INITIAL COIN OFFERINGS
WHAT DRIVES THE TOKEN PRICE ON THE SECONDARY MARKET?

Word count: 13.450

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Master's Dissertation submitted to obtain the degree of:

Master of Science in Business Economics

Academic year: 2017 – 2018

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Abstract

In an Initial Coin Offering (ICO), a cryptocurrency project raises money by creating and selling their own tokens. It can best be described as a conjunction between crowdfunding and blockchain. This phenomenon caused new ventures to raise over $6.5 billion in the first four months of 2018. This paper presents a model that addresses three major questions. First, we found evidence that the community size has a positive influence on the token price. Furthermore, by looking at the composition of the teams, we found that tech teams perform better than business teams. Finally, we did not find evidence of the product development influence.

Acknowledgement

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Glossary of Terms

CEO   Chief executive officer

CTO   Chief technology officer

ERC20   Ethereum request for comment

EU   European Union

GDP   Gross domestic product

ICO   Initial coin offering

IPO   Initial public offering

LLP   Limited liability partnership

MVP   Minimum viable product

POC   Proof of concept

SEC   Securities and exchange commission

SNS   Social network service

US   United States

VIF   Variance inflation factor

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I.   Introduction

While many people in the cryptocurrency eco-system believed 2017 became the year of the Initial Coin Offerings (ICOs, also referred to as Token sales), 2018 seems to show that last year was only the introduction of this novel phenomenon. In the first four months of 2017, $141 million was raised in 33 conducted ICOs (mean $4,3 million). Still, 2017 concluded with a total amount raised of $5.3 billion (Adhami, Giudici, & Martinazzi, 2018) and will go down in history as the year ICOs became popularized by the mass crypto investors. Blockchain projects were being inundated with cash[1]. However, in the final quarter of 2017, it became increasingly apparent that ICOs where evolving. The market matured, individual investors became much more discerning. Institutional investors entered the marketplace (ICORating, 2018) which led to a significant increase in the amounts and levels of scrutiny[2]. Exactly one year later, in the first four months of 2018 over $6.5 billion was raised by 229 companies (mean $28,4 million)[3]. To put this into context, the collective value raised by ICOs in the first 4 months of 2018 equals the yearly Gross Domestic Product (GDP) of Gambia, Liberia, and South Sudan, combined!

ICOs are defined by (Amsden & Schweizer, 2018, p. 7) as *an unregulated form of crowdsale to raise funds through a blockchain by selling venture-related tokens or coins in exchange for legal tender or cryptocurrencies.* We largely confirm this notion. However, the definition is not sufficient in the context of our research. We believe that the ICO space has two major groups and both should be present in the definition. First, you have the *venture* selling the tokens to raise funds, as referred to in the definition of (Amsden & Schweizer, 2018). Second is the group that buys these tokens in exchange for other more established cryptocurrencies, like Bitcoin or Ethereum (Fahmy, 2018). That is why we would add *"by selling venture-related tokens or coins to investors and crypto-enthusiasts"*. It is exactly this investor-side that we wish to disclose in this paper.

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[1] *The Bancor Foundation raised $153 million worth of ether in three hours* – see https://qz.com/1004892/the-bancor-ico-just-raised-153-million-on-ethereum-in-three-hours/
[2] *The evolution of the ICO, an analysis of the history and trends to date*, Emmet Creighton – see https://irishtechnews.ie/the-evolution-of-the-ico-an-analysis-of-the-history-and-trends-to-date/
[3] Data is obtained on the Coinschedule website – see https://www.coinschedule.com/stats.html?year=2018

It was at the 2013 San Jose Bitcoin conference where panelist, J.R. Willett, promoted the idea of Initial Coin Offerings by the following words: *"If you wanted to, today, start a new protocol layer on top of Bitcoin, a lot of people don't realize, you could do it without going to a bunch of venture capitalists."*[4] J.R. Willet is also the author of "The Second Bitcoin Whitepaper" which was published a few months prior to the conference. In his paper (Willet, 2012, p. 1) claims that *"the existing Bitcoin network can be used as a protocol layer, on top of which new currency layers with new rules can be built without changing the foundation."* Later, Willet will launch the *Mastercoin*[5], raising $680,000, which will go down in history as the first ever ICO.

For new ventures to succeed, they must obtain financial resources (Gompers, Lerner, Kovner, & Scharfstein, 2009; Boreiko, 2017) Traditionally, new business ventures target angel investors in the early stage and later rely on venture capital funds (Bhatia & Freeman, 2009). Eventually, the target then is to conduct an initial public offering (IPO) and become tradeable on a stock exchange (Barry, Muscarella, Peavy, & Vetsuypens, 1990). In this process, numerous intermediaries (investment banks, lawyers, auditors, advisors) take their share of the pie. Blockchain technology and the ICO phenomenon enables ventures to cut these intermediaries. According to (Tapscott & Tapscott, 2017) Capgemini Consultancy estimated that consumers could save up to $16 billion in banking and insurance fees each year through blockchain-based applications. (Kaal & Dell'Erba, 2017, p. 1) stated that *"ICOs are the most efficient means of financing entrepreneurial initiatives in the history of capital formation."* It is fairly easy for a blockchain start-up to raise money through an ICO. The money is raised quickly without strings attached.

As virtual currencies have become more widespread, the attention of financial regulators and financial institutions has been attracted. A substantial portion of the academic research regarding the cryptocurrency eco-system consists of regulation implications of ICOs and cryptocurrencies in general. Often studies try to illustrate — using the Howey test — whether or not tokens should be considered as a security (Rohr & Wright, 2017). In February 2018, during the U.S. Senate hearing on cryptocurrency, Securities and Exchange Commission (SEC) chairman Jay Clayton declared: *"I*

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[4] *Here's the man who created ICOs and this is the new token he's backing*, Laura Shin - see
https://www.forbes.com/sites/laurashin/2017/09/21/heres-the-man-who-created-icos-and-this-is-the-new-token-hes-backing/#b046f6511839
[5] Mastercoin rebranded to Omni in 2015 – see http://www.omnilayer.org

believe every ICO I've seen is a security"[6]. With this quote, he illustrated the standpoint of the SEC to treat ICOs like security offerings. (Hacker & Thomale, 2017) used a milder approach to the problem. Their study revealed that at least some types and hybrid forms of tokens are subject to EU securities regulation. It is clear that the ICO space is currently still a bit 'Wild West'. That led the Chinese authorities[7] to ban all ICOs in early September 2017. Numerous blockchain specialists believe that this type of policy throws the baby out with the bath water and could potentially lead to a backlog of the Chinese tech economy in the near future. We understand the concerns of regulatory treatment, or in fact the absence of regulatory treatment, and we truly believe this discussion will be crucial in the next step of mass adoption. Still, we do not intend to address this problem in this paper.

The scope of this paper is to be found on the secondary cryptocurrency market. The study is devoted to finding new insights on the determinants of the short-term relative token returns. Answers to three fundamental questions, concerning *Community size*, *Team composition*, and *Product development* are provided and discussed. We established a sample of 170 succeeded ICOs with a comprehensive set of 14 explanatory variables. The variables can be distinguished in two major groups. First, we comprised characteristics of the ICO process (e.g. amount raised, industry, duration, ICO price). Next, we gathered post-ICO data (e.g. community total, team composition, product development). All of the included ICOs were successfully executed and listed on an exchange. The short history of ICOs has not been free of scams and other fraudulent practices as showed by (Böhme, Christin, Edelman, & Moore, 2015; Yermack, 2015). Still, our focus is to find insights on the determinants of the relative returns of succeeded ICOs. That is why there are no failed ICOs comprised in the model. The reader should be aware of this survivorship bias.

To create a benchmark, we included the global cryptocurrency market cap[8]. Both, token price and global market cap are registered. Once at the time the ICO ended, and once 3 months after. The *Relative returns* thus represent the outperformance of the tokens relative to the benchmark. Using a multivariate regression model, we found that two out of three investigated variables have a statistically significant influence on the *Relative return* of the token.

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[6] Senate Hearing on Cryptocurrency, Blockchain, Bitcoin, ICO's – see
https://www.youtube.com/watch?v=4z7VWYOEmQM
[7] Later, South Korea followed the Chinese principle – see https://www.reuters.com/article/us-southkorea-bitcoin/south-korea-bans-raising-money-through-initial-coin-offerings-idUSKCN1C408N
[8] Major site listing cryptocurrency market cap rankings, price, charts… - see https://coinmarketcap.com

First, we found evidence of the positive influence of the *Community size*. Next, we also found proof of the influence of *Team composition*. 'Tech teams' seem to perform better than 'business teams'. Finally, we did not found a statistically significant relationship between *Product development* and *Relative return*.

The remainder of this paper is organized as follows. In the next section, we draw up three hypotheses out of the available literature. The following section sets forth the characteristics of the sample and the applied methodology. Finally, we discuss the results and draw up some conclusions.

I.   Hypotheses development

In this section, we develop a theoretical framework for the interpretation of the dependent variable. We provide three hypotheses that relate *Community size, Team composition* and *Product development* to the *Relative return.*

Community size

Ryan Zurrer, Principal & Venture Partner of Polychain Capital once stated that: *"tokens act like rocket fuel for network effects."* These effects are described by (Li & Mann, 2017, p. 8) as follows: "*A network externality, or network effect, describes the situation that the user surplus from each business transaction increases with the number of total transactions. Companies in start-up phase often need to spend significant resources and effort in the establishment of a critical mass, before they can exploit the network effects.*" The power of network effects can best be elucidated by the Uber example, a peer-to-peer ridesharing, and transportation network company. More riders will not directly improve the experience of one user. However, it will attract more drivers which will result in an improved marketplace for the community as a whole. This is a typical example of a two-sided network effect. The increased usage of one set of users increases the value of a complementary product to another set of users and vice versa[9].

The importance of a community and the affiliated network effects became even more clear after interviewing, Karel Striegel, CEO and Founder of Fundrequest (appendix 8). He recently conducted one of the first Belgian ICOs, raising $12 million. The company works on the establishment of a decentralized marketplace for open source collaboration. Any user that wants to see a new feature added or a bug fixed can use the marketplace to find an appropriate developer. A monetary reward can be added to the request. Once validated, a smart contract will be generated on the Ethereum Blockchain[10]. During the interview, Mr. Striegel told us about the next phase of the open source platform development. At the time of writing, they were launching the marketplace and its features.

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[9] *The Power of Network Effects: Why they make such Valuable Companies, and how to Harness them,* Eric Jorgenson – see https://medium.com/evergreen-business-weekly/the-power-of-network-effects-why-they-make-such-valuable-companies-and-how-to-harness-them-5d3fbc3659f8
[10] Fundrequest project website – see https://fundrequest.io

Being in the launch phase of the platform, their main concern was raising enough participants on both sides. This is a typical problem inherent to early-stage marketplaces. First, you need developers to attract users, these developers will only be interested once there are enough potential customers. It is a common problem, often referred to as *the bootstrapping problem*, in companies that are unable to obtain initial users as their product is not useful on a small scale. Companies like Uber, Airbnb and Tinder were able to solve this problem and have had great benefits of the network effects[11].

This is where the role of cryptocurrencies comes in. The shared incentive network that cryptocurrencies provide can be a great solution to *the bootstrapping problem*. Cryptocurrencies solve this problem by providing financial utility, in the form of tokens, to early users when there is no application utility. This incentivizes users and investors to join the platform early, form a community and help the company bypass *the bootstrapping problem*[12].
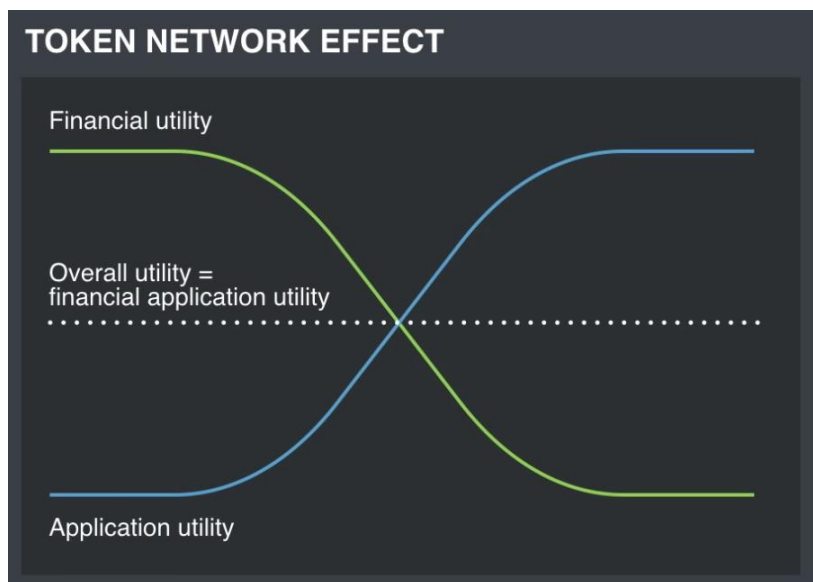
Figure 1: The token network effect Source: video "Decrypting Crypto: From Bitcoin and Blockchain to ICOs"

We consider this to be the first pillar in the explanation of the importance of communities in the cryptocurrency ecosystem.

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[11] *How to harness the power of network effects*, Nirmala Reddy – see https://www.forbes.com/sites/how-to-harness-the-power-of-network-effects/#6dde077a62e8

[12] *Cryptocurrencies and Network Effects*, Wing Vasiksiri – see https://medium.com/@wingvasiksiri/cryptocurrencies-and-network-effects-45f46cfe317c

"It seems like the dotcom bubble all over again, or the housing bubble all over again." – R.S.

That's Robert Shiller, Nobel Prize-winner and professor of economics at Yale University. The quote comes from Fortune magazine's cover story on bitcoin[13]. It is only one out of the numerous reputable economists that associated the recent developments in the cryptocurrency space with the dotcom bubble of the late 1990s. In 2016 Joel Monegro, Partner at PlaceHolder VC, published "Fat Protocols"[14]. In this thesis, he postulates that the blockchain stack captures value at the protocol level (Bitcoin and Ethereum) and not at the application level like the internet does.

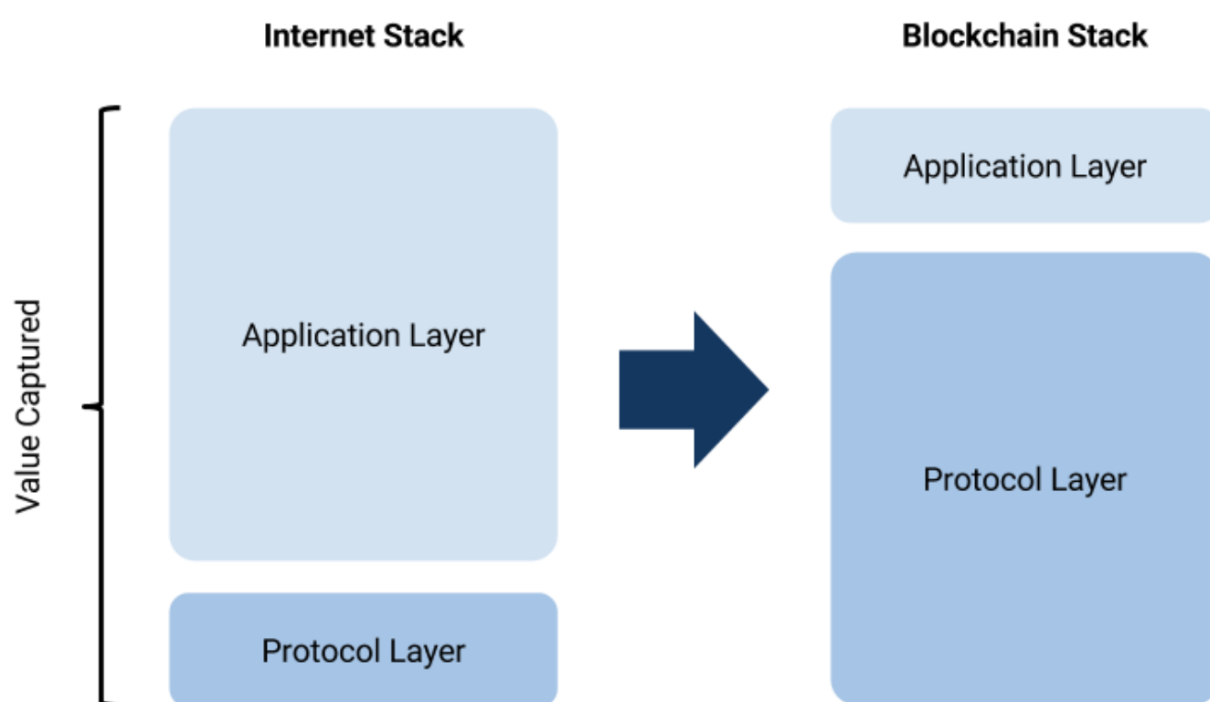*Figure 2: Value capturing layer Source: Fat Protocol Thesis*

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[13] *Housing or Dotcom: Which bubble does cryptocurrency mania resemble*, Marc Hochstein – see
https://www.coindesk.com/housing-dotcom-bubble-cryptocurrency-mania-resemble/
[14] *Crypto-network effect are driving thin protocols*, James Kilroe – see https://medium.com/newtown-partners/crypto-network-effects-are-driving-thin-protocols-a4108e94b1a

According to (Monegro, 2016), the previous generation of shared protocols (TCP/IP, HTTP, SMTP, etc.) produced immeasurable amounts of value[15], but most of it got captured at the applications layer, largely in the form of data (Google, Facebook, Amazon). In the blockchain stack, we see the exact opposite relationship. Value concentrates mainly at the shared protocol layer and only a fraction of the value is distributed along at the application layer. This means it is crucial for a community to be concentrated in the activities of the protocol layer in order to have an influence on the value of the token. In this context, following citation by Joel Monegro clearly indicates the importance of the community:

> *When a token appreciates in value, it draws the attention of early speculators, developers, and entrepreneurs. They become stakeholders in the protocol itself and are financially invested in its success. Then some of these early adopters, perhaps financed in part by the profits of getting in at the start, build products and services around the protocol, recognizing that its success would further increase the value of their tokens. Then some of these become successful and bring in new users to the network and perhaps VCs and other kinds of investors. This further increases the value of the tokens, which draws more attention from more entrepreneurs, which leads to more applications, and so on.—Joel Monegro*

The location of the value in the protocol layer is what we consider to be the second pillar in the explanation of the importance of communities in the cryptocurrency ecosystem.

We made use of three different Social Network Service channels to measure the magnitude of the community. What follows is a description of Twitter, Reddit, and Telegram influence. Since there was no possibility to find this data back in time, all data regarding the community was obtained at a later time than the token price. However, we are convinced that they represent a good proxy for the *Community Size*.

Null Hypothesis 1: The magnitude of the community has no influence on the relative return of the token.

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[15] Apple is leading the way in company valuation followed by Alphabet (Google), Microsoft, Amazon, and Facebook – see https://www.theguardian.com/business/2018/jan/03/apple-leads-race-to-become-world-first-1tn-dollar-company

A. Twitter activity

A very important and widely adopted means of communication service in the crypto space is Twitter. The online social network and microblogging services of the platform seem to attract ICO development teams and their associated investors substantially. In 280 characters or less the teams try to inform their community about updates or improvements. Some of these so-called 'tweets' are 'retweeted' by thousands of followers, which leads to an exponential exposure of potential investors. Numerous studies have been conducted on the influence of SNS channels on stock prices. Especially Twitter influence[16] on these traditional markets has attracted a lot of attention from academia. According to (Bollen, Mao, & Zeng, 2011) daily variations in public mood states shows a statistically significant correlation to daily changes in Dow Jones Industrial Average closing values. They are convinced that the aggregate of millions of tweets submitted to Twitter at any given time may provide an accurate representation of public mood and sentiment. That is why they investigated the emotions of the daily tweets and not the news. Contrary to (Bollen et al., 2011) we focused more on the magnitude of the community that Twitter creates around the token rather than the content of the tweets. In a perfect study, we would also include the words used and emotions expressed by the 170 investigated twitter pages, and all their followers. However, due to the enormity of tweets, this is practically not feasible.

Due to the novelty of the ICOs and the cryptocurrency space in general, little research has been done on Twitter influence. (Seungmin, Rashid, & V. Vlasov, 2017), who conducted an SNS channel analysis, aimed to obtain insights into the various channels and their influence on ICO results. The conclusion showed that Twitter had the first influence position. Based on these findings we decided to include the number of tweets, followers, and likes of each of the ICO's twitter accounts. Antithetical to the further findings in the (Seungmin et al., 2017) study, we do not believe in the inclusion of only one SNS channel in the model. We truly believe that the embodiment of multiple social network platforms is key in the creation of a plausible model. That is why Reddit and Telegram were also included.

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[16] Social-media influencer and celebrity Kylie Jenner caused Snapchat to lose $1.3 billion after one single tweet in which she expressed her negative opinion about the updated platform. – see
https://www.bloomberg.com/news/articles/2018-02-22/snap-royalty-kylie-jenner-erased-a-billion-dollars-in-one-tweet

B. Reddit members

Reddit is an online social media platform, widely used in the crypto space. The platform is separated into different *'subreddits'*. This makes it possible for communities related to different topics to create an independent platform. Most of the *subreddits* are open however, one has to be a member to participate actively in the discussions. People on Reddit gather together based on their shared interest in a particular topic, in this case, the token derived from the ICO. They interact with each other and the development team by exchanging ideas and critical reflections. The platform has grown into one of the major places for crypto investors to discuss the different merits of blockchain applications. Some of these *subreddits* have shown significant influence on the further development of the project (e.g. votings to get listed on new exchanges, recruitment of new team members, translations of the whitepaper)[17].

In our model, we integrated the number of subscribed members of each of the coins associated *subreddit*. Ideally, we would have used the number of members at the time the token price was observed (ICO end date + 3 months). However, only the current subscriber count is displayed for each particular *subreddit*. After consulting the third-party website, RedditMetrics.com, we found that the subscriber basis does not change dramatically over time once the first 3 months of the ICO have passed. Major changes in the membership numbers take place just before or shortly after the ICO has ended. Appendix 1 shows the membership evolution of the Bancor subreddit. The Bancor ICO was conducted on 12 June 2017. We clearly see that the membership basis grew exponentially around this time. Three months later, the number of the subscribers had grown to 2.703 and would still grow further still, no longer exponentially. This led us to assume that the time gap between the observation of the token price (T+3 months), and the collection of the membership basis is negligible. The observed Reddit members are thus a good proxy variable for the Reddit community.

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[17] Poloniex stated that they listen to the community before the listing of new tokens on their exchange – see (Momtaz, 2018)

C. Telegram

Telegram is a cloud-based messaging service developed by Telegram Messenger LLP. The platform enables users to send messages, photos, videos and other files. Antithetical to Whatsapp (Facebook subsidiary), Telegram's client-side code is open-source software. It is exactly this open-source model that attracts the cryptocurrency community, resulting in over 180 million users. In January of this year (2018), the social messaging company announced to launch its own ICO. With a target of raising $1.2 billion, Telegram was set to run the largest token sale in the history of ICOs[18]. This message led Dr. Vladislav Rutskiy, Associate Professor in Economics, Siberian Federal University (Russia) and the Investor Relations Manager at Descrow. to state that:

"Telegram has one important thing ready to be capitalized by its new Gram cryptocurrency, namely one of the largest and most active blockchain communities. This fact makes Gram coin possibly one of the strong rivals for such established crypto communities as Ripple or bitcoin,"[19]

However, the ideology of a democratized way of blockchain project funding vanished when CEO Pavel Durov announced to cancel the public sale in May 2018. The reason was that the company no longer needed extra funding after they had already raised $1.7 billion in private presale. Initially, the company secured $850 million from a global range of investors in early 2018. Established Venture Capital firms like Benchmark and Sequoia participated in the presale. Later, in the second phase, they raised another $850 million in what has to be one of the fastest tech fundraisings in history. However, this does not alter the fact that the telegram community is here to stay. The platform is still gaining influence and active users. We are convinced that the extra funding will only reinforce the further development and scope of the SNS channel. To include the influence of the Telegram community, we gathered the number of members of each of the coins included in the sample.

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[18] The Gram token will run on the Telegram Open Network (TON), a new blockchain designed by Telegram co-founder Dr. Nikolai Durov – see https://drive.google.com/file/d/1oaKoJDWvhtlvtQEuqxgfkUHcI5np1t5Q/view
[19] *Why the Timing of Telegram's $1.2 Billion ICO is Perfect*, David Drake – see http://www.ldjcapital.com/single-post/2018/01/18/Why-the-Timing-of-Telegrams-12-Billion-ICO-is-Perfect

Team composition

The reliability of the team members is one of the fundamental elements in the success of the ICO (Ibba, Pinna, Baralla, & Marchesi, 2017). Due to the lack of clear regulations, the quality of the management team is crucial in the context of agency costs (Jensen & Meckling, 1976). Poorly managed ICOs are prone to becoming scams and only fulfill the managers' malicious objectives (Momtaz, 2018). Higher venture quality (better-connected CEOs and larger team size) is positively correlated with ICO success (Amsden & Schweizer, 2018). Furthermore, (Ibba et al., 2017) found a correlation between team size and amount raised. Teams were divided into different intervals based on all people involved in the ICO including developers, partners, and advisors. Not only were ICOs in higher intervals able to raise more money on average, the minimum amount raised was also correlated with the team size.

We extended the previous findings by looking at the composition within the teams. In our database, we included the total team members as well as the percentage of the team that consists of developers. Chief Technology Officers (CTO), software engineers, blockchain engineers, blockchain developers, and frontend developers were all classified as *'developers'*. The cutoff was set at 50%. Teams that consist of at least 50% developers, were labeled as *'tech team'*. The remaining teams were then labeled as *'business team'*. The number of total team members includes the advisors of the project. These advisors are displayed on the projects' website and serve a legitimizing purpose. The lack of well-defined regulations and legal precedents makes cryptocurrency investors look for confirmation by influential actors in the space. We are aware of the fact that there have been numerous cases where the names of established persons were falsely identified as advisors[20]. Still, we are convinced that the influence of advisors should be included when investigating the relative returns. Whether these advisors effectively play a supporting role in the project or not is of no importance in the model used. The fact that they are announced to the investors and thus, influence their investment decisions is what we tried to capture.

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[20]*Alex Tapscott's Crypto VC Firm Going Public With $100M CAD Falsely Touted 4 Blockchain Stars as Advisors*, Laura Shin – see https://www.forbes.com/sites/laurashin/2017/11/01/alex-tapscotts-crypto-vc-firm-going-public-with-100m-cad-falsely-touted-4-blockchain-stars-as-advisors/#4a9208f61b1f
The sometimes-dubious practice of ICO advisors, JD Alois – see
https://www.crowdfundinsider.com/2018/04/132429-the-sometimes-dubious-practice-of-ico-advisors/

In an ideal scenario, we would have included the team data 3 months after the ICO ended. However, it is not possible to find team data at a specific date in the past. Furthermore, since we use a clear cutoff, we are convinced that this is a good proxy for the team composition. Hereby we assume that the composition of the team does not dramatically change over time. Small changes, however will have no great impact.

As reported by (Seungmin, Rashid, & V. Vlasov, 2017) it is important to calculate the intrinsic value of the target that is being valuated. This intrinsic value of the company or asset is based on the underlying perception of the value of both tangible and intangible factors. When conducting research on start-ups, the lack of a real product causes problems and often leads to speculations about the value of the underlying product. However, (Wang & Vergne, 2017) found that contrary to what is often been reported, not the buzz around the token but the innovation potential embedded in technological upgrades is the most important factor associated (positively) with cryptocurrency returns. (Clarysse & Moray, 2004) found that technical business development is a major task of the CEO of a high-tech start-up. CEOs who are not familiar with the technology won't be accepted by the entrepreneurial team and will eventually lead to management turnover (Clarysse & Moray, 2004). Furthermore, their findings advocate for more managing power for the entrepreneurial teams within the early stage venture. Only when revenues are made, a professional manager should be hired. The majority of the ICO-funded projects are still in early stage of development and should thus be led by a strong technical team of individuals.

The importance of technical team members arises from the reasons mentioned above. Still, we have to declare that so-called *'business teams'* also have an important endowment, like marketing. The marketing of the token starts in the early phase of the project (Momtaz, 2018). There is an increasing interest about the marketing of ICOs[21]. Recently, Google announced to ban all cryptocurrency-related content[22]. This policy change is in line with the ban that Facebook announced earlier this year. The increased marketing activity and competitiveness of ICOs led to some unconventional campaigns. ASKfm[23], a Ukraine-based social network company is the latest example of unusual

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[21] *The average cost for outsourcing ICO marketing to one of the top agencies starts from around $280,000,* Kirill Shilov – see https://hackernoon.com/what-should-your-ico-marketing-plan-look-like-in-2018-315135fe9851
[22] *Google will ban all cryptocurrency-related advertising,* Jillian D'Onfro – see https://www.cnbc.com/2018/03/13/google-bans-crypto-ads.html
[23] The company is based on a Q&A format and has 215 million registered users – see https://about.ask.fm/about/

marketing campaigns. In May 2018, they sent four crypto enthusiasts on a mission to the summit of Mount Everest, where they buried a hard drive holding $50,000 worth of their tokens. However, the publicity stunt that was supposed to raise buzz around their upcoming ICO went horribly wrong. A few days after the promotional video was released, a blogger came up with evidence of the tragic death of one of the local guides assisting the group[24]. ASKfm stated in a press release *'While others try sophisticated marketing techniques, these guys go out there and put themselves right on top of the tallest mountain on the planet'.* What had to be one of the most ballyhooed publicity stunts of the year made ASKfm look very bad.

The importance of marketing cannot be underestimated. Still, we believe that the major focus should be on the technology developments. Nonetheless, according to (PwC, 2018), technical expertise about blockchain is rare. In their 2017 Global Digital IQ Survey, some 86 percent of financial services (the industry most exposed to blockchain) executives said that their organizations haven't yet developed necessary blockchain skills. These findings are in line with Forbes' article on the shortage of qualified blockchain experts.

Even though the average salary of a blockchain engineer in Silicon Valley is $158,000, programmers who have experience in Solidity (language for creating smart contracts) is in short supply and high demand. - Forbes[25]

It is clear that the availability of the right technical knowledge cannot keep up with the pace of the booming ICO space. The scarcity of the talent creates empowerment of the qualified developers. The idea that tech teams perform better is hence two-fold. On the one hand, we believe that technical knowledge and expertise is crucial in the blockchain space. On the other hand, due to the lack of qualified developers and the growing demand for these talents, developers will only want to work on promising projects.

Null Hypothesis 2: There is no significant difference in relative returns between ICOs with tech teams and ICOs with business teams.

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[24] *A crypto stunt gone tragically wrong,* Jemima Kelly and Alexandra Scaggs – *see https://ftalphaville.ft.com/2018/05/25/1527224400000/A-crypto-stunt-gone-tragically-wrong/*
[25] *The Demand for Blockchain Engineers Is Skyrocketing, But Blockchain Itself Is Redefining How They're Employed*, Sherman Lee – see https://www.forbes.com/sites/shermanlee/2018/04/11/the-demand-for-blockchain-engineers-is-skyrocketing-but-blockchain-itself-is-redefining-how-theyre-employed/#4de832926715

Product development

While a lot of projects have great potential, few have actually launched a real product. Most ventures are in the "idea" stage or early stages. According to (Ernst & Young, 2017) only 5% of ventures has running projects, 11% had prototypes, and 84% were merely ideas. In the first quarter of 2018, 47% of the projects had no product development before their ICO campaign started (ICORating, 2018). This is in line with the findings by (Jackson, 2017) partner at Mangrove Capital, a leading European early-stage venture capital firm. In his report on 'Tokenization: Implications for the venture capital firm'[26] he is optimistic about the ICO applications. However, he also addresses the lack of real products created by the projects. The fact that ICOs are typically used to raise funds ahead of the product launch raises his concerns. Moreover, this results in another major problem. According to Vedran Kajic, Co-founder of CryptoTask, almost all ICOs are structured in such a way that they provide the founders with total control over the funds[27]. This does not provide the founders with an incentive of product development. CryptoTask offers a solution for this problem by creating a mechanism of *smart crowdfunding*. Once the project has raised its targeted funds, investors are provided with a voting right[28]. These investors can then vote on the development of the product. Funds will be released in stages and only if the founders actually deliver. In case the investors are dissatisfied, the smart contract will refund the investors.

"A good number of projects don't end up ever getting a real working prototype at all, let alone in time for the ICO date. This is going to be changing this year as I feel that more tokens and ICOs are going to be driven by actual utility and not so much speculation like they have previously." – *N.C.*

That is Nathan Christian, a blockchain expert who consults technology companies and is ranked top 10 'People of blockchain', in an interview with Cointelegraph. He is convinced that the times where ICO were only based on ideas, is over. *"Teams have to come up with real prototypes (alpha/beta) to create actual utility."*

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[26] *ICO Report 2017* – see http://www.mangrove.vc/ico-report2017
[27] *11 Experts on the Future of ICO & its Impact on Financial Markets*, Verdan Kajic – see https://www.newgenapps.com/blog/future-of-ico-impact-of-initial-coin-offering
[28] Currently only 1.7% of the tokens holds voting rights, while 65% only function as a form of payment for project services – see ICO Market Research Q1 2018, ICORating.com

We believe that he is right and that the development of the product should be priority number one for the projects. Real products are needed for the ICO phenomenon to become a mainstream funding mechanism. Furthermore, (Clarysse & Moray, 2004) stated that high-tech startups in their early phase should consider the further development of the technology as their main activity. Software startup companies often fail to provide good returns because they struggle with the development of their product (Crowne, 2002). A lot has been said about the problems that startups cope with sales or marketing. However, the failure of product development has not been addressed properly (Crowne, 2002). In this context, the abbreviation MVP is often used. This stands for minimum viable product. It is a product in prototype, but with its most essential features available. The launch of a full product without any previous testing in the market is very risky (Dobrila, 2012). For a startup, a MVP is crucial to validate the value and growth potential of their product (Dobrila, 2012). Furthermore, it increases investors trust in the product[29]. That is why ICO rating websites include a MVP score in their algorithms. On the ICOMarketData website the algorithm is explained in depth[30]. The rating is used to inform investors about the quality of the ICO. In the algorithm, the product development stage comprises 5 levels (1: untested concept, 2: initial test, 3: alpha launch, 4: beta launch, 5: fully working initial product). The focus in our study is on the difference between level 3 and 4. We updated previous findings and made a clear distinction between projects that already had a beta product and projects that are still in the alpha phase. This information was retrieved from the roadmap of the projects.

Related is the article of (Atkinson, 2018). He published his conclusion on the 11 pillars to run a great ICO. The research is based on interviews with stakeholders of 150 different ICOs. The results[31] show that the respondents place product over vision. Blockchain ventures should create real viable products with software, hardware, and IP content. If there is no viable product, no real revenues or no progress in the prototypes, the ICO will be doomed to fail and the token will eventually become worthless.

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[29] *I've also heard about the MVP, what's that?* – see https://cointelegraph.com/explained/how-to-analyze-icos-explained

[30] Rating algorithm – see https://www.icomarketdata.com/icorating

[31] Also in the results is the importance of the community and the composition of the team. – see https://irishtechnews.ie/survey-of-150-icos-reveals-consensus-of-11-success-factors/

Currently, there are hundreds of ICOs out there without any form of working products or meaningful prototypes. Companies organizing an ICO have to stand out somehow and doing this by establishing a real product will provide the company with a substantial competitive advantage. That is why we expect to see higher relative returns in the group of ICOs that already had a product in the beta stage three months after the ICO ended.

Null Hypothesis 3: The stage of product development has no influence on the relative return of the token.

II. Data and Methodology

Due to the lack of one consistent website providing all relevant data about ICOs, the sample was manually compiled. The sample comprises 170 ICOs launched between February 2016 and May 2018. The ICOs account for a combined total of over $4.9 billion raised in funding. Several ICO listing sites were used as well as various articles and of course the projects' websites. There was a sort of repeating cycle while searching for data on the web. To find the token tickers and the dates of the ICOs, we mainly used icohotlist.com. For the amounts raised, the initial token price, industry and the description of the venture and its use case, icodrops.com and icobench.com where used. Subsequently, we typically went to the website and whitepaper of the ICO and extracted information regarding company, team, developers, roadmap, and presale. Furthermore, we used LinkedIn to determine whether the company behind the ICO was in a start-up phase or not. Finally, we used Twitter, Reddit, and Telegram to find indicating numbers about the community. The disperse spread of the information hindered during the composition of the data but on the other hand it provided the possibility to double-check questionable information, which is by no means a luxury in this context of misinformation.

Before the regression was done, a correlation matrix was created to audit for multicollinearity. This visual check indicated that there was no problem with the model assumption. Still, it is possible that the pairwise correlations are small, and yet a linear dependence exists among three or even more variables[32]. That is why we double-checked by looking at the variance inflation factors (VIF). Following the rule of thumb[33], we can conclude that there is no problem of multicollinearity in the model (see appendix 2). Furthermore, we found that there was no problem with the auto-correlation of the residuals. However, we did find a problem with the assumption of homoscedasticity (Breusch Pagan test) and the normality of the error terms (Shapiro-Wilk test). We also noticed that all continuous variables were skewed (see appendix 3), which could potentially have led to the problems regarding homoscedasticity and normality of the error terms. This led us to decide to apply a transformation on the variables.

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[32] *Detecting Multicollinearity Using Variance Inflation Factors,* – see
https://newonlinecourses.science.psu.edu/stat501/node/347/
[33] VIFs exceeding 4 raises concerns and should be further investigated – see
http://kb.palisade.com/index.php?pg=kb.page&id=202

Using the YeoJohnson transformation, we aimed at obtaining a better fit and address the model assumption problems. After the transformation, we saw that the continuous variables were no longer skewed (appendix 4). Furthermore, all assumptions were met. This enabled us to draw substantiated conclusions from the further research results.

A. Dependent variable

We decided to use *Relative return* as our dependent variable because finance theory rationalizes asset return as a reward for investors (Hirschleifer, 2001). We included the ICO price of the token and the token price 3 months after the ICO ended. This provided us with a short-term return of the token. Some of the tokens were not yet listed on an exchange 3 months after the ICO ended. For these tokens, there was no price information available yet. As a proxy, we then included the token price of the first week of trading once they were listed. Furthermore, we created a benchmark by including the global cryptocurrency market cap at the end of the ICO as well as the global market cap 3 months after the ICO. Since cryptocurrencies are heavily correlated (Corbet, Meegan, Larkin, Lucey, & Yarovaya, 2017), the inclusion of the market cap as a benchmark is crucial to interpret the findings. The explanation of this correlation is two-fold[34]. First is the fact that most tokens can still only be bought with established cryptocurrencies like Bitcoin or Ethereum. Changes in these major cryptocurrencies will thus have an influence on all other tokens. Secondly, is the similarity between the coins. Bitcoin and Ethereum are not as different as General Motors and Facebook are. All data regarding the post ICO token prices and global market cap were obtained from CoinMarketCap.

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[34] *Analysing the Factors that Influence Cryptocurrency Prices with Cryptory,* David Sheehan – see https://dashee87.github.io/data%20science/python/analysing-the-factors-that-influence-cryptocurrency-prices-with-cryptory/

B. Independent variables

A total of 14 independent variables were included in the model. These variables can be divided into two major groups. We started by including seven variables that concern the characteristics of the ICO campaign. First, *Amount raised* (in USD), this variable has been used as a measure of ICO success by previous studies (e.g., Fish, 2018). Next, we included *Length* (duration in days), *Presale* (yes or no), *Network* (ERC20, NEO or Other), and *Coins issued* (derived from *Amount* and the ICO price). Finally, we also added the variable *Investor backed* (institutional contributors yes or no). Subsequently, we included a group of variables regarding post-ICO characteristics. First, we obtained information about the company that conducted the ICO. *Start-up* (yes or no), *Location* (the country where the company has its headquarter), *Team* (all team members including the advisors), and *Percentage developers* (the section of *Team* that consists of developers) were added to the regression model. Afterward, we included the variables from the hypotheses. *Product development* (alpha or beta phase), *Community total*[35] (derived variable from Twitter, Reddit, and Telegram data), and *Type team* (tech/business determined by *Percentage developers*, cutoff 50%) were added. Finally, we included *Legitimately distinctive* (yes or no). This variable indicates what the external audience thinks of the project. It gives an indication of the relevance of the project. Is it the first/the best in what it aims to provide? Or is it just another token to be written about in the blockchain literature? When the project is perceived as legitimately distinctive, it has a competitive advantage over other projects. The basis of this variable can be found in the work of (Lounsbury & Glynn, 2001) and (Navis & Glynn, 2011). The classification was done by ourselves after consulting the projects' websites, whitepapers, related articles, and social media pages.

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[35] The exact weights: tweets (10%), followers (30%), likes (5%), telegram members (15%), Reddit members (30%) – see appendix 9

III.   Empirical Results

This study provides a multivariate regression model built on a sample of 170 ICOs. For a general overview of the key numbers see table 1. The model has an explanatory power of 40%. The R-squared value indicates that the model provides a relatively good fit to the data. The p-value ($<$ 0.001) proves that the model explains a significant amount of variance in the outcome variable. Overall, we found a remarkably high (105%) average outperformance of the benchmark. If you had invested in all 170 ICO, you would have realized a strong outperformance of the market in a relatively short period. (Willet, 2012, p. 1) predicted that crypto projects would *"provide initial funds to hire developers to build software which implements the new protocol layers, and…richly reward early adopters of the new protocol"*. This rich reward seems to be true, at least from short-term perspective. However, when looking at the median (- 4%), we see that this is close to 0%. Underperform/outperform is almost perfectly 50-50, indicating the wide spread of the *Relative returns*. So, randomly picking ICOs to invest in does not seem to be a good long-term strategy. Investing in blockchain ventures comprises high risks, but the same applies to other early-stage investments as well (Fama & French, 2004). Following results could help investors to improve their investment strategy.

Regression statistics	
Multiple R-squared	0,4043
Adjusted R-squared	0,3104
F-statistic	4,308
P-value	2,40E-08
Average relative return	105%
Mean relative return	-4%

Table 1: Regression model key figures

A. Community Total

We analyzed the effect of the community on the *Relative return*. A new variable was created (*Community Total*) to measure this effect. The variable resulted from the weighted contribution of three major SNS channels, Twitter, Telegram, and Reddit. We found a p-value < 0.001 (see appendix 6). Which indicates that — given the null hypothesis is right — the chance of finding these extreme values is less than 0,1%[36] (Gibbons & Pratt, 1975). This led us to conclude that the null hypothesis can be rejected and that the magnitude of the community has a strong significant influence on the *Relative return.* Figure 3 represents a scatterplot to visually display the relationship.
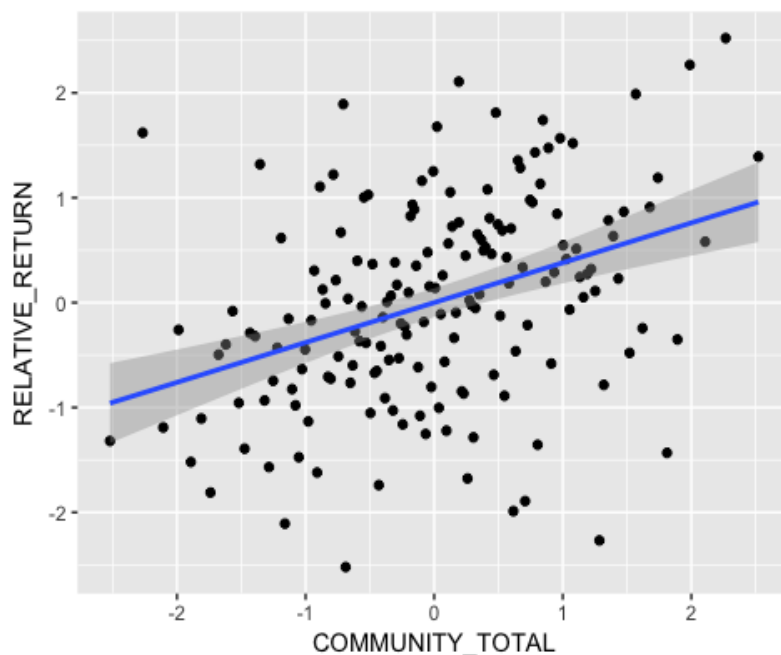

Figure 3: Relationship Community total - Relative return

The blue line represents the linear regression function of the relative returns per community size. If the null hypothesis would have been right, the blue line would be flat and the slope would equal 0. However, in this case, we clearly see that the slope is positive. When you move right along the x-axis, the fitted line rises. The low p-value (< 0.001) suggests that the slope is not zero, which in turn suggests that changes in the predictor variable are associated with changes in the response variable. Consequently, we can conclude that the magnitude of the community has a positive influence on the *Relative return*.

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[36] This is supposing constant observations (N) and infinite repeated experiments

B. Team Composition

In order to have a deeper understanding of how the composition of the team influences the token price on the secondary market, we included the team characteristics in the regression model. As stated before, the classification of the teams (tech/business) was based on the variable *Percentage developers*, with a cutoff of 50%. We made a dummy variable of both team types to formally test whether the composition of the team has an influence on the *Relative return*. Figure 4 represents a boxplot, which provides us with a first visual indication of the results. The vertical blue lines in the boxes exhibit the median relative return of each of the team types. The median of the group of tech teams is clearly higher than the one of the group of business teams. The whiskers represent the ranges for the bottom 25% and the top 25% of the data values. We see that the business teams have a wider spread. Furthermore, we see that there is a clear outlier in the 'business team' sample. This data value can strongly affect our results (Choi, 2009). We verified this value, it appeared not to be a measurement error. That is why we did not exclude it from the database.
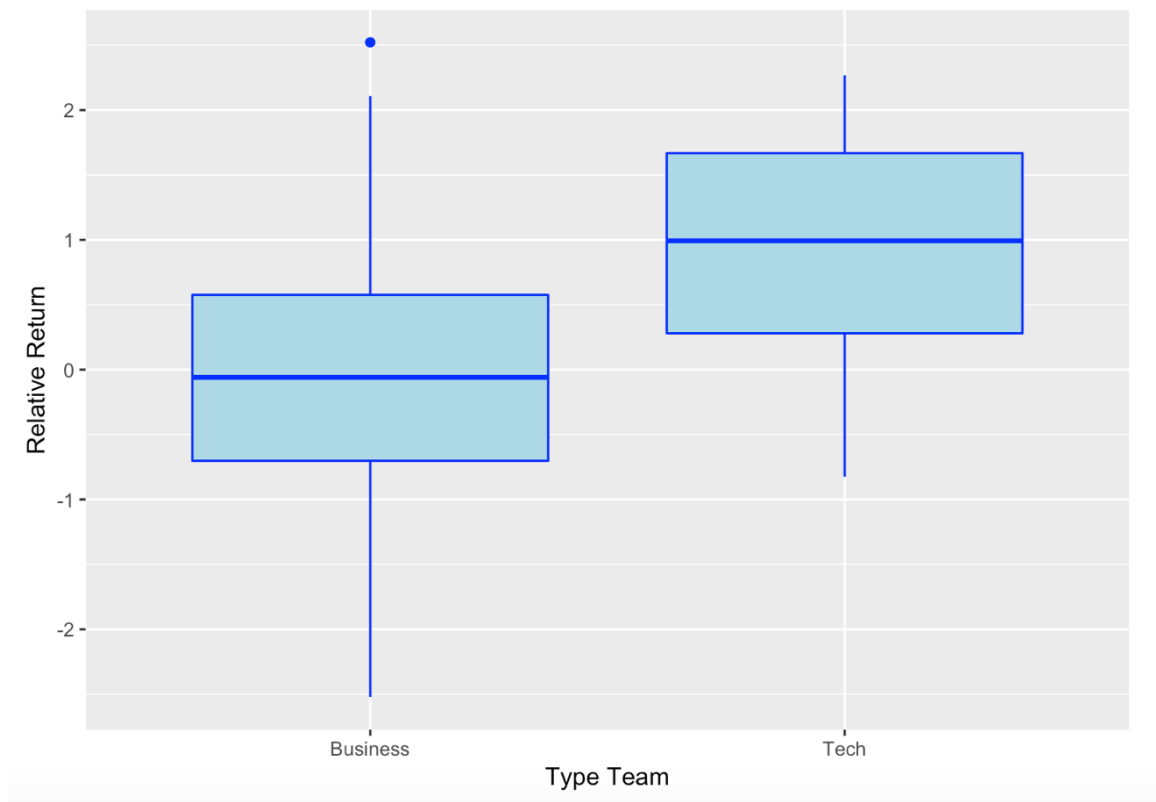

Figure 4: Boxplot Type Team

To confirm the visual impression received from the boxplot, we have to look at the p-value. The dummy variable *Type Team Tech* displays a p-value of 0.001 (see appendix 6). Which indicates that — given the null hypothesis is right — the chance of finding these extreme values equals 0.1% (Gibbons & Pratt, 1975). Consequently, we can conclude that the composition of the team has a statistically significant influence. Furthermore, these findings indicate that ICOs conducted by 'tech teams' perform better than ICOs conducted by 'business teams'.

C. Product Development

To include the influence of the evolution of the project on the token price, a dummy variable was created. *Product development* represents whether the project already had a beta prototype or was still in alpha phase 3 months after the ICO ended. Our results display a p-value of 0.26 (see appendix 6) for the *Product development* variable, which indicates that — given the null hypothesis is right — the chance of finding these extreme values equals 26% (Gibbons & Pratt, 1975). Based on a significance level of 0.05, we could not reject the null hypothesis. This led us to conclude that there is no statistically significant relationship between the stage of product development and the relative return. Figure 5 represents a boxplot to visually support our findings. The blue line representing the median of the beta group is situated slightly higher than the median of the alpha group. However, this small difference is not statistically significant as the p-value has indicated. Finally, we would like to point out that there is a clear outlier in the alpha group. This data value can strongly affect our results (Choi, 2009). Again, we verified this value and it appeared not to be a measurement error. That is why we did not exclude it from the database.
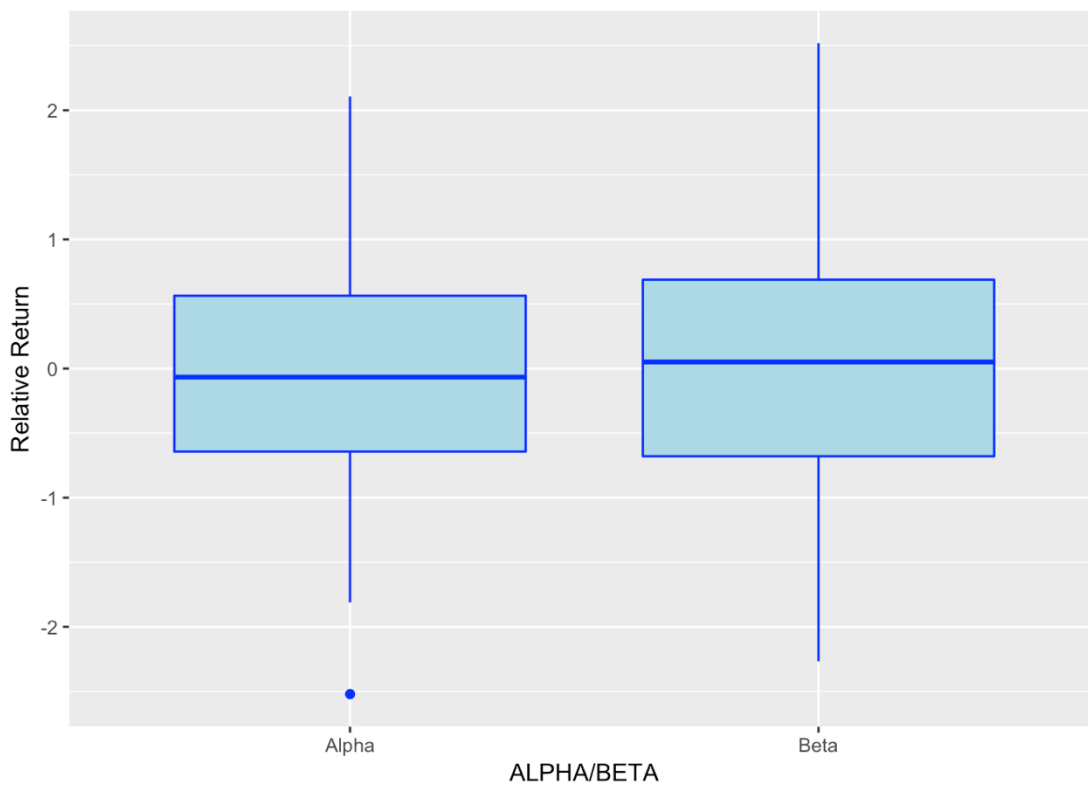
Figure 5: Boxplot Product Development

D. Control Variables

Besides the variables covering the hypothesis, we found some interesting results in our control variables. For exact p-values see appendix 6. First, *Amount raised* has a statically significant influence on the token price. ICO projects that have higher initial funds provide investors with better short-term returns. For visual interpretation see appendix 7. Second, we found that *Location Singapore* and *Presale Yes* both have a significant influence on the relative return. The former can probably be explained by the high concentration of ICO projects in the Asian sovereign city-state. The latter is probably due to the fact that more and more ICOs are organizing a presale. Finally, we see a very strong statistical influence of the variable *Legitimately Distinctive*. This indicates that ICO projects that bring something novel to the ICO space provide investors of the project with better returns than duplicated projects. However, the reader should be aware of the subjectivity of this variable. As stated before this distinction is based on our own personal insights.

IV. Conclusion

Back in 2015, Goldman Sachs' paper (Boroujerdi & Wolf, 2015) stated that *'The Blockchain could disrupt everything'*. Pay attention to the description 'the blockchain'. Back then, even Goldman Sachs had no clue of the magnitude of this new technology. Now, 3 years later, it is clear blockchain and the distributed ledger technology are here to stay[37]. Major international companies[38] have been investing in the technology and will continue to do so in the future. On the one hand, you have the leading cryptocurrencies (Bitcoin[39], Ethereum, Litecoin) that become more and more adopted by established companies. On the other hand, you have the revolutionary new way of venture financing that ICOs present. We believe both will shape the financial landscape of the future. U.S equity markets do not succeed in the facilitation of emerging companies. The current structure undermines entrepreneurship and jeopardizes the U.S. economy and its equity markets (Schwartz, 2012). The blockchain technology makes it possible for relatively small start-ups to raise funds as they would run an IPO. Moreover, ICOs enable them to dodge regulations, reach investors worldwide, provide liquidity to the founders as to the investors and so much more. The industry is still in the nascent stage. A lot of work still needs to be done in order for the ICO space to really take off and become an entrenched way of financing. Nevertheless, it is already revolutionizing the way ventures finance their activities. Regulators face a very challenging responsibility, which might require them to think out of the box[40]. Governments will definitely play a decisive role[41]. Their judgement and resulting policies of today will have major implications on the technological development in the near future.

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[37] Blockchains are one form of the distributed ledger technology, for a full description in difference – see https://medium.com/nakamo-to/whats-the-difference-between-blockchain-and-dlt-e4b9312c75dd

[38] Fred Smith, chairman and CEO of the U.S. logistics giant FedEx said that the company is heavily investing into the technology and that it eventually will revolutionize its business model – see https://www.coindesk.com/fedex-ceo-adopt-new-tech-like-blockchain-or-be-disrupted/
German car manufacturer Audi is testing blockchain technology for its distributed processes, they already successfully released a Proof of Concept (PoC) of its blockchain system and are now advancing beyond the PoC stage – see https://cointelegraph.com/news/audi-is-exploring-blockchain-for-its-distributional-network

[39] 100+ established companies are currently accepting bitcoin as a valid source of payment. Among them are Amazon, Bloomberg, and Dell for the full list – see https://www.ebay.com/gds/100-Companies-That-Accept-Bitcoins-As-Payment-/10000000206483242/g.html

[40] E.g. The SEC created HoweyCoin, a fake cryptocurrency to alert investors for the fraudulent nature of some ICOs. – see https://www.engadget.com/2018/05/16/sec-fake-cryptocurrency-show-how-ico-scams-work/

[41] The Venezuelan State launched its sovereign crypto asset (Petro) in February 2018. It is intended to supplement Venezuela's plummeting Bolívar Fuerte currency. – see http://www.elpetro.gob.ve/

The results of our study make three main contributions to the existing literature. First, we provide clear evidence regarding the influence of the community size on the relative returns of the ICO tokens. Previous research already found that social media sentiment is an important predictor in determining bitcoin's valuation (Mai, Shan, Bai, Wang, & Chiang, 2018). And that out of all SNS channels, Twitter has the first influence position on ICO results (Seungmin, Rashid, & V. Vlasov, 2017). We extended these findings by establishing a multi-channel analysis of the community. Creating one variable representing the community by applying weights to three different channels: Twitter, Reddit, and Telegram. Our results show a positive relationship between the magnitude of the community and the relative return of the token. This relationship was often presumed, yet not proven in a multi-channel model.

Second, we provide new insights in the importance of the team composition. In particular, we show that ICOs led by tech teams perform better on the secondary market than ICO led by business teams. We used a clear distinction by looking at the percentage of developers within the team and applied a cut-off of 50%. To the best of our knowledge, this is the first study to provide these insights and make such a clear distinction between tech and business teams within blockchain ventures.

Finally, we find that antithetical to our previous intuition, tokens with a product in beta phase do not perform better than tokens with a product in alpha phase. These regression results are consistent with previous statement by EY: *ICO valuation is often based on "fear of missing out[42]" instead of project development forecasts and the nature of token* (see Ernst & Young, 2017). Data compiled by (Russo & Kharif, 2017) draws an even more striking conclusion. They found that ICOs without a working product performed better in their first month of trading than the ones that are backed by a real product[43].

Overall the results of our regression model provide ICO investors with unambiguous new insights that could help them in the establishment of their long-term investment strategies.

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[42] There are tales of fortunes made and dreamed to be made, as stated by the SEC in their *'Statement on Cryptocurrencies and Initial Coin Offerings'* – see https://www.sec.gov/news/public-statement/statement-clayton-2017-12-11

[43] *The Hottest ICOs Are the Ones That Have Done the Least Amount of Work* – see https://www.bloomberg.com/news/articles/2017-12-12/want-to-issue-a-red-hot-ico-rule-no-1-is-do-very-little-work

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Appendix

Appendix 1. Bancor ICO, Reddit subscribers

Appendix 2. Multicollinearity check, all generalized VIFs are < 4. We can conclude that there is no problem with the model assumption of no multicollinearity.

	Generalized VIF		Generalized VIF
Amount Dollar	1,7144	Team Total	1,4561
Length	1,2627	Percent Developers	2,1106
Network	1,8088	Legitimately Distinctive	1,4778
Location	3,8881	Product Development	1,1831
Start-up	1,4184	Community Total	1,4631
Investor Backed	2,1265	Type Team	2,1161
Presale	1,8382	Coins Issued	1,1996

Appendix 3. Visual check. All continuous variables are skewed. Problematic for model assumptions and fit. Transforming variables can improve situation.
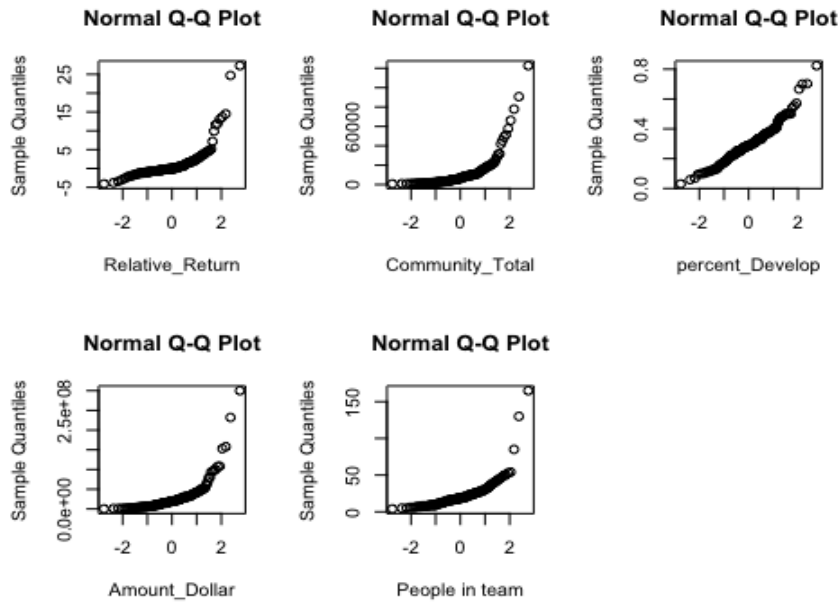
Appendix 4. Visual check. After transformation using Yeo-Johnson, all continuous variables look no longer skewed.
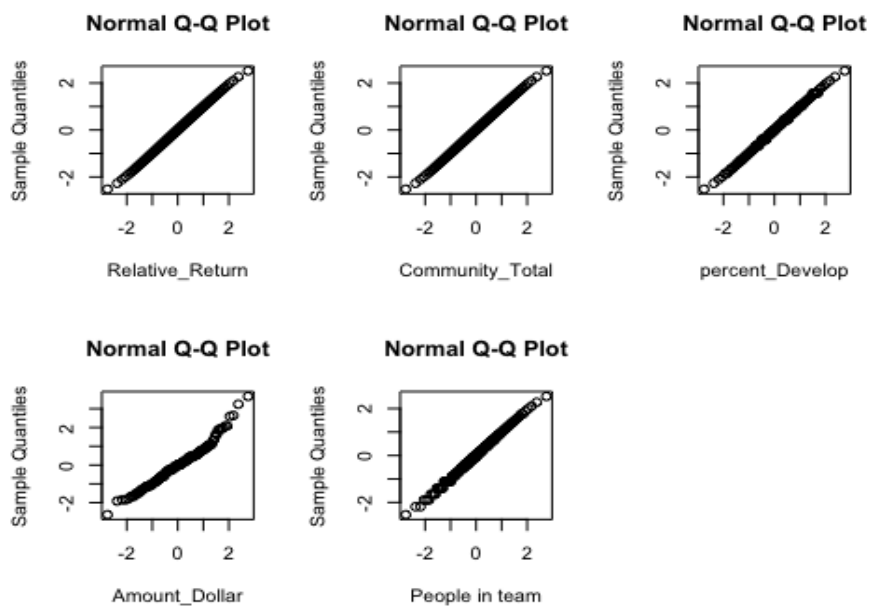
Appendix 5. Test for skewness, values > 5 are considered problematic. After transformation, no problem

	Before Transformation	After Transformation
Amount Dollar	4,17779	5,53E-01
Team	4,54590	7,49E-03
Percent Developers	0,90520	-9,62E-04
Community Total	4,00832	-2,22E-07
Relative Return	3,90014	-6,77E-16

Appendix 6. Regression results

|	Estimate	Std. Error	t value	p value	
Amount Dollar	-2,13E-01	8,66E-02	-2,462	0,014973	*
Lenght	-4,53E-03	3,74E-03	-1,212	0,227502	
Network NEO	1,18E-01	4,10E-01	0,287	0,774302	
Network Other	-3,66E-02	2,54E-01	-0,144	0,885740	
Location China	9,82E-01	8,38E-01	1,171	0,243592	
Location Hong Kong	2,32E-01	5,35E-01	0,434	0,664841	
Location Japan	8,27E-01	6,25E-01	1,323	0,187952	
Location Other	1,07E+00	6,17E-01	1,725	0,086559	.
Location Russia	-4,89E-02	4,83E-01	-0,101	0,919463	
Location Singapore	8,92E-01	4,08E-01	2,186	0,030421	*
Location Swiss	5,57E-01	4,22E-01	1,322	0,188351	
Location USA	3,33E-01	4,00E-01	0,833	0,406169	
Startup YES	2,76E-02	1,64E-01	0,168	0,866744	
Investor Backed YES	-4,15E-02	2,21E-01	-0,188	0,850977	
Presale YES	4,36E-01	2,07E-01	2,105	0,037006	*
Team	8,89E-02	7,54E-02	1,179	0,240282	
Percent Developers	4,96E-02	8,36E-02	0,593	0,554206	
Coins Issued	-1,58E-12	1,25E-12	-1,264	0,208154	
Legitimately Distinctive YES	5,55E-01	1,60E-01	3,463	0,000702	***
Product Development Beta	1,56E-01	1,39E-01	-1,124	0,262743	
Community Total	2,85E-01	8,18E-02	3,48	0,000662	***
Type Team Tech	1,04E+00	3,15E-01	3,313	0,001164	**

Signif. codes: '***' 0.001.   '**' 0.01   '*' 0.05   '.' 0.1

Appendix 7. Relationship *Amount Dollar* and *Relative Return*. According to p value strong significant relationship. Visually less obvious, probably due to the outliers in the bottom right corner.
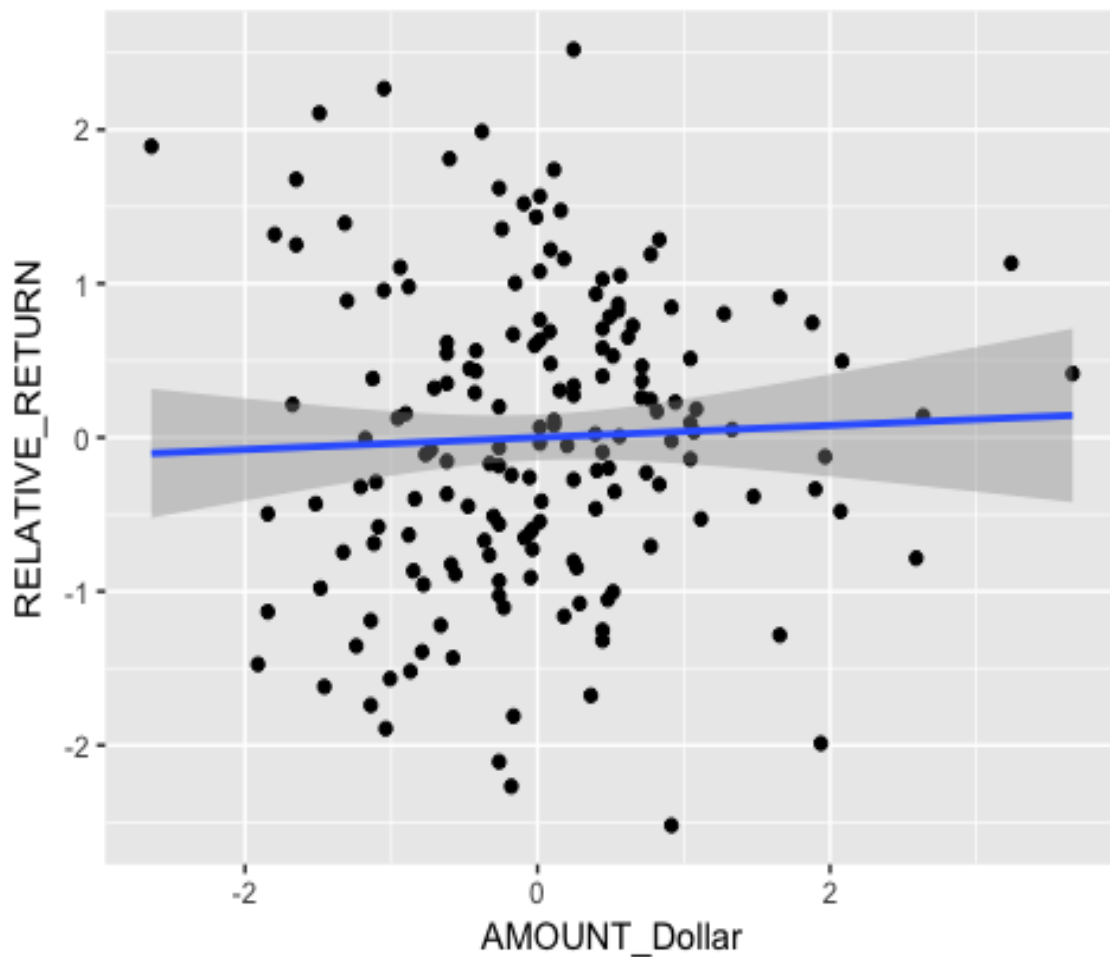
Appendix 8. Interview with Karel Striegel, CEO at Fundrequest

- Why did you choose for finance through a token sale/ICO instead of traditional financing?

    First of all, because it is easier. It is much more accessible. Eventually, it is just a new way of financing. We have considered traditional financing, however we noticed quite fast that this would be hard to obtain. When consulting the financial institutions, we asked for only 1% of the capital we have now. Even that small amount was already causing problems. Of course, next to the convenience, there was also the technology that caused us to opt for an ICO.

- When we have a look at the Fundrequest team, we clearly see that a lot of technical knowhow is present. Do you think a technical background is crucial when launching an ICO or could pure business sense get the job done as well?

    I think that to a certain extend marketing alone can be successful. This is where we, at Fundrequest, can still learn a lot. Marketing can surely help to raise more funds. However, at a certain moment the ICO has to be completed and the contract has to be created. This is where technical knowledge is needed. Just to raise money, a marketing team will do the job. Additionally, you can always hire a team of technical people to execute the contract. Especially because the codes are open source and can be copied. However, at the end of the day, the ICO is just to raise money. The product still has to be developed. I doubt that the marketing team will realize these developments.

- So, you believe that business teams can raise at least as many funds as a tech team, but will struggle with the further development?

    Yes, I do believe that the funds can put developers on the pay-roll. If projects don't hire the right technical knowledge, I think they are doomed to fail. I think you should be critical when reviewing the ICO. If you look at the whitepaper and you see that the company wants to build a technical project on the blockchain, but no developers are present in the team, it should ring a bell. At least that would raise my concerns.

- What we now see is that companies besides their team also hire a team of advisors. Do you believe these have a positive role in the further development of the project?

    If you look at our project, we have two kinds of investors. On the one hand, you have the ones that invest instantly. Mostly these are small amounts. These are the ones that are crying on Telegram once problems occur. On the other hand, you have the institutional investors.

When they have questions regarding the project developments, they just call us. Recently, I discovered a project, that according to their website, had a partnership with Request Network. We also have a partnership with REQ. When I contacted them, the project turned out to be a scam. I think it is important to be skeptical towards advisors.

- During our class, Advanced Corporate Finance (Tom Vanacker) at Ghent University we recently had a presentation by Bart Vanhaeren, Managing Director at KBC securities and founder of Bolero crowdfunding. He talked about the crowfunding platform and the fact that KBC is one of the first financial institutions to launch such a project. What is your view on this initiative? Do you think banks are lagging behind the ICO boom or do you believe banks will play an important role for ICOs in the future?

I think financial institutions could play a role. It will all depend on how they position themselves in the new market. The problem with those local initiatives is that they only have a small audience. An ICO is by definition international. In our token sale over 180 nationalities contributed. Besides that, there is also the disruptive technology that makes the position of all intermediaries (including financial institutions) vulnerable. However, we have to be realistic, there are still cases of fraudulent ICOs. The blockchain technology provides great benefits to solve the trust issues. Around that technology there are still too many possibilities for criminals. The ecosystem will need more regulation to counter these problems. The ICO phenomenon is not yet in its optimal stage. Still, I personally do not think that it will ever go away. It is just too efficient to disappear. Furthermore, the blockchain technology provides companies with almost unlimited options. The budgets that some of these companies now have at their disposal is so huge that I am convinced to see the next Airbnb, Twitter... rise out of one of these projects.

- You have stated before that the ecosystem needs more regulation. Do you think this is solely the task of governments? (focus on Belgium)

What personally annoys me the most is that the Belgian government is missing out on huge opportunities. If you were a little involved in this scene, you could see it coming a long time ago. First, the ICOs were rather small, when Status raised over $200 million everyone knew this was going to grow even bigger. The biggest problem is lack of clear regulations. Belgium misses the opportunity to take the lead in this matter. The EU is always going to come late so, in the meantime countries like Belgium should establish their own policy. Belgium has a big pool of talented developers and IT-related employees. A clear policy could boost a lot of local tech companies. Countries like Switzerland and Estonia understand the importance and take advantage of it. These countries will be home to the new 'Silicon Valley', and Belgium is missing out on this opportunity.

- We noticed that Alexander De Croo, Belgian minister of digital matters, made contact with VeChain CEO. What exactly do you think Belgium could do better in supporting the issuing companies and informing the investors? How could they have helped Fundrequest?

It always comes back to the lack of regulations. For example, when we launched our ICO we were invited by the FSMA (Belgian Financial Services and Markets Authority) to talk about our project. This gave us the opportunity to address some questions, at least we thought so. None of our questions were answered properly. That led us to personally go to Estonia and ask the same questions. The local Estonian authority provided us with clear answers and told us that we were welcome to launch the ICO over there. I understand that it is a new phenomenon that changes quickly. Still, I think Minister Alexander de Croo could do more effort. If you wait another five years, it is definitely going to be too late. Our neighboring countries are establishing a policy, we cannot stay behind. Eventually, it is just a new way of crowdfunding that needs regulation. The community itself already started by introducing the whitelist/KYC process. That was not even requested by governments.

- Your token sale was conducted in February 2018, in a period where bitcoin and the crypto space as a whole were in a declining trend. Do you think this had an influence on the amount raised and do you think that, in general, timing plays an important role in the collection of funds?

Yes, I think so. Our ICO was in the beginning of the correction. I believe that made it possible for us to reduce the loss of the funds. If we would've waited a little longer, it was definitely going to be a problem. Thus, timing is important. However, it goes in both ways. The perfect moment would be in the early phase of an uptrend. That way you can benefit from the up going trend and raise more funds (in fiat currency). But overall it is certainly a topic to take into consideration.

- Do you think that backing by institutional investors and the organization of a presale are crucial for the success of the ICO?

Yes, I think so yes. We did a seed in the summer. Which of course brings difficulties as well. Price fluctuations over this long period are challenging. It is not easy to organize for these fluctuations and to make sure that no one is in disadvantage because he invested early. We saw in our token sale that investors do not always invest as much as they say. Before the whitelist/KYC process, ICOs were basically open for 42 days with not many hard caps. Nowadays with the whitelist it is harder to invest in an ICO. This leads to people subscribing to whitelists of projects they don't even know. This eventually leads to problems in the token sale. For example, we wanted to raise $6 million in the public sale. During the whitelist registration process, we asked the investors what their minimum contribution would be.

According to those answers we would've raised $68 million. In reality, we were only going to raise $2 million. If you then only have a public sale, you are going to get in trouble. Furthermore, the early investors and big contributors are very useful in the further development of the product. They provide you with knowhow and secondary opinions. They also help with the establishment of partnerships in the future. Overall, you can compare these advantages with the advantages of venture capital and business angels. From what I see, the ICO phenomenon is more and more evolving to the traditional financing of VC and BA. It is not as decentralized as many believe. You see projects only organizing a private sale and no longer a public sale. I think this is inevitable because these traditional methods have already proven their worth.

- Last question, in our database we are also including data of Social Network Sites like Twitter, Reddit, and Telegram. Do you think these have an influence on the token price? Is it a good way of communication towards investors? Or is it just something you have to do to not stand out from the crowds?

We are actively posting on Twitter; every update is launched on all of our channels. I do not think it is going to make or break your ICO. Still, I do think it has an influence on the token price. Strong communities certainly use their influence. It is hard for me to estimate that power, but I definitely think it is present. As an investor, I would not blindly look at the number of followers, likes, members… I think projects with notably low followers should raise a red flag. Overall, I think you should definitely consider the information of the SNS channels in your due diligence.

Appendix 9. Since the ICO space is dominated by the objective to be as open-source as possible, we included the code (R statistics) of our data analysis. This provides all readers with the possibility to check how we came to our conclusions.

R Markdown

```r
##Reading data
ICO = as.data.frame(read_xlsx("ICO_Thesis_Master.xlsx"))

cutoff = 0.5

ICO["TypeTeam_2"] = ifelse(ICO$Percent_Develop>=cutoff,"Tech","Business")
ICO["COINS ISSUED"] =  ICO$AMOUNT_Dollar/ICO$ICO_PRICE_Dollar
ICO$ICO_PRICE_Dollar = NULL

#Setting weights COMMUNITY TOTAL
tweets =0.1
followers =0.3
likes =0.05
members_tel =0.15
members_red = 0.3

ICO$COMMUNITY_TOTAL = (ICO$TWEETS*tweets+ICO$FOLLOWERS*followers+
                       ICO$LIKES*likes+ICO$TEL_MEMBERS*members_tel+
                       ICO$RED_MEMBERS*members_red)

#Don't need any more
ICO$FOLLOWERS =NULL
ICO$TWEETS=NULL
ICO$LIKES=NULL
ICO$TEL_MEMBERS=NULL
ICO$RED_MEMBERS=NULL
ICO$COIN =NULL
ICO$DEVELOPERS = NULL
ICO$INDUSTRY = NULL

#Check dimension dataset
dim(ICO)

## [1] 170  15

head(ICO,n=2)

##   AMOUNT_Dollar LENGHT NETWORK  LOCATION START_UP INVESTOR_BACKED PRESALE
## 1       3.0e+08     35   ERC20 SINGAPORE       NO             YES     YES
## 2       4.2e+07     21   ERC20     OTHER       NO             YES     YES
##   TEAM Percent_Develop LEGITIMATELY_DISTINCTIVE PRODUCT_DEVELOPMENT_AB
## 1  165      0.38787879                     YES                   Beta
```

```
## 2 130       0.03076923                    YES                    Beta
##   COMMUNITY_TOTAL RELATIVE_RETURN TypeTeam_2 COINS ISSUED
## 1        17848.85        0.6707406  Business   2500000000
## 2         5108.75       -0.2804594  Business     28571429
```

```r
myvars <- names(ICO) %in% c("AMOUNT_Dollar","COINS_ISSUED","LENGTH","TEAM","Pe
rcent_Develop","RELATIVE_RETURN","COMMUNITY_TOTAL")
ICO_plot=  ICO[,myvars]


theme1 <- trellis.par.get()
theme1$plot.symbol$col = rgb(.2, .2, .2, .4)
theme1$plot.symbol$pch = 16
theme1$plot.line$col = rgb(1, 0, 0, .7)
theme1$plot.line$lwd <- 2
trellis.par.set(theme1)
featurePlot(x = ICO_plot[,1:4],
            y = ICO_plot$RELATIVE_RETURN,
            plot = "scatter",
            layout = c(2, 2))

#Get a look at the correlation matrix of the predictors
myvars <- names(ICO) %in% c("AMOUNT_Dollar","COINS_ISSUED","LENGTH","TEAM","Pe
rcent_Develop","RELATIVE_RETURN","COMMUNITY_TOTAL")

test = na.omit(ICO[myvars])
corr <- round(cor(na.omit(ICO[myvars])), 1)
ggcorrplot(corr, hc.order = TRUE,
           type = "lower",
           lab = TRUE,
           lab_size = 3,
           method="square",
           colors = c("#E46726", "white","#6D9EC1"),
           ggtheme=ggplot2::theme_gray,
           tl.cex = 10,
           show.diag = TRUE
)

data = ICO

#Without transforming variables
lm.fit = lm(RELATIVE_RETURN~.,data =data)
summary(lm.fit)
## Call:
## lm(formula = RELATIVE_RETURN ~ ., data = data)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -7.3619 -1.5039 -0.3212  0.9946 15.9753
```

```
## Coefficients:
##                              Estimate Std. Error t value Pr(>|t|)
## (Intercept)                -1.811e+00  2.036e+00  -0.890 0.375170
## AMOUNT_Dollar              -9.449e-09  8.812e-09  -1.072 0.285368
## LENGHT                     -1.295e-02  1.445e-02  -0.896 0.371538
## NETWORKNEO                 -9.065e-01  1.592e+00  -0.569 0.570035
## NETWORKOTHER                1.618e+00  1.005e+00   1.611 0.109421
## LOCATIONCHINA              -1.832e+00  3.342e+00  -0.548 0.584527
## LOCATIONHONG KONG           1.957e-01  2.107e+00   0.093 0.926123
## LOCATIONJAPAN              -4.662e-01  2.471e+00  -0.189 0.850632
## LOCATIONOther               4.048e+00  2.425e+00   1.669 0.097199 .
## LOCATIONOTHER               1.477e+00  1.535e+00   0.962 0.337546
## LOCATIONRUSSIA             -7.091e-01  1.884e+00  -0.376 0.707124
## LOCATIONSINGAPORE           1.796e+00  1.609e+00   1.116 0.266098
## LOCATIONSWISS               9.227e-01  1.635e+00   0.564 0.573372
## LOCATIONUSA                -3.635e-01  1.562e+00  -0.233 0.816254
## START_UPYES                 1.678e-01  6.546e-01   0.256 0.798104
## INVESTOR_BACKEDYES         -1.389e+00  8.380e-01  -1.657 0.099607 .
## PRESALEYES                  1.400e+00  8.158e-01   1.716 0.088243 .
## TEAM                        5.577e-03  1.650e-02   0.338 0.735799
## Percent_Develop            -9.314e-02  2.835e+00  -0.033 0.973833
## LEGITIMATELY_DISTINCTIVEYES 1.238e+00  6.019e-01   2.058 0.041409 *
## PRODUCT_DEVELOPMENT_ABBeta -2.624e-01  5.472e-01  -0.480 0.632227
## COMMUNITY_TOTAL             1.177e-04  1.893e-05   6.218 5.01e-09 ***
## TypeTeam_2Tech              5.364e+00  1.396e+00   3.842 0.000182 ***
## `COINS ISSUED`             -5.877e-12  4.841e-12  -1.214 0.226713
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.205 on 146 degrees of freedom
## Multiple R-squared:  0.4284, Adjusted R-squared:  0.3383
## F-statistic: 4.757 on 23 and 146 DF,  p-value: 2.11e-09

#Check resisduals
par(mfrow=c(2,2))
plot(lm.fit)

par(mfrow=c(1,1))

###Check model assumptions###

#heteroscedasticity --> NOT OK


bptest(lm.fit) #Breusch pagan test
##   studentized Breusch-Pagan test
##
## data:  lm.fit
## BP = 68.37, df = 23, p-value = 2.165e-06
```

```
#multicolinneartiy--> remove some variables that are too correlated, test for
remaining variables; all < 4 so --> OK
vif(lm.fit)

##                                  GVIF Df GVIF^(1/(2*Df))
## AMOUNT_Dollar             1.714411  1         1.309355
## LENGHT                    1.262661  1         1.123682
## NETWORK                   1.808771  2         1.159701
## LOCATION                  3.888127  9         1.078359
## START_UP                  1.418399  1         1.190966
## INVESTOR_BACKED           2.126467  1         1.458241
## PRESALE                   1.838249  1         1.355820
## TEAM                      1.456123  1         1.206699
## Percent_Develop           2.110632  1         1.452801
## LEGITIMATELY_DISTINCTIVE  1.477775  1         1.215638
## PRODUCT_DEVELOPMENT_AB    1.183105  1         1.087706
## COMMUNITY_TOTAL           1.463145  1         1.209605
## TypeTeam_2                2.116056  1         1.454667
## `COINS ISSUED`            1.199603  1         1.095264

#Autocorrelation of the residuals --> OK
acf(lm.fit$residuals)

# Method 1:
lmtest::dwtest(lm.fit)
##   Durbin-Watson test
##
## data:  lm.fit
## DW = 2.0355, p-value = 0.5285
## alternative hypothesis: true autocorrelation is greater than 0

# Method 2:
lawstat::runs.test(lm.fit$residuals)
##   Runs Test - Two sided
##
## data:  lm.fit$residuals
## Standardized Runs Statistic = 0.76924, p-value = 0.4417

#Errors normally distributed --> NOT OK

shapiro.test(lm.fit$residuals)
## Shapiro-Wilk normality test
##
## data:  lm.fit$residuals
## W = 0.88662, p-value = 4.34e-10

###END CHECK MODEL ASSUMPTIONS###

#How skewed are variables
Skewness = as.data.frame(do.call(rbind, lapply(na.omit(data[,myvars]), functio
n(x) skewness(x))))
```

```r
colnames(Skewness) = "Skewness"
Skewness

##               Skewness
## AMOUNT_Dollar   4.1777941
## TEAM            4.5459010
## Percent_Develop 0.9051965
## COMMUNITY_TOTAL 4.0083224
## RELATIVE_RETURN 3.9001393

#Check how variables are distribtuted visually
par(mfrow= c(2,3))
qqnorm(data$RELATIVE_RETURN,xlab = "Relative_Return")
qqnorm(data$COMMUNITY_TOTAL,xlab = "Community_Total")
qqnorm(data$Percent_Develop,xlab = "percent_Develop")
qqnorm(data$AMOUNT_Dollar,xlab = "Amount_Dollar")
qqnorm(data$TEAM,xlab = "People in team")
par(mfrow =c(1,1))

#All continouis variables are skewed, transforming variable can improve fit

predictors_Trans = data
set.seed(2018)
#Tansforming numerical values.
transform = bestNormalize(data$RELATIVE_RETURN,k = 5)
predictors_Trans$RELATIVE_RETURN = predict(transform,data$RELATIVE_RETURN)

transform = bestNormalize(data$COMMUNITY_TOTAL,k=5)
predictors_Trans$COMMUNITY_TOTAL = predict(transform,data$COMMUNITY_TOTAL)

transform = bestNormalize(data$Percent_Develop,k =5)
predictors_Trans$Percent_Develop = predict(transform,data$Percent_Develop)

transform = bestNormalize(data$AMOUNT_Dollar,k =5)
predictors_Trans$AMOUNT_Dollar = predict(transform,data$AMOUNT_Dollar)

transform = bestNormalize(data$TEAM,k =5)
predictors_Trans$TEAM = predict(transform,data$TEAM)


#Test skewness after --> OK
Skewness_after = as.data.frame(do.call(rbind, lapply(na.omit(predictors_Trans[
,myvars]), function(x) skewness(x))))
compareSkew = cbind(Skewness,Skewness_after)
colnames(compareSkew)= c("Before","After")
compareSkew

##                Before        After
## AMOUNT_Dollar   4.1777941  5.529765e-01
```

```
## TEAM            4.5459010  7.493156e-03
## Percent_Develop 0.9051965 -9.621107e-04

## COMMUNITY_TOTAL 4.0083224 -2.219351e-07
## RELATIVE_RETURN 3.9001393 -6.766182e-16
```

```r
#Check visually
par(mfrow= c(2,3))
qqnorm(predictors_Trans$RELATIVE_RETURN,xlab = "Relative_Return")
qqnorm(predictors_Trans$COMMUNITY_TOTAL,xlab = "Community_Total")
qqnorm(predictors_Trans$Percent_Develop,xlab = "percent_Develop")
qqnorm(predictors_Trans$AMOUNT_Dollar,xlab = "Amount_Dollar")
qqnorm(predictors_Trans$TEAM,xlab = "People in team")
par(mfrow= c(1,1))

ICO_plot_After_Trans =  predictors_Trans[,myvars]

theme1 <- trellis.par.get()
theme1$plot.symbol$col = rgb(.2, .2, .2, .4)
theme1$plot.symbol$pch = 16
theme1$plot.line$col = rgb(1, 0, 0, .7)
theme1$plot.line$lwd <- 2
trellis.par.set(theme1)
featurePlot(x = ICO_plot_After_Trans[,1:4],
            y = ICO_plot_After_Trans$RELATIVE_RETURN,
            plot = "scatter",
            layout = c(2, 2))

#Get a look at the correlation matrix of the predictors after transformation
myvars <- names(predictors_Trans) %in% c("AMOUNT_Dollar","COINS_ISSUED","LENGT
H","TEAM","Percent_Develop","RELATIVE_RETURN","COMMUNITY_TOTAL")

corr  =round(cor(na.omit(predictors_Trans[myvars])), 1)
ggcorrplot(corr, hc.order = TRUE,
           type = "lower",
           lab = TRUE,
           lab_size = 3,
           method="square",
           colors = c("#E46726", "white","#6D9EC1"),
           ggtheme=ggplot2::theme_gray,
           tl.cex = 10,
           show.diag = TRUE


####### SECOND REGRESSION AFTER TRANSFORMING ALL CONTINIOUS VARIABLES#########
#########

lm.fit_2 = lm(RELATIVE_RETURN~.,data =predictors_Trans)
summary(lm.fit_2)
## Call:
```

```
## lm(formula = RELATIVE_RETURN ~ ., data = predictors_Trans)
##
## Residuals:
##      Min       1Q   Median       3Q      Max


## -1.99549 -0.45052  0.05302  0.50916  1.84262
##
## Coefficients:
##                                Estimate Std. Error t value Pr(>|t|)
## (Intercept)                  -1.078e+00  4.718e-01  -2.285 0.023780 *
## AMOUNT_Dollar                -2.132e-01  8.660e-02  -2.462 0.014973 *
## LENGHT                       -4.534e-03  3.741e-03  -1.212 0.227502
## NETWORKNEO                    1.178e-01  4.099e-01   0.287 0.774302
## NETWORKOTHER                 -3.660e-02  2.543e-01  -0.144 0.885740
## LOCATIONCHINA                 9.815e-01  8.384e-01   1.171 0.243592
## LOCATIONHONG KONG             2.321e-01  5.346e-01   0.434 0.664841
## LOCATIONJAPAN                 8.270e-01  6.252e-01   1.323 0.187952
## LOCATIONOther                 1.065e+00  6.172e-01   1.725 0.086559 .
## LOCATIONOTHER                 6.463e-01  3.915e-01   1.651 0.100928
## LOCATIONRUSSIA               -4.892e-02  4.830e-01  -0.101 0.919463
## LOCATIONSINGAPORE             8.922e-01  4.082e-01   2.186 0.030421 *
## LOCATIONSWISS                 5.571e-01  4.215e-01   1.322 0.188351
## LOCATIONUSA                   3.328e-01  3.995e-01   0.833 0.406169
## START_UPYES                   2.756e-02  1.640e-01   0.168 0.866744
## INVESTOR_BACKEDYES           -4.151e-02  2.206e-01  -0.188 0.850997
## PRESALEYES                    4.364e-01  2.073e-01   2.105 0.037006 *
## TEAM                          8.886e-02  7.537e-02   1.179 0.240282
## Percent_Develop               4.957e-02  8.361e-02   0.593 0.554206
## LEGITIMATELY_DISTINCTIVEYES   5.552e-01  1.603e-01   3.463 0.000702 ***
## PRODUCT_DEVELOPMENT_ABBeta   -1.557e-01  1.385e-01  -1.124 0.262743
## COMMUNITY_TOTAL               2.846e-01  8.177e-02   3.480 0.000662 ***
## TypeTeam_2Tech                1.043e+00  3.149e-01   3.313 0.001164 **
## `COINS ISSUED`               -1.576e-12  1.247e-12  -1.264 0.208154
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.8113 on 146 degrees of freedom
## Multiple R-squared:  0.4043, Adjusted R-squared:  0.3104
## F-statistic: 4.308 on 23 and 146 DF,  p-value: 2.396e-08

#Check resisduals
par(mfrow = c(2,2))
plot(lm.fit_2)

par(mfrow = c(1,1))
```

```r
###Check model assumptions###

bptest(lm.fit_2) #Breusch pagan test check for heteroscedasticity p-value is 0
,3 so is OK
## 	studentized Breusch-Pagan test
## data: 	lm.fit_2
## BP = 25.901, df = 23, p-value = 0.3056

plot(lm.fit_2)

#multicollinearity--> remove some variables that are too correlated, all varia
bles < 4 so --> OK
vif(lm.fit_2)

## 				GVIF Df GVIF^(1/(2*Df))
## AMOUNT_Dollar 			1.925629 1 		1.387670
## LENGHT 				1.321302 1 		1.149479
## NETWORK 				1.870726 2 		1.169506
## LOCATION 				3.789828 9 		1.076826
## START_UP 				1.388841 1 		1.178491
## INVESTOR_BACKED 		2.300355 1 		1.516692
## PRESALE 				1.852750 1 		1.361158
## TEAM 					1.386096 1 		1.177326
## Percent_Develop 		1.710789 1 		1.307971
## LEGITIMATELY_DISTINCTIVE 1.636925 1 		1.279424
## PRODUCT_DEVELOPMENT_AB 	1.182962 1 		1.087641
## COMMUNITY_TOTAL 		1.638714 1 		1.280122
## TypeTeam_2 			1.680414 1 		1.296308
## `COINS ISSUED` 		1.242152 1 		1.114519

#Autocorrelation of the residuals --> OK
acf(lm.fit_2$residuals)

# Method 1:
lmtest::dwtest(lm.fit_2)
## 	Durbin-Watson test
## data: 	lm.fit_2
## DW = 2.2689, p-value = 0.9463
## alternative hypothesis: true autocorrelation is greater than 0

# Method 2:
lawstat::runs.test(lm.fit_2$residuals)
## 	Runs Test - Two sided
##
## data: 	lm.fit_2$residuals
## Standardized Runs Statistic = 0.15385, p-value = 0.8777

#Errors normally distributed --> OK
shapiro.test(lm.fit_2$residuals)
```

```
##
## Shapiro-Wilk normality test
##
## data:  lm.fit_2$residuals
## W = 0.98972, p-value = 0.2565

###END CHECK MODEL ASSUMPTIONS###

##Visuals##

#Community_total
ggplot(predictors_Trans,aes(x = COMMUNITY_TOTAL,y = RELATIVE_RETURN))+
  geom_point()+
  geom_smooth(method ="lm")

#Amount raised
ggplot(predictors_Trans,aes(x =AMOUNT_Dollar,y = RELATIVE_RETURN))+
  geom_point()+
  geom_smooth(method ="lm")

#Developers
ggplot(predictors_Trans,aes(x =Percent_Develop,y = RELATIVE_RETURN))+
  geom_point()+
  geom_smooth(method ="lm")

#Product development
ggplot(predictors_Trans, aes(x = predictors_Trans$PRODUCT_DEVELOPMENT_AB,
                             y = predictors_Trans$RELATIVE_RETURN)) +
  geom_boxplot(fill = "lightblue", colour = "blue") +
  scale_x_discrete() + xlab("ALPHA/BETA") +
  ylab("Relative Return")

#Check visually team techies business
ggplot(predictors_Trans, aes(x = TypeTeam_2, y = RELATIVE_RETURN)) +
  geom_boxplot(fill = "lightblue", colour = "blue") +
  scale_x_discrete() + xlab("Type Team") +
  ylab("Relative Return")
```