Initial Coin Offerings (ICOs) for SME Financing

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Foreword

Distributed Ledger Technologies (DLT) like blockchain are a relatively recent arrival in the world of finance, but are already driving new forms of financial innovation, new breeds of financial products, and creating new processes and platforms. Initial Coin Offerings (ICOs) are one of the most prominent applications of blockchain for finance, allowing for an innovative and inclusive way of financing for small and medium-sized companies (SMEs). Over the past two years the use of ICOs has gone from 'too small to care' to 'too big to ignore' for markets and regulators alike.

Much of the discourse around ICOs to date has focused on the uncertainty of the applicable regulatory framework for ICOs and crypto-asset markets. This report takes the analysis further, discussing "tokenomics" and limitations in ICO structuring which can give rise to conflicts of interest and expose investors to significant risks. It analyses issues around valuation, accounting and allocation of value, as well as trading of tokens. It highlights the importance of network effects as a source of value creation in ICO offerings and the limits to the use of ICOs as a "mainstream" financing tool.

Policy makers have a central role to play in addressing the market and conduct risks involved in ICO structures. We need greater clarity in the regulatory and supervisory frameworks applied to ICOs, as a stepping stone to their safer use for financing purposes. Clear AML/CFT requirements, financial consumer protection safeguards and enhanced disclosure are some of the actions required. A proportionate regulatory approach can address key requirements without stripping away ICOs' speed and cost advantages.

International cooperation is also important. ICOs are global in nature and trade easily across borders. A more coordinated global approach is necessary to prevent regulatory arbitrage and allow ICOs to deliver their potential for the financing of blockchain-based SMEs, while also adequately protecting investors.

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Executive Summary

Initial Coin Offerings (ICOs) consist of the creation of digital tokens by small companies to investors, in exchange for fiat currency or *first-generation* dominant cryptocurrencies, such as the Bitcoin. ICOs are enabled by the use of Distributed Ledger Technologies (DLTs), such as the Blockchain, which facilitate the exchange of value without the need for a trusted central authority or intermediary, allowing for important efficiency gains driven by such disintermediation.

ICOs are having a moment, with much media coverage and hype around their potential for profit making. This extends to their potential to address the SME financing gap. ICOs enable value creation through the potential development of network effects and efficiency gains driven by the use of the blockchain. Although the lack of regulatory clarity currently exposes ICO participants to some risks, ICOs have the potential to offer a new way to raise capital for projects enabled by DLTs and the blockchain, benefiting from efficiencies, cost savings and speed of execution, if appropriately regulated and supervised.

Regulated ICOs can be a more inclusive financing vehicle by allowing small retail investors to participate in the financing of small businesses and start-ups. Depending on the type of rights assigned to ICO tokens, companies can raise risk capital without sharing ownership, addressing one of the main impediments to the use of public equity financing (dilution). SMEs are granted direct access to an unlimited investor pool and the liquidity of tokens issued in ICOs is one of most important benefits of ICOs when compared to conventional start-up financing mechanisms such as Venture Capital (VC) funding.

Despite these potentials, ICOs in their current shape and form carry important risks for SME issuers and investors subscribing to token offerings. These are mainly linked to the uncertainty of the applicable regulatory framework for ICOs and crypto-asset markets, coupled with the lack of financial consumer protection safeguards, limitations in the structuring of ICOs and operational risks related to DLTs, exposing investors subscribing to ICO offerings and SMEs issuing tokens to significant risks.

Issues around pre-ICOs present potential conflicts of interest arising from the pre-sale of tokens at heavy discounts that hold exactly the same risk as the ones purchased by investors at the offering stage. In addition, the absence of skin-in-the-game by issuers who do not take any personal financial risk poses another source of potential conflicts.

Most ICO offerings do not fit the standard investment paradigm, inter alia because of the ways value is created and attributed between the different participants of a network and the difficulty in quantifying that effect. Sharing and allocating the value created by tokens may not always be straightforward given the duality of the token's function both as a means to represent the future value of the company (similar to an equity share) but also as a means to transact on the platform or get access to the platform (usage or utility). Understanding ICO structuring is a pre-requisite for the valuation and pricing of tokens by SMEs and investors subscribing to ICO offerings.

The listing and active trading of a token in a crypto-exchange or crypto-trading platform is considered as a proxy for the success of the ICO and an important factor for the future viability of the business. Market returns of ICO tokens have been found to carry some systematic risk as their value is correlated with bitcoin returns.

The low cost of token issuance driven by efficiency savings from blockchain-based solutions is considered to be one of the most important benefits of financing through ICOs.

The evolution of costs related to an ICO issuance follows the evolution of a financing mechanism, as ICOs mature and move away from unregulated territory, and increasingly involve advisory fees (legal, financial, security), marketing expenses, listing fees and other post-ICO costs.

Venture capital (VC) investment in blockchain-related projects has been compared to ICO issuance, so as to depict the proliferation of ICOs as a financing vehicle for early stage financing of start-ups. VC funding can be, and has been, complementary to an ICO offering, with VCs offering non-monetary contribution such as expertise, industry knowledge, connections, as well as managerial and strategic assistance.

The most prominent limitation of ICOs at their current stage and form lies in the regulatory uncertainty and arbitrage exploited by some issuers. The absence of disclosure requirements in ICOs exacerbates information asymmetries already present in early stage SME financing. There is also a lack of a financial consumer and investor protection in ICOs that would allow investors to obtain redress and compensation, in a situation where coverage by bankruptcy laws is not assured, and the risk of fraud is high. As the uncertainty and the risks involved in ICOs at their current form are vast, ICOs cannot be considered as an appropriate investment for retail investors who do not necessarily have the financial skills required to undertake such high-risk, high-volatility investments.

The potential of ICOs as a mainstream financing option for SMEs of any type and activity is considered to be very limited at this time, particularly given the regulatory vacuum of the crypto-asset market. Although ICOs are being hailed as the solution to SME financing gaps, ICOs are, by nature, not the right solution for every project and a differentiation should be made between blockchain-enabled projects or products/services, and businesses or products/services not built on DLTs, as the former has a higher potential of benefiting from an ICO.

Policymakers have a role in creating the conditions necessary to facilitate the development of ICOs in a safe and fair way, and allow for the potential benefits of ICO structures to be enjoyed in a viable and sustainable way by SMEs, while at the same time protecting SMEs and investors from risks involved in such structures. Clarity in the regulatory and supervisory framework applying to ICOs is arguably a stepping stone to the safer use of token issuance for financing purposes. Standardised disclosure requirements would be indispensable to overcome information asymmetries that are already present in the financing of SME risk. Enhanced investor protection for retail investors, coupled with efforts for greater awareness of risks by retail investors, can safeguard their informed participation in such financing. AML/CFT requirements on ICO issuances are equally important, especially given the wide range of relevant issues observed in the crypto-assets space.[1]

Given the global nature of ICOs issuing and trading across borders, cooperation at the international level is warranted for a coordinated global approach that will prevent regulatory arbitrage and allow ICOs to deliver their potential for the financing of blockchain-based SMEs, while also adequately protecting investors.

[1] In response to these concerns, on the 19 October 2018 the FATF adopted changes to the FATF Recommendations and Glossary that clarify that these apply in the case of financial activities involving "virtual assets" and "virtual asset service providers", including providers of financial services for ICOs (see Section 5.2.4).

1. Initial Coin Offerings (ICOs) for SMEs

1.1. Introduction

Initial Coin Offerings (ICOs)[2] consist of the creation of digital tokens by start-up companies (i.e. young micro-SMEs) and their distribution to investors in exchange for fiat currency or, in most cases, mainstream cryptocurrencies (Bitcoin or Ether). ICOs are enabled by the use of Distributed Ledger Technologies (DLTs), such as the Blockchain[3], which facilitate the exchange of value without the need for a trusted central authority or intermediary (e.g. government, bank) and allow for efficiency gains driven by such dis-intermediation. Tokens are cryptographically-secured and benefit from the inherent characteristics of DLTs on which they are built such as transparency, security and immutability of the ledger given its distributed nature.

The important role of SMEs in the real economy is well recognised and is derived from their contribution to employment, value added, innovation and general economic growth. Financing sources allow SMEs to fulfil their role, and it is therefore important for SMEs to have access to multiple financing sources both under normal market conditions and in periods of financial stress.

This report analyses the emergence and potential of ICOs as a financing mechanism for start-ups and SMEs, examines the benefits and challenges of this mechanism for small businesses and investors, and discusses policy implications of ICO activity for inclusive financing of SMEs and the real economy.

The report does not discuss classification/taxonomy of tokens or regulatory responses to ICOs, given the work currently being undertaken by regulators and the International Organisation of Securities Commission (IOSCO) (FSB, 2018). Also, the report is based on the theoretical discourse of token offerings and is not intended as a practical ICO guide.

The **annex** of the report provides a **primer to ICOs**, introducing token issuances as financing mechanisms and briefly explaining the underlying technology, which allows for a better understanding of the benefits and limitations of the mechanism for SMEs and investors.

[2] Initial Coin Offerings are also described as initial token offerings, crowdsales of coins or tokens, token or coin sales.

[3] DLTs and the blockchain are terms used interchangeably in this paper.

2. The importance of the ecosystem for ICOs: Network effects

ICOs involve, by design, a platform comprising a network of participants who purchase and hold tokens. This network and the wider ICO ecosystem are central to the success of ICO-funded ventures, enabling the creation of network effects.

Network effects allow for potential value creation by the network that is being formed automatically and by default in every ICO with the mere participation of tokenholders in the offering. Such value resides primarily with those ICO participants who subscribe with the aim of using the platform or service offered on the platform, or with investors who have a dual role as both investors and users of the platform.

Potential network effects, together with efficiency gains driven by the use of DLTs, are arguably the two most important sources of value creation of ICOs.

2.1. ICO ecosystems

The ICO ecosystem is a complex environment extending beyond SMEs launching ICOs (issuers[4]) and individuals or institutions wishing to participate in the ICO (investors or participants). It comprises digital exchange venues; trading platform operators; digital wallet providers; increasingly emerging financial and technical advisors; participants in regulated markets where tokens are underlying or referenced assets (e.g. derivatives, exchange-traded funds); investment funds or other collective schemes investing in tokens (e.g. hedge funds – reportedly heavily involved in the ICO market); custodians and regulators.

The ICO ecosystem is tech-heavy, and building a community plays an important role in their development given the open source nature of many of the platforms' protocol. Computer engineers, programmers and developers build the network infrastructure and develop the platforms' protocol (software) and applications that run on it. The entire community of developers and programmers can contribute to such projects given the open source nature of the protocol used in most cases.[5]

Social media and specialised internet websites play a role in communicating the projects backed by ICOs and even marketing the issuance: platforms such as telegram, specialised sites such as Github, but also mainstream social media such as Twitter and Facebook participate in the promotion and marketing of ICOs.

The importance of the network in blockchain-based projects is such that some ICO issuers have resorted to "airdrops", the free distribution of tokens issued through random allocation or based on specific criteria (see Box 2.1). Although such mechanisms enable the rapid creation of a network around the project, participants' incentives may not necessarily be appropriate for the platform to fulfil its potential (e.g. speculation).

[4] The terms "issuer", "company" and "project" are used interchangeably for the purposes of this report. It should be duly noted, however, that in many of the ICOs that have occurred, the issuing entity is not incorporated. Similarly, "product", "service" or "any other right" are used interchangeably in this paper.

[5] Open source code is code that is made available to everyone who wishes to read, use, copy or modify the code, encouraging experimentation and improvement of the code by anyone interested.

Box 2.1. Airdrops

An airdrop involves the free distribution of native tokens by issuers to existing or new users of their platform, before or concomitantly with the ICO offering. It is an innovative way for a company to promote its product/service via active participants instead of traditional marketing via professional service providers.

The main purpose of airdrops is to kick-start the creation of a community of token-holders before or together with the ICO, or to boost the network effects of already created networks. Airdrops are used for marketing purposes; to raise awareness of a new token; drive more participants to the issuance; but also reward existing participants/token-holders for their loyalty, their active engagement in the network or for bulk purchases.

As most airdrops involve tokens which are not already traded in secondary markets, the holders of such free tokens cannot exchange them and cash out. Token-holders can benefit from the usage of the token (access to a service/product) or wait for the token to become liquid so as to trade it.

In many cases, tokens distributed in airdrops are distributed randomly through the use of smart contracts which send these free tokens to active wallets. In some cases, airdrops can raise financial consumer protection considerations, when used by scammers who trick users into disclosing their private wallet keys in order to receive free tokens. Anecdotal evidence suggests that airdrops may also be used as an alternative way to provide access to tokens in countries where ICOs are banned.

Given the tech-heaviness the ecosystem and the technological requirements underpinning ICO mechanisms, an SME wishing to issue tokens needs to have a business rationale based on DLTs and the blockchain. SMEs may be tempted to use ICOs as a way to easily raise funds given the momentum even when the use of the blockchain is not adding any value. However, if the proposed service or product does not integrate the use of blockchain, the implementation of the project and long-term sustainability of the company is questionable.

2.2. Network effects: an important value creator in ICOs

Network effects describe the positive externalities observed in networks when the value of a product/service to a user increases as the number of users increases, and the potential links between participants grow for every new participant joining the network (Hendler and Golbeck, 2008)[6]. Existing theory on network effects suggests that "embeddedness" of network systems provides participants with unique opportunities and benefits derived from each other's participation, and firms organised through networks have higher survival chances than firms that are not (Uzzi, 1996).

In other words, the benefits a user enjoys from joining a network increase with the total number of users who are part of the network. This value proposition has first been quantified by *Metcalfe's law* (the value of a network is proportional to the square of the number of users of the network) and *Zipf's law* (the value of a network is proportional to n

[6] In a typical network, the addition of a new participant (or network node) increases the willingness to pay for network services by all participants and the benefits of the addition of an extra node exceed the private benefits accruing to the particular node.

log n, where n is the number of users of the network) (Briscoe et al., 2007). Irrespective of how its value is measured, the existence of network effects is widely acknowledged.

ICOs enable value creation by design: through the formation of platforms based on distributed ledger technologies; the attraction of participants and users (effectively all subscribers/tokenholders) and their possible interactions; and ultimately the inducement of positive network externalities on those platforms. These potential network effects increase the economic value of the platform itself and can have wider economic and social benefits.

In practical terms, the imposition of hard caps (see Section 3.1), which effectively create a tentative sale of tokens which will not be effectuated unless the cap is reached, ensures that a critical mass of users needs to be gathered before the project is launched. Positive network externalities are also evidenced by the strong positive correlation of ICO market values with the number of Twitter followers of ICO issuing companies (Benedetti and Kostovetsky, 2018), indicative of the value created when a platform reaches a critical mass of users.

Recent academic research suggests that ICOs solve a coordination failure inherent in many platforms which allow for network effects (Li and Mann, 2018). This failure relates to the complementarity among participants in the network, whereby initial participants do not know whether the network will attract a sufficient number of users for the network effects to materialise, and have a lower incentive to join. ICOs can address such failure through escalating price schedules, where the minimum price investors pay increases as more investors join the network, subsidising first movers. While such sequencing can be beneficial to resolve coordination issues, several rounds/stages of a tokensale can create the risk of becoming like a pyramid/Ponzi scheme fraud, with each round paying the previous round's investors by pumping up the price of the token enough for previous tokenholders to exit.

Trading of tokens has demonstrated[7] to create a feedback loop between token valuation and platform adoption (Cong et al., 2018). In other words, the appreciation of token value leads more investors to buy tokens and join the platform, which in turn increases and accelerates user adoption of the platform. In that model, token price appreciation is in itself driven by investors' expectations about the value of the platform and by capitalising on the growth of the user base.

Value creation by network effects could not be created in case of pure capital formation, i.e. when tokens are only used as a financing channel for a non-blockchain business model which is not based on the creation of a community around the product/service. Tokens which have a hybrid use, both as instruments for capital raising and a medium of exchange, lead to accelerated platform adoption. It could be argued that such value will not be equally created in case an investor is a pure capital provider with no interest whatsoever in using the platform.

The fact that there is no value creation due to network effects in the case of ICOs for pure financing of non-blockchain based services or products is perhaps the main argument against the "mainstreaming" of ICOs for SMEs. Cost efficiencies of blockchain-enabled structures and disintermediation remain important benefits of ICOs, however, in balance,

[7] Based on a dynamic asset pricing model of crypto-tokens on blockchain-based platforms (Chong et al., 2018).

these may not prove sufficient to allow for the expansion of the ICO financing model to non-blockchain-based SMEs (see Section 5.3).

Academic research also argues that launching an ICO could potentially harness the "wisdom of crowds*"* by aggregating dispersed information about platform quality and allow for informed decision-making by participants in the network (Lee et. Al, 2018; Li and Mann, 2018). Prospective participants need to be heterogeneously informed for the wisdom of crowds effect to be exploited. Academics further suggest that the wisdom of crowds could effectively substitute the intermediary role played by traditional underwriters in the financing of blockchain-based start-ups. Given the limited quality and quantity of information disclosed about ICOs; the limited due diligence by participants; and speculators' herding behaviour, the above potential benefit is yet to be seen in ICOs.

3. "Tokenomics": the economics of ICOs

The economics of ICO issuances, increasingly known as *tokenomics*, involve all decisions around the issuing and implementation of a token within an ICO ecosystem, and the way holders of tokens are able to use these to exchange goods and services on the platform. Such decisions include structuring of the offering, sale models, pricing of tokens and allocation mechanisms.

Parallels have been drawn between central bank currency issuance and ICOs. Many industry participants refer to a "monetary policy" in token issuance, as issuers need to manage expectations of tokenholders and ensure price stability for the token.

3.1. Structuring of ICO offerings

Structuring of ICO offerings varies across projects in regards to the number of tokens issued; the proportion maintained as compared to the one distributed to investors; the allocation mechanisms; the future supply of tokens; and the sale model used. As this financing mechanism is new and innovative, the structuring of the offerings tends to evolve as the mechanism matures, in part as a response to failures experienced.

Most ICO offerings are capped, placing a ceiling on the amount they wish to raise which is in turn translated into a cap in the number of tokens that will be issued. Uncapped ICOs run the risk of token "inflation", with the value of existing tokens being eroded with every new token issuance. This effect is similar to the dilution to which equity-holders are subjected to.[8]

The schedule of token issuance, if tokens are not issued in a single issuance, needs to be clarified by the issuer upfront. Given potential token "inflation" and the fact that the price of tokens is affected by the supply of tokens, initial token-holders are sometimes negatively surprised when the issuer decides to issue more tokens than initially announced.

Having a full and accurate schedule of the medium-term financing needs of a start-up upfront can be a very difficult task, as their financing needs depend on the success of the business, the speed of its development and other unpredictable factors. This can be a real challenge for SMEs who may realise after the ICO that their initial issuance did not sufficiently cover their financing needs; the issuers will have to deal with a trade-off between depriving themselves of further token-based funding rounds so as not to negatively surprise their existing token-holders or issue further unscheduled rounds of tokens and dilute them.

This is why many issuers decide to hold part of the tokens issued as reserves that are not yet sold. Such reserves effectively serve as a safety net in case the company needs to raise further funding in the future. These can also be used to incentivise miners or developers contributing to the project by serving as compensation,[9] or can be given to a market maker

[8] It could be argued, however, that in the case of equities the equity-holders are owners of the company's assets, and as such, have ownership of the funds paid by new investors which end up in the company's assets side.

[9] In permissionless blockchains, consensus is achieved through the proof-of-work mechanism and the tokens issued on the platform can be used to reward miners who participate in the validation of

tasked with preserving the price stability of tokens if these get listed on a trading platform. Deciding how many tokens to keep as reserves is a delicate balancing act for the entrepreneur who does not wish to deprive the ecosystem of tokens.

A mechanism that can help issuing companies foster a thriving ecosystem is placing caps on individual contributions.[10] Such maximum limits on investment per individual investor promote the diversification of platform participants, helping the development of the network, with a significant impact on value creation (see Section 2.2). At the same time, caps can impede the hoarding of tokens by speculators who accumulate tokens expecting their value to appreciate. Such hoarding is, in turn, detrimental to the functioning of secondary markets for tokens, stripping the market of valuable free floating tokens. Conversely, minimum contributions can be imposed in case the issuer wishes to restrict participation to institutional investors. This, however, can be counter-productive on the creation of positive network externalities.

In addition to fostering a more vibrant network, caps on individual contributions promote KYC/AML activities by issuers, as it effectively requires a KYC process to be undertaken by the issuer. In such cases, issuers verify that the address of each tokenholder represents a unique individual and can create whitelists with users' addresses and verifications, similar to shareholder registries.

A portion of the tokens issued is, in many cases, set aside for the founding team of the project[11]. When the tokens issued do not incorporate any ownership rights, allocating part of the token issuance to the founders, who continue to hold full ownership of the company, could be seen as counter-intuitive or even conflicting. Such cases could give rise to misalignments of interest when founders have interest in inflating the token price artificially, only to "flip" the token to new buyers for large profits (so-called "pump and dump" schemes). Lock-up periods for tokens reserved for founders should therefore be used as a tool to align the interests of founders with those of other tokenholders.

Extra tokens are allocated to those undertaking the mining process through which nodes validate transactions. Mining nodes try to solve complex mathematical calculations in order to verify transactions, and are rewarded with new tokens for every validated transaction.

The case of Filecoin can be a good illustration of token allocation[12]. Thirty per cent of the tokens created would be disbursed "at genesis": 15% to the development team, 10% to investors, and 5% to the "Filecoin Foundation" that will ensure the future development of the project. The 15% team allocation, together with the 5% to the Filecoin Foundation was considered by the industry as rather high. The remaining 70% of tokens would be reserved

new transactions. Native tokens can help incentivise miners and validators and improve the functionality, stability and growth of the ecosystem (Nakamoto, 2008).

[10] An example of an ICO with such caps was the Fabric ICO, where the cap for individual contributions was set at 9ETH, a limit not low enough to make it hard for the issuers to reach the ICO hard cap, but also not high enough to deprive some of the prospective subscribers from the opportunity to participate (https://fabrictoken.io/fabric-token-ico-announcement-contribution-caps-gas-price-limit-big-warning/).

[11] Anecdotal evidence suggests this percentage is on average c.20% of total tokens issued.

It has been argued that the willingness of the founders to retain a large portion of tokens signals their expectation that the tokens will have a higher value in the future (Chod and Lyandres, 2018).

[12] https://filecoin.io/, see Box 3.1 for more information on the Filecoin ICO.

for mining rewards, and miners will be able to earn those tokens as reward for every block in exchange for replicating files on the network.

The issuance can be contingent to the achievement of a minimum threshold, the "soft cap". If the pre-defined target of proceeds set by the imposition of the soft cap is not met, investor contributions are returned and the platform is not launched. Such soft caps are also customary in crowdfunding campaigns.

When it comes to sales models, sales at a fixed price, auctions, reverse auctions and hybrid forms of the above or other innovative mechanisms are being used. To date, no single structure or sale model has proved to combine all the desired properties that would render it an industry standard.

The technology underpinning ICOs allows issuers to include in the code a pre-specified algorithm or schedule for the issuance of tokens, as well as terms and conditions for the supply of tokens (prices, thresholds, caps, etc.), which are then automatically executed on the blockchain (e.g. through smart contracts). This improves the credibility and trust of potential token holders, but reduces flexibility of the company to adjust to fluctuating market conditions.

In the absence of lock-in periods for entrepreneurs issuing ICOs, one way to protect investors could be the allocation of issuance funds to custodians who will only hand out funds to the issuer upon achievement of pre-defined milestones. Such milestones in the development of the project and the lifetime of the company would need to be disclosed ahead of the issuance.

In any and all cases, transparency around ICO terms and conditions is of paramount importance for participants and increases the credibility of the issuance. As ICOs are, for the most part, unregulated, disclosure requirements do not apply and in many cases investors do not receive the level of information necessary for them to make informed investment decisions (see Section 5.2).

3.1.1. Pre-ICOs

Before the actual ICO, some issuers choose to undertake a private offering of tokens or token "pre-sale" to a small number of identified parties, in most cases insiders or cornerstone investors such as VC funds. Tokens in such pre-sales enjoy a discounted price for the tokens and in most cases proceeds raised are used to cover the set-up and expenses of undertaking the ICO transaction (marketing expenses, advisory fees, etc.).

Private sales of tokens ahead of ICOs raise a number of issues, as they tend to favour insiders by offering heavy discounts on the tokens that hold exactly the same risk as the ones purchased by investors during the offering. Issuers who use pre-sales to cover the expenses of undertaking an ICO offering do not take on any personal risk at all.

Not having any "skin-in-the-game" is another source of potential conflicts, as the founders carry no personal financial risk in the transaction besides reputational risk. Having some personal capital at risk assists founders of start-ups in convincing investors of their involvement and can act as a tool for the alignment of interests between entrepreneurs and investors.

3.2. Token valuation and pricing

The application of standard corporate finance valuation frameworks to tokens issued in ICOs is challenging. Most ICO offerings do not fit the standard investment paradigm given the underlying economic relationships involved in such offerings, as well as the novelty and complexity of the structures[13] used.

The difficulty valuing ICO tokens is very much linked to the difficulty in defining tokens. If tokens were to be defined as currency, their valuation could be somehow similar to cash or cash alternatives; if defined based on their utility value, they would represent the price of the service at any point in time; if considered equity securities, the company's enterprise value would need to be modelled and the price of the security derived from such model.

The economics of the issuance (number of tokens, offering price, structure of the token offering) need to be defined and disclosed to potential participants upfront, to allow for the valuation of the tokens, however, this is not always assured given the absence of disclosure requirements in most ICOs. The full schedule of tokens to be issued at the initial and future stages need to be known with accuracy for an investor to be able to make an informed decision about the value of the token, as existing tokenholders are diluted by subsequent issuances (what is defined as "token inflation").[14]

Pre-defining the token schedule of issuance may reduce the flexibility of an SME to quickly respond to changing market conditions, reducing the agility of the company. Entrepreneurs themselves are faced with the challenging task of having to decide, with accuracy, their total financing needs that their venture will face in the future, so as to determine the total supply of tokens, before the platform is even built – or impose a dilution for their initial tokenholders at a later stage.

Another level of difficulty in valuation and pricing relates to the way value is (i) created and (ii) shared within the network. As mentioned above, network effects represent an important value creator for blockchain-enabled projects, and the expected monetised value of such positive externalities needs to be accounted for in valuation.

Sharing and allocation of the value created by tokens may not always be straightforward in the case of an ICO. In cases where tokens are considered securities, token-holders get their fair share of value derived from the appreciation in the value of the platform. But the duality in the function of a token, both as a means to represent the future value of the company (similar to an equity share) but also as a means to transact on the platform or get access to the platform (usage or utility), needs to be priced in.

In the absence of ownership rights, as is often the case in ICOs, and if the tokens issued are not considered securities, an expected upside in the value of the company will only be shared by traditional equity-holders/owners of the company (if these exist) and not by token-holders. Conversely, any upside from the appreciation in the value of tokens will be

[13] Valuation of tokens with an unknown supply is an almost impossible task in some cases, such as uncapped sale structures where there is no defined amount of tokens to be issued or no ceiling for the issuance.

[14] According to some research, the value of an ICO is independent of the anticipated growth of the platform and, conditional on the platform successfully raising the funds, offers higher returns to the entrepreneur when compared to traditional equity financing (Catalini and Gans, 2018). The opposite happens when the entrepreneur cannot credibly commit to the original money supply schedule or if the commitment to using the token as the only medium of exchange on the platform is violated.

attributed to token-holders. A potential dichotomy of value attribution may arise between token-holders and traditional equity-holders in case an initial investment round with traditional equity has taken place before the ICO (VC/business angel or other) or in a follow-on financing round with traditional equity.

In its simplest form, pricing of a capped ICO offering a fixed number or tokens would result in a fixed price per token and a valuation reflecting the target or cap of the offering. This would be the case even for a regulated offering with no uncertainty about the regulatory framework or the stability of the market. In practice, given that many offerings occur in unregulated markets, and/or some of the trading or exchange platforms involved are in grey regulatory zone, uncertainty around the credibility of the trading or exchange platforms needs to be priced in the token.

Interestingly, if the platform does not have any other revenues after its token offering and no revenue is generated from the sale of services/products to token-holders or non-token-holders, the value of the company can be assumed to be only based on token appreciation. In such cases, the value of the company will be equal to the number of tokens in issuance times the price of the token, similar to the market capitalisation metric.[15]

It can be argued that the pricing of ICO tokens is linked to, and therefore may be dependent on, the pricing of the prominent cryptocurrency used to buy it and to which it will be converted when sold. As tokens are in most cases exchanged against one of the prominent cryptocurrencies (e.g. Bitcoin or Ether) in primary or secondary markets, the price of the reference cryptocurrency will not be dissociated from the price of these coins. This exposes tokens offered to increased volatility given the extreme volatility witnessed in such reference cryptocurrencies. In terms of pricing, ICO tokens may also carry a premium linked to regulatory uncertainty and an illiquidity premium until the token is listed on an exchange.

The difficulty in assigning a fair value to tokens issued in ICOs at their current form may therefore be a limitation for the wider use of ICOs as a financing mechanism for SMEs and participating investors.

3.2.1. Accounting for tokens

Financial reporting of companies that have raised financing through a tokensale is currently a challenge for all ICO participants. To date, there is no international standard agreed for the accounting of ICO tokens. The diversity of legal and regulatory interpretations of tokens and ambiguity about the nature of ICO structures explains part of the lack of accounting and reporting frameworks. Conversely, when tokens issued fall under an existing regulatory framework (e.g. securities regulation), their recording and disclosure is in accordance with applicable requirements for securities offerings.

The absence of standardised financial reporting practices for tokens of unregulated ICOs (through the extension of the application of existing standards to tokens or through the development of new standards), impedes transparency and complicates decision-making by participating investors. Accounting standards, both at national and international level, deliver useful information to investors, allowing them to make informed decisions. The absence of standardised accounting treatment in general can also lead to misleading or

[15] In a hypothetical scenario where entrepreneurs do not hold any tokens and the service/product is paid only in tokens, total ownership of the company will be completely decentralised and the entrepreneurs would effectively risk ending up with a zero stake in their company.

incomplete financial reporting (Levitt, 1998). In response to that, accounting standard-setting bodies are actively looking into the area of accounting for crypto-assets (Deloitte, 2018).

3.3. Secondary markets and token-holder returns

Trading of tokens in secondary markets is neither automatic nor guaranteed after the issuance of tokens in an ICO. The listing and active trading of a token in a crypto-exchange or crypto-trading platform[16] is actually considered as a proxy for the success of the IPO. Listing in multiple exchanges is thought by the market to be a good benchmark for the strength of the token, acting as a signal for investor interest. This also pushes some ICO issuers to pay to have their tokens listed on a crypto-exchange with healthy liquidity (see Section 3.4), which in turn increases the costs of ICOs.

The price of tokens traded on secondary markets is freely determined by the supply and demand forces of the market, and in theory tokens should be trading close to their fair value. However, empirical evidence has related token prices to metrics such as Twitter followers and social media activity (Benedetti and Kostovetsky, 2018).

Based on the same empirical study, ICO tokens recorded abnormally high average returns: up to 82% on the first day of trading, with average buy-and-hold returns of 48% in the first 30 trading days. Such returns could be attributed to high risk-return characteristics of ICOs which carry important uncertainty (business, regulatory, etc.); or could be an indication of a bubble.

The same research has found evidence of significant ICO under-pricing, similar to that experienced in IPOs. In contrast to IPOs where positive returns are reversed after the IPO, tokens record very high returns from ICO to listing and beyond, up to the first six months after listing.[17]

Empirical evidence suggests that the market returns of tokens issued in ICOs are strongly correlated with bitcoin returns (Hu et al., 2018).[18] According to this research, ICO tokens carry a common source of systematic (non-idiosyncratic) risk correlated with bitcoin returns. This could be driven by the fact that most tokens need to be converted to bitcoins before being converted into fiat.

Any correlation of ICO tokens with bitcoin returns gives rise to risks stemming from market failures in the bitcoin market. Given that the price of the bitcoin is prone to price manipulation, likely by single traders (Gandal et al. 2018) and that the law of one price is often violated for bitcoin which trades at different prices across various exchanges (Kroeger and Sarkar, 2017), issuing tokens that are correlated to the course of the bitcoin is exposing tokens to such market deficiencies or failures.

[16] Examples of trading platforms for tokens include Bittrex, Binance, Coinbase, and Bitfinex.

[17] Indicatively, based on the sample of Benedetti and Kostovetsky, the first day's average returns range from 14% to 16%, 30-day average returns range from 41% to 67%, and the 180-day average returns range from 150% to 430%.

[18] Based on the study of 222 cryptocurrencies above the USD 1 million cut-off out of 1 324 listed ones on coinmarketcap.com as of 23 November 2017 and for the period November 2015-17. Based on correlations with bitcoin returns at the daily and monthly frequencies, and through a principle component analysis.

The importance of secondary trading means that launching an ICO and issuing a token is not sufficient: SMEs need to be able to sustain tokens in the market by ensuring investors are interested in buying them in the post-offering market. This is challenging when some token-holders are driven by the hype and/or speculative purposes.

When tokens are used to provide access to products/services on the platform (utility tokens), secondary trading may lead to the entrepreneur losing control over the pricing of his product/service.

Trading of tokens purchased solely as a means of accessing a platform and using the product/service de-links the value of the token from its usage value, especially when speculators are participating in such market. In a theoretical model, where the exchange rate of ICO tokens remains stable (price stability), the tokens that the SME is receiving in payment for its services reflect the customers' willingness to pay and reveals consumer value (Catalini and Gans, 2018). However, the price of a token traded in the market is driven by multiple forces, including speculation. Issuing tokens can therefore prevent the entrepreneur from exercising an independent pricing strategy for his product/service.

3.4. The costs of an ICO offering

The low cost of issuance, that is driven by efficiency savings of blockchain-based solutions, is considered to be one of the most important benefits of financing through an ICO. The only costs involved in early token-sales were technical costs of setting up the infrastructure and developing the protocol, plus exchange platform fees for the conversion of tokens, as advisors were rarely involved then.

While the cost benefits were intuitive in the first generation of ICO offerings, which effectively benefited from regulatory uncertainty, regulatory gaps or even regulatory arbitrage, this is becoming less the case as ICOs mature and move away from unregulated territory.[19] The evolution of costs related to an ICO issuance follows the evolution of financing mechanisms, and today involves advisory fees (legal, financial, security), heavy marketing expenses, listing fees and other post-ICO costs such as community management services.

Anecdotal evidence suggests that even today, ICOs are a cheaper way to raise funds when compared to IPOs: according to some market participants, ICO costs about 3% of total funds raised for offerings of about USD 1 million, compared to 3–5% equivalent rate for an IPO. More importantly, IPOs involve additional fees of c.7% paid as compensation to underwriters (investment banks) who effectively guarantee the equity offering.[20]

The breakdown of ICO costs therefore varies between offerings, depending on the underlying technology, the jurisdiction, its size and other structuring characteristics. The main components of such costs are similar across the board and include technical costs, legal fees, other advisory fees, marketing costs and listing fees.

[19] In absolute figures, according to industry participants, ICO costs may be as low as USD 60 000, reaching up to USD 500 000 on the high end.

[20] It should be noted, however, that small company IPOs in many jurisdictions benefit from proportionate requirements and exemptions which allow for much lower costs of listing (e.g. The Jumpstart Our Business Startups Act and its reform (JOBS Act 3.0) in the US, easing access to the public capital markets for Emerging Growth Companies). https://docs.house.gov/billsthisweek/20180716/S488.pdf.

Technical fees include the creation of a token that will be used in the ICO and the development of the protocol on the basis of which the project will be run. ICO tokens are in their majority based on the ETC20 protocol on the Ethereum blockchain, which are simple to manipulate and inexpensive compared to the development of a native token on its own blockchain. Technical fees are also paid for the development of smart contracts which is the basis for any transaction on the platform to be executed. On-going technical fees will have to be paid to developers to audit the platform and the contracts on a recurrent basis, address bugs or weaknesses in the code and avoid any hacking.

Legal fees are paid in exchange for advice around the regulatory framework applying to the offering, the drafting of appropriate language in the whitepaper (see ICO Primer in Annex) and other contractual and marketing documentation. Issuers can also pay for assistance in the drafting of a professional and credible whitepaper, which is becoming more important as the market becomes crowded and investors become more wary of scams. Other advisory services contracted for an ICO launch may include specialised companies undertaking verification and accreditation of token purchasers (KYC process).

Marketing expenses have been important for companies wishing to stand out of the crowd and drive consumer interest, and have advertising, PR and social media campaigns, as well as innovative marketing tools. "Bounty programmes" have been designed by issuers to award tokens to social media influencers and marketers in exchange for promotion of their product/service. In some IPOs, up to 5% of all tokens are being reserved for such bounty programmes. Similarly, bonus structures such as size discounts, discounts for early investors or referrals are used to incentivise investors, and represent a cost to the issuer.

Marketing and communication, both at launch and throughout the life of the project, take up an increasingly large part of ICO expenses in today's increasingly crowded ICO space. Communication post-ICO involves additional fees, with special community management services being sold to issuers, aimed at ensuring the creation and maintenance of a vibrant network around the project/service. Platforms aggregating information about issuance of tokens can charge c. USD 500 for a listing (e.g. Topicolist.com), while premium space and endorsement by such a platform may cost up to USD 25,000 (such as Coinschedule.com) (Amsden and Schweizer, 2018).[21]

Shortly after an ICO, issuers need to secure the listing of the tokens on crypto-exchanges to ensure liquidity for their tokens. Listing fees for issued tokens can reach up to USD 1 million, depending on the reputation of the listing venue (Autonomous next, 2018). These fees are compared to USD 125 – 300K for a traditional equity exchange listing (main market), in addition to a comparable annual fee to remain listed. Securing a listing not only provides liquidity to token-holders but is essentially considered as a determining factor for the viability of the project and the company, which may explain the disproportionate amount of fees involved.

Although fees applied to the conversion of tokens to crypto and then to fiat in crypto-exchanges are not directly linked to the offering, they can be considered an integral part of the cost structure of an ICO. Regulated crypto-exchanges charge conversion fees on the amount converted for each transaction, in addition to the spread applied to the exchange rate of the cryptocurrency. Such conversion fees are much higher than FX conversion fees.

[21] Such costs are added on top of the standard costs of issuance which we estimated at around 3% of total funds raised for offerings of about USD 1 million based on market participants (see paragraph 79).

Indicatively, conversion fees can range from 1.39% to 3.99%, in addition to a spread on the exchange rate for buying or selling cryptocurrency (Coinbase, 2018).

Investors wishing to participate in the token-sale will also need to pay for transaction fees on the purchase of newly issued tokens and/or trading fees when the tokens are accepted on secondary markets. Trading fees vary from 0.1% (e.g. Binance) to 0.25% (e.g. Bittrex) of the token traded, while trading platforms such as Kraken or Bitfinex charge transaction fees based on a market-maker model.

Transactions taking place on the blockchain are verified by the network through the "mining" process. Transaction fees are paid to those "mining nodes" that perform the validation of each transaction, and can either be fixed as is the case with some ethereum platforms[22] or can vary depending on the demand/supply dynamics. For example, bidding higher transaction fees to miners for the validation of a purchase is a way to beat competition and get access to tokens in a capped offering with oversubscription, as was the case of the Basic Attention Token (BAT) ICO.[23]

[22] 21,000 "gas" irrespective of transaction value - resulting in higher costs for servicing smaller investors (Amsden and Schweizer, 2018).

[23] The BAT ICO raised USD 35 million in 24 seconds, bringing down the entire network because of congestion. The total transaction fees paid exceeded USD 15 000 (ETH 70.15), with the highest single fee being c. USD 6 600; 185 purchases were successful and over 10,000 failed (Buterin, 2017).

Box 3.1. Illustrative example of an ICO offering: Filecoin

Filecoin is a decentralized storage network built on the blockchain with a native protocol token called "Filecoin". In theory, the more participants enter the network, the more users benefit as there is more potential storage capacity and demand for storage (network effects).

Conceptually, tokenholders can use the Filecoin to pay for storage or distribution of data, while Filecoin miners earn Filecoins for providing storage to clients. Unlike Bitcoin, where mining is used to validate transactions and maintain blockchain consensus, miners in Filecoin also provide storage directly to clients and Filecoin's mining power is proportional to active storage space (similar concept to proof-of-stake).

The Filecoin ICO was one of the largest ICOs to date. The company raised USD 52 million in a pre-sale to select strategic advisors. The ICO offering was completed on 7 September 2017, raising over USD 205 million in USD, ETH, BTC, and ZEC, from over 2,100 investors in over 50 countries.

Investors received Simple Agreement for Future Tokens (SAFTs) that gave holders the right to receive Filecoin tokens at the network launch. Investors would need to create a Filecoin wallet to which tokens will be sent when the network launches. The offering complied with legal requirements of KYC/AML checks and accreditation requirements (access to accredited investors only, based on US standards).

The Filecoin ICO was capped at 200 million Filecoins. Advisors bought in at USD 0.75 per Filecoin SAFT, while the offering price for remaining investors was scaling and increasing for every USD 40 million raised according to a pre-defined function. A vesting schedule applied to early investors while retail investors could get discounts for long-term vesting.

The price of the Filecoin token will effectively represent the price of storage in the network once the network is operational, but the demand for tokens did not necessarily reflect the demand for storage in the network. Given that the exchange price of tokens can increase indefinitely, the real cost of using the storage service can theoretically end up at any price.

The funds were raised on the back of the Filecoin Protocol and shall be used to recruit, create the actual network and build all the software tools needed to operate and use the network.

By August 2018, the company built the first protocol implementation (go-filecoin) and is expecting to launch the Filecoin main network in Q2/Q3 2019.

Source: https://filecoin.io

4. ICOs vs. traditional financing channels for SMEs

To understand the benefits and limitations of ICOs, we briefly compare ICOs with conventional financing mechanisms catering for financing needs of similar characteristics, i.e. risk capital for seed and early stage financing.

4.1. ICO vs. IPO

IPOs are commonly seen as similar to ICOs, perhaps due to the similarities in the terminology used in ICOs. Both constitute public offering of instruments that have rights attached to them and are used as ways to raise financing for the issuing company (see Figure 4.1). But the similarities of the two mechanisms are limited to terminology and the mechanisms differ at most levels (see Figure 4.2).

Figure 4.1. ICO process vs. IPO process

IPOs cater to established companies with a mature business proposition, a proven operating business and healthy cash flow generation, while ICOs are undertaken by start-ups that may not even be incorporated and do not have established operations yet. In addition, the duality in the function of many of the tokens issued, representing participation in the project and also having a usage/utility value, is unique to ICOs.

ICOs are in their majority project-based and the financing raised is actually allowing the start-up to finance the undertaking of a specific project, compared against IPOs where the financing is company-based. In addition, the vast majority of ICO offerings have financed blockchain-based companies with products or services created and delivered on the blockchain, whereas IPOs are industry agnostic. From the investor perspective, the investment in IPOs is based on a track record of both operational and financial performance. In ICOs, the investment is made on the basis of a proposed technological concept for a blockchain-enabled solution to a need.

In terms of timing in a SME life cycle, the two mechanisms respond to different periods of the life cycle: IPOs follow series A-D financing or are used as an exit after venture capital funding, while ICOs look for seed/early stage financing, similar to seed financing (or perhaps series A round), for example. An IPO could not be an option for a start-up without a track record of operations and a financial performance track record.

In terms of financing size, fundraising is smaller in ICOs than IPOs, with the median IPO in 2016 raising USD 94.5 million compared to USD 6.4 million for the median ICO (Hu et

al., 2017). Despite being a lower-cost financing option, an increase in ICO costs commensurate with the maturing of the mechanism and its move toward regulated territory is being observed, particularly for large size offerings. The cost differential is also dependant on the particular jurisdiction of IPO issuance, as a number of countries have implemented proportionate regulations for public equity issuance, which allow for lower costs of issuance (for more see Nassr and Wehinger, 2016).

A major difference between the two financing mechanisms lies in the rights attributed to participants of the offering. IPOs give shareholders ownership rights in the company, rights in the future cash flows of the company (through dividends) and voting rights depending on the type of the shares issued. Rights assigned to token-holders vary between different offerings but, in their majority, ICOs do not confer ownership rights. This can be a major advantage to entrepreneurs who wish to raise financing but do not wish to give away part of their ownership, which is one of the main impediments to the use of public equities by SMEs (Nassr and Wehinger, 2016). At the same time, the governance of blockchain-based structures may be challenging for token-holders, particularly in the absence of voting rights.

Valuation and pricing in IPO offerings is performed by underwriters and is based on the application of corporate finance theory on the company financials. Valuation and pricing of tokens is challenging given the absence of any performance metric, the complexity in value creation and attribution in networks, and the difficulty in applying standard corporate finance theory on blockchain-based networks (see Section 3.2).

Underpricing of the tokens is reported to be higher than that of IPO shares (Benedetti and Kostovetski, 2018). Such degree of underpricing in ICOs relative to IPOs can be explained by the difficulty in performing a valuation and pricing analysis in ICOs (see Section 3.2), in addition to the "crypto-hype" observed in 2017-18.

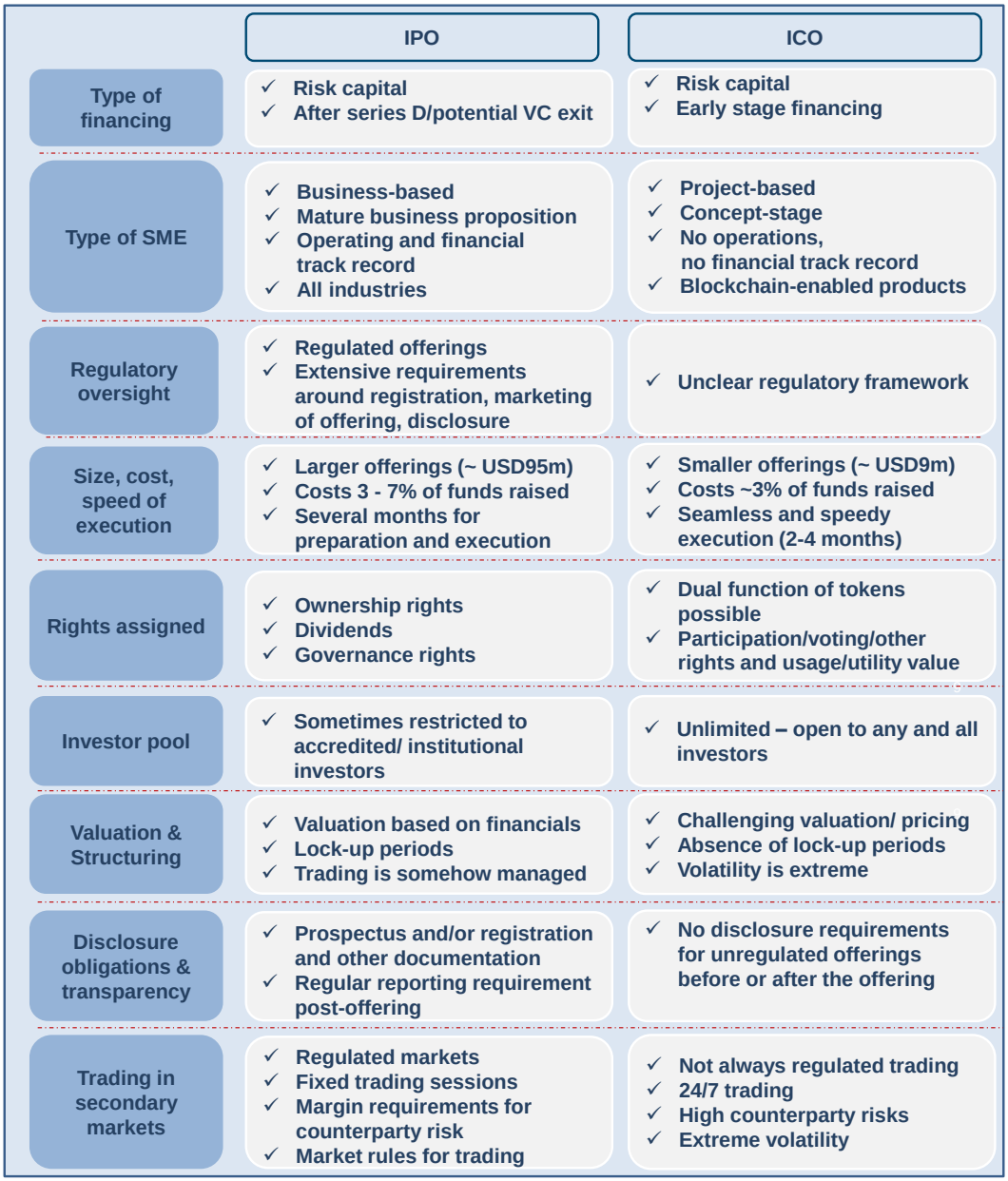
In addition to pricing, underwriters also help with price stabilisation post-IPO which is absent in ICOs. In the absence of market rules (e.g. market limits or order size limitations to prevent extreme volatility) that prevent the collapse in the price of a share in a single trading session, tokens are exposed to massive drops in the value and to extreme volatility. ICO participants with large share of tokens in circulation can therefore easily manipulate the price of a token.

The existence of lock-up periods for founders/entrepreneurs and management in IPOs prevents them for influencing post-issuance trading or the dumping of their shares with a view to quickly cash out. The only lock-up in ICOs is the inherent period from the issuance of the tokens and until their listing on a secondary trading platform. Even during that period, an over-the-counter sale of tokens is possible by owners and management.

ICO offerings limit the flexibility of the issuer to raise further rounds of financing via follow-on offerings of tokens or of traditional equity financing. Entrepreneurs need to pre-determine and reserve a portion of the tokens issued for the purposes of further financing rounds (Section 3.1). This exercise needs to be done upfront, before the platform is even launched and when uncertainty is at its maximum. In case of an equity offering following a token offering, the dynamics of value attribution between token-holders and equity-holders would need to be examined.

Unlike shares, ICOs allow for a fraction of a token to be traded, which benefits retail investors wishing to invest smaller amounts depending on their risk appetite.

Figure 4.2. ICOs vs. IPOs



4.2. ICO vs. crowdfunding

ICOs have been described by market participants as "crowdfunding on the blockchain". Indeed, ICOs with tokens used as a means of exchange for the future use of a product/service that is yet to be developed are similar to reward-based crowdfunding, as in both cases the companies[24] pre-sell a product or service that remains to be built. Reward-

[24] It should be duly noted, however, that in many of the ICOs that have occurred, the issuing entity is not incorporated (see footnote 3 above).

based crowdfunding offers non-pecuniary tangible (e.g., product) or intangible (e.g., reputation, identity) rewards in exchange for funding (Lambert & Schwienbacher, 2010).

Comparing equity-based crowdfunding to ICO offerings is less straight-forward, given that the majority of ICOs do not confer equity ownership or participation in future revenue streams of the issuing company.[25] While the decision of investors to invest in equity crowdfunding is purely driven by financial return motivations, investors pledging funds for rewards-based crowdfunding can have non-financial motives such as an interest in receiving rewards, their willingness to support ideas or be a part of a community.

Both financing mechanisms are based on technology and online payment systems to facilitate transactions, and both are suitable for seed and early-stage financing of start-ups. In the case of crowdfunding, products or services tend to be in a more advanced stage of development, with at least a prototype in place when the campaign is launched, compared against ICOs which are mostly at concept level at the time of the offering.

In addition to raising funds, both financing mechanisms aim to incentivise early product adoption and the formation of a community around their project. It can be safely assumed that, given the nature of distributed ledger technologies, network effects of ICOs are more important than the ones present in crowdfunding campaigns.

Unlike crowdfunding, where an online crowdfunding platform (Kickstarter, RocketHub) is required for the campaign to be launched, ICOs do not rely on an intermediary. Intermediaries are replaced by the blockchain, removing the corresponding costs of intermediation and benefitting from efficiencies generated by the use of DLTs. At the same time, other costs involved in ICOs, such as listing costs, are non-existent in crowdfunding. Although both structures involve small ticket investments, the ultimate size of fundraising tends to be larger in ICOs, and thus any cost comparison between the two financing mechanisms may be misleading given the difference in their respective funding sizes.[26]

Another important difference lies in the pricing of the products. A company launching a crowdfunding campaign allowing for the pre-purchase of its product has to define in advance the price of the product. In ICOs, there is no price commitment as to the price of its future services (Agrawal et al., 2013, Catalini and Gans, 2018).

Another important parameter in that crowdfunding platforms have vested interest to select credible projects for the campaigns they list, given the reputational risk involved for the platform. The only reputational risk involved in ICOs is the one of entrepreneurs themselves as no vetting by an independent agent with aligned interests is performed.

The vested interest of the crowdfunding platform has implications in the disclosure of offerings. In the event of an ICO offering without specific disclosure requirements, the ICO whitepaper contents may be published without any prior due diligence or validation by a third party. On the other hand, the vested interest of the crowdfunding platform to ensure its credibility implies a minimum control in the contents of crowdfunding disclosure to ensure the quality of documentation.

[25] The other types of crowdfunding are donation-based crowdfunding where there is no physical or monetary reward, and debt crowdfunding which is similar to lending without an intermediary.

[26] There is a large disparity in terms of size of crowdfunding campaigns, academic research estimated the median crowdfunding campaign to be around EUR 6 500 while the average entrepreneur raises on average around EUR 150 000 (Belleflamme et al., 2013).

Importantly, both crowdfunding and ICO offerings reach a much wider investor base, allowing retail investors to participate in the financing of SMEs and start-ups. In the current form of ICOs and particularly when the offering is not regulated, there is no restriction in the profile of the potential investor. In the case of crowdfunding, and depending on the jurisdiction, restrictions may apply on the pool of potential investors. In the US, the statutory "accredited investor" definition takes into account financial status under net worth/net income tests or educational/professional expertise, as verified by certain regulatory authorities.[27]

4.3. ICO vs. venture capital

High information asymmetry (Petersen and Rajan, 1995) and high uncertainty, as documented in the organisational ecology literature and reflected in the risks linked to their "newness" and "smallness" (Hannan and Freeman, 1989), typically limit a start-up's access to traditional financing sources. In contrast, VC firms have the capabilities required to deal with these factors and contribute to the management of start-ups.

Venture capital (VC) investment in blockchain-related projects has been used as a comparative metric to ICO issuance so as to depict the proliferation of ICOs as a financing vehicle for early stage financing of start-ups relative to the wider VC landscape. Such comparison, although powerful in showcasing the growth in ICO offerings, may be unjustified for a number of reasons.

VC funding can be, and has been in practice, complementary to an ICO offering. VC funds have participated in a number of ICOs offerings either at the pre-ICO stage by taking part in private pre-sales or by funding the expenses of an ICO. For example, in the *Filecoin* ICO, the issuer (Protocol Labs) raised USD 52 million in a pre-sale, a week before the launch of the public offering to investors including Union Square Ventures and Sequoia Capital venture funds (Wall Street Journal, 2018).

Such complementarity should be sought by start-ups undergoing ICO offerings, in order to take advantage of the non-monetary backing provided by a VC fund. The non-monetary contribution of a VC consists of expertise, industry knowledge, connections and network of contacts, as well as managerial and strategic assistance. VCs provide "coaching" to start-ups and play an active role in the monitoring of a firm's evolution (Fried et al., 1998). This uniquely caters to the needs of start-ups at the early stage of their development and is missed by start-ups raising funds just through ICOs.

The founding team of a company is of paramount importance in both cases, and the expertise, prior experience and credentials of the founding teams is one of the success factors in both cases. It would, however, be more carefully scrutinised by a VC investor than it is by a retail token-holder, as will be the business plan of the start-up.

Similarly, VC funds undertake a rigorous due diligence process which analyse the management team, the proposed business plan and its viability, among other things. Due diligence in ICO offerings, on the contrary, is not undertaken in a systematic manner.

The undeniable comparative advantage of an ICO offering compared to venture capital financing from the perspective of both the investor and the entrepreneur is liquidity. Tokens

[27] For detailed information, see https://docs.house.gov/billsthisweek/20180716/S488.pdf

issued in ICOs can be traded in secondary markets with immediate liquidity from the day of listing.[28]

In contrast, VC investments are extremely illiquid and it can take several years for a fund to be able to exit the investment. ICOs give founders the possibility to "cash out" immediately upon raising financing for their company, although as we have discussed in Section 5.2 this may reduce the alignment of interests between the entrepreneur and the investors funding the company.

Recent academic studies on financing of entrepreneurial ventures by ICOs shows that in high volatility[29] projects, ICO financing is expected to be more prevalent (if not the preferred source of) financing given that the VC investors would require a higher return to cover for such volatility. In the same vein, ICOs are shown to dominate VC funding for ventures which have a higher proportion of idiosyncratic risk (Chod and Lyandres, 2018).

Naturally, ICOs will be the preferred funding avenue for entrepreneurs as they can receive tokens without pledging any personal funds for the project. Indeed, academic research suggests that ICOs are preferred for projects with a high risk of failure and right-skewed payoff distribution, given that in case of some retention of ICO proceeds by the entrepreneur, the payoff for the entrepreneur is positive even when the project fails (Chod and Lyandres, 2018).

Entrepreneurs may decide to seek financing through an ICO instead of VC as a way to attract a consumer-base and build a network around the project instead of seeking a personal financial reward. While there is a fundamental difference between the two financing methods, the easier network effects may partly explain why ICO funding has overtaken VC funding in recent months. Rather than resorting to an ICO in the absence of other alternatives, companies may seek to fund their companies through token issuance with a view to create and monetise value from network effects.

It should also be noted that, according to market participants, some VC funds consider ICOs as a potential alternative exit option for their traditional VC investments.

[28] Note that in theory tokens can also be traded over the counter, with the transfer of tokens from one wallet to another and the transfer of funds (fiat or other) from one person to another, without the need for a formalised listing on a secondary market.

[29] Referring to the volatility of the venture payoffs.

5. ICOs for SMEs

5.1. Benefits of ICOs for SMEs

ICOs facilitate the exchange of value without the need for a trusted central authority or intermediary (government, bank) which allows for efficiency gains. It could be argued that the disintermediation that occurs in ICOs could "democratise" SME financing, distributing control among SMEs and participants/token-holders instead of concentrating decision power in the hands of financiers, as is the case with banks in traditional debt financing. At the same time, SMEs diversify their financing options, allowing them to appeal on not just their profit potential but other characteristics of their project, which in turn could encourage banks to look into seeking alternative ways to determine their SME financing methods, too.

Automation and the use of innovative applications enabled by the use of distributed ledger technologies, such as the blockchain, can create further efficiencies gains in addition to the ones driven by disintermediation. In theory, such efficiencies can be shared by SMEs and investors alike, potentially translating into lower funding costs when compared to public offerings, depending on the specifics of each offering.

In addition to cost savings, financing through ICOs offers SMEs and entrepreneurs direct access to an unlimited investor pool. At their current form, ICOs are directly communicated and addressed to the public on a global scale and without any restriction or limitation on the type of investor, including retail investors. Access to unlimited funding pools has enormous potential for SMEs gaining funding, but carries very significant risks for investors when financial consumer protection safeguards are not applicable, as is the case for most ICOs.

In theory, ICOs can be more inclusive financing vehicles than traditional financing mechanisms, perhaps with the exception of crowdfunding. The unrestricted access to funding through an ICO by any company, coupled with the inclusive environment of networks created by subscribers to such offerings, foster inclusiveness during the fundraising and beyond. The fact that tokens are dividable and subscribers can buy fractions of newly-issued tokens allows for considerable flexibility in the participation of those wishing to limit their exposure according to their risk appetite.

Inclusiveness is also possibly fostered at the investment level through the active participation[30] of even smaller retail investor in the resulting network. A company issuing tokens effectively enrols future users of its product (before the actual product/service is even operational) and creates an inclusive network of investors whose active participation in the network has an impact on the company's viability. Depending on the structure of the ICO, token-holders may become active in the governance of the company and be asked to decide on strategic issues around the advancement of the project.

From a business strategy perspective, ICOs can allow the entrepreneur to generate buyer competition which reveals consumer value without the need to know *ex ante* the willingness of consumers to pay for the product/service (Catalini and Gans, 2018).

[30] Active participation in the healthy operation of the network through mining, voting, validating, staking or just by being part of the network community.

ICOs are faster to implement when compared to other public offerings, at least in the current state of the cryptocurrency market. The examples of Bancor (USD 150 million raised in 3 hours) or BAT (USD 34 million raised in less than a minute) are prominent examples of the speed of execution for the raising of financing, and the pre-ICO phase is similarly shorter compared to other financing instruments. This, however, cannot be exclusively attributed to the benefits of the technology employed, as it is also due to limited disclosure requirements and due diligence performed in many of the current ICOs. Such practices, however, have a detrimental effect on the credibility and viability of the project and on investor protection.

The cost and speed of execution are also linked to lower regulatory requirements applying to some ICOs. Depending on the jurisdiction, the lack of registration and disclosure requirements, or due diligence before the issuance increase the speed of execution, while the absence of required disclosure post-issuance reduces costs. Such benefits can be overridden by reduced transparency and related risks carried by subscribers to token offerings.

From a technical perspective, tokens issued in ICOs are cryptographically secured and, given that they are based on the blockchain, benefit from characteristics of DLTs, such as immutability, permanence, transparency and security. The use of smart contracts may reduce counterparty risk as the programming of such applications guarantees the automatic execution of a transaction upon triggering of pre-defined conditions.

ICOs have the potential to create economic value that goes beyond the value of the company and the product/service that is developed on the back of funds raised. Network effects created in ICOs by the mere participation of subscribers in the newly-built network is an important value creator and a comparative advantage of ICOs when compared to traditional methods of financing.

Unlike the internet, where most of the value was captured at the application layer, value in blockchain-based companies is captured also at the protocol level ("fat" protocol layer) on top of which digital applications can continue to be deployed. Blockchain-based models have the ability to continue to attract and deploy projects on the platform, create value at the protocol level and incentivise the creation of additional applications at the application layer.

ICOs have the potential to overcome some of the impediments to the financing of early stage SMEs in an innovative way. The unwillingness of entrepreneurs to give away equity ownership or control in their company restrains the use of public equity funding by SMEs (Nassr and Wehinger, 2016). Depending on how token offerings are structured, companies can raise risk capital without necessarily conferring ownership rights. In other words, the entrepreneur can publicly raise finance without risking dilution.

ICOs introduced an alternative new instrument for capital raising of SMEs, with the potential to improve competition in SME financing. In addition to providing capital to those companies that have no alternative, ICOs could put pressure on existing financing sources (e.g. VCs) to compete and provide better terms for the financing of SMEs.

Last but not least, the fact that ICOs had been unregulated for a large part of issuances that have already occurred helped proliferate the mechanism. The absence of a regulatory framework, however, can only be viewed as a benefit for fraudulent issuers and scam ICOs, and carries important risks for investors and issuing companies alike.

Figure 5.1. Benefits of ICOs

5.2. Limitations of ICOs for SMEs

In their current form, ICOs involve a number of challenges both for SMEs and investors subscribing to offerings, and risk having repercussions to the wider SME financing market by diverting important resources from productive investments to fraudulent activity and scams.

5.2.1. Regulatory uncertainty

The regulatory framework applying to ICO offerings is not always clear and may depend on the circumstances of each ICO offering on a case-by-case basis (IOSCO, 2018). Regulatory uncertainty around ICOs and the possible absence of supervision of such offerings exposes both issuers and participants to important risks. According to one estimate, no information was provided at all as to the regulatory status of the ICO in more than 2/3 of ICOs out of a sample of 400, while only 1/3 of ICOs in the sample mentioned the law applicable to the ICO (Zetsche et al., 2018).

In addition to the lack of clarity around the regulatory framework applying to the offerings and the tokens issued, regulatory uncertainty exists around the underlying distributed ledger technology and its digital applications, on the basis of which ICOs occur. For example, the legal enforceability of smart contracts and the application of standard law on smart contracts remains to be determined, as is the recourse of investors in case of a loss that is due to a technological failure of the distributed network (OECD, 2017).

Given the global nature of ICO offerings, cross-border issues around marketing and issuance of tokens will arise, especially in the absence of coordinated activity by regulators. The disproportionate distribution of ICO offerings in a small number of jurisdictions may be evidence of regulatory arbitrage being exploited by issuers (Zetsche et al., 2018). Taxation is also another important motivation behind such regulatory arbitrage.

In unregulated ICOs, the absence of disclosure requirements in ICOs exacerbates information asymmetries already present in early stage SME financing due to the non-existence of prior financial information or performance track record of start-ups. The absence of standardised disclosure requirements and the fact that whitepapers are not

verified or vetted does impede proper risk assessment of the investment by investors and exposes them to unidentified or undocumented risks. The absence of appropriate due diligence by financial professionals, which would force issuers to consider factors that need to be examined acting as a natural filter for selection, and the lack of requirements for regular reporting post-ICO, further reduces transparency. The lack of any formal auditing process can further aggravate any resulting weaknesses at the post-issuance stage.

5.2.2. Issues related to the structuring of token offerings

Valuation and pricing of tokens is challenging, as traditional corporate finance theories may not be easily applicable to token issuances. Most ICO offerings do not fit the standard investment paradigm, *inter alia* because of the ways value is created and attributed between the different participants of a network, the estimation and quantification of network effects, and the duality in the function of the tokens which in most cases have some usage value in addition to investment-specific value.

Estimating the appropriate value of tokens is even more difficult given the lack of transparency of most ICOs. Assessing the fundamentals of projects that are still at concept stage is almost impossible, and the task is further complicated by the absence of standardised and vetted information disclosure.

Entrepreneurs may find it challenging to accurately calculate the financing needs of the company for the foreseeable post-ICO future, in order to pre-define token supply and avoid dilution of early token-holders. The separation of value attribution in case of a follow-on offering with traditional financing instruments, such as straight equity, may also be a challenge to the SME itself, with repercussions to investors.

The structuring of token issuances can give rise to conflicts of interest by the issuer. The ability of entrepreneurs to receive tokens issued through an ICO on the back of a concept that has not been executed and without having taken any personal financial risk in the venture could create such misalignments of interest.

In the absence of lock-up period requirements, the lack of any "skin-in-the-game" from the side of the entrepreneur can be a source of potential conflicts (e.g. pump and dump schemes): once the token sale is over, there is little incentive left for the founding team to actually deliver the project. The fact is that most ICOs are single-round offerings with a time mismatch between developers' rewards and token buyers' interests and a lack of feedback mechanisms between the development of the project and access to financing (Buterin, 2017).[31]

Similarly, companies are exposed to increased volatility that may be partly due to subscribers who are only driven by speculation and have no intention of participating in the newly-created network. Indeed, investors driven by speculative herd behaviour may invest with the intention to sell as soon as the tokens become tradeable (in what is called "flipping"). This further exacerbates the inability of SMEs to exercise their own pricing strategy when tokens may be the only way to consume the product/service.

[31] A theoretical solution to such issues involves the allocation of revenues to curators who only hand out funds once pre-defined milestones are achieved (Buterin, 2017).

5.2.3. Investor protection

As the uncertainty and risks involved in ICOs in their current form are vast, particularly given the regulatory vacuum in crypto-asset markets, many ICO offerings may not be considered as an appropriate investment for retail investors who do not necessarily have the financial skills or knowledge required to undertake high-risk investments. This financing instrument is by default risky, as it targets early stage risk finance. Regulatory uncertainty, the lack of transparency and difficulties in applying traditional valuation methodologies further prevent investors from making rational, informed decisions and exposes them unduly to risks.

The high price volatility of crypto-assets has raised concerns about the suitability of such instruments for retail investors (FSB, 2018). Tokens traded in secondary markets experience high volatility levels upon listing and in the aftermath (Section 3.3).

Appropriate financial literacy skills are required for retail investors to be able to understand the risks involved in token issuance and grasp the main elements of token valuation. In the absence of vetted disclosure or formalised audit, the burden of due discovery lies with the investor and for this a solid financial understanding of the investment instrument is of paramount importance for retail investors in particular.

Investors wishing to subscribe to ICO offerings would need to have technical skills in addition to financial literacy skills. These may extend beyond the basic technical understanding of the blockchain and may involve coding skills. This would be required for investors wishing to audit the code used by the company, which in many cases is open source and shared with potential investors. In the absence of a track record, such code may be the basis for the evaluation of the start-up.

In addition, retail investors need to be able to manage private keys which give total control over the funds associated with one's public keys and with one's investment. This involves the storing and protection of private keys and is critical given that it is impossible to recover invested funds if the private key is accidentally lost or stolen.

In the absence of a clear regulatory framework applying to the token issuance, the rights of investors to obtain redress and compensation are also unclear and potentially limited due to the legal uncertainty. Similarly, coverage by bankruptcy laws is not assured, and the ranking of token-holders compared to other creditors is unclear.

The risk of fraud is high in ICOs, although the data on offerings reported as scams varies. Estimates of frauds range between 5% to 25% of ICO offerings (Catalini and Gans, 2018) and up to a stunning 81% (Figure 5.2), depending on the classification used. Examples of fraud cases include Pincoin, iFan, OneCoin Ponzi scheme, Bitconnect referral system, Plexcoin and Centratech, to name just a few.[32] SEC set up a fake ICO, called HoweCoins, to educate investors about how to avoid scams (SEC, 2018).

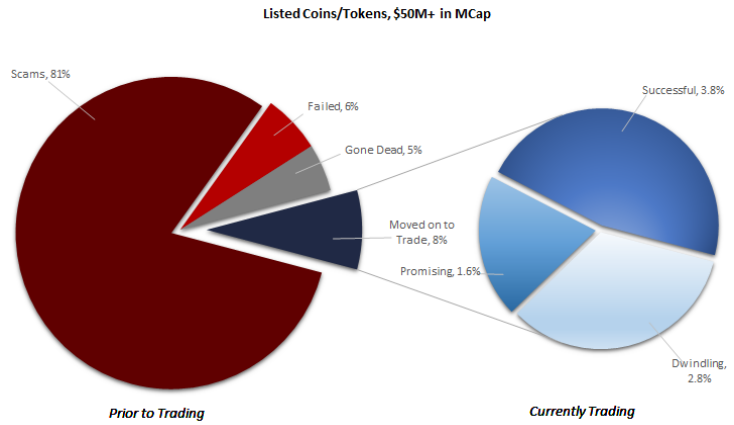
In addition to the potential absence of financial consumer protection for investors participating in ICO offerings, the impact of standard private law liability is also constrained. Without specific requirements for the provision of information around the issuing entity, the impact of private law liability as a correcting factor is severely limited (Zetsche et al., 2018). According to recent academic studies, issuers are, in many cases,

[32] News story by Gareth Jenkinson, 18 April 2018, https://cointelegraph.com/news/unpacking-the-5-biggest-cryptocurrency-scams.

difficult to track as they do not report a domicile, with ICO documentation often failing to provide a physical, postal or other contact address (Zetsche et al., 2018).[33]

Segregation of assets by custodians is another issue in ICOs, as it is even difficult to understand whether investor funds are kept in pooled or segregated accounts. According to some estimates, out of a sample of 400 ICOs studied, only 14.46% provided information on whether the funding received from investors will be pooled or remain segregated (IIF, 2018).

Figure 5.2. Estimates of ICO Scams



Source: Dowlat and Hodapp, 2018.

Risks for investors and entrepreneurs extend beyond the issuance of tokens and into the wider crypto-asset ecosystem. Trading platforms used for secondary trading of tokens, as well as crypto-exchanges to which investors resort for conversion of tokens into other crypto or fiat, may lack normal disciplines in protecting investor assets held for trading and settlement, as seen by recent losses incurred by such exchanges (e.g. Bit Grail and Coincheck hacks). Even in ICOs with geographical restrictions for the marketing of the issuance, which may act as a safeguard for consumer protection purposes, secondary trading has no restrictions. The lack of regulatory market structure around governance of issuance, trading and exchange of tokens across the different markets accepting tokens exposes both token-holders and issuers to additional risks.

5.2.4. Corporate governance and regulatory compliance

The lack of governance structures at the issuer level and the network level create an extra source of risk for both issuers and investors. Corporate governance issues affect token-holders in the absence of voting rights assigned to tokens issued in some offerings, or through the potential unbalanced or even unfair allocation of tokens (e.g. heavy discounts in pre-sales for the exact same risk taken) and the absence in some offerings of anti-dilution protection.

Most structures would not have a (in)formal board structure or any other oversight mechanism over management. This is more problematic in structures without skin-in-the-

[33] In the sample used in the specific academic study, more than 67.1% of the issuers did not disclose valid postal contact details (Zetsche et al., 2018).

game by the entrepreneur and where there is no binding commitment from the entrepreneur's side to deliver the project on the basis of which the financing was provided. The lack of disclosure around use of funds adds another level of complexity to this issue.

Regular reporting requirements are also lacking, including around large ownership stakes which may give more space for price manipulation by single large stakeholders.

Decentralised governance is also problematic for the SMEs themselves. Token-holders can perform so-called "51% attacks" when the majority of the network decides to make changes that are not in line with the initial plan of the company. Token-holders could also "fork", similar to what happens in crypto-currency blockchains, when token-holders disagree with the original protocol and decide to deviate and develop a second version of the token by adjusting the basic code.[34] This would mean that the SME would in fact give up total control to token-holders (democratised governance).

Control may also become divided for SMEs in terms of pricing policy due to the high volatility associated with tokens traded on secondary markets[35]. Limitations exist on SMEs on whether they can offer their products/services to non-token-holders wishing to pay in fiat currency, as the determination of price becomes challenging when tokens are also floating in secondary markets. This has repercussions on the customer base as it means excluding a big part of the non-crypto community from access to the product/service.

Without pre-defined rules set for the post-ICO supply of tokens, token-holders risk devaluation if the SME decides to take action without approval from existing token-holders. The SME itself risks becoming unable to further expand the network if such an eventuality is not incorporated in the code, in order to avoid one-sided actions taken by the company at the expense of the network.

In terms of regulatory compliance, Know Your Customer (KYC) and Anti-Money Laundering (AML) are a big area of concern for ICO offerings, and current requirements may be inadequate. Depending on the case, there may be no requirement for ICO issuers to identify and verify the identity of participants in the ICO, including for compliance with AML/CFT requirements. Anonymity of the funding process can be addressed in "whitelisted" ICOs where a register of participants is kept, especially when issuers want to control participation (see Section 3.1).

ICOs may non-deliberately contribute to (and participate in) money laundering or financing of terrorism by allowing investors to invest funds that have not gone through AML/CFT control checks. By way of example, in the absence of KYC performed, a money launderer can buy tokens in the ICO or in secondary markets, trade those tokens for other crypto-currencies with no trace of illicit activity and eventually trade for fiat. AML issues around crypto-assets in general have been a major source of concern, adding another layer of concern to the ICO market (FATF, 2018a).

On 19 October 2018, in response to the increasing AML/CFT risks associated with crypto-asset financial activities, the FATF adopted changes to its Recommendations and Glossary that clarify and include in their scope of application financial activities involving "virtual assets" and "virtual asset service providers" – such as exchanges, certain types of wallet providers, and providers of financial services for ICOs (FATF, 2018b). These changes make clear that jurisdictions should ensure that virtual asset service providers are subject

[34] See the example of Ethereum and Ethereum Classic as a classic example of fork.

[35] When tokens are used as medium of exchange for access to a product/service.

to AML/CFT regulations, for example conducting customer due diligence including ongoing monitoring, record-keeping, and reporting of suspicious transactions. In addition, such providers should be licensed or registered and subject to monitoring to ensure compliance. The FATF will further elaborate on how these requirements should be applied in relation to virtual assets.

Data privacy and identity protection may be contrary to the inherent public nature of some DLTs. The "right to be forgotten", provided in some jurisdictions, may be difficult to be applied in immutable databases such as the blockchain. These may be issues that need to be further investigated in the area of ICOs.

5.2.5. Operational and business risks

Anecdotal evidence suggests that ICO issuers have difficulty in getting banking services. This can restrict the fundraising to crypto-currencies as the issuer would not be able to accept and use fiat currency. It can also restrain the conversion and use of proceeds in fiat and reduce their ability to hedge their crypto-asset exposure (exchange rate, volatility).

In cases where the SME ecosystem extends beyond the blockchain network, participants may not necessarily be ready for the use of crypto-assets throughout, in which case conversion from crypto-currencies will be required. Having systems in place to abide by the KYC and AML/CFT requirements could in turn signal greater credibility and integrity of the offering and allow for more issuers to be accepted in the banking system. Currently, the vast majority of ICOs only accepts crypto-currency in exchange for newly-issued tokens.

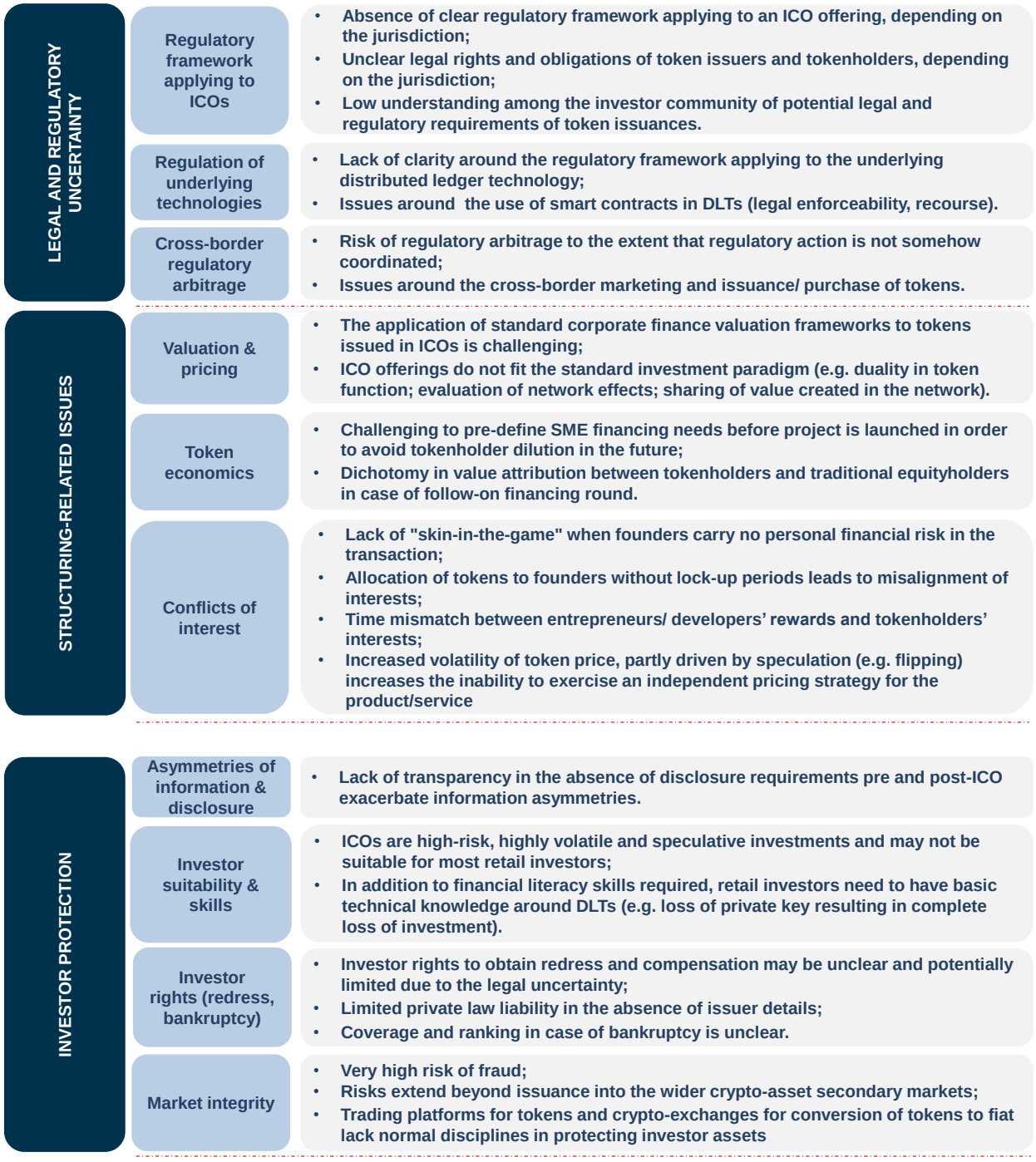
Technical skills are required for both SMEs and token-holders to maintain a network based on DLT. The need of technological expertise is not a given for SMEs that are not involved in blockchain-enabled projects. This further increases execution risks for token issuance and the maintenance of the platform/network.

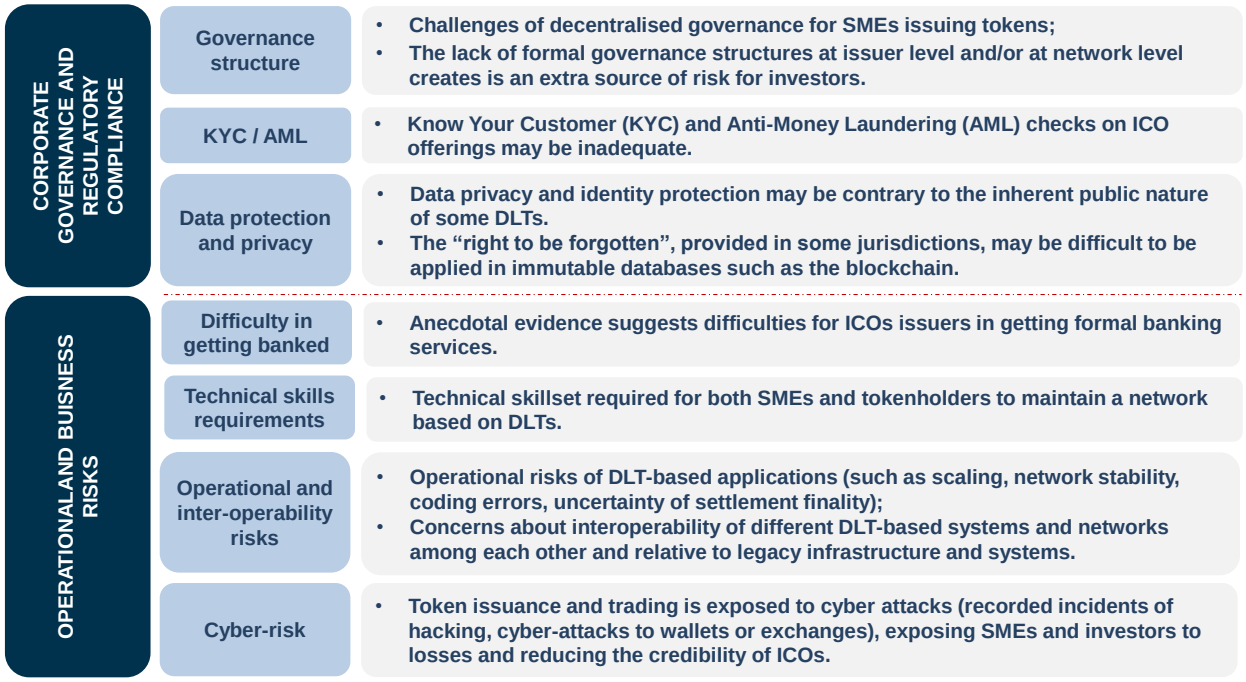
Operational risks of DLT-based applications, such as scaling, network stability, coding errors, and uncertainty of settlement finality, are transposed to ICOs and depend on the protocol used. Transaction speed, capacity for execution and computational power required for validation and recording differ depending on the type of blockchain used (lightening and ETH vs. Bitcoin) and the type of consensus mechanism being applied. Concerns about interoperability of different DLT-based systems and networks among each other and relative to legacy infrastructure and systems may impact the wider SME ecosystem of blockchain-based projects.

Token issuance and trading is also exposed to cyber-attacks, with a number of recorded incidents of hacking and cyber-attacks, exposing SMEs and investors to losses and reducing the credibility of ICOs. Digital wallets and exchanges are attractive targets for cyber-criminals. ICOs themselves are hacked by hackers giving false instructions for the funds to be sent to the address of the hacker instead of the address of the issuer. According to some estimates almost 10% of ICO funds have been lost to hackers' attacks (Ernst & Young, 2017).

SMEs and start-ups are particularly vulnerable to cyber-attacks as they lack the cyber security strategies and the budget required for such risks to be effectively mitigated.

Figure 5.3. Limitations of ICO offerings





5.3. Can ICOs become a mainstream financing mechanism?

Although ICOs are hyped by some as the solution to SME financing gaps, ICOs may not be the right financial instrument for every person or every project, even in a more mature, safe and regulated form. A differentiation needs to be made between blockchain-enabled projects or products/services, and businesses or products/services not built on DLTs.

For an SME to benefit from the raising of financing through an ICO, there needs to be a business rationale that requires the use of a DLT solution to address real consumer need. A number of SMEs are creating concepts that will allow for a successful ICO offering without a real business rationale behind the use of the blockchain. The benefits of token issuance when such rationale is non-existent are limited to cost and speed.

ICOs are particularly beneficial for products and services that are founded on the basis of a network. Token issuance allows for quicker adoption of the product/service and the creation of a customer-base before the launch of the project. Most importantly, maximising value creation through network effects present in newly-created networks of investors purchasing tokens is one of the major comparative advantages of ICOs when compared to other forms of financing. In the absence of a business model that can benefit from such network effects, launching an ICO offering may not be a viable and sustainable financing solution.

It therefore seems inappropriate to consider ICOs as a potential "mainstream" financing mechanism for SMEs whose projects are not enabled by DLTs and which would not benefit from network effects. Nevertheless, a number of companies are pursuing such offerings,

exploiting the momentum in token issuances.[36] Limitations in the use of the tokens by the non-blockchain based SME will further impede the viability of the business, as tokens will need to be used to facilitate transactions within the boundaries of the entire ecosystem of the company which will not be the case for non-blockchained SMEs.

Additionally, ICOs mostly address seed and early stage financing needs of the SME's life cycle and is not equally suitable to address the most pressing SME financing gap found in some regions of the world. In Europe, such financing gap is reported to be found in the follow-on or growth stage of the life cycle, which allows SMEs to accelerate their international expansion and strengthen their position against global competitors (EIF, 2018).

5.4. Policy and regulatory considerations

ICOs offer an innovative way to raise capital for young and innovative SMEs enabled by DLTs and the blockchain. Under specific caveats, regulated forms of ICOs have the potential to become an alternative financing mechanism for young SMEs with DLT-related projects, which could improve competition in the SME financing space. ICOs could facilitate faster financing of SMEs at a lower cost compared to most traditional financing mechanisms, benefiting from cost efficiencies derived from automation and disintermediation through the use of DLTs and the blockchain.

Depending on the conditions of issuance, ICOs are changing capital formation and inclusive financing in ways that we have not seen before. ICOs can be a more inclusive financing vehicle by allowing small retail investors to participate in the financing of small businesses and start-ups. ICOs can provide SMEs with direct access to an unlimited investor pool, offering near-immediate liquidity and the potential to create economic value that goes beyond the value of the company through the creation and monetisation of network effects. Depending on the structure, SME founders can raise early stage funding without giving away ownership, therefore addressing a major impediment to IPOs.

Despite this powerful potential, in the current stage and in their current form, uncertainty in the applicable regulatory framework for ICOs and crypto-asset markets, coupled with limitations in the structuring of ICOs and operational risks related to DLT-based networks, there are significant risks for investors participating in ICOs, while at the same time exposing SMEs to risks.

Clarity in the regulatory and supervisory framework applying to ICOs is arguably a stepping stone to the safer use of token issuance for financing purposes. Standardised disclosure requirements are indispensable so as to overcome information asymmetries that are already present in the financing of SME risk. Enhanced investor protection for retail investors, coupled with efforts for the financial education of retail investors, can safeguard their informed participation in such financing. AML/CFT requirements on all ICO

[36] Some examples of non-network-based projects include Bananacoin, backed by environmental friendly bananas grown in Laos and the upcoming ICO of Intex Resources ASA, a Norwegian mining company, and a planned ICO of the Plaza Hotel in New York (Chod and Lyandres, 2018).

issuances are equally important, especially given the wide range of relevant issues observed in the crypto-assets space.[37]

The pitfalls from the design and structure of ICOs, and issues related to authentication, disclosure, governance and misalignment of interests between founders and investors could be addressed as the financing mechanism matures. As market confidence in the underlying DLT technology grows, the potential to create a safer environment for such activity in the future is strong. In addition to regulation, best practices that are increasingly driven by the industry[38] could also support a robust and safe ICO market.

When ICOs mature and develop, they have the potential to complement traditional bank and market-based lending, facilitating a better distribution of risk amongst market participants. A delicate balance will need to be achieved in the development or application of regulatory and supervisory requirements that will not deprive the ICO mechanism of its speed and cost benefits, particularly when it comes to smaller size offerings. Proportional application of regulatory requirements, as is the case in small public equity offerings in certain jurisdictions, could be considered as the way forward.

Given the global nature of ICOs issuing and trading across borders, cooperation at the international level would warrant a coordinated approach that will prevent regulatory arbitrage and allow ICOs to deliver their potential for the financing of blockchain-based SMEs, while also protecting investors.

[37] In response to AML/CFT concerns, the FATF has recently adopted changes to its Recommendations and Glossary in order to ensure that the providers of financial services for ICOs are subject to AML/CFT regulations (FATF, 2018b) (see Section 5.2.4).

[38] For example, see Best Practices of Token Sales issued by the Fintech association of Hong Kong (Fintech Association of Hong Kong, 2017), and the Roadmap for Blockchain standards in Australia to support the application of DLT standards (Standards Australia, 2017).

Annex A. An ICO primer

The ICO process

ICOs consist of the creation of digital tokens by small companies to investors, in exchange for fiat currency or, as in most cases, *first-generation*[39] dominant cryptocurrencies, such as the Bitcoin. ICOs are enabled by the use of Distributed Ledger Technologies (DLTs), such as the Blockchain[40], which facilitate the exchange of value without the need for a trusted central authority or intermediary (e.g. government, bank) which allows for important efficiency gains driven by such disintermediation. The project will, by definition, involve a platform comprising the network of participants who purchase and hold tokens.

Although the ICO process is not standardised, the main steps of token offerings follow the same pattern (see Figure 5.4) and the steps taken by prospective investors are described in Figure 5.5.

A start-up or the developing team of a project that is not yet incorporated[41] announces to the public their intention to perform an ICO and inform the public about the project and the offering terms and conditions through the publication of a non-standardised offering document, called the *whitepaper*. Official communication channels of the crypto-community (e.g. Telegram) are often used to provide updates and/or respond to queries of prospective participants to the offering. A technical paper with the more technical details of the project may also be made publicly available, and/or a terms and conditions document.[42]

If the offering is successful and the minimum fundraising target floor is reached, the start-up creates new tokens on the blockchain, which investors then receive in exchange for major cryptocurrencies or, less often, for fiat currency. Otherwise, if such "soft cap" is not reached, money is returned to investors and no token is issued.

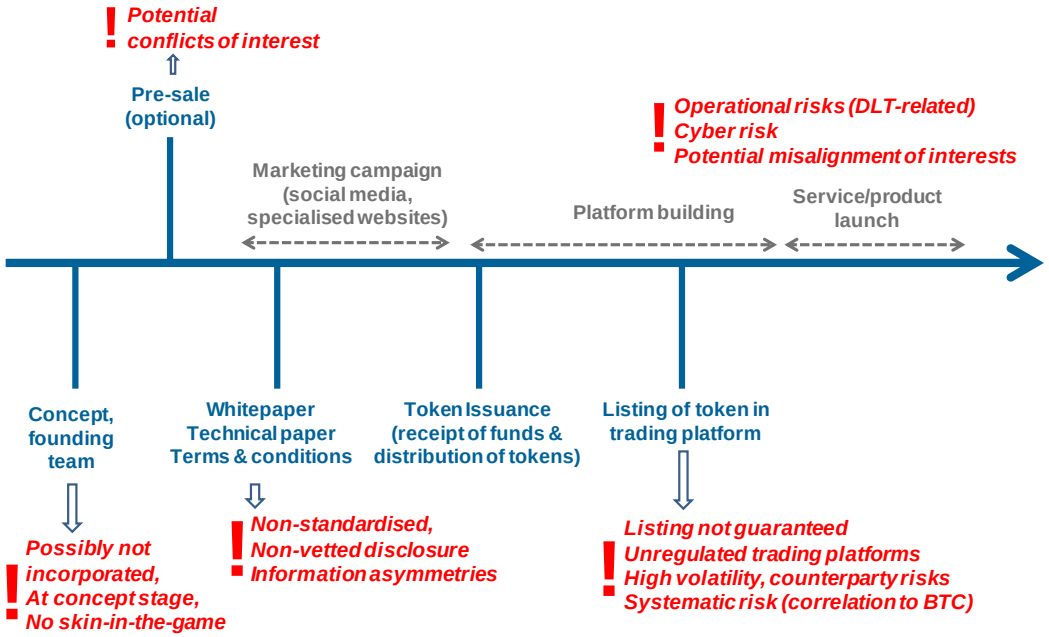
[39] As described by the Financial Stability Board, first generation crypto-assets are private digital tokens, which include so-called cryptocurrencies and crypto-assets, that are totally decentralised and do not represent a claim or underlying asset, such as the Bitcoin (FSB, 2018).

[40] DLTs and the blockchain are terms used interchangeably in this paper.

[41] The terms "issuer" and "company" are used interchangeably for the purposes of this report. It should be duly noted, however, that in many of the ICOs that have occurred, the issuing entity is not incorporated.

[42] Some issuers have proposed the use of Simple Agreements for Future Tokens (SAFTs), which are commercial instruments (voucher) used to convey rights in tokens prior to the development of the tokens' functionality. The tokens are proposed to be ultimately delivered to investors at a later stage and be fully-functional at that later stage (https://saftproject.com/#saft-whitepaper).

Figure 5.4. The ICO Process



Note: Indicative process, not all steps are required.

An investor who does not hold cryptocurrency and wishes to subscribe to the token offering signs-up to a digital exchange accepting fiat currency, and transfers fiat currency to the exchange. This is then converted into one of the prominent cryptocurrencies, mainly Bitcoin (BTC) and Ether (ETH). Many exchanges are regulated and thus connected to the banking system, while transfer of fiat currency can also be done through card payment. In cases of such regulated exchanges, investors have to go through a KYC/AML process.

Given that most exchanges hold all funds in one pool, the investor needs to sign up with a digital wallet provider and create their own personal *private* wallet, from which they can buy the tokens.[43] Digital or crypto-wallets are essentially software programmes storing each person's private and public keys which allow them to send and receive tokens through blockchain transactions. While the public key acts as the wallet address and can be known to everyone (like a bank account number), the private key is a secret number that allows you to access and spend your tokens (like a pin number). Private keys go hand-in-hand with the public keys and ownership of the private key gives complete control over the tokens stored under the corresponding public key.

In order to be able to receive tokens by the issuer, the investor needs to have sent the payment (BTC or ETH)[44] from his own private wallet for which he holds the private key and which can be identified as his own. The investor funds, which are now converted from

[43] In the absence of a private wallet, the ICO issuer would not know who is sending the funds and where the tokens should be sent to.

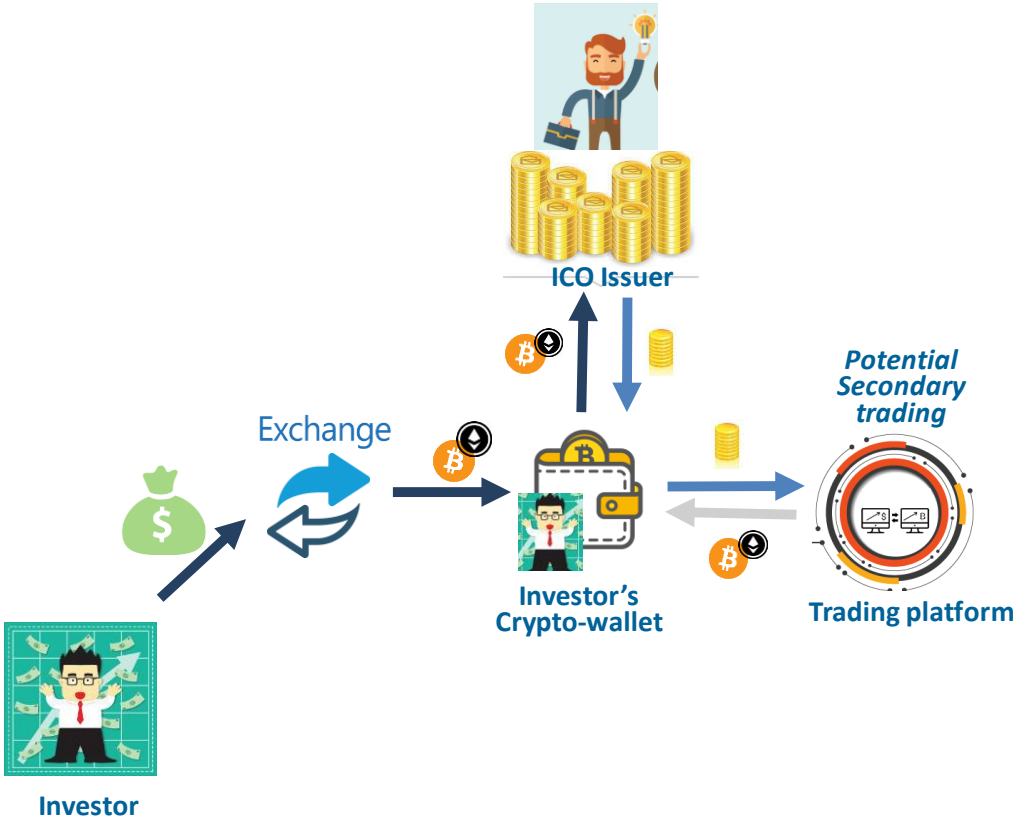
[44] Bitcoin and Ether are the most commonly used cryptocurrencies used by such crypto-exchanges.

fiat to one of the prominent cryptocurrencies, are then sent from the exchange to the private wallet before being sent from the private wallet to the address of the ICO which issues the new tokens. The tokens will only be issued if the ICO has been successful at raising the funds targeted by the issuers, and will be sent to the private wallet of the investor (public key). In order for the investor to be able to access the tokens, his private key must match the public key where the tokens are sent by the issuer.

The newly-created tokens are, in most cases, not accepted by the exchange which the investor used to convert his fiat currency into one of the prominent cryptocurrencies. The investor will have to go through a second, different crypto-exchange which lists crypto-tokens. These exchanges act as secondary markets for newly-issued tokens and allow the purchase of newly-issued tokens against more mainstream cryptocurrencies.

Having the newly-created tokens in his private crypto-wallet, the investor has to go back to a regulated exchange if and when he decides to exchange his money back to fiat currency and bring them back into the traditional banking system.[45] Alternatively, the investor can sell the tokens in one of the exchanges where the new token is listed.

Figure 5.5. Participating in an ICO



[45] Links to and from the banking system are established with regulated exchanges (e.g. Coinbase).

ICO-generated tokens

ICOs are enabled by distributed ledger technology like the blockchain. A decentralised network of participants (nodes) holds a copy of such common ledger, and through mining and consensus mechanisms validates transactions occurring in the network. Miners participating in the validation of transactions are rewarded with fees or with tokens issued on the platform in the context of the ICO.

Enabling technology

Tokens issued in ICOs are digitally-represented, cryptographically-secured units of value, whose creation is enabled by DLTs and the blockchain. Although there is no common classification framework for digital financial assets, tokens issued by ICOs could be classified as digital assets built on the blockchain, whether their function is similar to payment tokens/cryptocurrencies, asset tokens, or utility tokens tied to a product usage. Tokens can have their own blockchain ("native" tokens) or be built on top of other blockchains.

The proliferation of ICOs was in part enabled by the creation of tokens on an existing protocol instead of creating a new blockchain for each new token. Instead, a standard template on the blockchain is being used (e.g. the ERC-20 standard[46] on the Ethereum platform[47]), with modifications on the code of the protocol allowing for the creation of new tailor-made tokens. This, in turn, allows for interoperability between the different tokens, as these share the same standard interface used for their creation, and the development of distributed applications (dapps) based on the same standard and which can operate on the same platform. It also enhances interoperability with digital wallets, allowing for better compatibility and easier storing of tokens in them.

ICOs rely heavily on smart contracts: these are distributed applications created and run over the blockchain, which consist of self-executing contracts written as code on blockchain ledgers, automatically executed upon reaching pre-defined trigger events written in the code. Smart contracts facilitate the disintermediation from which ICOs benefit, by allowing for the automated transfer of tokens or payment upon triggering of certain conditions which are pre-defined and registered in the code of the blockchain.[48]

Definitions and rights

There is currently no standardised definition of tokens, and the term token is sometimes used interchangeably with the term coin. For some, coins are alternative cryptocurrencies to the Bitcoin, which have been created on their own blockchain and protocol which supports the coin (e.g. Ethereum, Ripple, Omni, Waves), whereas tokens reside on top of other blockchains. For others, coins are mainly used as a medium of exchange or storage of value (like currencies), while tokens are used as coupons or vouchers of a reward or funding mechanism (Hu et al., 2017). Another proposed distinction is based on coins

[46] Ethereum Request for Comments or ERC is a protocol that allows a token to be unique and bespoke, while at the same time being standardised so as to ensure compatibility with the Ethereum platform where it can be exchanged.

[47] Around 80% of ICOs leverage on Ethereum (ESMA, 2018).

[48] For example, smart contracts can allow for the distribution of dividends in pre-determined time intervals and based on pre-determined conditions.

referring to more transactional-based cryptocurrency assets, whereas tokens refer more to a type of investment vehicle, embodying or serving as a representation of claims against an entity or its assets, cash flows, residual value etc. (Bricker, 2017).

Tokens issued through ICOs share common characteristics with a number of different asset classes, which makes it difficult to classify them under one conventional asset class: they are issued through processes that resemble equity issuance, trade like currencies,, while they can also be used to facilitate the use of a platform (utilities). In addition, such tokens share the characteristics that inherent to DLTs on which they are built, such as a truly global nature, transparency, security and immutability given their distributed nature.

Tokens issued in ICOs can confer a combination of different types of rights to their holders (Figure 5.6). These include access rights to participate in the platform (in which case tokens are used to pay for fees involved in platform participation), rights to buy the service or product of the issuer (in which case tokens are used to pay for the service), claims on future revenues of the company, rights to contribute to the development of the software, voting rights similar to those assigned to shares, and other governance rights that can range from decision-making about the platform to validation of new participants or transactions in proof-of-stake models.[49]

The types of rights assigned to tokens differ a lot from one ICO to another and are closely linked to the strategy of the company and the intended purpose of the token issuance. For example, if the company relies on the developer community for the creation of applications that run on the platform, the tokens will need to incentivise and reward those participants. In certain proof-of-stake systems, validators of new transactions must own tokens in order to be able to participate in the validation of new transactions.

Figure 5.6. Types of token rights

Note: Indicative, non-exhaustive list of token rights. Ownership rights are mentioned as theoretically possible but in practice the majority of tokens issued in ICOs do not confer ownership rights.

[49] In certain proof-of-stake systems, validators of new transactions must own tokens in order to be able to participate in the validation of new transactions. Validators of transactions in proof-of-stake transactions earn transaction fees by the transaction parties.

Estimates of recent academic literature demonstrate that in most cases ICO tokens grant contributors the right to access platform services (68% of the cases), governance powers (24.9% of the cases) and only the minority of tokens hold profit rights (26.1% of the cases) (Adhami et al., 2018).[50]

Tokenholders have no refund rights if the issuer fails to be develop the platform, if the network fails to be created or if the product fails to be created in the absence of investor protection legislation of unregulated offerings.

Token classification

A number of regulators have proposed different approaches to classification: the Swiss Financial Market Supervisory Authority classifies tokens based on their underlying economic function into payment tokens, utility tokens, or asset tokens (FINMA, 2018). Other classifications can be made according to the way tokens generate returns or the way these are allocated to investors. According to the U.S. Securities and Exchange Commission, the definition of a token and its regulatory treatment do not depend on its "labelling" but on a careful assessment of the economic realities underlying a transaction (SEC, 2017a).

Recent academic literature has provided statistics on the ICO market based on how issuers are defining the tokens offered. These statistics may not be representative of the true nature of the market given the lack of formal classification framework, and moreover, many issuers would tend to self-classify their tokens as utility tokens, in order to avoid the triggering of financial requirements linked to the offering of securities.

The dividing line between the different types of tokens is blurred. For a token to be treated as a pure utility token, i.e. intended to perform a function within the network and facilitate the use of the platform, the token would need to have zero value outside the network it is being used (e.g. tokens that are part of a rewards programme or tokens that are used in online gaming platforms and cannot be exchanged for fiat currency or cryptocurrencies). This, however, is not the case with most ICO-issued tokens which tend to list on crypto-exchanges after the offering, and freely traded in secondary markets with the expectation of a profit. In such cases, value is derived from trading the token and without its practical use on the platform.

Regulatory framework

Token classification and taxonomies are being discussed by regulators and the industry in an effort to understand what regulation should apply to them. Tokens could be considered as financial instruments, securities, commodities, non-cash payment facilities or managed investment schemes, depending on the characteristics.

To date, regulatory responses to ICO issuances differ and range from no guidance ("wait and see" approach), to introducing a statutory framework for the regulation of ICOs (e.g. Bermuda), introduce bans (e.g. China) or apply a case-by-case approach to regulating ICOs (e.g. U.S. SEC). Regulators from a number of jurisdictions have issued warnings or guidance (see Annex B).

Lack of clarity in the regulatory treatment of ICOs exposes both companies issuing ICOs and ICO subscribers (whether investors or consumers) to a number of important risks (see

[50] Based on a sample of 253 offerings occurred from 2014 to August 2017.

Section 5.2). This limitation is further aggravated due to the global nature of ICOs and the cross-border implications of ICO issuances to investors in different jurisdictions, and the sometimes difficult task of determining the jurisdiction of the issuer. At the same time, ICOs relying on regulatory arbitrage or exploiting loopholes in regulation tarnish the ICO market's reputation and integrity, impeding a possible fruitful exploitation of an innovative mechanism for the financing of SMEs.

At the time of writing of this report, the International Organisation of Securities Commissions is expected to report on a consistent approach to regulatory treatment for ICOs across its members.

It should be noted, however, that in addition to regulatory frameworks applying to the tokensale and the tokens issued, questions remain as to if and how regulation will apply to the DLT technology underpinning ICO structures. Indicatively, this is particularly relevant to the use of smart contracts in transactions and their enforceability as contracts under standard contract law or the overall application of contract law on such applications.

Box 5.1. The DAO offering and the use of the Howey test by the US SEC

The DAO is an example of a decentralised autonomous organisation representing a virtual organisation existing as computer code and implemented on the blockchain. The DAO was launched in April 2016 as an unincorporated organisation with the aim to raise financing to fund projects through the issuance of DAO tokens to investors. The ICO raised c.USD150 million. Shortly after the offering was completed, an attacker used a flaw in the DAO's code to steal a third of DAO's assets.

The U.S. Securities and Exchange Commission (SEC) investigated the offering and concluded that the DAO Tokens are securities within the meaning of the Securities Act of 1933 and the Securities Exchange Act of 1934 (SEC, 2017b). In analysing the DAO Token's nature, the SEC applied the *Howey test* which includes elements required for the qualification of an investment contract under the Securities Act (SEC v. W.J. Howey Co., 328 U.S. 293 (1948)): (i) an investment of money in a common enterprise, (ii) a reasonable expectation of profits, and (iii) profits derived from the managerial efforts of others.

In the case of the DAO, the SEC concluded, among other things, that investors in DAO Tokens made a contribution of value that can create an investment contract by using Ether to make their investments, and DAO Tokens were received in exchange for Ether: investors expected a return on their investments through a share of potential profits from projects to be undertaken by the DAO, and relied on the managerial efforts of DAO's founders for such return, particularly since the voting rights assigned to the tokens did not provide tokenholders with meaningful control over the company.

In addition to the regulatory framework applying to ICOs, clarity on the regulation applying to the rest of the ecosystem built around token sales is of paramount importance in order to ensure market integrity and investor protection throughout the process (see Section 2.1 on ICO ecosystems). For example, most regulators have stated that AML/CTF regulations apply to ICOs, as well as to digital exchanges and payment systems which facilitate token trading, clearing and settlement.

ICO activity[51]

Despite being a very recent phenomenon, ICO activity has exploded in the past two years. The first ICO issuance was the MasterCoin, proposed by J.R. Willett in 2013 (Willett, 2013). The growth in ICO activity can be attributed to the novelty of the mechanism and the speculative hype around crypto-currencies experienced in the period 2016-17 with the rise of the bitcoin. Ethereum's introduction of the ERC20 standard for token creation allowed for a much easier ICO process which also contributed to such growth. At the same time, the need of early bitcoin investors to divest part of their massive gains within the cryptocurrency environment has also had an impact on the trend.

The vast majority of ICOs in 2017 has financed IT infrastructure, followed by trading and investing and general finance applications (OECD, 2018). In effect, the growth in the use of DLTs led to an increasing need of financing companies that are built on the blockchain, which exceeded the capacity of technology intensive or specialised venture capital funds (IIF, 2018).

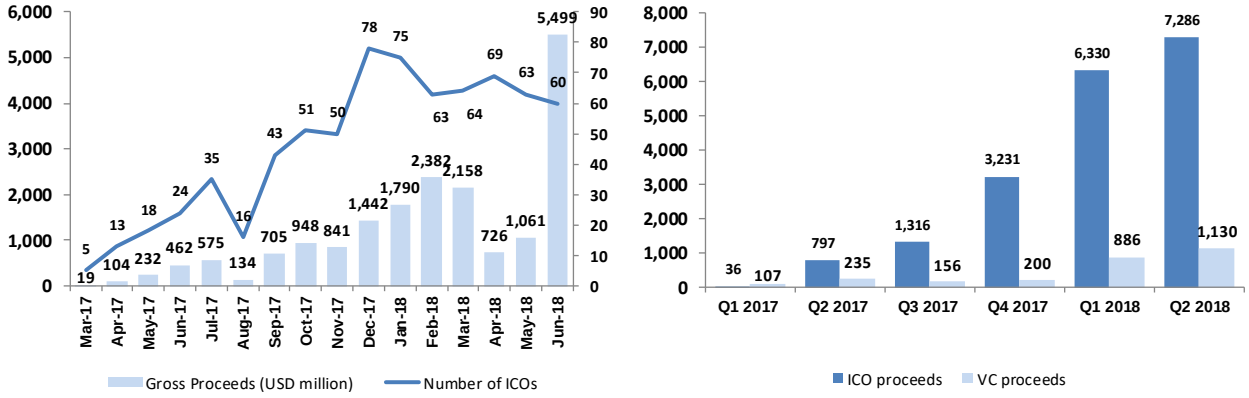
Data collected by Zetzsche et al. (2018) indicate that the global ICO volume exceeded USD 25 billion as of February 2018, with an acceleration of the growth trend in the second half of 2017 (Zetsche et al., 2018). Interestingly, the total ICO volume in the second half of 2017 exceeded the sum of all previous ICOs together. According to the same dataset, in terms of geography, ICO issuances are global but the US is the dominant offering jurisdiction. It should be noted, however, that in around 1/3 of the offerings of the sample used, issuing entity or promoter's origin could not be identified.

Failure rates are extremely high, and a reported 45% of ICOs issued in 2017 have failed (Risley et al. 2017). Survival rates for SMEs 120 days after the ICO, measured by the absence of any announcement about the capital raised or failure to list their token in an exchange, were only 44.2% (Benedetti and Kostovetsky, 2018). Early stage financing is by definition high-risk, so failure rates are expected to be high.

[51] The quality of data on ICO offerings and crypto-assets varies and might not always be satisfactory, while market-related figures (prices, trading volumes, and volatility may be manipulated or may not necessarily fit all types of crypto-assets equally (FSB, 2018). Public data used should therefore be treated with caution.

Figure 5.7. ICO activity

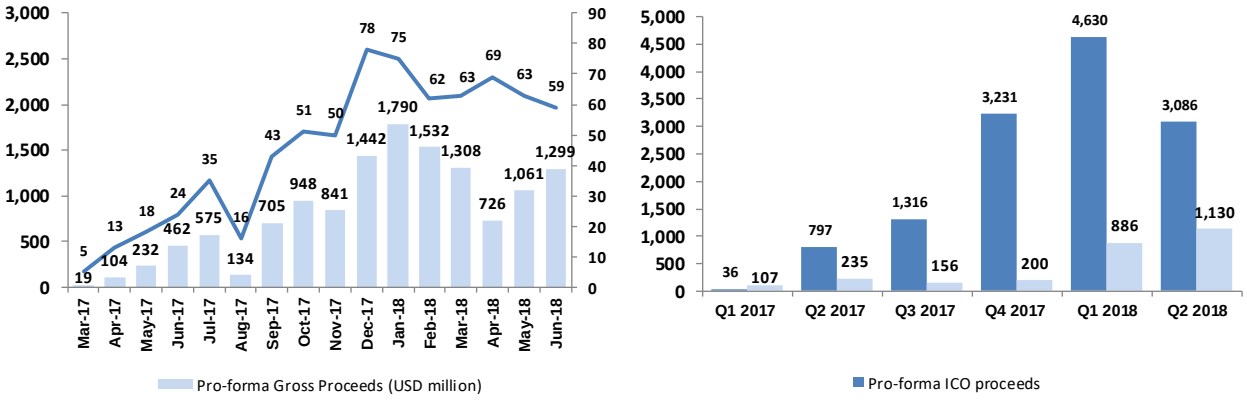
By number of offerings and ICO proceeds (LHS), ICO proceeds vs. VC proceeds for blockchain funding (RHS)



Note: Venture capital funding includes only blockchain-related funding.
Source: OECD calculations based on data from Coindesk.

Figure 5.8. Pro-forma ICO activity (excluding Telegram and EOS ICOs)

By number of offerings and ICO proceeds (LHS), ICO proceeds vs. VC proceeds for blockchain funding (RHS) on a pro-forma basis excluding the Telegram and EOS ICOs



Note: ICO proceeds on a pro-forma basis, excluding the Telegram ICO (USD 1.7bn raised in two rounds on February and March 2018) and the EOS ICO (USD 4.2bn closed in June 2018).Venture capital funding includes only blockchain-related funding.
Source: OECD calculations based on data from Coindesk..

Annex B. Selected regulatory responses to Initial Coin Offerings worldwide[52]

European Union

Country	Authority	Action	Description
Austria	Financial Market Authority (FMA)	**Focus on ICOs** (November 17)	ICOs are as constructed in such a way that they are not subject to any form or regulation, and they are also not subject to supervision. Investors and consumers do not enjoy a comparable degree of protection as they would with regulated products or products issued by supervised entities. Under certain circumstances, an ICO may however constitute a financial service requiring a licence, or may fall within the scope of another supervisory law with regard to investor protection. This must however be checked on a case-by-case basis. https://www.fma.gv.at/en/fma-thematic-focuses/fma-focus-on-initial-coin-offerings/
Belgium	Financial Services and Markets Authority (FSMA)	**Communication** (13/11/17)	Depending on how the ICO is structured, certain financial regulations may apply. But many ICOs are not subject to any legislation and so for the moment lie outside of any supervision. Some ICOs are set up in order to defraud investors. Signs that may help identify potentially dubious ICOs include the provision of very limited information and the setting of unrealistic objectives. Where there is a great deal of hype, for example with a very short sales period, pushy advertisements or promotion by a celebrity, caution is especially advisable.

[52] Built on the basis of an initial table of regulatory responses put together by ESMA in April 2018 (OECD, 2018).

			https://www.fsma.be/sites/default/files/public/content/EN/Circ/fsma_2017_20_en.pdf
Czech Republic	Ministry of Finance	**Public consultation**	The Ministry of Finance has prepared a public consultation on virtual currencies and other virtual assets. The aim of the consultation is to collect the views of experts about the possibilities of legal anchoring of virtual assets and the use of blockchain technology to register book-entry securities. Any legal opinions or material conclusions and recommendations implied by the document have no formal significance. The deadline for submission of the response was set at January 14, 2019. The results of the consultation will be published in an anonymized manner at the website of the Ministry of Finance.
Denmark	Financial Services Authority	**Warning** (19/02/18)	The Danish FSA endorses consumer warnings about cryptocurrency from the EU's three financial supervisory authorities – EBA, EIOPA and ESMA, and warns investors about the risks that buying cryptocurrency entails. Source:https://www.finanstilsynet.dk/Nyheder-og-Presse/Pressemeddelelser/2018/EU-authorities-warn-consumers-about-cryptocurrency?sc_lang=en
Estonia	Estonian Financial Supervision Authority	**Position on ICOs and investor alert** (October 17)	Tokens, depending on their structure, might be considered as securities according to the definition set forth in the current Securities Market Act (SMA) as well as in the Law of Obligations Act (LOA). In assessing whether or not securities laws apply, the EFSA states that substance should be considered over form. Every ICO is unique and should be assessed on its own characteristics. http://www.fi.ee/?id=12466 Investor alert http://www.fi.ee/index.php?id=21547

France	AMF French National Assembly	**Investor warning + Consultation paper** (26/10/17) PACTE Legislation (09/10/18)	Under French law, generally no specific regulation addresses this new way of raising funds and a large majority of ICOs may not be under regulation of the French AMF. However, a case by case analysis is required for each ICO to determine if existing rules are applicable. AMF calls for stakeholders to answer its consultation paper which considers three possible regulatory approaches: i. a best practice code ; ii. a prospectus regulation ; or iii. an *ad hoc* regime. AMF warns the public that ICO are risky and dedicated to an informed public: http://www.amf-france.org/en_US/Publications/Consultations-publiques/Annee-en-cours?langSwitch=true Article 26 of the PACTE law provides the possibility for token issuers to apply for a visa from the AMF, prior to any offering of tokens to the public. The French regulatory framework will be based on a few basic rules: • Existence of a legal entity established or registered in France; • Monitoring and safeguarding of the assets collected as part of the offer; • AML/CFT controls at the time of the public offering of tokens; • Investors will therefore have access to a "white list" by the AMF gathering reliable information on the ecosystem's serious/legitimate players. The PACTE law was voted in first reading by the French National Assembly and will be examined by the Senate in January 2019.
Germany	BaFin	**Consumer warning** (9/11/17)	BaFin wishes to point out that the acquisition of cryptocurrency coins as part of so-called ICOs may result in substantial risks for investors. ICOs are a highly speculative form of investment. Investors should therefore be prepared for the possibility of losing their investment completely.

		Expert article on ICOs (15/11/17)	As is the case with most new trends, the high level of public interest in ICOs is also attracting fraudsters. https://www.bafin.de/SharedDocs/Veroeffentlichungen/EN/Meldung/2017/meldung_171109_ICOs_en.html Based on the specific formulation of the contract for each ICO, BaFin decides on a case-by-case basis whether the offeror is required to obtain authorisation pursuant to the German Banking Act (KWG), Investment Code (KAGB), Payment Services Supervision Act (ZAG) or Insurance Supervision Act (VAG) and whether they must fulfil prospectus requirements. Generally speaking, cryptocurrency tokens constitute financial instruments (units of account) within the meaning of the KWG. Therefore, undertakings and persons that arrange the acquisition of tokens, sell or purchase tokens on a commercial basis, or operate secondary market platforms on which tokens are traded are generally required to obtain authorisation from BaFin in advance. https://www.bafin.de/SharedDocs/Veroeffentlichungen/EN/Fachartikel/2017/fa_bj_1711_ICO_en.html
Ireland	Central Bank of Ireland	**Information notice** (December 2017)	Information notice alerting consumers to the high risks associated with Initial Coin Offerings. Source:https://www.centralbank.ie/consumer-hub/consumer-notices/alert-on-initial-coin-offerings
Italy	Bank of Italy	**Warnings** (a. 30/1/2015 b. 30/1/2015 c. 19/3/2018)	The Bank of Italy issued a communication in which it discourages banks from purchasing, selling or holding virtual currencies (see the Box “The spread of crypto-assets and the implications for financial stability”, in Financial Stability Report, 1, 2018). It has also published information to clarify the main risks to consumers and small investors stemming from their use, as have the three European financial authorities (EBA, ESMA and EIOPA). Bank of Italy’s communications and warnings: a) http://www.bancaditalia.it/pubblicazioni/bollettino-vigilanza/2015-01/20150130_II15.pdf; b) http://www.bancaditalia.it/compiti/vigilanza/avvisi-pub/avvertenza-valute-virtuali/index.html;

	Italy's Financial Intelligence Unit	(d. 30/1/2015)	c) https://www.bancaditalia.it/media/notizia/avvertenza-per-i-consumatori-sui-rischi-delle-valute-virtuali-marzo-2018 Italy's Financial Intelligence Unit issued a communication on the illicit use of virtual currencies: http://uif.bancaditalia.it/normativa/norm-indicatori-anomalia/Comunicazione_UIF_su_VV.pdf
Lithuania	Bank of Lithuania	**Position on VCs and ICOs** (10/10/17)	Notwithstanding the fact that such activities are not regulated, in their essence, they are the raising of funds from investors, often unprofessional, to finance some activity. Since the risk of losing investors' funds and other risks are particularly high, our position is that such offering, in certain cases, should be subject to investment related legislative requirements and restrictions http://www.lb.lt/en/news/bank-of-lithuania-announces-its-position-on-virtual-currencies-and-ico
Malta	Malta Financial Services Authority (MFSA)	**Consultation on Financial Instrument Test** (13/04/18)	Introduction of a Test to determine how a DLT asset should be classified. The Test shall be applicable to issuers of ICOs conducted in or from within Malta, so as to determine whether the respective activity should fall within the context of the applicable EU and respective national legislative and regulatory frameworks or otherwise. Source: https://www.mfsa.com.mt/pages/announcement.aspx?id=11115
Malta	Malta Financial Services Authority (MFSA)	**Discussion Paper on ICOs and VCs** (30/11/17)	The purpose of the DP is to collect feedback on a new legislative framework, the Malta 'Virtual Currency Act' that would regulate ICOs, VCs and service providers involved in ICOs and other VC activities that fall outside of the existing regulatory framework. https://www.mfsa.com.mt/pages/announcements.aspx?id=10
Nether-lands	Authority for Financial Markets (AFM)	**Investor warning** (13/11/17)	Although the AFM sees the possibilities of blockchain technology for financial services, it points to the high risks of ICOs in the current hype. The high risk of scams and loss of intake combined with the hype around ICOs at the moment is a dangerous cocktail. https://www.afm.nl/en/professionals/onderwerpen/ico

Poland	Komisja Nadzoru Finansowego (Polish Financial Supervision Authority) and Narodowy Bank Polski (Central Bank of Poland)	**Investor warnings (07/07/17 and 22/11/2017)**	The Central bank of Poland (Narodowy Bank Polski) and the Polish Financial Supervision Authority (Komisja Nadzoru Finansowego, KNF) warned potential users against the risks associated with "virtual currencies" not only for their users, but also for financial institutions. The necessity to distinguish "virtual currencies" from the distributed ledger technology (DLT), used by some of the "virtual currencies" is also underlined. https://www.knf.gov.pl/knf/en/komponenty/img/Statement_by_NBP_and_KNF_on_virtual_currencies_7_07_2017_57364.pdf Warning to investors about the risks of investing in tokens, as part of ICOs. https://www.knf.gov.pl/knf/en/komponenty/img/The_KNFs_statement_on_selling_socalled_coins_or_tokens_ICO_60238.pdf
Slovenia	Financial Stability Board	**Investor warning** (10/10/17)	https://www.bsi.si/iskalniki/sporocila-za-javnost-en.asp?VsebinaId=20186&MapaId=202#20186
Spain	Bank of Spain and Comisión Nacional del Mercado de Valores	**Statement** (08/02/2018)	No cryptocurrency issue or ICO has been registered, authorised or verified by any supervisory agencies in Spain. Highlights the risks of cryptocurrencies and ICOs: high risk of loss of invested capital, fraud, illiquidity, extreme volatility, inadequate information, cross-border issues. Source: https://www.bde.es/f/webbde/GAP/Secciones/SalaPrensa/NotasInformativas/18/presbe2018_07en.pdf
Sweden	Finansinspektionen (FI)	**Investor warning** (7/11/17)	FI warns against five main risks of ICOs: most ICOs are unregulated; market valuation of digital assets does not necessarily match real market value; there is neither guaranteed access to a second market nor information requirement and there is an increasing risk of investment fraud due to the recent hype in ICOs. http://www.fi.se/sv/publicerat/nyheter/2017/varning-for-risker-med-initial-coin-offerings/

United Kingdom	FCA	**Investor warning** (12/09/17)	ICOs are very high-risk speculative investments. Investors should be conscious of the risks involved. Whether an ICO falls within the FCA's regulatory boundaries or not can only be decided case by case. Businesses involved in an ICO should carefully consider if their activities could mean they are arranging, dealing or advising on regulated financial investments. Each promoter needs to consider whether their activities amount to regulated activities under the relevant law. In addition, digital currency exchanges that facilitate the exchange of certain tokens should consider if they need to be authorised by the FCA to be able to deliver their services. https://www.fca.org.uk/print/news/statements/initial-coin-offerings
EU	ESMA	**Guidance** (13/11/17)	In November 2017, ESMA alerted firms to the need to meet relevant regulatory requirements: https://www.esma.europa.eu/sites/default/files/library/esma50-157-828_ico_statement_firms.pdf

Outside European Union

Argentina	Comision Nacional de Valores (CNV)	**Warning** (04/12/2017)	Investor warning, highlighting that ICOs are high-risk speculative investments. Risks faced by ICO investors include lack of specific regulation, price volatility and lack of liquidity, potential fraud, inadequate access to relevant information, technological and infrastructure failures and risks arising from the international nature of ICOs. Source: http://www.cnv.gob.ar/web/secciones/prensa/comunicados.aspx?id=208&p=2

Australia	Australian Securities and Investments Commission (ASIC)	**Guidance - Information Sheet 225** (28/09/17)	The legal status of an ICO is dependent of the circumstances of the ICO, such as how the ICO is structured and operated, and the rights attached to the coin. In some cases, the ICO will only be subject to the general law and the Australian consumer laws. In other cases, the **ICO may be subject to the Corporations Act.** ASIC aims to assist businesses to understand their potential obligations under the Corporations Act by issuing the guidance contained in this information sheet. ASIC also encourages businesses to approach the Innovation Hub for informal assistance. http://asic.gov.au/about-asic/media-centre/find-a-media-release/2017-releases/17-325mr-asic-provides-guidance-for-initial-coin-offerings/
Australia	Australian Securities and Investments Commission (ASIC)	**Information Sheet 225** updating ICO guidance **and Warning** (2 May 2018)	Prohibitions against misleading and deceptive conduct in respect of ICOs and crypto-assets: • For ICOs and crypto-assets that are financial products, the Corporations Act includes prohibitions against misleading and deceptive conduct; • For ICOs and crypto-assets that are **not** financial products (for example, Bitcoin), the same prohibitions against misleading or deceptive conduct apply under the Australian Consumer Law. Source: https://asic.gov.au/regulatory-resources/digital-transformation/initial-coin-offerings-and-crypto-currency/
Australia	Australian Securities and Investments Commission (ASIC)	Delegation of powers to ASIC (19 April 2018)	ASIC received delegated powers from the Australian Competition and Consumer Commission (ACCC) to take action under the Australian Consumer Law relating to misleading or deceptive conduct in marketing or selling of ICOs, even if the ICO does not involve a financial product. Source: https://asic.gov.au/about-asic/media-centre/find-a-media-release/2018-releases/18-122mr-asic-takes-action-on-misleading-or-deceptive-conduct-in-icos/

Australia	Australian Securities and Investments Commission (ASIC)	Warning (20 September 2018)	Investor warning against misleading and deceptive conduct in ICOs targeting retail investors. Source: https://asic.gov.au/about-asic/news-centre/find-a-media-release/2018-releases/18-274mr-asic-acts-against-misleading-initial-coin-offerings-and-crypto-asset-funds-targeted-at-retail-investors/
Bermuda	Government of Bermuda	Legislation for ICOs (April 2018)	Companies and Limited Liability Company / ICO Amendment Act 2018 introducing a statutory regulatory framework for ICOs. Regulates offerings of 'digital assets', which are meant to capture all of the various categories of digital coins and tokens (whether they be utility, securitized, equity or otherwise) being issued publicly as ICOs and via token sales. Not intended to regulate private sales or those which are engaged in the business of pure virtual currency issuances. Source: http://bermudalawblog.bm/2018/05/bermuda-launches-ico-and-digital-assets-legislative-framework/
Brazil	Brazilian Securities and Exchange Commission	**Clarification memorandum (11/10/2017)**	Characterisation of ICOs as offerings of securities, clarification of risks arising from such transactions and their link to the current securities market regulatory framework. Source: http://www.cvm.gov.br/noticias/arquivos/2017/20171116-1.html
Canada	Canadian Securities Administrators	**Staff Notice** (11/05/18)	Staff Notice 46-308 – Securities Law Implications for Offerings of Tokens (the "2018 CSA Notice"), which provides additional guidance on token offerings, including those characterized in the industry as "utility tokens". The 2018 CSA Notice: (i) provides examples of situations in which an offering of tokens may be subject to securities law, and (ii) addresses multiple step token offerings. Source: http://www.osc.gov.on.ca/documents/en/Securities-Category4/csa_20180611_46-308_implications-for-offerings-of-tokens.pdf

Canada	Canadian Securities Administrator (CSA) Ontario Securities Commission (OSC)	**Staff notice** (24/08/17) **Guidance** (08/03/17)	**A coin/token may still be a "security" as defined in securities legislation of the jurisdictions of Canada.** Businesses should complete an analysis on whether a security is involved. Legal and/or other professional advice may be useful in making this determination. http://www.osc.gov.on.ca/documents/en/Securities-Category4/csa_20170824_cryptocurrency-offerings.pdf The OSC warned that **issuers of ICOs may need to meet legal requirements**, such as registration and filing an official prospectus. http://www.osc.gov.on.ca/en/NewsEvents_nr_20170308_osc-highlights-potential-securities-law-requirements.htm
Cayman Islands	Cayman Islands Monetary Authority (CIMA)	**Advisory warning on virtual currencies and ICOs** (23/04/18)	Warning on the risks related to virtual currencies and ICOs. Source:https://www.cima.ky/upimages/noticedoc/1524507769PublicAdvisory-VirtualCurrencies_1524507769.pdfv
China	The People's Bank of China	**Ban** (04/09/17)	In essence, ICO is a kind of non-approved illegal open fund raising behaviour, suspected of illegal sale tokens, illegal securities issuance and illegal fund-raising, financial fraud, pyramid schemes and other criminal activities. As of the date of this announcement, **all types of currency issuance financing activities shall cease immediately.** https://www.coindesk.com/china-outlaws-icos-financial-regulators-order-halt-token-trading/
Gibraltar	Gibraltar Financial Services Commission (GFSC)	**Statement on DLT activities and ICOs** (22/09/17)	A new regulatory framework for DLT which will become operational as from January 2018 will regulate the activities of firms, operating in or from Gibraltar, that use DLT to store or transmit value belonging to others, such as virtual currency exchanges. Gibraltar is considering a complementary regulatory framework covering the promotion and sale of tokens, aligned with the DLT framework. Tokens vary widely in design and purpose. In some cases, tokens represent securities, such as shares in a company, and their promotion and sale are regulated as such. More often, tokens

			serve some cryptocurrency or functional use that is unregulated, such as prepayment for access to a product or service that is to be developed using funds raised in the ICO. http://www.gfsc.gi/news/statement-on-initial-coin-offerings-250
Eurasian Economic Union	Eurasian Economic Commission	**Recommendation** (Ongoing)	Eurasian Economic Commission is in the process of developping a recommendation for member countries (Russia, Kazakhstan, Kyrgyzstan, Belarussia, Armenia) on how cryptoeconomy (cryptocurrency, ICO, cryptoexchange, etc.) should be regulated in member countries. The recommendation will create a regulatory framework and will touch the issues of taxation, AML/CFT, how cryptocurrency can be used as a means of payment. The purpose of recommendation is to create a harmonized regulation of cryptoeconomy in the region, where a single financial market must be established by 2025.
Hong Kong, China	Securities and Futures Commission (SFC)	**Statement** (05/09/17)	Whilst digital tokens offered in typical ICOs are usually characterised as a “virtual commodity”, the SFC has observed more recently **that certain ICOs have terms and features that may mean that they are “securities”.** http://www.sfc.hk/edistributionWeb/gateway/EN/news-and-announcements/news/doc?refNo=17PR117
Japan	Financial Services Agency of Japan (FSA)	**Statement on ICOs (27/10/17)**	ICOs may fall within the scope of the the Payment Services Act and/or the Financial Instruments and Exchange Act, depending on how they are structured. Businesses delivering such services without registration are subject to criminal penalties. FSA also warns of risks associated with ICOs (price volatility, potential for fraud). Source: https://www.fsa.go.jp/policy/virtual_currency/07.pdf
Korea	Financial Services Commission (FSC)	**Ban** (29/09/17)	South Korea’s Financial Services Commission took the decision to ban all forms of cryptocurrency-based money raising activity, saying it has "serious concern about the fact that the current market funds are being pushed into a non-productive speculative direction

			http://www.businessinsider.com/ico-south-korea-bans-icos-2017-9?international=true&r=US&IR=T
Malaysia	Securities Commission of Malaysia	**Statement** (19/01/18)	Cautionary statement on ICOs, stating that launching of an ICO may trigger regulatory requirements under securities laws. Members of the public are reminded to exercise caution before participating in an ICO. Source: https://www.sc.com.my/post_archive/cautionary-statement-on-initial-coin-offerings/
Mexico	Comisión Nacional Bancaria y de Valores (CNBV)	**Warning** (13/12/17)	The Mexican financial authorities (CNBV, Banco de Mexico and the Ministry of Finance) warned the general public about the risks associated to virtual assets and financial schemes commonly referred to as ICO's. http://www.cnbv.gob.mx/PRENSA/Prensa%20%20Otros/Comunicado%20Conjunto%20SHCP%20BdeM%20y%20CNBV%20ICOS.pdf
New Zealand	Financial Markets Authority	**Commentary** (25/10/17)	Clarifies that specific characteristics and economic substance of an ICO determine if it's a financial product, if it is regulated, and if so how. Source: https://fma.govt.nz/compliance/cryptocurrencies/initial-coin-offers/
Russia	Bank of Russia and Ministry of Finance	**Draft Regulation (25/01/18)**	Proposal for regulatory framework for ICOs and cryptocurrency exchanges. The draft law regulates the creation, issuance, storage and circulation of digital financial assets, as well as the exercise of rights and performance of obligations under smart contracts Source:https://www.minfin.ru/ru/document/?id_4=121810&page_id=2104&popup=Y&area_id=4#
Singapore	Monetary Authority of Singapore (MAS)	**Regulatory position** (01/08/17)	Digital tokens may represent ownership or a security interest over an issuer's assets or property. **Such tokens may therefore be considered an offer of shares or units in a collective investment scheme under the Securities and Futures Act.** Where digital tokens

			fall within the definition of securities in the SFA, issuers of such tokens would be required to lodge and register a prospectus with MAS prior to the offer of such tokens, unless exempted. http://www.mas.gov.sg/News-and-Publications/Media-Releases/2017/MAS-clarifies-regulatory-position-on-the-offer-of-digital-tokens-in-Singapore.aspx
Switzerland	FINMA	**Guidance** (29/09/17) **Guidelines** (29/02/18) **Enforcement actions and warning** (19/09/17)	ICOs are currently not governed by any specific regulation. However, due to the underlying purpose and specific characteristics of ICOs, various links to current regulatory law may exist depending on the structure of the services provided. Companies or individuals who intend launching an ICO have to ensure that they comply with the requirements set out in the relevant financial market laws. https://www.finma.ch/en/~/media/finma/dokumente/dokumentencenter/myfinma/4dokumentation/finma-aufsichtsmitteilungen/20170929-finma-aufsichtsmitteilung-04-2017.pdf?la=en FINMA published guidelines, which complement its earlier Guidance (above), which set out how it intends to treat enquiries from ICO organisers. Creating transparency at this time is deemed to be important given the dynamic market and the high level of demand. https://www.finma.ch/en/news/2018/02/20180216-mm-ico-wegleitung/ FINMA closes down coin providers and issues warning about fake cryptocurrencies https://www.finma.ch/en/news/2017/09/20170919-mm-coin-anbieter/
Thailand	Securities and Exchange Commission	**Statement** (14/09/17)	Advises investors interested in investing in an ICO to seek to understand the benefits and risks associated with the ICO; in addition to general risks faced by startups, investors are exposed to heightened risks of price volatility, inadequate liquidity, cyber security, as well as potential fraud and scam. Source: https://www.sec.or.th/EN/Pages/FinTech/ICO.aspx

United States	Securities and Exchange Commission (SEC)	**Investigate report + Investor Bulletin** ("DAO Report") (25/07/17)	**Depending on the facts and circumstances of each individual ICO, the virtual coins or tokens that are offered or sold may be securities.** If they are securities, the offer and sale of these virtual coins or tokens in an ICO are subject to the federal securities laws. New technologies and financial products, such as those associated with ICOs, can be used improperly to entice investors with the promise of high returns in a new investment space. **The SEC's Office of Investor Education and Advocacy is issuing this Investor Bulletin to make investors aware of potential risks of participating in ICOs**. • Press Release: https://www.sec.gov/news/press-release/2017-131 • Investigation Report: https://www.sec.gov/litigation/investreport/34-81207.pdf • Investor Alert: https://www.investor.gov/additional-resources/news-alerts/alerts-bulletins/investor-bulletin-initial-coin-offerings
		Investor alert (28/08/17)	The SEC issued a warning against potential ICO scams and "pump and dump" schemes by public companies. The warning follows recent trading suspensions https://www.investor.gov/additional-resources/news-alerts/alerts-bulletins/investor-alert-public-companies-making-ico-related
		Settled order ("Munchee Order") (11/12/17)	The SEC issued a settled order against an issuer named Munchee, Inc., making clear that a token may be a security even if it has some purported utility https://www.sec.gov/litigation/admin/2017/33-10445.pdf https://www.sec.gov/news/speech/speech-hinman-061418

United States (cont'd)		**Statement on Digital Asset Securities Issuance and Trading** (16/11/18)	The SEC highlights recent enforcement actions involving the intersection of long-standing applications of federal securities laws and new technologies, falling into three categories: (1) initial offers and sales of digital asset securities (including those issued in ICOs; (2) investment vehicles investing in digital asset securities and those who advise others about investing in these securities; and (3) secondary market trading of digital asset securities. Market participants must still adhere to the well-established and well-functioning federal securities law framework when dealing with technological innovations, regardless of whether the securities are issued in certificated form or using new technologies, such as blockchain. There is a path to compliance with the federal securities laws going forward, even where issuers have conducted an illegal unregistered offering of digital asset securities. Source: https://www.sec.gov/news/public-statement/digital-asset-securites-issuuance-and-trading

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