18th century, and is, in my opinion, a great proof that extraordinary rise in crypto prices in the second half of 2017 was indeed a bubble.

The end date is negatively associated with the percentage of hard cap raised, most likely as a result of more ICOs and greater competition for funds starting in the second half of 2017. Only 114 ICOs were completed before July 2017 and 1219 ICOs were completed after that.

When it comes to ICO return on the secondary market, I confirmed that the token sale price is associated with ICO return. The preference of ICO investors for lower-priced tokens, therefore, makes sense as the irrationality of the ICO market and the lack of any real fundamentals on which to price tokens seem to reward investing into tokens with low nominal prices. The preference for lower prices assets between individual investors is a phenomenon also found in the stock market and known as the nominal price illusion.

Reddit subscribers and Twitter followers (only significant at 90 % confidence interval) are both positively associated with ICO return, while Alexa rank is negatively associated, as expected. Surprisingly, I found out that the project's Telegram group members are negatively associated with ICO return (although not statistically significant at 90 % confidence interval), likely as a result of bounty campaigns and airdrops, which effectively dilute the value of tokens that are bought during the sale. While these campaigns are a good promotion for the ICO (Telegram group members are positively associated with the percentage of hard cap raised), they are not a good long-term strategy. ICO investors should, therefore, be careful next time they invest in an ICO with a lot of Telegram group members and bounty campaign, as the hype surrounding them is artificial and will likely not last after an ICO.

Both hard cap and USD raised are negatively associated with ICO return. However, they are surprisingly not statistically significant (hard cap is only significant at 90 % confidence interval), not confirming my hypothesis that smaller ICOs have a higher return potential, an effect observed in the stock market and known as the small-cap effect.

Time is negatively associated with ICO return, confirming that ICO returns have declined over time. This is likely due to the increased competition in the ICO market starting in the second half of 2017 and the fall in crypto prices at the start of 2018, which lowered the returns in USD for all the ICOs.

While ICOs are the future of fundraising in my opinion, the market is very much still in the early stages and is not in any way an efficient capital market. Still, an average return of those ICOs that are trading on the secondary market (not of all ICOs) is 1,806 %, which explains a lot about why investors continue to rush into the market, even though the average return is steadily decreasing. However, there are some ICOs with extreme returns while 152 out of 358 collected ICOs that are trading on the secondary market have a negative return. ICO investors should, therefore, be careful before investing in an ICO and do a proper research of the project and the team behind it. This could be a problem, as I found out that having a prototype or a minimum viable product and a public GitHub account does not really matter for investors and does not make any difference when tokens start trading on the secondary market. Perhaps a longer time horizon is needed for the higher quality projects to come on top or perhaps these two variables are not actually representable of the ICO quality.

Much more research is needed to fully understand the various factors behind the successful ICO fundraising and returns. In addition to important, but hard to quantify factors, such as the competence of the team, I assume there are also some randomness and luck involved.

With time, increased ICO regulation, better disclosure standards, and better access to information should contribute to more transparent ICO market, which will enable more protection to investors. Hopefully, my findings can help individual ICO investors do better research and make better investment decisions.

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