An exploratory study of Initial Coin Offerings

A better understanding of the ICO market and its fraudulent and unregulated nature.

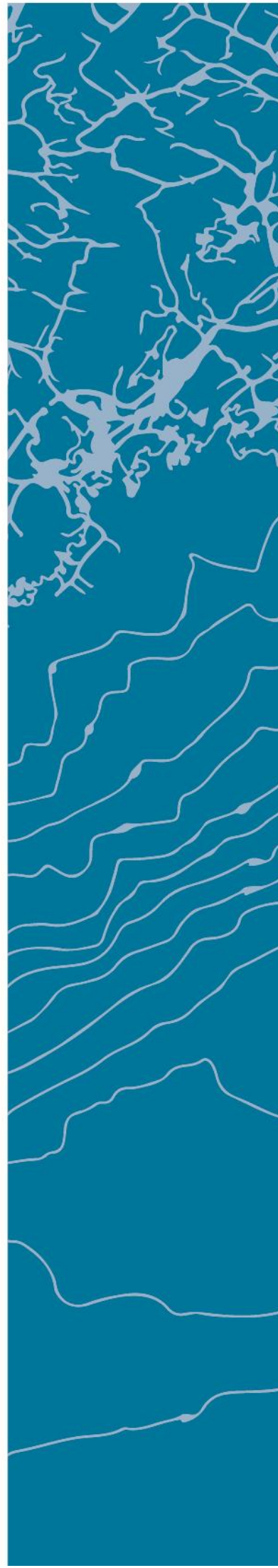LUCAS MIKAEL PALM & ØYSTEIN BERGESEN

Foreword and acknowledgments

When we decided to write a thesis about this subject the crypto asset market was peaking with a market capitalization of about $800 billion. We saw friends and colleges investing heavily in a market we believed to be very risky. Our first goal was to research and try to convince the reader that the crypto market was in a bubble. However, shortly after the start of our research, the market collapsed, and there was no longer a need to establish whether the market experienced a bubble. This led us to change our focus to fraudulent behavior and malpractices that still take place in this very new and unregulated market. We have read numerous articles and books that highlight the potential of blockchain technology, and while we agree that blockchain will likely be very important in the future, the ICO market is facing significant challenges.

Abstract

Initial Coin Offerings (ICOs) has become a new way for firms to raise capital, in 2017 and the first quarter of 2018 they raised approximately $12 billion. If a person managed to buy the top 10 performing ICOs in 2017, they would have had an average return of 10,400%. These returns have created considerable media attention and increased focus from law-makers in different countries. As this is such a new phenomenon there is an insufficient amount of research done; this thesis addresses this gap. By conducting an exploratory study where we summarize the data available, we describe the most critical issues in this new market.

We have found that the market experienced a large speculative bubble where large sums of money entered the market. The easy money encouraged unethical actors attempting to exploit investors. The market has no standards or supervision, and it is rife with hacking and scams, mainly due to the vast information asymmetry between buyers and sellers. These issues have made legal institutions react, and the U.S. has been the most prominent enforcer in the market. They claim that most ICOs to date (2018) have been illegal offerings of securities and have started to focus on issuers who act fraudulently. Many other countries have warned about ICOs, but so far, few have taken significant action.

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1 Introduction

If you have an idea you think is great or a small company with a grand vision, you will need funding to make it a reality. One way to obtain funding is to approach angel investors or Venture Capital (VC) firms to fund your project, but these firms often require a significant share in the company they choose to fund. Alternatively, you could try to list your company on a public exchange. However, in doing so, you would have to supply the exchange with audited financial information on a regular basis, which induces considerable costs. The last alternative was to crowdfund your project, but the downside is that an underwriter charges approximately 10% of the proceeds. These were the options before Initial Coin Offerings (ICOs) arrived. An ICO is a way for new entrepreneurs to receive funding. You do not have to file anything to regulatory authorities, you do not have to pay an expensive auditor, and you do not have to give up a percentage of your company. In fact, you do not even need to have a company at all. The only thing you must do is follow some instructions online, and assuming you know how a computer works you could create a *token*. A token could give the buyer any rights you wish, be it a right to an asset or access to your service. The issuer would then have to sell the token to the public and try to convince them that the token will give the buyer value, in the shape of financial or personal gain.

ICOs are a new phenomenon; in 2017 they raised above $5 billion, and during the first four months of 2018 they have already raised $7 billion (Coindesk, 2018). The top 100 ICOs launched in 2017 have on average had a price increase of 1,532%, and the top 10 had an average of 10,407% (Coinist, 2018). These extreme value increases baffled economists, and early investors were in euphoria. The hype in the market and the simplicity of accessing it caused many new investors to enter.

The downside to this unregulated and unsupervised market is the increasing frequency of hacks, scams and other fraudulent behavior. Some issuers of ICOs fake their businesses and take off with the money raised, while some investors exploit the anonymity to perform "pump and dump" schemes. An estimated 10% of the money raised with ICOs was stolen in hacks in 2017 (EY, 2017).

1.1 Background

In 2008, as a response to the recent financial crisis and the distrust towards banks and financial institutions, Bitcoin was created by Satoshi Nakamoto. Bitcoin was meant to be a completely decentralized payment system, enabling its users to transfer value across borders with anonymity and without the interference of banks and government. As Bitcoin increased in popularity new "coins" [1] such as Ripple, Monero, NEO and Ethereum were created with different capabilities.

In 2017, the interest in the blockchain technology spread to financial markets. Some listed companies changed their names to include the word "blockchain", or announced a new blockchain-based strategy, and saw their stock prices soar. Perhaps the most famous was the name change of Long Island Ice Tea to Long Blockchain, which led to a quadruple of its share price (Shapira & Leinz, 2017). With the dotcom bubble in 2001 fresh in mind, many were quick to make comparisons with the blockchain technology, both positive and negative. Cryptocurrencies received a lot of media attention where some compared it to the famous Tulip Mania (1637) and South Sea Bubble (1720), while others claimed it would revolutionize the financial industry.

At the end of 2017, the main coins rose exponentially. Bitcoin started the year at $1000 and ended it with a modest 13-fold increase, Ethereum ended the year with a 90-fold increase, but both were dwarfed by Ripple, which at its height had a 360-fold increase (Coinmarketcap, 2018a; 2018b; 2018c). The idea behind the first "cryptocurrencies" was to be a safe peer-to-peer payment system (Nakamoto, 2008), but in 2017 they turned into speculative investment vehicles. An excellent example of this is Dogecoin, a coin that was dedicated to a particular species of dog and was initially meant as a joke. However, to the creator's dismay, the market capitalization of the coin rose above $2 billion at the beginning of 2018 (Zhao, 2018).

During the rise of these coins, Ethereum created a new system that allowed anyone to create applications on top of the Ethereum protocol easily. These applications were called decentralized apps, or Dapps, and were run on smart contracts. Smart contracts enabled entities to create their own "token" (proof of ownership) and sell them to the public in what came to be known as "Initial Coin Offerings." A lot of companies and entrepreneurs,

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[1] Coins are crypto assets with their own blockchain. Tokens are created on top of an existing blockchain. This distinction will be discussed later in this thesis.

especially in the tech industry, saw a great opportunity to raise capital easy and quick without having to go through the bureaucratic process of registering an Initial Public Offering (IPO). A large spectrum of different projects has since been funded in ICOs, ranging from peer to peer payment systems to stakes in gold mines, and even adult entertainment. The popularity of blockchain related businesses and the returns on previous "crypto assets" made the appetite for these exotic instruments high.

After the peak in January 2018, the total market capitalization of crypto assets fell from highs above $800 billion down to almost $250 billion in April 2018, a reduction of nearly 70% in three months. In comparison, during the dotcom bubble, the Nasdaq 200 fell roughly 78% from its peak (Alden, 2005). There are probably few who would disagree that the hype around new year in 2018 did not constitute a bubble. During this decline, not only coins lost value but also most of the tokens that were issued in ICOs had a similar decline. Figure 1.1 shows the substantial increase in the total market capitalization at the end of 2017 and the subsequent decline at the beginning of 2018 (Coinmarketcap, 2018d).

Figure 1.1 - Total Market Capitalization. November 2017-March 2018. Source: Coinmarketcap. Retrieved on May 1, 2018, from https://coinmarketcap.com/charts/

Despite this crash in the market for the tokens, it has remained a popular method for funding projects. Figure 1.2 shows that ICOs raised more capital in the first three months of 2018 than the whole year 2017.

Figure 1.2 - Monthly New ICO Funding. Source: Coindesk. Retrieved May 2nd, 2018 from:
https://www.coindesk.com/ico-tracker/

The unexplored nature and high returns of the crypto asset market have led us to ask the questions: 1) What are ICOs, and how do they work? 2) Was the crypto asset market in a bubble, and if so, what are the consequences? 3) What are regulators across the world doing to address this market?

1.2 Outline

Since this is such a new topic, we want to contribute by doing an exploratory study that gathers and synthesizes secondary data in the form of existing research, news articles, statistics, and government press releases. Barely any previous research has been written by people without personal interests in the industry. A substantial amount of literature exists on Bitcoin and the concept of how blockchains work, but there is not much published research about ICOs. A search on the ISI Web of Science database[2] for "Initial Coin Offering" yields zero results.

The second chapter will try to clarify the definitions and terms in the crypto asset market and give the reader a better understanding of the history and technology behind ICOs. The

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[2] A service that gathers articles from more than 33,000 academic journals worldwide. Last accessed 28.05.2018.
(Source: https://clarivate.com/products/web-of-science/)

framework will serve as a base to understand how ICOs are structured and how they are connected to the blockchain technology. The third chapter will explain how ICOs work and which functions they have. It will also describe how ICOs have developed the past year and how they are sold and marketed. These two chapters will answer the question of what an ICO is and lay the groundwork for both chapter three and four.

The fourth chapter will start with a literature review of the Minsky-Kindleberger model and the book "Irrational Exuberance" by Robert J. Shiller. This theory will then be applied to the ICO market and used to discuss whether there was a bubble in the crypto asset market. Besides news articles comparing the crypto markets to previous manias, and reporting on all hacks and scams, there is no extensive research done comparing the ICO craze with previous bubbles. A better understanding of how manias historically have worked out could provide important insights on the risks in the market. As Kindleberger put it: "*Fraudulent behavior increases in economic booms. Fortunes are made in a boom, individuals become greedy for a share of the increase in wealth and swindlers come forward to exploit that greed*" (Aliber & Kindleberger, 2015, p.169).

Because a lot of fraudulent and unethical behavior has followed most manias historically, there will be a focus on fraudulent behavior observed in the crypto asset market. Even though the valuation of the crypto market has had a significant decline, the interest for ICOs is still high, and the amount of fraudulent behavior has increased. The main reason that this market is full of unethical behavior is that it was almost entirely unregulated when it first came. There is not a question if regulators across the world will react to this market, the question is when.

Therefore, the fifth chapter will answer the question of how regulators across the world will react to the ICO market. By synthesizing the data available from government press releases, legal cases, and class action lawsuits, we wish to give the reader a better understanding of the regulatory landscape ICOs might face. The chapter will focus on actions taken by the Securities and Exchange Commission (SEC) in the U.S. since it has been the most active legal institution, with actions against ICOs not only in the U.S. but also outside its borders. An important question regarding the treatment of ICOs in many countries is whether a token could constitute a security. Therefore, we will present an explanation of the test that is currently being used to classify ICOs in the U.S. called the *Howey test*. By summarizing the most important legal actions taken against ICO to date, we also wish to illustrate the

consequences of being classified as a security. Besides the U.S., this chapter will describe an overview of the legal stance of some of the most important countries for the ICO market.

We hope that our work will contribute by laying out a framework from where further studies could be made. Furthermore, this thesis will hopefully educate investors about fraudulent behavior observed in the market and suggest some solutions for how it could be avoided. We will also contribute by summarizing how regulation from authorities has been applied and what the consequences for both investors and issuers could be. The data could hopefully provide helpful insights to lawmakers in other countries who are deciding on how to deal with ICOs. Finally, we wish to create an understandable depiction of this new phenomenon for anyone interested.

2 The blockchain and its connection to Initial Coin Offerings

To fully understand Initial Coin Offerings, it is essential to understand the technology that makes them possible. This chapter tells the story of how the blockchain technology evolved from Bitcoin to Ethereum and the other platforms that facilitate ICOs. It also includes a discussion of the numerous different terms that are used when describing this new technology.

2.1 A clarification of terms in the blockchain space

In this new market, there are many different terms used: cryptocurrency, coin, token, altcoin, utility token, asset token, protocol token, and platform token. Many of these are used interchangeably in media and research both within and outside the community, which contributes to the complexity of this new phenomenon.

Cryptocurrency

It is common to use the phrase "Cryptocurrency" to address the entire market or just a single blockchain. The founder of the company Ripple, Brad Garlinghouse, disagrees with the term cryptocurrency and argues that a more suiting definition would be to call them assets since most of them do not work as common currencies (Roberts, 2018). In the rest of this thesis, we choose to use the term "crypto asset" for a single cryptocurrency, and "crypto asset market" for the entire market.

Coin

Aziz (2017) explains that all coins and tokens are interchangeably called cryptocurrencies but argues that using the term cryptocurrency is a mistake. He proposes a different categorization in which we only have coins and tokens. Coins are assets that are created with their own blockchain. They are often used as a mean to transact value either between tokens or as a means of payment between individuals and sometimes businesses. Coins have also been called Altcoins which is short for Alternative coins (the alternative being Bitcoin).

Token

Aziz (2017) defines tokens as a representation of an asset or service that runs on top of another blockchain. These tokens are registered on the same blockchains as some of the coins, and they do not need their own. Even though a coin has its own blockchain and a token is run on an established blockchain they could be very similar.

2.2 What is a blockchain?

A blockchain is a *distributed public ledger*. Distributed means that the ledger is accessible by everyone connected to it, and a ledger is a record of transactions between a group of people. Using this technology removes the need for a central institution (such as a bank) to process and verify all transactions. The reason why a bank is needed for online transactions is to verify that the sender of the money has enough funds and that the receiver is debited with the correct amount. In a blockchain, this is solved by storing all transactions publicly on the ledger. The account balance of everyone is registered on the ledger and cannot be altered. If a person with an account balance of one unit tries to send two units, the transaction will automatically be disapproved by the ledger. If the sender has enough funds, the transaction is approved, and the balances of both sender and receiver are updated (Nakamoto, 2008). This is a simplified explanation; a more technical explanation is outside the scope of this thesis but can be found in other sources (see for example, Tapscott & Tapscott, 2016).
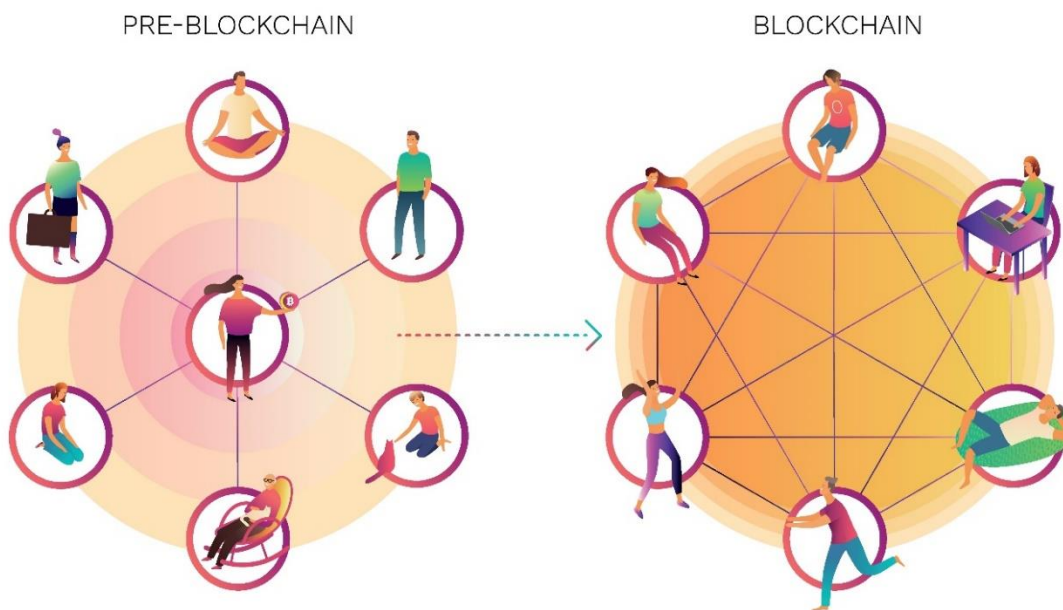
Figure 2.1 - Centralized vs. distributed system. Source: Colourbox. Retrieved on 22.05.2018 from
https://www.colourbox.com/vector/blockchain-concept-vector-illustration-vector-31705432

The blockchain removes the need for a centralized institution by using encrypted digital signatures that are unique for each person and each transaction. To send money the sender needs to approve the transaction by signing with his private key. The private key is like a password giving access to all assets that a person holds on the blockchain, if forgotten, stolen,

or lost, the assets are gone. A public key works like a username or bank account number, you can give it to someone if you wish to receive a transaction, but they cannot access your funds with it.

Each transaction receives an irreversible timestamp, and all transactions within a specific timeframe are placed in a "block", which is added to the ledger. The figure below is an illustration of how transactions are placed into blocks and published in chronological order. This is meant to show how Bob can trust that Peter is the legitimate owner of the funds because the ledger automatically registers that Peter received $10 from Jane, who received $10 from John, and so on. Because all transactions have a timestamp, the ledger can also see that Peter has not already sent the $10 to someone else, solving the so-called double-spending problem. This is a simplified illustration, in reality, there are several hundred transactions in each block. The names are not visible, only the public keys and amounts sent are visible on the ledger.
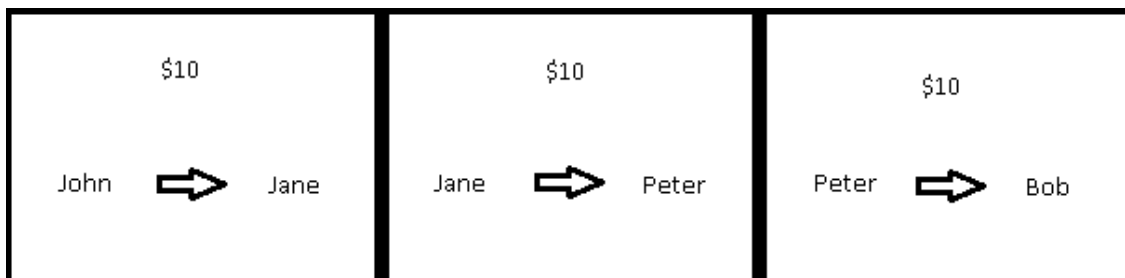
Figure 2.2 - Illustration of blocks.

2.3   Bitcoin

2.3.1   History

Although some of the basic ideas behind blockchain had already existed for several years (Haber & Stornetta, 1991), it was first conceptualized by Satoshi Nakamoto in 2008 [3]. In a white paper called "Bitcoin: A Peer-to-Peer Electronic Cash System", he described Bitcoin as electronic cash that would allow transactions to be made directly from one party to another without a central authority. After the software was released in early 2009, Bitcoin started to gain some popularity, and in 2010 the first purchase was made when two pizzas were bought for 10,000 Bitcoins (Marr, 2017).

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[3] The name Satoshi Nakamoto is a pseudonym, the real identity of Bitcoins creator is still unknown.

In 2011 the first competing cryptocurrencies were created, such as Namecoin and Litecoin. During 2014 the total number of cryptocurrencies went from 66 at the beginning of the year to over 500 in December (Coinmarketcap, 2018e; Coinmarketcap, 2018f). Despite this tenfold increase, Bitcoin maintained its dominance in the market. All through 2014, the value of Bitcoin accounted for between 75%-95% of the total value of the market, as seen in Figure 2.3 below. It was not until 2017 that this dominance was significantly reduced, when it fell as low as 38%, with Ethereum as its largest competitor (Coinmarketcap, 2018g).
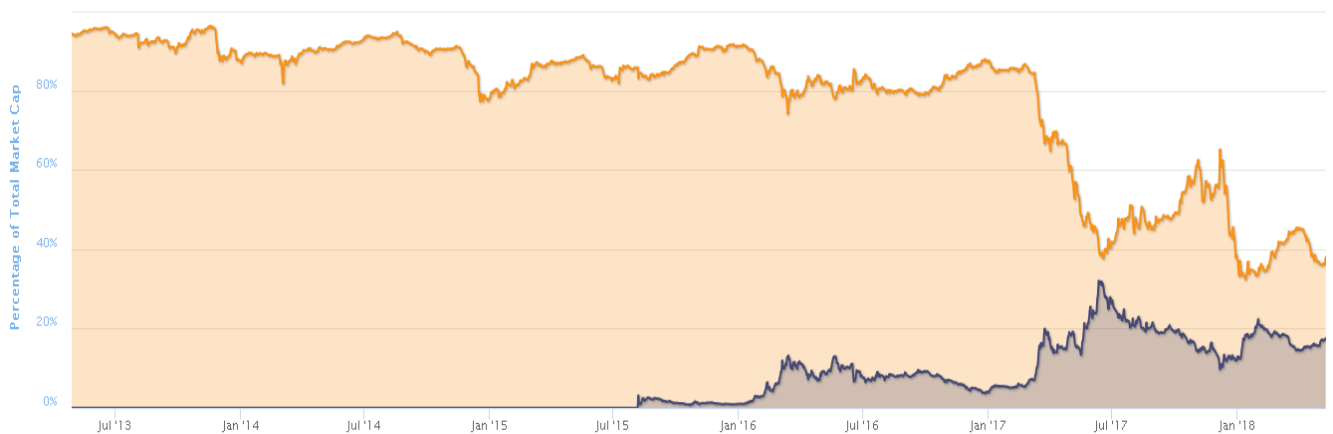
Figure 2.3 - Bitcoin market dominance. The orange line is Bitcoin, blue is Ethereum. Source: Coinmarketcap. *Retrieved on May 11th, 2018 from https://coinmarketcap.com/charts/#dominance-percentage*

2.3.2 How a blockchain works

In his white paper, Satoshi Nakamoto describes how Bitcoin works in a relatively technical language that is outside the scope of this thesis. Instead, the transaction process will be described in a simplified way. If we continue from the example mentioned above, when Peter wants to send $10 to Bob he signs with his private key and the transaction is sent to all computers in the network. All these computers (known as "miners" or "nodes") place the transaction in a block and compete to find a mathematical "solution" to the block. To illustrate, let's say they are competing to find the solution to the following equation: $x^2 + 3 = 12$. The first computer to find the solution sends the block to the network, containing the following information: "Peter sends Bob $10. x=3". The network can easily check that the answer is correct by inputting x=3 in the equation and accept the block. If the block is accepted, the computer that found the solution is rewarded with new Bitcoins. This process is called "proof of work" and is meant to make falsification of data on the blockchain difficult and costly (Velde, 2013).

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The probability of each computer finding the solution to a given block is based on how much computing power that computer can produce. If there are 100 computers in the network, all of them with the same amount of computing power, each computer has a 1% chance of being the first to find the solution. This means that to manipulate the blockchain one would need to possess more than 50% of the total computing power in the network and carry out a so-called "51%-attack" or "majority attack". In 2014 the Bitcoin mining pool GHash.io reached 50% of the total computing power of Bitcoin but voluntarily proposed to lower this number so that it would never exceed 39,99% (Wilhelm, 2014). It should be noted that if someone succeeds at getting the majority, they could not use the network to steal coins, they could only reverse previous transactions and stop new transactions from being made.

After the first computer finds the solution to a block and broadcasts it to the network, the other computers accept the block if all transactions included in the block are valid. There is no voting in the traditional sense; if a computer accepts the block as valid, it merely shows this acceptance by starting to work on the next block. An attacker wishing to manipulate the blockchain will not accept the block that is published but instead publishes his own block on the blockchain. Because the attacker will include at least one transaction that is not valid, this block will not be approved by the rest of the network, causing the blockchain to split in two (see Figure 2.4). In a blockchain, the longest chain is always considered the correct chain because it has the most work put into it. Therefore, to succeed, the attacker will always have to maintain the longest chain, which is practically impossible if he does not control more than 50% of the network (Nakamoto, 2008).
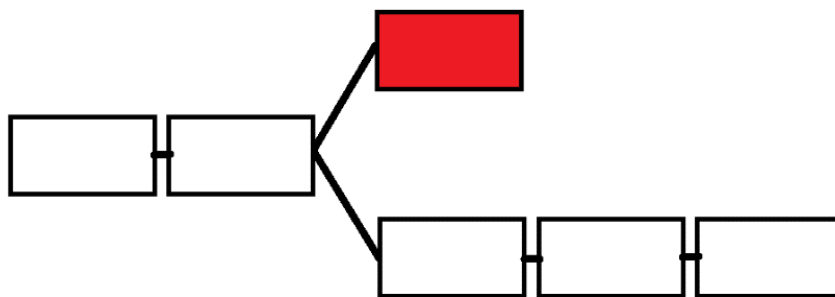
Figure 2.4 - Split blockchain. The attacker (red) splits the blockchain, but all other computers keep working on the valid block, making it the longest, and therefore correct, chain.

2.4 Ethereum

Above we have used Bitcoin as an example when explaining how a blockchain works, but there are many other types of blockchains. Founded by Vitalik Buterin in 2013, Ethereum is currently the second largest coin. As opposed to Bitcoin, which was initially meant to be used for transactional purposes, Ethereum aims to be a platform where anyone can create their own application on top of it (Buterin, 2013). In the rest of this chapter, we will describe some of the main features behind Ethereum and how these features have made ICOs possible.

2.4.1 Smart contracts

One of the main reasons Ethereum has become so popular is the possibility of using *smart contracts*. Smart contracts are digital contracts that are executed automatically when certain conditions are met; they do not rely on a centralized operator (Rohr & Wright, 2018, p.18). We can illustrate with an example of a simple smart contract. If Peter and Bob want to make a bet on which team will win a game of football, but they do not trust each other completely, they can use a smart contract. Both Peter and Bob send $10 each to the smart contract, and the smart contract holds the funds until the game is over. If team A wins the game, the sum of $20 is sent to Peter, if team B wins the $20 is sent to Bob, and if it is a tie they both get their $10 back. The smart contract does all of this automatically; there is no need for a third party such as an online bookmaker.

More complicated contracts with more money involved increase the importance of writing the contract correctly. The code of every smart contract is stored on the blockchain, which means that anyone can view it (Sergey et.al., 2018). It is also important to note that once the smart contract is published on the blockchain, its code cannot be updated. This means that if someone has sent funds to a smart contract that has flaws in its code, there is a risk that the funds could be stolen.

Smart contracts are powered by Ether, Ethereum's coin, which is used to pay the miners that do the computations necessary for the smart contracts to be executed. This transaction fee, also called "gas", serves as an incentive for users to contribute to the network, as well as to prevent attacks by making them costly (Buterin, 2013). The amount of gas required varies and is mainly dependent on the desired speed and complexity of the transaction. For example, a simple transaction of 1 Ether from person A to person B requires less gas than a transaction using a complicated smart contract.

2.4.2 Decentralized applications (Dapps)

Decentralized applications are similar to smart contracts, but they differ in two main ways (Buterin, 2014). Firstly, a decentralized application does not necessarily have to be financial. Secondly, where smart contracts only have a fixed number of participants, a decentralized application can have an unlimited number of participants on all sides of the market. A decentralized application can be just like any other application that a person has on his or her smartphone, with the only difference being that it does not depend on a single server but instead the entire network of users (Tapscott & Tapscott, 2016, p.119). This structure is meant to prevent long periods of downtime because of server problems, like users of EA Sports games Fifa and Battlefield have frequently experienced (Mullin, 2017; Mackrell, 2018). It is possible to create a Dapp that is much more complex than a single smart contract by instead having multiple smart contracts that communicate with each other and with the underlying blockchain (Buterin, 2013).

2.5 Tokens

If Ethereum is used to create a decentralized application, it is also possible to create a *token* that can be used to purchase products or services inside the Dapp. These tokens are meant to function in the same way as a coin, they are easily transferable and do not need a central authority to validate transactions. A standardized smart contract called ERC20 has made the creation of tokens very easy, the whole process is described in detail on the Ethereum webpage (Ethereum, 2018a). The ERC20 standard is a set of guidelines which makes all tokens that follow this standard compatible with each other. This means that if an ERC20 token is created, it can be used over the entire Ethereum network, and all wallets[4] that accept Ether will also accept the token. It should be noted that it is not necessary to have a Dapp to create a token, nor is it necessary for a Dapp to have its own token.

The differences between a blockchain, a decentralized application (Dapp) and a token can be illustrated by using the example of a widely popular game called Pokémon Go. This game is downloaded to a smartphone, which has an operating system, usually iOS (iPhone), Android or Windows. The operating system in this example works in the same way as the Ethereum blockchain; it is possible to build applications on top of it. The Dapp in this example is the game itself. When playing the game, it is possible to buy Pokécoins, a coin that can be used to

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[4] In order to buy tokens, you need a digital wallet. This will be explained further in chapter 3.

buy specific items inside the game. These Pokécoins works the same way as a token; tokens could be used as payment inside the Dapp. One of the main differences between Pokécoins and tokens, however, is that once bought Pokécoins cannot be resold on an exchange like most tokens.
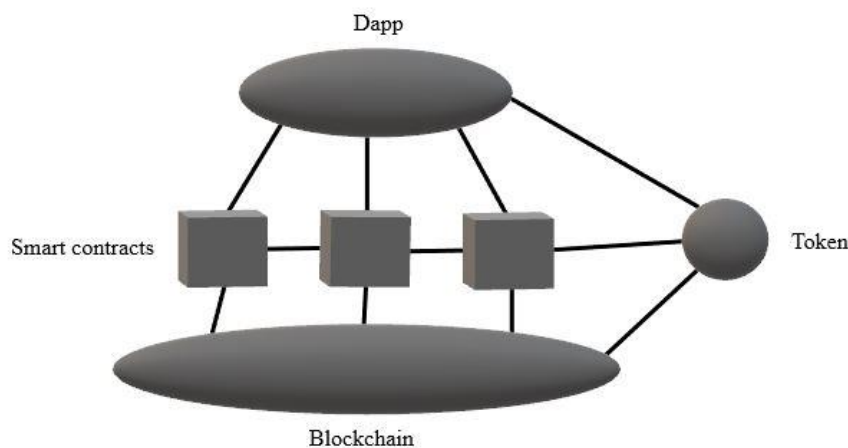
Figure 2.5 - Illustration of blockchains, smart contracts, Dapps, and tokens.

Ethereum is not the only platform that makes it possible to launch a new token. NEO, Omni, and Ardor are other examples, but Ethereum is by far the most popular. An overview of the 100 largest tokens sorted by market capitalization shows that 93 of them are using the Ethereum platform (Coinmarketcap, 2018h).

2.6 The birth of Initial Coin Offerings as a fundraising method

The introduction of the ERC20 smart contract did not only make it simple to create a token, but it also made it simple to sell these tokens to participants who wanted to support the project. Regular crowdfunding through platforms such as Kickstarter has a cost of up to 10% of total funds raised (Kickstarter, 2018), but the usage of smart contracts removed the need for this third party to collect funds and distribute rewards. This type of token sale became known as an Initial Coin Offering. This name originates from the financial term Initial Public Offering (IPO). An IPO is a process when a private company registers its shares on a publicly traded exchange, either to realize shares or to increase funding. An ICO can be described as a mix between an IPO and crowdfunding, but instead of selling shares, the issuer sells tokens. Another important feature is that an ICO could be created by anyone, from a large company to a single programmer (Rohr & Wright, 2018, p.3).

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3 Initial Coin Offerings Explained

While the previous chapter described how Initial Coin Offerings were made possible by blockchain technology, this chapter describes in more detail how an ICO is done. It describes the structure of the token sale, the rights associated with the tokens and how investors can participate in the sale. The last section of the chapter describes how the market for tokens has developed during 2017 and the first months of 2018.

3.1 Why create an ICO?

One main reason why ICOs have grown to become a popular financing activity and why entities choose to create their own ICO is because of the simplicity and low costs. Anyone wishing to create a token could follow an instructional video and create one without much effort. Also, the ICO market has been mostly unregulated which makes it cheaper than going through the process of creating an IPO. There are no expensive audit-procedures or detailed prospectuses required, and no underwriter that claims a large percentage of the proceeds. Another advantage is that tokens usually (with some exceptions) do not give the buyer any voting rights, which helps the issuer to keep full control of the company. Many venture capital firms claim a large part of the shares in companies they fund and may take control or influence decisions in the company.

In 2017, raising funds in an ICO was not only simple in the sense that the tokens were easy to create, but the attention and hype around crypto assets caused a massive demand for all kinds of tokens. There were several examples of ICOs collecting millions of dollars in just a few minutes. Web browser Brave collected $35m in 30 seconds when they sold their Basic Attention Token in an ICO in May of 2017 (Keane, 2017). Another example is SingularityNET, who raised $36m in one minute later the same year (Dinkins, 2017).

Another important reason why a project might choose to do an ICO is to get potential customers involved early in the hope of obtaining network effects. Network effects refer to how the addition of a new customer increases the willingness to pay for all participants in the network (Economides, 1993). An example of this is Metcalfe's Law, which states that the total value of the network is equal to the squared number of participants. It has been shown that this theory fits especially well with social networks such as Facebook (Metcalfe,2013; Zhang, Liu & Xu, 2015). The theory also seems to fit well with the price of Bitcoin (Peterson, 2017). Issuers will want to get a large user base even before launching their product, hoping

that the value of the network will grow exponentially as new users join. This is probably even more important when the company behind the ICO is launching a service that demands a large user base.

3.2   How to create an ICO

When a project wishes to create an ICO, they start by creating a white paper. The white paper is one of the most important marketing tools, and its purpose is to convince the prospective investor that the product or service is viable and has value. It is similar to a prospectus (a legally mandated document issued before a company offers securities to the public), except the white paper does not have the same legal requirements. The paper also describes how the tokens will work in the system and how they might add value to consumers or investors. Many white papers include a description of what the proceeds will be used for and a description of the team behind the issuing. Some describe the process of the ICO, when and how the sale will be performed and if there is a limit on the amount of funding. A significant amount includes a disclaimer telling the reader about all the risks associated with the project and that they are not a security. Another type of information the creators often disclose is the code used to create the token. This code may be made public through an arena such as Github where programmers and possible investors could review the code. A study of 253 ICOs between 2014 and August 2017 found that the availability of code was the factor that had the highest correlation to a successful ICO (Adhami, Giudici & Martinazzi, 2017).

When the white paper and code has been written, many ICOs choose to offer bounty programs to marketers and programmers. These programs are done before or after the ICO, depending on what type of help the promoter is seeking. Bounty programs that occur before the ICO are usually related to marketing on the Internet and social media. The contributors receive tokens according to how many views, likes, and shares they get on their media posts when marketing the ICO. The company issuing the ICO gets "free" advertising, while the bounty seekers get an increased payout as the ICO becomes more popular. It becomes a win-win situation. Some also choose to have a bounty program after the ICO. These can take different forms, one being a translation bounty. Here the contributor is rewarded with tokens for translating the white paper, website and other documents. Another post-ICO bounty program, and maybe the most common, is a bug reporting bounty. In this case, tokens are given in return for pointing out possible weaknesses in the code that could cause problems in the future. The reward depends on the several factors, Ethereum pays rewards ranging from

$500 up to as much as $25,000 depending on the combination of impact and probability (Ethereum, 2018b).

3.3 Token sale structure

When selling the tokens to investors, the issuer can choose if they want a fixed supply of tokens and if they want to sell them at a fixed price. There are three options an ICO can use when they structure the smart contract: A hard cap, soft cap or no cap on the amounts raised. A hard cap is the maximum amount of funding that the ICO can raise. If there are more buyers after the hard cap has been reached, their funds will not be accepted. The soft cap is the minimum funding required to distribute the tokens after the sale. If the ICO does not reach its soft cap, all funds will automatically be returned to the buyers. No cap means that there is no limit to how much funding will be accepted, tokens are sold at a fixed priced for a fixed period, and the offering will not close before the time has run out. Tezos is a good example of an ICO with no cap; this resulted in one of the largest token offerings ever recorded, raising a total of $232 million (Foster, Olthoff & Levin, 2018). The structure of the token offering varies greatly, and an offering could use a combination of these methods with both a soft and a hard-cap. The choice of structure depends if the issuer wishes to receive as much money as possible or to include a larger number of investors.

There are also different types of pricing mechanisms during the offering. The choice of pricing could have a significant impact on the value of the token after the sale and the percentage of ownership. Many ICOs sell their tokens at a fixed price, but a so-called "Dutch auction" is also quite common. In this type of auction, the price of the token is based on a bidding round for a fixed number of tokens. All bids are collected from the buyers and sorted in descending order, from the highest price to the lowest. The buyers also include in their bid how many tokens they want at the specific price. Starting with the highest bid all bids are accepted until the total amount is sold, and the lowest accepted bid becomes the price for all tokens. We can illustrate with an example.

100 tokens for sale	Amount	Price
Bid A	50	100$
Bid B	30	70$
Bid C	20	50$
Bid D	20	45$

Note: The lowest bid that matches the supply is the final price for all bids.
All tokens are sold for $50, and person A-C gets their orders filled.

Figure 3.1 - Dutch Auction

3.4 What does a token give the owner?

A token does not work like a share in a company where the owner is entitled to ownership, future profits and voting rights. The rights attached to the token depends on the choices of the issuer. This is one of the reasons why tokens are hard to classify; there is a myriad of different combinations of token attributes. An overview based on a sample of 253 ICOs from 2014 until 2017 categorizes the tokens based on the rights attached. In this specific sample, about 21% of the tokens acted as currencies. While a majority of 68% gave access to services, 25% gave decision rights, and 26% gave the holder a part of future profits (Adhami et.al., 2017). Smith+Crown separates the rights attached to tokens in six categories that are illustrated in the figure below.

Token Rights
SMITH + CROWN

Digital tokens being sold in ICOs confer a combination of rights to holders

Payment
Token is the only way to make payments on the network

GNT are the only way to pay for services on the network.

Access
Token provide the ability to use the platform itself

LSK is needed to pay transaction fees on the network.

Profit or Fee
Holders get a portion of revenues or profits

Holders of TIME earn the fees from Labour-hour tokens.

Contribution
Tokens needed to play certain roles on the platform or app

1ST allow holders to determine who won gaming matches

Block Creation
Tokens determine who secures the blockchain

KMD holders select the notary nodes who secure the blockchain

Governance
Holders influence features, project direction, protocol details, or more

DGD holders determine how DigixDAO funds are spent

Figure 3.2 - Token rights. Source: Smith+Crown. Retrieved on April 30th, 2018 from https://www.smithandcrown.com/token-rights/

Golem is a good example of a payment token. They are creating a system that allows users to rent idle computer-capacity in exchange for GNT-tokens. The owner of a GNT token can only use these tokens on the platform to pay for its services. There are only two reasons to buy them: Either a person wishes to use the service, or he or she anticipates that they will appreciate. There is a limited number of GNT-tokens and if the service becomes popular investors believe that the overall value of the tokens will increase. During Golem's ICO 1 billion tokens were sold for $8.6 million in about half an hour. Almost all tokens sold in ICOs have a predetermined fixed number of tokens making them scarce.

3.5 Valuation

Using standard valuation models, such as the Discounted Cash Flow Model (where a value of the asset is calculated through discounting future cash flows from the project) or fundamental ratios such as the Price to Earnings ratio (stock price divided by earnings per share) or Price to Book ratio (stock price divided by book value per share), to assess the value of a token is nearly impossible. Most tokens do not possess traditional investment traits such as steady cash flow or observable book value. Moreover, even though some do, much of the information is not given to buyers since there are no reporting standards. The lack of information poses a higher risk of mispricing since there are no explicit anchors on which prices are based. A possible fact that further assists this theory is that many other coins are increasingly correlated to the price of Bitcoin (Chainalysis, 2018). Instead of these traditional valuation techniques, people have tried to find alternatives. The one that is the most popular is the Equation of Exchange.

$$MV = PT$$

M is the total amount of tokens available in the market, *V* stands for the velocity of the token, how many times it is transferred between people per day. *P* stands for the price level of the goods and services offered on the platform nominated in the token price and *T* is an index of the total value of transactions per day. When a new platform is launched with its own token (that is the only one that can be used for that platform) that allows both buyers and sellers to meet and transact goods or services, the expected value of the token could be estimated using this model. The value of the token could be calculated by rearranging the model to and taking the inverse relationship to change *P* from the price of goods sold to the price of the token (Buterin, 2017).

$$P = T/(M * V)$$

This formula is a simplified version of a possible alternative valuation model, but it does have merit since the popularity of the platform (Dapp) will increase *T* while *M* remains constant (assuming the velocity is unchanged). This model has received much criticism because of the difficulties in measuring the velocity of a token. The other variables are also hard to measure, and it is a very uncertain estimate to use.

There is also another method that is easier to measure called the Network Value-to-Transaction Ratio (NVT). This ratio is merely the market capitalization of the token (token

price multiplied by supply) divided by the daily transaction volume. This measurement is only applicable where the purpose of the token is to conduct transactions. Other problems are that when the price of a token increases, so does the volume, the same goes for large declines, making the model less useful (Lannquist, 2018).

3.6 Participating in an ICO

To participate in an ICO in 2017, the buyer almost always needed to pay with Bitcoin or Ether, but sometimes credit card payments or other crypto assets were allowed. In the first step, participants buy Bitcoin or Ether on an online exchange with their credit card. After receiving the coins, they send them to a public key presented by the issuer of the ICO. After purchase, the funds are held up in a smart contract. The smart contract is programmed to start the distribution of tokens once the offering is complete and the soft cap has been reached. If the soft cap is not reached the smart contract automatically returns the coins to the investors, but if it is successful, the funds are transferred to the account of the issuer. The buyer will then receive the tokens as a confirmation of their stake. When the buyer receives their token, they can usually turn to an exchange and sell them after a short period.

3.7 Wallets

To receive a Bitcoin/Ether/token, it is necessary to have a *wallet*. The coins/tokens are registered as a proof of ownership on the blockchain, and a person's private key is the access to those funds. The wallet is merely the method of storing this private key. There are several different wallets that differ in the degree of security and accessibility. The easiest and probably safest wallet is a *paper wallet*. A paper wallet means that the private key is written down on paper (Rosic, 2017).

Another type of wallet is a *software wallet,* which can be either a *desktop wallet*, *an online wallet* or a *mobile wallet*. A desktop wallet means that the token owner downloads a program and stores the key locally on his or her computer. With an *online wallet,* the private key is stored online, which means it can be accessed from any device with an internet connection. A *mobile wallet* is an app downloaded to a smartphone, which makes it accessible anywhere. The app can either store the key locally on the phone or on a server online. The final type of wallet is a *hardware wallet,* which usually comes in the form of an encrypted USB or hard-drive. The USB is designed explicitly for storing cryptocurrencies and makes it possible to store the keys offline, but at the same time make transactions online.

3.8   Exchanges

Most crypto asset exchanges work similarly to a regular web-based stock exchange where buyers and sellers place orders, but there are many differences between them. One of the main differences between exchanges is the method they use for determining which tokens should be listed. Some require the issuer to pay to be listed, with some charging as much as $1 million (Williams-Grut, 2018). Others have no fees; instead, they let their customers vote on which tokens should be listed. Although there is a large number available, the largest exchanges have significant power over the issuers since they can offer substantial traffic and many potential buyers. According to Coinmarketcap (2018i), there are currently 214 different crypto asset exchanges, but the five largest have 39% of the total market volume while the ten largest have 50%[5].

3.9   Developments in the ICO market

In September 2017 there were slightly over 150 tokens available for purchase with a total market capitalization of $90 billion. The value of tokens in circulation (meaning all tokens that were not in lock-up periods or otherwise withheld) was at $6 billion, representing 7% of total market value (Rohr & Wright, 2018, p.31). On the 6th of January 2018 the entire crypto asset market had a value of $795 billion, and by March the same year, this value was halved to $396 billion (Coinmarketcap, 2018d). The number of tokens in March was 640 (Coinmarketcap, 2018j), compared to 150 only half a year ago. In the same period, the total value of all tokens based on market capitalization more than doubled to $198 billion, while the total value of circulating supply of tokens was $36.5 billion (Coinmarketcap, 2018k). This change in circulating supply represents an increase from 7% to 18%. Two possible explanations are that the lock-up periods are beginning to expire and that new ICOs have had a higher degree of circulating supply.

According to TokenData (2018a)[6], 442 Initial Coin Offerings were registered raising a total of $5.6bn in 2017. The average return on tokens in 2017 were declining each quarter, from astronomical returns of 4,460% in the first quarter to 650% in the last quarter. This resulted in an average return of 1,280% on a yearly basis, with a median of 490%. These numbers indicate that some tokens had sizeable relative price increases. At the beginning of 2018, the

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[5] Based on data from April 27th, 2018. In this calculation BitMEX has been excluded as they do not sell Bitcoin in the market, only forward contracts.

[6] It should be noted that these statistics do not differ between coins and tokens.

average return on tokens fell dramatically compared to 2017. In the first two months of 2018, the average return was at 217% with a median return of 142% (TokenData, 2018b). The extreme returns observed, and the following decline leads us to the next question in this thesis, whether the market experienced a speculative bubble.

4 Was the crypto asset market in a bubble, and what are the consequences?

The returns mentioned in the last chapter is a phenomenon that is rarely seen in financial markets. There is probably little doubt that the valuations grew too large too fast in most cases. Looking at the crypto asset market through the lens of theory relating to market manias and irrational behavior could help illustrate whether there was a bubble and might highlight some risks with such a boom. We do note that the crypto asset market is relatively small in comparison to previous large financial bubbles such as the most recent, dotcom in 2001 and housing in 2008. However, studying what is happening in the ICO market now using patterns from earlier booms will hopefully add some valuable insights into why the market crashed and what the consequences could be.

4.1 Definition of a bubble and the Minsky-Kindleberger model

All bubbles have different causes and effects, and since the word bubble is a very subjective description, it also has many definitions. Charles P. Kindleberger described a bubble as "*a significant increase in the price of an asset or a security or a commodity that cannot be explained by the 'fundamentals', when the basis for projecting the price of the asset or security at a future date is the recent increase in its price*" (Aliber & Kindleberger, 2015, p.43). Nobel prize-winning economist Robert J. Shiller has a similar description in his book "Irrational Exuberance" but focused more on the psychological aspects. *"I define a speculative bubble as a situation in which news of price increases spurs investor enthusiasm, which spreads by psychological contagion from person to person, in the process amplifying stories that might justify the price increases..." (Shiller, 2005, p.2).*

The Minsky-Kindleberger (MK) model is often divided into four phases. In the first phase, there is a displacement, a positive shock to the economy. This shock is followed by a boom-phase where prices deviate from their fundamental value and credit expands to fill the investment demand. When mentality changes and the tide turns, the market becomes distressed and then experiences panic, resulting in a slow or fast loss of value. This model is a generalization of the anatomy of a typical mania in a market. Each phase will be described more thoroughly followed by observations from the crypto asset market to make it easy to compare the events that led up to the bursting of the bubble at the beginning of 2018.

4.2 The first phase: Displacement

According to the Minsky-Kindleberger model, the first phase of a speculative mania starts with a displacement, a shock to the financial system that could change the anticipated profit opportunities for that market. This can be everything from laxer regulation, great innovations such as the internet, or a significant rise or fall in the price of a commodity. Previous examples of such shocks are the dotcom bubble in 2001, where the internet revolutionized the flow of information, or the deregulation in Japan that caused companies and banks to overleverage in the 1980s. In the beginning, a lot of new investors and entrepreneurs invest because of these sound profit opportunities that arise from the displacement. However, if the displacement carries on for too long, it might turn into a speculative mania where actors invest based on previous price increases instead of sound analysis. Nonetheless, a substantial change in a part of the economy does not necessarily mean that it is the start of a speculative mania. *"Virtually every mania is associated with a robust economic expansion, but only a few economic expansions are associated with a mania"* (Aliber & Kindleberger, 2015, p.22).

The introduction of blockchain and ICOs could be considered such a displacement in a small market. Even though Bitcoin had existed since 2008, it was not until 2012 that the interest in crypto assets started to gain attention in some specialized media. A Forbes article written in 2012 described that a person could be his or her own bank using Bitcoin and that this was the first step towards a cashless society (Matonis, 2012). Bitcoin was a new phenomenon with a very promising new technology, and the subsequent price increases in Bitcoin from about $100 to $1000 in 2012 probably created a perception of profit opportunities in that market. Interest grew from there and by 2017 mainstream newspapers often included news from the crypto asset market. The interest for crypto assets became increasingly apparent when Google Trends published the top searches for 2017, where "Bitcoin" was the second most searched term in the category "global news", right behind hurricane Irma (Google, 2018). Every displacement has a compelling story, and so did Bitcoin. It was supposed to create a means of payment across borders without the influence of government or banks.

4.3 Boom phase and euphoria

After the displacement takes place and new investors and entrepreneurs enter, the market turns into a boom phase. During this phase, most investors do not base their investments on fundamental analysis, and analyst forecasts generally overestimate the returns on projects. The media starts to focus its attention on the new market, and there is an exponential rise in

prices and interest (Buckley, 2011, p 121). The Minsky-Kindleberger model focuses on the expansion of credit as the main culprit for causing overvaluation in a boom phase, but there is currently little data on how much credit that was used in the crypto asset market during the boom of 2017.

To give a better explanation of the boom phase, Shiller's work in the book Irrational Exuberance focuses on the behavior of market participants. Displacement in a sector could drive the market from a rational increase in valuation to a speculative overvaluation. Shiller refers to this phenomenon as "naturally occurring Ponzi processes" (Shiller, 2005, p.69-76). He further explains with a hypothesis that the increases in prices could cause a feedback loop of speculation. He illustrates this with a quote from Charles Mackay, commenting on the tulip mania: *«Many individuals grew rich. A golden bait hung temptingly out before the people, and one after another they rushed to the tulip marts, like flies around a honey-pot.*" (Shiller, 2005, p.245). This behavior is probably what many in the crypto community know better as FOMO (Fear of Missing Out). Shiller credits a part of this behavior to "adaptive expectations", a hypothesis about people's tendency to adjust their expectations based on previously observed price movements.

He also discusses the possibility that these feedback loops are so well known among investors that bubbles could exist merely because people want to join the bubble for a while. The investors are hoping that someone is willing to buy the asset at a higher price, even though they think it is already overvalued. These feedback loops can be considered rational from an individual perspective, but as more people have the same thought, the bubble grows bigger. In many previous manias, the last ones to enter such a bubble are usually the less informed. This way of thinking has many names; the "Greater Fool Theory" or "die Letzten beißen die Runde [*sic*]"[7], the latter meaning that "the dogs will bite the laggards" (Aliber & Kindleberger, 2015, p.63).

The introduction of ICOs as a new way to invest in early projects, and the subsequent price increases, refocused media attention from traditional coins such as Bitcoin and Ethereum to the new and promising tokens. An article written by Alex Hern for the Guardian in July 2017 captures the new interest in ICOs with the title: "*Initial Coin Offerings: Cryptocurrency's next high-risk money maker*". Participating in ICOs was a new way to invest without any

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[7] The book misspells the German word Hunde, meaning "dog", as "Runde" which means "round".

intervention of large institutional players, nor time-consuming filings. The small supply of ICOs when they first came and the astronomical returns (averaging above 4000% during the first three months of 2017) created much attention (TokenData, 2018a).

The price increases seen in 2017 does not necessarily qualify for a mania if the prices are based on sound fundamental value. However, one could argue that the price increases of many tokens at the end of 2017 was a result of a hype that lifted all crypto assets. When even the earlier mentioned Dogecoin, which was meant as a joke, reached a valuation of $2billion this conclusion is not far-fetched. The subsequent decline in the values of almost all crypto assets leaves little doubt that there was a sense of euphoria.

Another factor that we believe contributed to this boom phase was the mechanics of the purchase and selling process. Both "money" earned from the early coins and new money entered the market to invest in ICOs at the end of 2017. The only way to buy these tokens were with Bitcoin or Ether (in a few cases other coins). All the demand for ICOs from investors who did not already own these coins had to be filled. Meanwhile, the value of Bitcoin or Ether does not drop when they are exchanged for tokens. This problem is highlighted by Laura Shin who argues that the value of Ethereum is increased by the ICOs launched on its platform. She quotes Mark Twain *"In a gold rush, it's good to be selling the pans"* (Shin, 2017). Assuming the amount of capital flowing into ICOs from fiat currency is sufficiently large, this will increase demand for both Bitcoin and Ethereum as shown in the figure below.
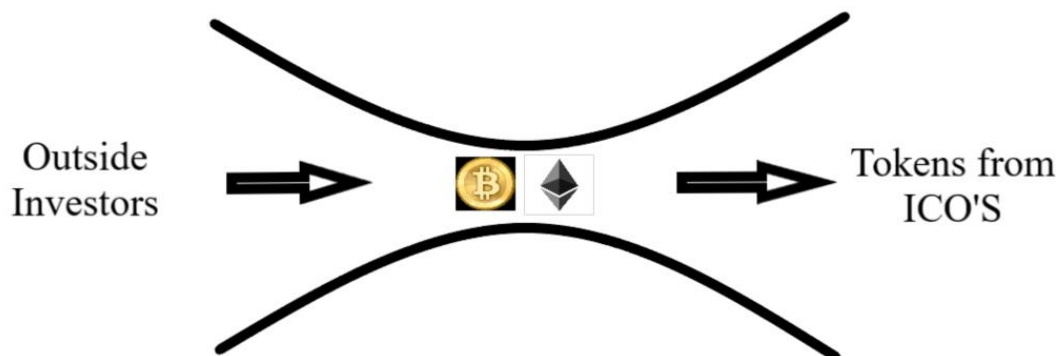

Figure 4.1 - Funnel Currency Tokens

All coins that are used in a purchase of an ICO must sooner or later be sold again by the issuer as their expenses are still nominated in fiat currency. This means that each purchase of a token using Bitcoin or Ether must be accompanied by two more buyers once the initial buyer and the issuer of the ICO want to sell their tokens. This possible systematic problem is eliminated once other crypto assets could be used to purchase ICOs, but that was not the case during 2017. Once the sell-off started in January 2018 most tokens had to be sold through Bitcoin and Ether to be liquidated into fiat currencies. The decline reversed the flow in the funnel with increased force due to the large appreciations of value the tokens had compared to their ICO price.

In the MK model, this euphoria eventually turns into a bust as investor expectations change. This does not happen overnight, and the expectations of the entire market do not change at the same time. As mentioned in the introduction the crypto asset market's total market capitalization fell roughly 70%. This decline happened during a time frame of approximately four months. This fall was due to; a peak in public interest, statements by regulatory authorities and a lack of fundamental value underpinning the prices of the crypto assets (Chainalysis, 2018).

4.4   Unethical behavior in the ICO market

A mania with seemingly endless profit opportunities attracts many actors with unethical agendas. Kindleberger describes that: "Fraudulent behavior increases in economic booms. Fortunes are made in a boom, individuals become greedy for a share of the increase in wealth and swindlers come forward to exploit that greed." (Aliber & Kindleberger, 2015 p.169). The mid-19th-century railway mania in the U.S. is an early example of a significant innovation which was followed by unethical behavior that caused much harm to investors. At the beginning of the mania, the new technology attracted much capital, and the firms enjoyed high valuations. It later turned out that many of the projects were unfeasible and that many firms had manipulated their accounting and shares (Smith, 1848, p.59; Bryer, 1991, p.456). The Dotcom era had similar traits, the new technology was followed by a mania for IT-related stocks. Companies raising money could expect high valuations and money was available for every startup with a decent idea. As the projects failed to show the revenues they had promised, the entire market crashed (Aliber & Kindleberger, 2015, p.212-217).

Shiller agrees with Kindleberger and calls fraudulent activities a natural part of a speculative bubble. Activities created to exploit thinking errors among investors (such as FOMO) occur more frequently in a bubble. The activities might not be directly illegal, but due to the slow justice system, they might become pervasive. During a boom, the value of the assets is mostly based on expectations of future value. This subjective valuation enables dishonest people to take advantage of the speculative environment. He further argues that the most common type is not outright unlawful behavior, most of the exploiters follow the law. Instead, they create businesses they do not even plan to complete (Shiller, 2005, p.76-78).

The market for ICOs is especially vulnerable to this type of behavior. Firstly, basing everything on computer code makes outright theft from participants outside the market easier. Secondly, the information asymmetry between the issuer of tokens and the investors could be considerable since there is no third-party assessing and vouching for the information that is given. Thirdly, the ease at which a token can be created makes the market even more vulnerable to fraudulent behavior. Lastly, the market for ICOs is mainly considered an unregulated market; this probably attracts even more interest from bad actors.

4.4.1 Hacking and phishing schemes

One of the most significant risks when participating in an ICO is that the project is hacked. According to a research report by Ernst & Young, 10% of funds in ICOs are lost due to hacks (EY, 2017). The report claims that issuers prioritize attracting investors over properly securing the ICO, which hackers then exploit. The most common method used in this type of attack is *phishing,* due its simplicity and effectiveness. With phishing, the attackers disable the original website and publish a copy that displays the wrong public key. Buyers of the token that do not take the proper precautions will then transfer the funds to the wrong address, which in most cases leads to the funds never being recovered. These types of attacks also lead to indirect losses in the form of loss of confidence in a project, and in some cases loss of sensitive personal information.

Another way hackers can steal tokens is by exploiting errors in the code of the smart contract used to create the token. Smart contracts are entirely autonomous, which can be an advantage, but it can also create severe problems in some cases. Because they are executed automatically, it is extremely important that the code is written in a way that cannot be exploited by someone with dishonest intentions. The most well-known example of flaws in the code of a smart

contract is probably the hack that stole $55 million worth of Ether from the DAO (Decentralized Autonomous Organization) in June 2016 (Leising, 2017).

4.4.2 Issuers exploiting information asymmetry

Another risk is when issuers of an ICO perform what is known as an "exit scam". An exit scam means that when the ICO is concluded, and investors have contributed their funds, the issuers shut down the project and disappear with all proceeds. There have been several examples of such scams. One, albeit not very successful, was the ICO of the Chinese project Miroskii who claimed they would become the new Bitcoin. The creators added a photo of the actor Ryan Gosling under the alias "Kevin Belanger" as their graphic designer. This attempted fraud was, not surprisingly, noticed by the community and the creators disappeared (Sommerlad, 2018). Another example was the ICO of Benebit, in which approximately $3 million was stolen. After being intensively marketed for a long time (it is believed as much as $500,000 was used for promotion), it was discovered that the photos of key executives were in fact taken from the website of a British school. Shortly after this discovery, Benebit deleted their website, along with most of their social media accounts, and vanished (Sedgwick, 2018a).

The vast amounts of attention and funding ICOs are currently receiving could lead to an increasing amount of ICOs with no real intention of creating the service or product they are selling. This is more or less the same as an exit scam, but instead of disappearing, they could play along and act as if they try to create the product. The issuer does not have to publish any financial statements or proof of how the funds are being used. The white paper is currently one of the most important sources of information that investors assess before investing in an ICO, and the lack of quality assurance of those white papers makes it very easy to trick people.

Currently, there has been over a thousand attempts to issue ICOs. An article by Bitcoin.com, using data from 902 offerings in 2017, classified 142 as failed (not reaching their lower cap on funding), and a further 276 that failed due to exit scams or just slowly fading away (Sedgwick, 2018b). That is a 46% fail rate. If they also include those ICOs where the issuer has stopped communicating, or they have decreased significantly in size, the number rises to 59%. This study includes data from projects that did not become listed on an exchange; this might be misleading since no investor lost their funds if that happens. If we exclude the 142

ICOs that did not meet their funding goals (money was sent back to investors) the percentage drops to 51%. The timeline of many of the ICO projects span several years, and it will be interesting to see how many ICOs that follow up on their promises.

To improve the quality and reliability of the information given by issuers, there needs to be a third party that reviews and verifies the information in white papers. Reporting standards regarding the progress of the projects and their financial situation ought to be put in place. It is difficult to say who the third party that should review information should be. Perhaps exchanges could take a more active role in creating standards and verifying the information that is given.

4.4.3 Investors exploiting information asymmetry

A study made by UK Business Insider in 2017 found evidence of five different "pump and dump" schemes in small crypto assets during a two-week period (Williams-Grut, 2017). A "pump and dump" is when a person or group of people collaborate to boost the price of a tradeable asset, either by giving misleading information or by manipulating the price of the asset (usually both). After other investors join the hype, the schemers start selling their tokens. The study argued that the lack of regulatory surveillance of exchanges make the crypto asset market rife with such schemes. They were orchestrated through a messaging app where their first move was to buy the asset until it increased, then market the coin in social media with fake news about mergers, deals or similar positive information.

This type of exploitation is not surprising in a market without surveillance. Even if a "pump and dump" is reported to the authorities, it is hard to catch the perpetrator. The transactions are usually visible, but anonymous, and the messages sent between people participating in the scams are in many cases from fake accounts. Bittrex, one of the largest crypto exchanges, issued a statement where they warned investors of these schemes and said they would suspend and notify authorities about accounts that are used for such scams. The Commodity Futures Trading Commission (CFTC) in the U.S. published a new customer advisory at the beginning of 2018 about the risks of "pump and dump" schemes. They also encourage "whistleblowers" to report schemes for a reward (CFTC, 2018).

To reduce the frequency of these "pump and dump" schemes, there needs to be more collaboration between exchanges and regulators. Regulators could, for example, give exchanges the opportunity to become "accredited" if they register certain information.

Becoming accredited could depend on how successful the exchange has been at preventing "pump and dumps" (and other fraudulent behavior), and how they have handled them if they happen. In a time where there is considerable uncertainty in the market, investors would likely appreciate the opportunity to trade on an exchange that has been approved by an official regulatory authority.

4.5 Pre-ICOs

A new trend has developed during the first months of 2018. Not only has there been an exponential rise in ICOs, but also publicly available pre-ICOs. A pre-ICO is when a company issues tokens before the public ICO. These used to be made to attract strategic investors, but lately, these pre-ICOs has become accessible by everyone. In these pre-sales, the tokens are often sold at different discounts which decrease with time. At the beginning of April 2018 there were at least 250 active pre-ICOs, and since the beginning of 2018 over 450 had been concluded. In comparison, there were slightly above 400 active "normal" ICO offerings (ICO Alert, 2018). Statistics show that for January and February of 2018, pre-ICOs contributed on average 58% of total capital raised in the entire ICO market (TokenData, 2018b).

PRE-SALE	ROUND 1	ROUND 2	ROUND 3
-65% discount	-50% discount	-40% discount	-20% discount
Feb 15 - Mar 14	Mar 15 - Apr 4	Apr 5 - Apr 25	Apr 26 - May 16
3.000 ETH Hard Cap	6.000 ETH Hard Cap	6.000 ETH Hard Cap	6.000 ETH Hard Cap
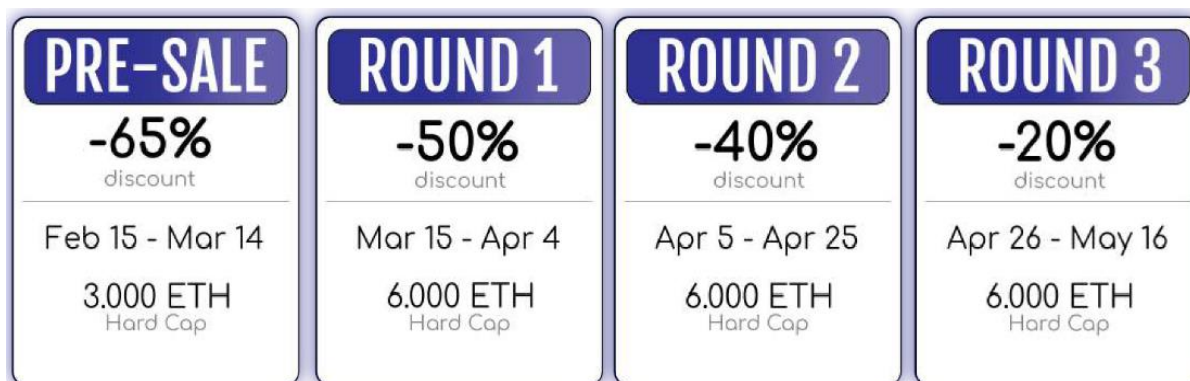
Figure 4.2 - Pre-ICO discounts. Source: Tilxcoin website. Retrieved on May 1st, 2018 from
https://www.tilxcoin.com/ico/

It seems as if investors are moving away from the traditional ICOs and into these pre-ICOs. The reason why many issuers choose to sell their tokens this way is most likely due to the exploitation of an anchoring effect[8], and a feeling of urgency. The question is, who would like to buy the actual ICO once these pre-sale rounds are done?

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[8] A method to lure customers to buy products. The full price works as an anchor, and the seller hopes that the buyer fails to adjust the anchor downward (Angner, 2016, p.67).

4.6 Private sales

Before an ICO is issued to the public, many issuers choose to have a private sale. Private sales are not to be confused with pre-ICOs since these in most cases have become open to the public. A private sale only includes chosen investors and usually focus on strategic partners that could help the project. Since the project is at a very early stage, the discounts given are often large. One extreme example comes from the private sale of the token Salt who made their last public ICO at a price of 25$. The number of tokens sold in this last round only accounted for 0.05% of the total amount of tokens. 16.9% of all available tokens were sold at a private sale where the price of the tokens was $0.25, meaning a discount of 99%. They lowered the discount for each subsequent offering, and the largest share of tokens (29%) was sold at $1.5, a discount of 94% (Dun, 2017). This extreme discount caused early investors to sit with profits up to 10,000% with a public offering price of 25$. Inevitably this led to a selloff as the token was listed on the exchanges and the value of the tokens quickly dropped to 2.3$. Many people in the later rounds probably felt cheated as they saw their investment drop over 90% once the tokens were tradeable on an exchange.

There are also communities where large groups of investors gather to bargain with the ICO issuer to get a greater discount on the tokens. The reason why the issuer might wish to make a deal is to make the project look popular from the start. An example of such a community is ICO Syndicate which states that it has above 10,000 members. They have a strict membership application and write that the information on deals they give to their members is strictly confidential. As a member of these groups, people are invited to buy tokens at a substantial discount. On their website, they state that: "*These backroom prices are how the rich get richer*" (ICO Syndicate, 2018).

These private sales create a significant risk for investors who are not a part of this type of community. Issuers do not disclose any information about how many tokens have been sold in private sales, or at what price they were sold. At the time of the actual ICO, the price of the token will be higher, and buyers in these private sales will have an incentive to sell at a profit. This discount that is given could lead to high volatility when the tokens are distributed and tradeable on exchanges. Since they are not regulated, there is no legal requirement for disclosure of large positions as it is with stocks. Moreover, even if the white paper states that the investors participating in the private sale have a holding period, this does not have to be the case. This risk would be reduced by displaying the public keys of the largest token

holders. By doing this, new investors could see the transactions made previously and check that they have not been selling large parts of their tokens before the ICO. Also, to prove that team members have a lock-up period on their tokens, these tokens could be put in a smart contract that cannot release them before a specific date.

4.7 Rating sites

The case of Benebit (mentioned in section 4.3.2) that made an exit scam brings up another problem in the current ICO market. Before it was discovered as a fraud, Benebit had been given favorable ratings from different ICO review sites. There has been an increasing amount of these types of websites that rate new ICO projects. Most rating sites use the "issuer pays" model; the issuer pays to get rated and, in most cases, can also pay extra to get more heavily featured on the homepage. On one of the largest rating sites, the most expensive package costs 35 Bitcoin ($325,000 on May 10th 2018). This package includes features such as a rating, removing competitors from the buyer's profile, and increased visibility on the competitor's profile page (ICO Bench, 2018). Some even offer services where the rating site prepares the entire marketing material for the ICO, from assisting with the white paper to their social media profiles. One could wonder if the rating agency will give a higher rating to an ICO they have created themselves?

A possible solution to the problem of rating sites is to change the payment model. When the issuer pays to be rated it raises a question of how unbiased the rating is, this could be solved by instead having investors pay for the service. The rating sites may not still be able to charge $325,000, but an alternative where each investor pays for a subscription is possible. These subscriptions could be divided into different packages, where the most expensive package includes a highly detailed analysis while the cheapest only offers a summary. This option is likely less profitable in the short term, but if a rating site offers unbiased and thorough analyses over time, it will be more trustworthy and therefore gain a broader user base.

It seems as if the Boom and Euphoria phase has introduced a large amount of fraudulent behavior in the ICO market, most likely due to its unregulated nature and previous tales of fortune. The increase of fraud, hacking, and scams has contributed to the decline and mistrust in the market. Many have called for some regulation to make the market trustworthy (Buntinx, 2018). To protect investors and indirectly issuers, and to eliminate harmful information asymmetry, it seems clear that some regulation must be introduced.

5   Regulatory action against ICOs and its consequences

The crypto asset market has mostly been unregulated in 2017 and the early months of 2018, but some authorities have started to take notice. Besides a few countries, such as China and South Korea, that have banned ICOs completely, the U.S. Securities and Exchange Commission (SEC) is one of the few regulators that has been active in this space. The SEC acted against several ICOs in 2017 and 2018 and has issued repeated warnings to investors. A testimony, held by chairman of the SEC Jay Clayton, warned that: *"When investors are offered and sold securities – which to date ICOs have largely been – they are entitled to the benefits of state and federal securities laws and sellers and other market participants must follow these laws"* (SEC, 2018a).

> *"In the aftermath of a boom, the political environment changes, the public who lost money is outraged, offenders are prosecuted, and regulation is tightened."*
>
> Shiller, 2005, p.76

The reason why the focus of this thesis is on the SEC is that a large part of the ICOs done in 2017 are based in the U.S. (see Figure 5.1). Also, foreign ICO issuers are still liable under U.S. law if they sell or market their tokens to U.S. citizens.
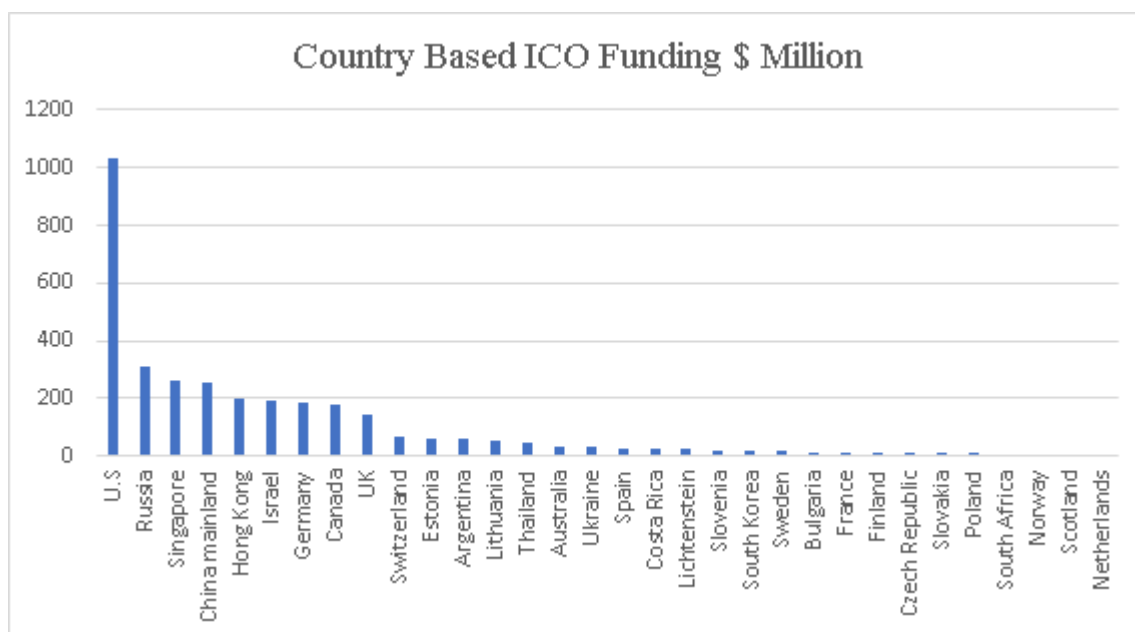

Figure 5.1 - ICO projects by country. Data source: EY. Retrieved on May 11th from http://www.ey.com/Publication/vwLUAssets/ey-research-initial-coin-offerings-icos/%24File/ey-research-initial-coin-offerings-icos.pdf

Although the focus of this chapter is U.S. regulation, the last section will describe the current regulatory status of ICOs in other parts of the world. This section will illustrate how this new phenomenon has divided regulators and that there is no consensus on how ICOs should be treated.

5.1 What is a security?

The most prominent risk ICOs face, except being charged with outright fraud, is being charged with issuing an unregistered security. A security could be any contract between two parties, ranging from stocks, bonds and investment contracts to "*a certificate of interest or participation in any profit sharing agreement*" (Securities Act of 1933, 1933). The definition of what constitutes a security is hence extensive. However, the most crucial element of a security is that it is a contract that involves risk and a possibility to profit.

If an issuer is selling what the SEC deems to be a security in the U.S. or to U.S. citizens, they must be registered before selling it (none of the ICOs done in 2017 have done this so far (SEC, 2018a)). They must also include an audited prospectus with all the information necessary for investors to make informed decisions. The prospectus would have to include an overview of the company's properties and business, and a description of the security to be offered for sale (SEC, 2011). It is also required to include information about the management of the company, and financial statements certified by independent accountants.

As financial markets develop, new examples of securities appear. To deal with this problem, the SEC has a very open interpretation of what a security is. The method they use to establish whether a contract is a security comes from a precedent from 1946 called the "Howey test".

5.2 Howey test

This test was first used in the US Supreme Court in 1946 in the case "SEC vs. Howey Co.". According to the ruling, an investment contract is "*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.*" (SEC v. Howey Co., 1946).

In the summer of 2016, $55 million was stolen from the Decentralized Autonomous Organization (DAO) due to errors in its code. A year later, in July 2017, the SEC issued a report saying that DAO tokens were securities and therefore subject to federal securities laws (SEC, 2017a). They came to this conclusion by using the Howey test. The definition of an investment contract from the Howey case is usually divided into four separate criteria that

must all be met to be classified as a security. There must be an investment of money, the investor has an expectation of profit, the investment is in a common enterprise, and the expected profits come from the efforts of others.

5.2.1 Investment of money

In the report on the DAO, when discussing if there was an investment of money, the SEC decided that an investment made with Ether satisfy the first criteria of the Howey test. This decision signals that the SEC will likely consider this criterion to be satisfied for all ICOs, regardless of whether it was bought with Ether, Bitcoin or any other coin.

5.2.2 Expectation of profit

The DAO was structured as a fund where owners of the token had voting rights and rights to future profits. Hence it was clear that buying the token would yield a profit. However, many utility tokens do not have a clear profit expectation. Many token issuers argue that they are not issuing securities since people can use the tokens on the platform to buy products and services. However, SEC chairman Jay Clayton gave a warning to issuers on this topic in a statement: "*Merely calling a token a "utility" token or structuring it to provide some utility does not prevent the token from being a security.*" (SEC, 2017b) This statement is consistent with the DAO report where it is highlighted that substance is more important than form, meaning that the economic intentions and realities of the offering are what should be the basis for the decision.

Another important factor is whether the utility or service is completed at the time of the token sale, or much later. If someone buys a token that can be used on a platform, e.g., a video game, but the platform will not be launched until two years later, it is unlikely that this person would buy the token now without expecting a profit. However, if the game is already playable, it is more likely that the person buying the token intends to use it in the game. If the platform is finished when the token is sold it would make it easier to argue that the token represents a utility. This point is even more evident in the case of pre-ICOs. When tokens are sold at large discounts long before the product is finished, the expectation of profit associated with the token becomes very clear. It seems unlikely that any pre-ICO with a discount could escape this criterion of the Howey test.

The structure of the token sale is also something that could be considered when determining if a token creates an expectation of profit. There have been examples of ICOs that claim they

want to create a platform that reaches millions of people, but when the ICO is finished all tokens have been sold to a small number of investors. It is probably hard to argue that those buyers intended to use the tokens on the service that the ICO was creating. The Basic Attention Token, for example, is used to buy ad slots and ad-free online experiences. The purpose of the ICO was to give users access to the services of the platform (Basic Attention Token, 2018). However, all the 300 million tokens sold during the ICO were bought by 184 individual buyers (Petty, 2017). One could ask why many ICOs selling tokens for services do not also add a restriction on how many tokens each buyer can receive.

5.2.3 Investment in a common enterprise

The third criterion of the Howey test states that to be a security there must be an investment in a common enterprise, but the Supreme Court did not specify the definition of a common enterprise (Borneman, 2005). Instead, the different courts in the U.S. have used three different approaches to determine whether a company should be considered a common enterprise: the horizontal approach, the narrow vertical approach, and the broad vertical approach.

The horizontal approach focuses on the relationship between investors and whether there is a "pooling" of assets, which means that the investors share the risks and benefits of the enterprise. In an ICO all buyers contribute Ether/Bitcoin, or in some cases U.S. Dollars or other fiat currencies and receive tokens in return. This is a "pooling" of assets, and when using the horizontal approach, the conclusion would likely be that the ICO is a common enterprise. The narrow vertical approach says that there is a common enterprise if the risks and benefits are shared between the investors and the issuer and if their profits and losses are correlated. This is probably true for most ICOs where issuers own a significant part of the tokens.

Finally, the broad vertical approach says there is a common enterprise if the success of an investment depends upon the expertise of the issuer (Borneman, 2005). This is especially relevant in the case of ICOs, as the information given in white papers and other promotional material often is insufficient, meaning that the issuer has much more knowledge about the investment than the investor does.

In their report regarding the DAO, the SEC decided without any discussion that DAO token holders had invested in a common enterprise. They did not specify which of the approaches mentioned above they applied, but the sentence "*The ETH was pooled and available to The*

DAO to fund projects." implies that the horizontal approach was used. Setting this precedent, it seems most ICOs would satisfy the criteria of a common enterprise, but the SEC has also indicated that they will evaluate each ICO separately depending on the specific facts (SEC, 2017c).

5.2.4 Profits come from the efforts of others

In the original case from 1946, it was said that there must be an expectation of profits "*solely from the efforts of the promoter or a third party*" (SEC v. Howey Co., 1946). In the following years, the different courts have put different emphasis on the word "solely", some have relaxed this requirement and instead used phrases like "undeniably significant" or "predominantly" (SEC v. Koscot Interplanetary, 1974). "Undeniably significant" was used by the SEC in its report regarding the DAO. It stated that although the token owners were ultimately the ones that voted on which projects to fund, the creators of the DAO still managed the process and were responsible for finding the various projects that token holders voted on. This decision indicates that even though some tokens may give the owners certain voting rights, it does not mean that the investment is under the sufficient investor control required to pass the Howey test. If a token does not give the owner voting rights and the project is far from finished, the value of the token relies heavily on the efforts of the issuer and would fall under this criterion.

5.2.5 How to avoid being a security under the Howey test

It seems as most ICOs will fulfill the criterion of an investment of money since the SEC stated that Ether was considered money. The criterion of an investment in a common enterprise is also hard to avoid since an ICO is a pooling of assets. To avoid the criterion of profit expectations an issuer cannot structure the token so that it explicitly or implicitly gives the buyer a sense that it will appreciate. To avoid creating a profit expectation all marketing, including social media, website and white paper, must be written in a way that does not indicate that the success of the project will make the tokens more valuable. Having a fixed supply of tokens at the ICO and later reducing the supply of tokens also creates an implicit expectation of profit. This is very similar to a share buyback program which has the same effect as a dividend.

Another step an issuer can take is to have a part of the service/utility ready for sale or use at the time of the offering. Most ICOs that are conducted today do not have a platform where the

tokens could be used, only about 5% of the ICOs conducted in 2017 had running projects (EY, 2017). Furthermore, if an issuer wishes to include as many future users as possible in a token sale and avoid selling the tokens to a few investors, they should introduce a limit to the number of tokens each person can buy. That way it is easier arguing that the purchasers are buying the tokens for consumption or use, and not because they expect to sell for a profit.

5.3 Examples of SEC action

The SEC is very active in pursuing ICOs that do not comply with U.S. law and have acted against several ICOs already. In this section, we provide several examples of ICOs that have been stopped by the SEC and discuss similarities between the cases. We hope that this will provide some insight into how the SEC will regulate ICOs in the future.

SEC v. Maksim Zaslavskiy

In September 2017 the SEC charged Maksim Zaslavskiy and his two companies, REcoin Group Foundation and DRC World, with fraud as well as charges for selling unregistered securities. According to the charges, investors in both companies were promised large returns on their investments, but the truth was that neither of the companies had any real operations. In both cases, funds were raised with an ICO, but the tokens investors were supposed to get in return never existed (SEC, 2017d).

REcoin was supposedly backed by real estate investments and DRC by diamonds, but the proceeds from the ICOs were never used to buy anything. The SEC was able to freeze the accounts of Zaslavskiy and the two companies after obtaining an emergency court order. A month after the SEC brought their charges they were joined by the FBI, who brought a criminal complaint against Zaslavskiy for fraud (Histed, 2018). Zaslavskiy filed a motion to dismiss, claiming that the tokens he sold did not satisfy the Howey test and were therefore not securities. The decision from the courts is expected at the beginning of 2019 (De, 2018a). This decision will likely be an important precedent of federal court's stance on ICOs.

SEC v. PlexCorps

In December 2017 the SEC obtained another emergency court order to freeze the assets of an ICO. This time charges were brought against Dominic Lacroix and his company PlexCorps, who had already raised $15 million from thousands of investors. The charges claim that PlexCorps sold unregistered securities, and defrauded investors by promising a 1,354% profit in less than a month. This was the first case of a new unit, named the Cyber Unit, that was

created in September 2017 to investigate misconduct related to blockchain and ICOs. Chief of the unit Robert Cohen said the following: *"This first Cyber Unit case hits all of the characteristics of a full-fledged cyber scam and is exactly the kind of misconduct the unit will be pursuing."* (SEC, 2017e).

SEC v. Munchee Inc.

Just ten days after filing charges against PlexCorps, the SEC Cyber Unit stopped the ICO of Munchee Inc. Munchee had launched an ICO with the intention of raising capital to improve an existing iPhone application that centered around reviews of restaurant meals. Munchee wanted to move their app to a blockchain and issue a token that would be used in the new app. The SEC brought charges because of the marketing done by the company, where they claimed that their efforts would increase the value of the tokens. Munchee also emphasized that they would create a secondary market for the tokens. By using the Howey test, the SEC found that Munchee had created an expectation of profits derived from the efforts of others. However, because the company cooperated with the SEC and returned all proceeds to the investors, the issuers were not charged (SEC, 2017f).

SEC v. AriseBank

In January 2018 the SEC obtained a court order to stop the ICO of AriseBank, who claimed to have raised $600m by selling their token AriseCoin. The SEC claimed that AriseBank had made several false claims, failed to disclose that key executives had criminal backgrounds, and were selling unregistered securities (SEC, 2018b). AriseBank used a celebrity endorsement from boxer Evander Holyfield as a part of their marketing, something that the SEC had warned might be illegal just a few months earlier (SEC, 2017g). AriseBank also claimed to have developed a trading algorithm that would automatically trade in different cryptocurrencies, giving daily profits to token holders. These profits would be paid in eACO, a separate token that had to be spent within a limited time. AriseBank claimed that this would increase the value of AriseCoin. The SEC froze all AriseBank assets and sought penalties from two key executives.

SEC v. Centra Tech

In April 2018 the SEC charged Centra Tech Inc. for selling unregistered securities. They also charged two key executives with fraud, one of which was arrested when trying to leave the country (SEC, 2018c). A few weeks later they brought the same charges against a third

executive (SEC, 2018d). The SEC argued that Centra defrauded investors by making several false claims. For example, they claimed to have a debit card backed by VISA and MasterCard that could easily convert cryptocurrencies U.S. dollars, when in reality they had no deals with either of the companies. They falsely claimed that token holders would be paid dividends and it was discovered that Centra had listed several fictional people as their executives.

5.3.1 Similarities between SEC cases

The first and most apparent similarity between these cases is that all six have been stopped because they have been sales of unregistered securities. In all cases, the marketing of the project has caused investors to expect profits from the efforts of others. This expectation of profit was created either by explicitly stating that investors will earn large profits on their investments (REcoin, DRC, PlexCorps, and Munchee) or by promising investors some parts of the company's profits (AriseBank and Centra). By using the Howey test, the SEC concluded that these ICOs were securities.

Another similarity is that there has been clear evidence of fraud in all cases, except in the case of Munchee. The focus on fraud may indicate that, for the time being, the SEC is primarily targeting ICOs that seem to be securities, but also have elements of fraudulent behavior. However, this does not necessarily mean that ICOs with good intentions are safe from the reach of the SEC. As we have seen with Munchee, there is still a possibility of receiving charges if the issuer is not careful with how the ICO is marketed. It is also important to note that the SEC is applying existing securities law to ICOs, which enables these laws to be applied retroactively. Using existing laws means that it does not matter if an ICO was conducted in 2014 or 2017, issuers would still have broken the law if they issued a security without registering it with the SEC.

5.3.2 SEC action against exchanges

The report on the DAO warned that all exchanges selling securities that are not registered with the SEC are unlawful. They concluded that in the case of the DAO, the exchanges that were used at the time were illegal and should have been registered with the SEC. On March 7th, 2018 the SEC published a public statement warning about exchanges dealing with digital assets such as ICOs. They wrote, "*A number of these platforms provide a mechanism for trading assets that meet the definition of a "security" under the federal securities laws. If a platform offers trading of digital assets that are securities and operates as an "exchange," as*

defined by the federal securities laws, then the platform must register with the SEC as a national securities exchange or be exempt from registration". (SEC, 2018e). They do not disclose which platforms or which digital assets they are discussing. In the statement, they warn that they will continue to focus on exchanges that are dealing with ICOs that are securities. They also include the possibility that providers of digital wallets could trigger registration requirements.

SEC v. Ethan Burnside

In December 2014, the SEC charged programmer Ethan Burnside for operating two unregistered online exchanges that sold securities using Bitcoin and Litecoin. Burnside cooperated with the investigation and ended up paying back the profits he made, plus interest and a penalty. He was also banned from participating in the securities industry in the future (SEC, 2014).

SEC v. BitFunder

On February 21st, 2018 the SEC announced that they had charged BitFunder and its founder Jon E. Montroll for operating an unregistered securities exchange and defrauding its customers. According to the complaint, BitFunder did not disclose to its customers that a hack had occurred that stole more than 6,000 Bitcoins from the exchange. Montroll was also charged for making false statements about an unregistered security offering. The complaint sought to get the customers their money back, plus interest and penalties. During the investigation Montroll allegedly committed perjury and obstruction of justice, which lead to a parallel criminal case against him (SEC, 2018f).

5.4 Class action lawsuits

Other than the actions taken by the SEC there have also been several class action lawsuits against issuers of ICOs. A class action is when many people come together to sue another person or a company (Rottenstein Law Group, 2018). In this type of case every *plaintiff* (person suing) have suffered the same type of damage, so instead of bringing several lawsuits that are almost identical, they are combined into one. Below is a summary of some of the class action lawsuits that have been filed so far.

Tezos

After raising $232 million in their ICO in July 2017, Tezos have been hit with four different class action lawsuits. They all argued that Tezos sold unregistered securities, and two of the lawsuits claimed that securities-fraud was committed (Foster, Olthoff & Levin, 2018).

Centra

Several months before the SEC brought its charges, Centra Tech was faced with a class action lawsuit. Similar to the SEC case, the plaintiff claimed that Centra was selling unregistered securities. The case document argues that Centra marketed their token in a way that clearly led buyers to expect a profit from their investment (Rensel v. Centra Tech, 2017). Because they were selling securities Centra were also liable for any false claims made in connection with the offering, as described earlier in this chapter.

Monkey Capital

In December 2017 the company Monkey Capital was sued by their investors, who claimed that Monkey Capital had sold unregistered securities. Charges also included fraud, based on several misleading and untrue statements made by Monkey Capital and key executive Daniel Harrison. The company had collected more than $5 million which they claimed they would use to develop, among other things, a private crypto asset exchange and a decentralized hedge fund. The complaint says: "*In short, the thing for which Plaintiffs and each Class Member invested his/her/its valuable assets looks like a security, functions like a security, and fits the description of a security.*" (Hodges et al. v. Monkey Capital LLC, 2018). The lawsuit was first filed as a class action on behalf of all investors but was amended to include only seven individual investors in March 2018.

5.5   Action by other U.S. regulators

The cases mentioned so far in this chapter have all been against ICOs located in the U.S., either because they were registered there or because key executives were American. However, there has also been some legal action against projects based outside the U.S. The Texas State Securities Board issued a Cease and Desist order to halt an ICO created by BitConnect in England. The securities board concluded that the BitConnect Coin was a security and that they were targeting Texas residents and other citizens in U.S. states (TSSB, 2018). After this lawsuit, the BitConnect platform was shut down leading to a drop in the value of the token

from $300 to $0,74 as of April 2018. This has triggered several class action lawsuits in which BitConnect is charged with being a pyramid scheme and for issuing unregistered securities among other counts (De, 2018b).

On May 21st, 2018, the North American Securities Administrators Association (NASAA) announced a large number of enforcement actions against fraudulent ICOs and the issuers behind them. Over 40 jurisdictions cooperated in "Operation Cryptosweep", leading to nearly 70 inquiries and investigations, in addition to 35 pending or completed enforcement actions. In a press release the president of NASAA, Joseph P. Borg, said that "*The actions announced today are just the tip of the iceberg*". An important part of the operation was to raise awareness about the risks associated with ICOs, and Borg went on to say, "*Not every ICO or cryptocurrency-related investment is fraudulent, but we urge investors to approach any initial coin offering or cryptocurrency-related investment product with extreme caution.*" (NASAA, 2018).

5.6 Consequences of being classified as a security

If an ICO is classified as a security without complying with SEC registration requirements, the issuer is in violation of the Securities Act of 1933, Section 5. In their report on the DAO, the SEC emphasized that all sales of securities must comply with this section (SEC, 2017a). A violation of this section could allow investors to sue issuers of the offering and get their investment back with interest, as well as potential damages. The damages could include the losses the investors incurred caused by the price decline of the token (Sarkar, 2018). Section 12 (a) (2) of the same act also states that the person who offers a security and misstates or excludes material information is liable to the purchaser and could have to cover damages. The important point is that many investors who invested during the boom have lost significant amounts and are starting to sue issuers in an attempt to get their money back. In a paper written by Polsinelli LLP in March 2018, the authors say they believe that we have only seen the beginning of class action lawsuits against ICOs and that they will increase in frequency in the future (Foster et al., 2018).

5.7 Exemptions

ICO issuers can apply for an exemption from the Securities Act of 1933 which allows them to sell securities with fewer requirements than a regular security registration. However, there are several criteria that needs to be fulfilled to qualify, such as offerings of limited size or

offerings to a small number of people or a particular type of investor. Below we provide a simplified overview of the two most relevant exemptions, a more detailed overview can be found in Appendix 1.

	Rule 506 C	Regulation A
Offering Limit	None	$50 Million
General Solicitation	Yes	Yes
Only Accredited Investors?	Yes	No
Filing Requirements	Registration Form	Two Years Audited Financial Statements
Restrictions on Resale?	Yes	No

Note: General Solicitation means that the issuer can publicly advertise the ICO.

Figure 5.2 - Overview of SEC Exemptions

One example of an ICO filing an exemption is Telegram, who raised the staggering amount of $1.7 billion early in 2018. The offering was filed as an exemption under rule 506(c) in two rounds of $850 million each (SEC, 2018g; 2018h). Filecoin used the same exemption when they had their public ICO in 2017 (SEC, 2017h; 2017i). This exemption has no limit on the amount offered as long as all investors are so-called "accredited investors", and the company has to take reasonable steps to ensure that all investors qualify as such. The definition of an accredited investor according to Rule 501 of Regulation D of the Securities Act of 1933 is a person with either an income of over $200,000 or a net worth of over $1,000,000. Data shows that the median household income in the United States is $59,039, and only 7% of households have an income of $200,000 or more (Semega, Fontenot & Kollar, 2017, p.23).

Filing under rule 506(c) also means that the tokens are classified as restricted securities, securities that cannot be resold unless several conditions outlined in Rule 144 are met. Two conditions apply to all investors and include a holding period as well as an information requirement. We will not go into further detail regarding these conditions; the important point is that when filing as an exemption under rule 506(c) the tokens cannot be immediately resold (SEC, 2013).

An alternative to Rule 506(c) is Regulation A, which is divided into Tier 1 and Tier 2. Tier 1 has an offering limit of $20 million while Tier 2 has a limit of $50 million. Also, the public

float cannot exceed $75 million, meaning that the total valuation of the tokens cannot exceed that amount. Both allow for general solicitation, and unlike Rule 506 it is allowed for non-accredited investors to participate in the offering. However, for Tier 2 offerings there is a limit for how much non-accredited investors can invest based on their net worth and net income. A key difference compared to Rule 506 is that Regulation A has significant reporting requirements. Both tiers are required to provide two years of financial statements; the Tier 2 offering needs to be audited while Tier 1 only requires a review. Further, Tier 2 offerings have to provide consecutive financial reports similar to a registered security. Another critical difference between the two is that Tier 2 preempts state laws, which means that they do not need to register in each state where the security is sold, while Tier 1 does not. One advantage of a Regulation A offering is that there are no restrictions on the resale of the securities.

As we have seen with Telegram and Filecoin, it seems likely that most ICOs will opt for Rule 506(c) due to its low costs and simplicity. The fact that Regulation A exemptions have a maximum investment of $20 million or $50 million and a cap on the public float will probably discourage many issuers from using this exemption. Adding this to the significant reporting requirements makes it even less likely that they will be widely used. The main drawback of using Rule 506(c) is that it is only possible to sell to accredited investors and that the offering becomes a restricted security. The appeal of cryptocurrencies for many has been the fact that it is an open community where everyone can contribute to the projects in which they believe. If the rules only allow the people with high income and financial institutions to participate some could argue the whole point of decentralization and financial inclusion is lost.

5.8   Other countries

The U.S. has so far chosen to use existing regulation and apply it to the crypto market. They have communicated that they will be reviewing each ICO on a case-by-case basis but have also said that most ICOs so far have been securities. The increased attention from regulators in the U.S. has caused many projects to exclude U.S. citizens from their offerings, and these issuers will now focus their marketing efforts in other parts of the world. There is no international consensus on how this new phenomenon should be treated, so the approaches used differ widely from country to country. Below is a summary of the regulatory status in some areas that are of significant interest, either because they are an essential part of the ICO market or because they have taken a unique stance.

In February 2018, the Swiss Financial Market Supervisory Authority (FINMA) issued guidelines on how they intend to apply existing financial market legislation to ICOs. They divide the tokens into three different categories: payment tokens, utility tokens, and asset tokens. This categorization and their definitions are like those used in this thesis (coins, utility tokens, and investment tokens). "Payment tokens" will have to follow Anti Money Laundering (AML) regulations but will not be regarded as securities. The "asset tokes" will have to follow Swiss securities law. The "utility tokens" will be regarded as a security unless: "... *their **sole purpose** is to confer digital access rights to an application or service and if the utility token can **already** be used in this way at the point of issue.*" (Emphasis added) (FINMA, 2018). These guidelines are significant because Switzerland has been considered a crypto friendly country, and several ICOs have been organized as Swiss foundations (Neghaiwi, 2018). However, the requirements for utility tokens described by FINMA are almost the same as those used by the SEC. So far, the Swiss regulators have not acted against any ICOs, but if they do, the approach might be similar to the one taken by the SEC.

In November 2017 the European Securities and Market Authorities (ESMA) issued two statements warning investors and issuers about the risks of ICOs (ESMA, 2017a; ESMA, 2017b). They warned issuers that ICOs might fall under existing regulation, and if they do, they will have to follow the corresponding rules. The relevant rules depend on the structure of the offering but could include the requirement of a prospectus with the necessary facts for investors to make informed decisions. Anti-Money Laundering rules could also apply, as well as several requirements described in The Markets in Financial Instruments Directive (MiFID). In their statement to investors, ESMA warns that if ICOs fall outside the scope of existing regulation investors do not benefit from the protection that comes with regulated investments. They also warn about price volatility, inadequate information and potential flaws in the technology. The approach taken by ESMA is important because it might influence European countries. Norway is one example, in their warning to investors they write that they will follow the rules given by ESMA (see Appendix 2).

In September 2017 the People's Bank of China (PBC) issued a statement together with Chinese legal authorities, where they banned all ICO related activity. They ordered all issuers of ICOs to repay the proceeds and closed all exchanges that facilitated the purchase of crypto assets. The motivation was to protect investors from these ICOs, which according to the PBC were conducting illegal issuing of securities, fundraising, frauds and pyramid schemes (PBC,

2017). South Korea also issued a similar ban in September 2017 (Kim, 2017). However, it is possible that the country will reverse its decision when certain conditions are met (Yoo-chul, 2018).

On the other side of the scale when it comes to regulation is Belarus, who have chosen a very welcoming approach to ICOs. Since the early 2000s, Belarus has worked to become an attractive location for IT firms. It started with the establishment of the Belarus Hi-Tech Park (HTP) in 2005, with the main goal of supporting the software industry (HTP, 2018). The firms registered at the HTP pay no corporate taxes, no customs duties, and employees of the companies pay a reduced personal income tax of 9% compared to the usual 13% (HTP, 2017). The HTP is a so-called virtual park, meaning that the companies do not need to locate within a specified geographical area within Belarus, they can choose to locate anywhere in the country if they fulfill the criteria for registration.

In December 2017 the President of Belarus, Alexander Lukashenko, signed a decree that made the country one of the most crypto-friendly in the world. The decree fully legalized ICOs, crypto assets, and smart contracts, and even made all proceeds tax free until 2023. This acceptance was meant to be a continuation of the initiative started in 2005, and the HTP will be the center of all operations with crypto assets (Dev.by, 2017). Any company in Belarus may create their own crypto asset, but they must go through an HTP-registered company to do so. This is meant to improve investor protection as the HTP-companies are considered trusted and respectable companies. To prevent money laundering and terrorist funding, the decree states that verification processes will be implemented when exchanging tokens and crypto assets for fiat money.

Below is a table summarizing the legal status of ICOs in the top 10 countries by amount raised in 2017, as shown in Figure 5.1. Links to statements made by these regulators can be found in Appendix 2. The table shows that although regulators are starting to take notice, there is still much uncertainty in this market.

Country	Legal status
United States	Subject to existing securities regulation.
Russia	Regulation introduced, no action taken.
Singapore	Issued guidelines, could fall under existing regulation.
China	Illegal.
Hong Kong	Issued warnings.
Israel	Could be securities, judged on a case-by-case basis.
Germany	Issued warnings.
Canada	Could fall under existing securities regulation.
United Kingdom	Issued warning, could fall under existing regulation.
Switzerland	Issued guidelines, most tokens likely securities.

Figure 5.3 - Legal status selected countries

6 Conclusion

In chapter two and three we summarized our findings on what an Initial Coin Offering is and how it is connected to the blockchain. An ICO is the sale of a token or a coin that is connected to an existing blockchain. Most ICOs are developed on the Ethereum blockchain which is an improvement from the blockchain of Bitcoin. The Ethereum blockchain enables complicated decentralized apps (Dapps) to run on its blockchain. When creators of these new Dapps realized that they could create their own blockchains on top of Ethereum and then sell tokens from these blockchains, the market for ICOs was created. The reason why this grew so popular was that the issuers could attract large amounts of capital without going through the costly and time-consuming processes of an Initial Public Offering (IPO), Venture Capital funding or Crowdfunding.

An ICO is far different from a regular IPO, the closest similarity is probably the name, which is not the smartest choice considering that most issuers wish to avoid securities law. Anyone who wants can create an ICO, and it is relatively easy. However, all tokens sold in ICOs differ depending on which traits the issuer chooses. A token can have many capabilities; it could work as a currency, a stock, a proof of ownership, a right to vote or a mix of these traits. It is therefore difficult to distinguish one token from another, and even harder to make any meaningful categorizations.

Currently, the white paper is one of the most important sources of information for a buyer in an ICO. In the white paper the issuer "sells" his plan for the project, along with a financial description of how the funds will be used. In many white papers, the target funding goal between the soft cap (minimum sum of investments) and the hard cap (maximum sum of investments) is very wide. If the issuers know approximately how much resources are needed to execute the project, the interval between the soft cap and hard cap should not have to be so large. Tezos, one of the largest ICOs to date that raised $232 million did not have a hard cap at all.

The sale structure of many ICOs raises another important question. If the goal of the ICO is to create a network effect and include as many future users as possible, it is strange that the issuers do not place an upper limit on the amounts of tokens each investor could buy. An example is the Basic Attention Token where all 300 million tokens were sold to a total of 184

buyers. We assume that these buyers were not purchasing several lifetimes of ad-free internet surfing, more likely they intended to sell their tokens with a profit.

There is an increasing number of projects that try to issue ICOs, and the competition for investor funds is growing. This competition has caused the majority of new ICOs to include large discounts on the tokens they sell in the so-called pre-sales. Investors who do not buy the token to use its product or service might be in for a disappointment when the "real" public ICO takes place. One could assume that all rational buyers bought the token when it was sold for a discount instead of waiting for the price to increase. The price increases of the tokens sold in ICOs observed during 2017 is most likely over.

Chapter four included the discussion about whether the market was in a bubble, and what the consequences of this have been. The chapter focused on the fraudulent and unethical behavior that we observed during our research. The crypto asset market rose exponentially at the end of 2017 and then abruptly fell more than 70% in only four months. During the boom the media-hype and large increase of new investors caused the market to explode. The increases were probably due to the adaptive expectations of investor psychology and the greater fool theory. People believed they could join the ride for a while, and step off before the crash, even if they believed it was a bubble. As the market fell, it is evident that funding for ICOs started to decline, as seen in figure 1.2. The events in 2017 and at the beginning of 2018 were the hallmarks of a typical bubble.

Kindleberger argued that every mania is followed by fraudulent behavior and the unregulated market for ICOs is certainly no exception. The consequence of such a tremendous boom in a market is an increase in fraudulent and unethical activities. During our research, we have found several areas where investors are being exploited. The main reason why this market became so popular for fraudsters was the large amount of capital that entered the market and its unregulated nature.

During the boom hackers exploited inexperienced crypto investors by stealing funds through different hacking schemes, the most common being phishing. Another weakness in the market that allows for fraudulent behavior is the information asymmetry between the buyer and seller of ICOs. There are no reporting standards or third parties assuring the validity of the information coming from the issuer, allowing them to report anything they wish. The lack of reporting standards could lead to situations such as an exit scam where it is evident that the

sale is a fraud. There is also a risk that the issuer acts as if they are trying to finish the product or service without any intention of actually completing it. They could just shut down the project and argue that the product or service is no longer viable. During this time, they may have extracted the funds for personal use or just paid large salaries or bonuses to themselves and the employees. It might take a long time before the failure of the product or service is detected since many of the projects are not supposed to be finished for years, and no requirements exist for periodic financial reporting. There is a reason why companies that issue shares follow reporting standards. To reduce the information asymmetry there needs to be a third party that verifies the information coming from the issuer.

A related risk regarding information asymmetry is the risk that a private sale with large discounts has taken place before the issuance of the ICO. Many issuers do not inform investors in ICOs of how many tokens that were sold in these private sales and at which price. The example with the SALT token that gave buyers in a private sale a discount of 99% is shocking, but most likely not unique. Examples of groups exploiting these private sales such as the ICO Syndicate reveal their unethical nature. They purchase the tokens cheap in private sales and sell their tokens to less informed investors, and to be qualified to join a person must already be wealthy. To solve this problem, the ICO community should consider creating standards for transparency.

Regulatory authorities do not currently have any supervision of the secondary markets. This lack of supervision has led to much unethical behavior where groups of investors stage "pump and dump" schemes to exploit other investors. The only way to solve this would be if exchanges took a more active role in detecting and preventing these schemes and worked closer with legal authorities. All these examples of fraudulent and unethical behavior destroy the purpose of the blockchain technology. There is a need for increased investor and consumer protection, and regulatory certainty could help the market become more stable and trustworthy.

In chapter five we present our findings of the legal landscape surrounding ICOs. One of the few regulatory authorities that have acted to regulate ICOs is the U.S. Securities and Exchange Commission. In a statement by the SEC, the chairman said that almost all ICOs he had seen were securities. An important distinction between tokens is whether it could be classified as a security or not, if it is, securities regulation applies. When the SEC has

determined if a token is a security or not, they have used the Howey test on a case-by-case basis. The most important criteria of the Howey test are if the issuer creates an expectation of profit with the buyer and if the profits come from the efforts of others (in this case the issuer).

The actions by the SEC have been targeting issuers acting fraudulently, and ICOs based in the U.S. However, the charges brought by the Texas Securities Board against BitConnect has shown that foreign issuers selling tokens to U.S. citizens also fall under the scope of the Securities Act. The majority of ICOs were stopped before the tokens were distributed to the buyers, but until now, the only token that has been charged long after the ICO was Centra. After a class action lawsuit, as well as charges from the SEC, the value of the token decreased by approximately 99%. Another consequence for the issuer, if they are classified as a security, is that the buyers of the tokens could claim damages for their losses.

If issuers wish to comply with U.S. securities law, but not do an IPO, they can file for an exemption with the SEC. Filecoin and Telegram, two of the largest ICOs so far, have filed their offerings as exemptions under Rule 506 (c). When using this exemption, the issuer can only sell to accredited U.S. investors (persons with an income above $200,000). The initial purpose of ICOs was to include everyone in this new decentralized economy, but using this exemption excludes most U.S. citizens.

Some other nations have chosen to ban ICOs entirely, while most have issued statements warning about the speculative nature. Belarus has made ICOs legal and has even removed all taxes on investments in crypto assets. However, even if a few small nations will allow ICOs in the future, the issuers will not be able to sell their tokens to investors in countries that do not allow ICOs offering securities.

Our interpretation of SEC actions is that if tokens do not have a clear consumptive value at the moment of issue, they risk being classified as securities. This follows the logic that if a token is bought with the intention of using it for consumption, the purchaser would not buy it several years before the platform is ready for use. If the issuers wish to avoid that their tokens are classified as securities, but still want to sell them to investors in the U.S., they would either need to have the platform ready or file for an exemption.

6.1 Limitations of the thesis

One of the most significant challenges when studying such a new topic is to find reliable sources. Much of what we have encountered has been biased because it was sponsored by

issuers or other participants with interests in the market. Moreover, because of the anonymity of the blockchain technology, and the fact that there are over 200 different crypto asset exchanges, statistics on ICOs and token prices vary significantly between different sources. Some of the other sources we have used might not be of the standard that would be optimal for a master thesis, but because of the insufficient amount of academic literature they have been included to thoroughly describe the subject. However, when we draw conclusions they are based only on the most credible sources such as official SEC statements and legal documents.

As MBA students we also realize that we do not have the optimal knowledge concerning the code and programming of the blockchain technology, nor do we have the expertise to analyze legal documents from the U.S accurately.

6.2   Suggestions for further research

As mentioned in chapter 4, expansion of credit is an important part of the boom phase according to the Minsky-Kindleberger model, but there is currently not much data available describing how much credit was used to buy crypto assets during 2017. When this data becomes available, it would be interesting to study how the amount of credit affected the market.

Many countries have issued warnings and guidelines to investors, but few have acted accordingly. It will be interesting to see how the market will change once more countries start to introduce regulation, either by applying existing regulation like the U.S. and SEC or by adopting new rules. Also, as seen in Figure 5.1, a large part of ICO projects in 2017 originated in either the U.S. or China. Now that the SEC is becoming more active, and China have banned ICOs altogether, many projects could be looking for jurisdictions that are less regulated. However, as discussed in chapter 5, issuers registered in other parts of the world cannot sell to U.S. citizens unless a registration or exemption is filed.

So far, most ICOs have been done for products and platforms that are yet to be launched, and many are still a few years away. Meanwhile, the crypto asset market has been extremely volatile. The question is, will the market stabilize once tokens can be used for their intended purposes and issuers start to deliver on their promises? If not, how will pricing of services work on these platforms? Will they have a fixed price in dollars or a fixed price in tokens?

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Appendix 1: Overview of exemptions

Overview of Exemptions*

U.S. SECURITIES AND EXCHANGE COMMISSION
Division of Corporation Finance | Office of Small Business Policy

	SECTION 4(a)(2)	REGULATION D			REGULATION CROWDFUNDING	REGULATION A		INTRASTATE		
		Rule 506(b)	Rule 506(c)	Rule 504		Tier 1	Tier 2	Section 3(a)(11)	Rule 147	Rule 147A
Offering Limit within a 12-month Period	None	None	None	$5 million	$1.07 million	$20 million	$50 million	None	None	None
General Solicitation	No	No	Yes	Permitted in limited circumstances	Permitted with limits on advertising after Form C is filed. Offering must be conducted on an internet platform through a registered intermediary	Permitted; before qualification, testing the waters permitted before and after the offering statement is filed		Offerees must be in-state residents	Offerees must be in-state residents	Yes
Issuer Requirements	None	"Bad actor" disqualifications apply	"Bad actor" disqualifications apply	Excludes blank-check, reporting, and investment companies. "Bad actor" disqualifications apply	Excludes non-US, blank-check, reporting, and investment companies. "Bad actor" disqualifications apply	US or Canadian issuers. Excludes blank-check, reporting, and investment companies, issuers of certain securities, and certain companies with a Section 12(j) order. "Bad actor" disqualifications apply		In-state residents "doing business" and incorporated in-state; excludes investment companies	In-state residents "doing business" and incorporated in-state; excludes investment companies	In-state residents and "doing business" in-state; excludes investment companies
Investor Requirements	Transaction by an issuer not involving any public offering. See SEC v. Ralston Purina Co.	Unlimited accredited investors. Up to 35 sophisticated but non-accredited investors	Unlimited accredited investors. Issuer must take reasonable steps to verify that all purchasers are accredited investors	None	Investment limitations based on annual income and net worth	None	Non-accredited investors subject to investment limits	Offerees and purchasers must be in-state residents	Offerees and purchasers must be in-state residents	Purchasers must be in-state residents
SEC Filing Requirements	None	Form D. Additional information required for non-accredited investors	Form D	Form D	Form C, including two years of financial statements that are certified, reviewed or audited, as required. Progress and annual reports	Form 1-A, including two years of financial statements. Exit report	Form 1-A, including two years of audited financial statements. Annual, semi-annual, current, and exit reports	None	None	None
Restrictions on Resale	Yes. Restricted securities	Yes. Restricted securities	Yes. Restricted securities	Yes. Restricted securities except in limited circumstances	12-month resale limitations	No	No	Securities must come to rest with in-state residents	Yes. Resales within state for six months	Yes. Resales within state for six months
Preemption of State Registration or Qualification	No	Yes	Yes	No	Yes	No	Yes	No	No	No

* All offers and sales of securities in the U.S. must be registered with the SEC or conducted pursuant to a federal exemption from registration. This chart provides a summary of certain exemptions and related requirements contained in the Commission's rules and regulations; it is not a substitute for the rules and regulations. Additional information can be found at **www.sec.gov/smallbusiness**.

Source: SEC website. Retrieved on May 10th, 2018 from

https://www.sec.gov/smallbusiness/exemptofferings/exemptofferingschart

Appendix 2: Links to warnings given by regulators

United States	https://www.investor.gov/additional-resources/news-alerts/alerts-bulletins/investor-bulletin-initial-coin-offerings
Russia	https://cryptoslate.com/russia-ico-regulations/
Singapore	http://www.mas.gov.sg/~/media/MAS/Regulations%20and%20Financial%20Stability/Regulations%20Guidance%20and%20Licensing/Securities%20Futures%20and%20Fund%20Management/Regulations%20Guidance%20and%20Licensing/Guidelines/A%20Guide%20to%20Digital%20Token%20Offerings%20%2014%20Nov%202017.pdf
China	http://www.pbc.gov.cn/english/130721/3377816/index.html
Hong Kong	http://www.sfc.hk/edistributionWeb/gateway/EN/news-and-announcements/news/doc?refNo=17PR147
Israel	http://www.iosco.org/library/ico-statements/Israel%20-%20ISA%20-%20Interim%20Report%20on%20Examination%20and%20Regulation%20of%20ICOs%20-%20Press%20Release%20-%20with%20Link%20to%20(Hebrew)%20Report.pdf
Germany	https://www.bafin.de/SharedDocs/Veroeffentlichungen/EN/Meldung/2017/meldung_171109_ICOs_en.html
Canada	http://www.osc.gov.on.ca/en/SecuritiesLaw_csa_20170824_cryptocurrency-offerings.htm
United Kingdom	https://www.fca.org.uk/news/statements/initial-coin-offerings
Switzerland	https://www.finma.ch/en/news/2018/02/20180216-mm-ico-wegleitung/
International Organization of Securities Commissions (IOSCO)	http://www.iosco.org/news/pdf/IOSCONEWS485.pdf
ESMA	https://www.esma.europa.eu/sites/default/files/library/esma50-157-829_ico_statement_investors.pdf
United Arab Emirates (UAE)	https://www.sca.gov.ae/English/News/Pages/Articles/2018/2018-2-4.aspx
Sweden (in Swedish)	https://www.fi.se/sv/publicerat/nyheter/2018/olampligt-for-konsumenter-att-investera-i-virtuella-valutor/

Norway (in Norwegian)	https://www.finanstilsynet.no/markedsadvarsler/2017/initial-coin-offerings-icoer---advarsel-til-investorer-og-foretak/?id=
Japan	https://www.fsa.go.jp/policy/virtual_currency/07.pdf
Italy	http://www.consob.it/web/consob-and-its-activities/warnings/documenti/english/entutela/esma/enct20171204_esma.htm
Spain	https://www.bde.es/f/webbde/GAP/Secciones/SalaPrensa/NotasInformativas/18/presbe2018_07en.pdf

Appendix 3: Reflection Note

Introduction

When thinking of possible themes for our thesis, we knew we wanted to write about something different than most other students were writing about. We tried to be original for our bachelor thesis as well, which gave good results, but this theme was much more outside the box than the relationship between oil prices and the Norwegian Krone. It started with an interest and curiosity for blockchain technology, and we had observed the extreme price increases of Bitcoin and most other crypto assets. We noticed that several companies changed their names to include the word "blockchain" which caused their share prices to increase rapidly. During the fall of 2017 we attended the course "History of Financial Crises" (an excellent course that I highly recommend for all student at UiA) and these name changes appeared very similar to what happened during the dotcom bubble of 2001. After researching this phenomenon our focused turned gradually to something that had given its investors a much higher return than shares in these new "blockchain companies". We discovered Initial Coin Offerings (ICOs).

At the beginning of January 2018, the total market capitalization for the crypto asset market was above $835bn, and one Bitcoin was worth $17,000 (Coinmarketcap 2018d; 2018a). During the previous summer and fall, we heard about friends and colleges that invested heavily in this market, hoping to become the next crypto-millionaire. Some of these friends had high returns on their investments, but we believed that the market was unsustainable and very risky. For this reason, we set out to prove that this was a bubble, using what we had learned in the previously mentioned course. However, shortly after we started this research, the market crashed, reaching a low of $292bn on February 6th, a fall of approximately 65% in one month. After this we turned our focus to the fraud and hacking that frequently occurred, hoping that our thesis could warn investors about the significant risks in this market.

Summary of thesis findings

The main finding of this thesis is that there is a substantial amount of fraudulent behavior in this market that creates risk for investors. Most notably, there exists a significant information asymmetry between investors and issuers. Legal institutions have been slow to react, but some

are now starting to introduce regulation. The U.S. has been the most prominent regulator, applying existing securities regulation to ICOs. While China and South Korea have banned ICOs completely, Belarus stands out as one of the most crypto-friendly countries after they legalized all crypto-related activities as well as removing taxes for the next five years.

Internationalization

The blockchain technology is decentralized, and one of its main characteristics is that value and information can be transferred across borders quickly and easily. The crypto asset market is always open and available for anyone with an internet connection and makes it possible for people all over the world to have access to payment systems without hefty fees. Blockchain can also help solve international problems such as refugee identify, as we have seen in Finland (Suberg, 2017).[9] Finally, crypto assets can help people in countries where the national economy, and hence currency, is having problems. Venezuela has been an example of this, where extreme inflation has made the national currency almost worthless.

Innovation

To discuss innovation in relation to Initial Coin Offerings is extremely relevant. Bitcoin has revolutionized how we transfer value, and the blockchain technology it is based on will likely disrupt several industries. Blockchain is not limited to transfers of value in the form of crypto assets such as Bitcoin; it makes it possible to transfer and manage any type of information. Although the crypto asset market is highly volatile and vulnerable to fraudulent actors, I have little doubt that blockchain technology will be very important in the future and may transform our lives in the same way the internet has done. Most of the project funded with ICOs during the last year are still in the early stages of their development; it will be interesting to see how many of them succeed and how the successful projects will transform their respective industries.

An important question, at least in connection with blockchain and ICOs, is how regulators will find the balance between encouraging innovation and protecting investors. The crypto asset market has been mostly unregulated so far, but some regulatory authorities have started to step up. The most extreme responses have come from China and South Korea, who have chosen to ban ICOs altogether. The U.S. Securities and Exchange Commission (SEC) is one

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[9] Suberg, W. (2017). Finland Solves Refugee Identity with Blockchain Debit Cards. Retrieved from https://cointelegraph.com/news/finland-solves-refugee-identity-with-blockchain-debit-cards

of the few regulators that have applied existing regulation to the crypto market. They have stated that most ICOs they have seen qualify as securities under current law and should be regulated as such. Several ICOs have been stopped so far, mostly because they tried to defraud investors. Some might argue that strict regulation will stifle innovation, but as the actions from the SEC have shown it is necessary to have laws that protect retail investors. A balanced approach would of course be the most optimal, but strict regulation is better than no regulation at all.

Responsibility

The question of regulation and innovation serves as an excellent transition to the theme of responsibility. As mentioned, the crypto market has so far been full of fraudulent behavior because of its unregulated nature. This type of behavior must be significantly reduced, or it seems unlikely that the market will become legitimate and trusted in the way that stock markets are today. If lawmakers are not able to do this, the participants in the market must help themselves by creating some best practices. One example is that issuers of so-called "utility tokens" can start limiting how many tokens each investor can buy. As we have illustrated in this thesis, there have been cases where all tokens in an ICO have been bought by a small number of investors, making it unlikely that they were bought for consumption purposes. Perhaps the biggest problem currently is the information asymmetry between investors and issuers. Issuers could help remedy this problem by providing periodic information that can be verified by its investors.