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ALTERNATIVE MODELS

Token offerings: A revolution in
corporate finance

PAUL P. MOMTAZ | KATHRIN RENNERTSEDER
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ALTERNATIVE CAPITAL MARKETS

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DEAR READER,

Welcome to edition 49 of the Capco Institute Journal of Financial Transformation.

Disruptive business models are re-writing the rules of our industry, placing continuous pressure on financial institutions to innovate. Fresh thinking is needed to break away from business as usual, to embrace the more rewarding, although more complex alternatives.

This edition of the Journal looks at new digital models across our industry. Industry leaders are reaching beyond digital enablement to focus on new emerging technologies to better serve their clients. Capital markets, for example, are witnessing the introduction of alternative reference rates and sources of funding for companies, including digital exchanges that deal with crypto-assets.

This edition also examines how these alternatives are creating new risks for firms, investors, and regulators, who are looking to improve investor protection, without changing functioning market structures.

I am confident that you will find the latest edition of the Capco Journal to be stimulating and an invaluable source of information and strategic insight. Our contributors are distinguished, world-class thinkers. Every Journal article has been prepared by acknowledged experts in their fields, and focuses on the practical application of these new models in the financial services industry.

As ever, we hope you enjoy the quality of the expertise and opinion on offer, and that it will help you leverage your innovation agenda to differentiate and accelerate growth.

A handwritten signature in black ink, appearing to read 'Lance Levy', with a stylized, flowing script.

Lance Levy, Capco CEO

TOKEN OFFERINGS: A REVOLUTION IN CORPORATE FINANCE?

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ABSTRACT

Token offerings or initial coin offerings (ICOs) are blockchain-based smart contracts designed to raise external finance without an intermediary. The new technology might herald a revolution in entrepreneurial and corporate finance, with soaring market growth rates over the last two years. This paper surveys the market evolution, offering mechanisms, and token types. Stylized facts on the pricing and long-term performance of ICOs are presented, and lessons learned from the first wave of token sales are discussed.

1. INTRODUCTION

Initial coin offerings (ICOs), also referred to as token sales or token offerings, have gained rapid popularity since 2017. ICOs are smart contracts based on blockchain technology and designed to raise external finance without an intermediary [Momtaz (2019b)]. While the concept is mainly known under the term “initial coin offering,” the term “initial” is factually misleading in nature. Firms usually fix the maximum token supply in the smart contract and hence rule out the possibility of “seasoned” offering under the same contract. But, in keeping with convention, we use ICOs and token offerings interchangeably.

Token issuers make use of smart contracts that implement an automatic algorithm of the following type: if investor i sends funds in the amount of x to token issuer j , then i automatically receives y tokens from j in exchange, where x/y is the exchange rate that has been fixed ex-ante in the smart contract [Momtaz (2019b)]. The main innovation of this technology is that it eliminates the intermediary completely so that investors and token issuers can share transaction rents exclusively among each other. Another

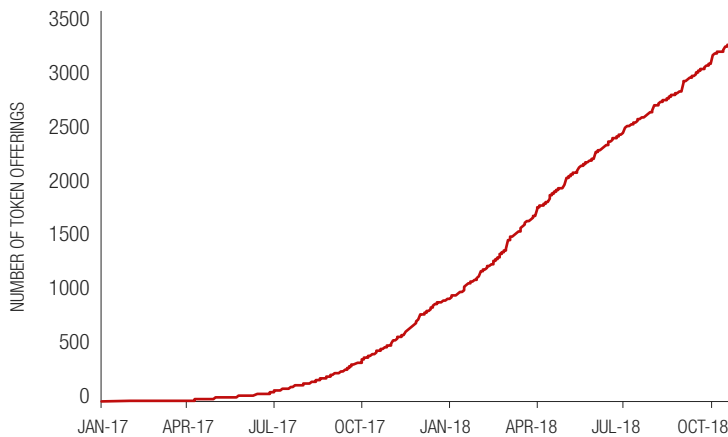
attractive feature of this new financing mechanism is that there are almost no transaction costs involved, making it also very attractive for entrepreneurial firms.

While token offerings are attractive to small firms, they are equally attractive to large firms, with increasing relevance for large corporates as the general acceptance of blockchain finance percolates financial markets and society at large. Two facts shall suffice to prove this point. First, the largest token offering so far (EOS, U.S.\$4.2 bn) exceeds in terms of gross proceeds all cumulative proceeds raised by all entrepreneurial firms on the premier crowdfunding platform, Kickstarter, since its inception in 2009 [Fisch (2019)]. Second, the EOS token offering is in terms of gross proceeds comparable to the three largest IPOs during the same time period [Howell et al. (2018)]. This shows that token offerings may herald a revolution not only in entrepreneurial, but also in corporate finance for large companies. It also has wide applications for multi-national enterprises (MNEs) that aim to streamline their internal capital transfers across countries. An illustrative example is the announcement by J.P. Morgan that it aims to issue its own cryptocurrency, JPMorgan-Coin.¹

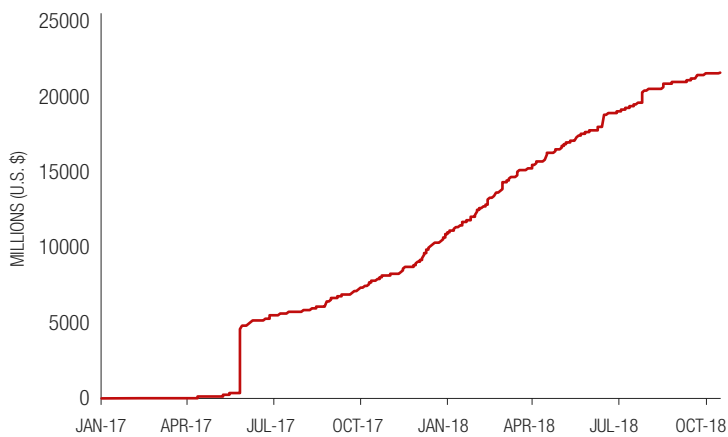
¹ <https://bit.ly/2SGPpy1>

Figure 1: The evolution of the token offering market

a) Cumulative number of token offerings



b) Cumulative funding volume of token offerings



In this article, we provide an overview of the market evolution, explain the mechanics of token offerings, compare token offerings to conventional sources of financing, review the market performance so far, and finally discuss lessons learned and next steps for this infant market to thrive.

2. MARKET OVERVIEW

The idea of token offerings was first applied in 2013 with a meagre investor demand [Boreiko and Sahdev (2018)]. The breakthrough year was 2017, when about

1,000 token offerings sought funding and the increase in market capitalization in these so-called alt-coins (the term comes from “alternative coins” in regard to the dominant coin, bitcoin) increased by about U.S.\$370 bn, which is equivalent to the 10th largest corporation or the 32nd largest country in terms of GDP, and exceeds the entire European venture capital industry [Amsden and Schweizer (2018), Blaseg (2018), Momtaz (2018b)].

Figure 1 shows the cumulative number of token offerings and funding from January 2017 through October 2018. The market reached gross proceeds in the amount of U.S.\$21.2 bn raised by 3,252 firms by October 2018, illustrating that much value is added in the after-market (compare U.S.\$21.2 bn to U.S.\$370 bn in after-market value). Still, the funding success is exceptional, since mainly early-stage firms or project groups, that have only developed an initial idea of their business, have initiated token offerings during the first wave of the market. As Figure 1b shows, June 2017 witnessed a steep incline in gross proceeds that is attributable to the EOS offering, raising U.S.\$4.2 bn. Since then, more than 100 new token projects enter the market every month.

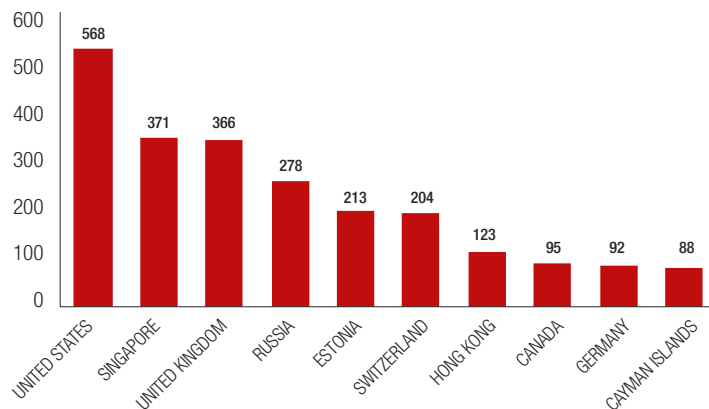
Figure 2a illustrates the token offering activity by country. The market for token offerings is prevailing in the depicted 10 jurisdictions contributing more than 73% of worldwide token offerings. Because firms that initiate token offerings provide digital services or products on decentralized online platforms, which are not confined by state borders, the data suggests that taxation strategies are currently less of a concern than in traditional financial markets [Huang et al. (2018)]. However, the dominance of countries such as Singapore and Switzerland that have expressed regulatory standpoints that promote token offerings (371 and 204, respectively, token offerings between January 2017 and October 2018) shows that blockchain-based funding activities foster more in markets with milder regulatory environments and lower degrees of legal uncertainty.²

As Figure 2b shows, the main share of token offerings takes place in platform services (15.0%), cryptocurrency (10.9%), and business services (6.5%). At the same time, it is notable that firms in traditional industries such as healthcare and utilities find their way into the market for tokens and pursue the expansion into new markets by pivoting into innovative business models based on blockchain services.

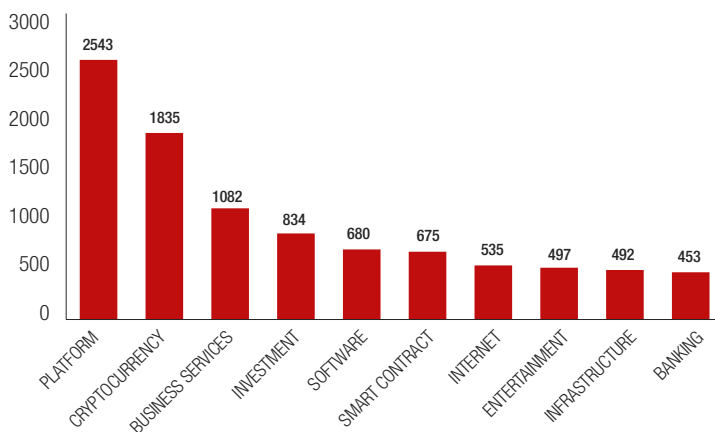
² An interesting question that has not been addressed yet in the context of blockchain finance is the extent of regulatory convergence across borders that is seen in many financial markets, e.g., in M&A markets [Drobetz and Momtaz (2019) and Dissanaïke et al. (2018)].

Figure 2: Token offering activity by country and industry

a) Country overview



b) Industry overview



3. THE MECHANICS OF TOKEN OFFERINGS

3.1 What are token offerings?

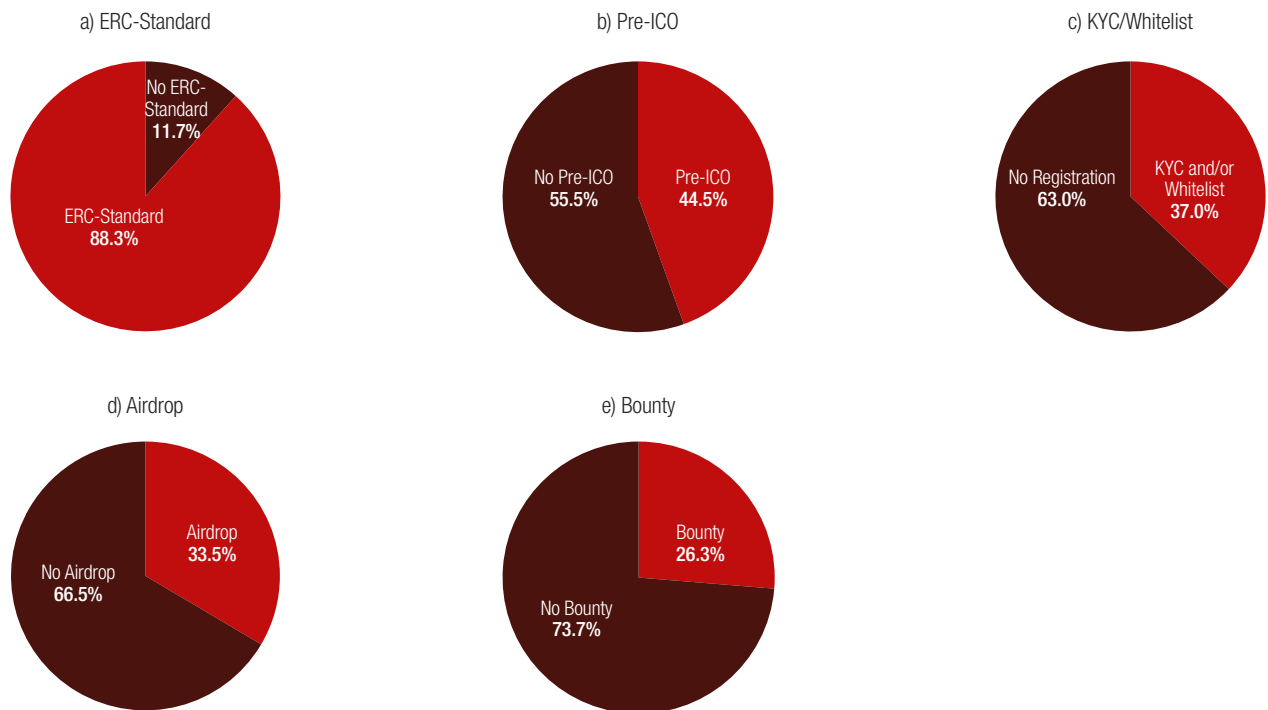
Token offerings are blockchain-based offerings of cryptographic tokens. Figure 3a shows that token offerings processed using the ethereum blockchain, a smart-contract framework that helps set terms and automate the exchange of tokens for fiat or digital currencies, dominate the market at a share of 88.3%. Boon for some and bane for others, token offerings help firms to raise finance without the need of a financial intermediary. Token offerings are advertised on designated online platforms and investors can send money directly in exchange for the offered tokens. An early claim of enthusiasts of the token

offering mechanism was that it would help democratize finance by cutting out the middleman (or underwriter) and hence distributing all the gains among the platform users. However, institutional investors have entered the market and are able to dictate their terms and shape the market [Howell et al. (2018)]. In fact, many firms have sold large portions of their offered tokens to institutional investors in private pre-offerings at significant discounts (often up to 75%). Figure 3b shows that pre-offerings (or pre-ICOs) are executed in 44.5% of all documented token offerings.

The soaring growth of the token offering market can be explained by the combination of a few factors. First, token offerings are attractive to firms in need of external finance because the mechanism enables them to acquire funds very fast. Token offerings are set up in a few minutes at no cost using technical token standards such as the ERC-20. Most token offerings accept the major cryptocurrencies ethereum (85%) and bitcoin (41.8%), and, to a lesser extent, litecoin (14.7%), as the exchange currency from investors. The usage of cryptocurrencies makes transactions more rapidly verifiable and involves lower costs than payments using fiat money. Further, firms appreciate that this method is geographically unbounded as fundraising happens exclusively via the internet. Consequently, firms are able to approach all potential investors worldwide very efficiently. At the same time, token offerings can easily exclude pre-defined groups of investors and thereby avoid regulatory uncertainties. While U.S. investors are prevented to participate in 29% of token offerings, only 4.7% and less than 1% of token offerings refuse investments from Singapore and Russia, with China and Korea at 18% and 7.1%, respectively.

Second, token offerings are very attractive to investors for at least two reasons. One being the pseudo-anonymous nature of tokens, which makes it technically impossible to determine an investor's real identity. The only transparent feature known about the investors is their wallet address, i.e., the combination of numbers and letters that investors use to send and receive tokens. Although token transfers can be reconstructed using the information stored on blockchains, they never reveal the true identity. Hence, the term "pseudo-anonymous." Still, 37% of firms require verification of investor identities via KYC (know your customer) or whitelist registrations (Figure 3c). Within a KYC process, potential investors are obliged to provide personal data (e.g., photo IDs and email addresses), undergo approval processes, and sometimes even explain their intention to buy the token in question in a short

Figure 3: Token offering features



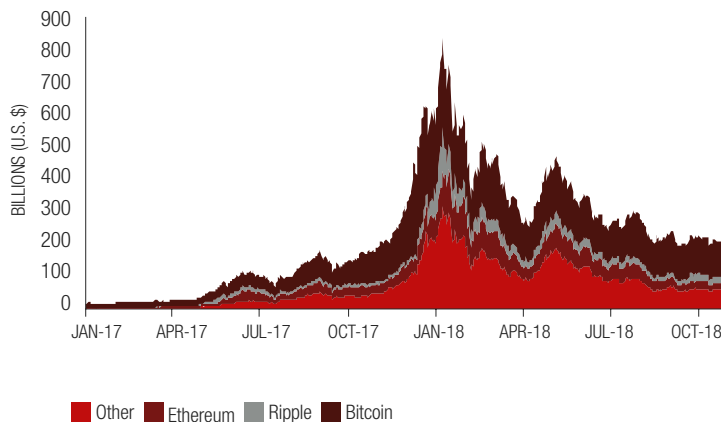
essay. With this, firms can prevent, inter alia, investors from countries where token offerings are prohibited, such as China and South Korea, from participating in the token offering. Whitelists are similar to a pre-order with advance payments, where interested parties are registered on the whitelist with their cryptocurrency wallet address as soon as advance payments are made. Thereby, projects can estimate the exact amount of funds they will raise and get more data on personal investor features and intentions if further KYC processes are part of the registration process. Whitelisting without KYC, however, only refers to the pre-approval of the future investors' cryptocurrency wallet address without personal data being transferred. This method is losing its popularity as firms risk violating the regulations in certain jurisdictions demanding mandatory identification of investors to prevent money laundering or terrorism financing. The other feature investors are attracted to is the immediate liquidity of the offered tokens. Most projects list their tokens within 30 to 60 days after the token offering on cryptocurrency exchange platforms [Momtaz (2018b)]. This gives investors the chance to exit an investment anytime.

3.2 The typology of token offerings

There are six different token offering models [Momtaz (2019b)]:

1. Traditional token offerings (ICO): in a token offering in the traditional sense, firms offer different types of tokens (see below) in exchange for fiat money or cryptocurrencies. This token offering type is closely related to IPOs. Classic token offerings are often preceded by pre-offerings, in which firms raise money to finance the actual token offering and gauge market demand. If the token offering is approved by the SEC, it is often called a "security token offering" (STO).

2. Interactive token offering (IICO): IICOs counteract criticism of traditional token offerings related to token valuation. Many token offerings are uncapped, which means that they raise as much money as they can. A downside of this model is that the token valuation is not transparent to investors. The IICO model helps to overcome this issue by implementing a dynamic bidding system, in which investors can voluntarily bid and withdraw their bid during the bookbuilding process, which may result in an efficient price equilibrium.

Figure 4: Listed market volume

3. Initial supply auction (ISA): the ISA model is based on a mechanism that discriminates the token price. ISA transactions sell tokens at a high price that decreases gradually until the funding demand is covered. However, this model has received criticism as it does not reward early investors for taking higher risk and signaling quality to the market, leading to disappointed investors due to missing economic incentives and higher token offering failure rates [Hellmann and Puri (2002), Momtaz (2019a)].

4. Simple agreement for future tokens (SAFT): the SAFT model addresses legal concerns in other token offering models and is mostly employed in pre-offerings. The idea is to offer investors the right to receive future tokens (mostly of the utility type, see below) that will be incorporated into a specific platform. The model is adapted from the “simple agreement for future equity” contract.

5. Airdrops: airdrops are free giveaways of tokens to anyone with a known wallet address. This model is used to create knock-on effects for platform growth via user adaptation in 33.5% of token offerings (Figure 3d). The firm that issues the tokens is still able to raise funding by retaining a share of the tokens that can be traded against other cryptocurrencies once the token is listed.

6. Smartdrops: smartdrops operate in the same spirit as airdrops with the difference that smartdrops only distribute tokens among those users with interest in the specific platform's innovation. Hence, they are a popular way of introducing the new technology and fast-tracking community growth. In a similar vein, bounty programs, used in 26.3% of token offerings (Figure 3e), incentivize interested participants for various activities associated with the token offering (e.g., the creation of a token logo or advertising the token offering on social media channels in exchange for tokens).

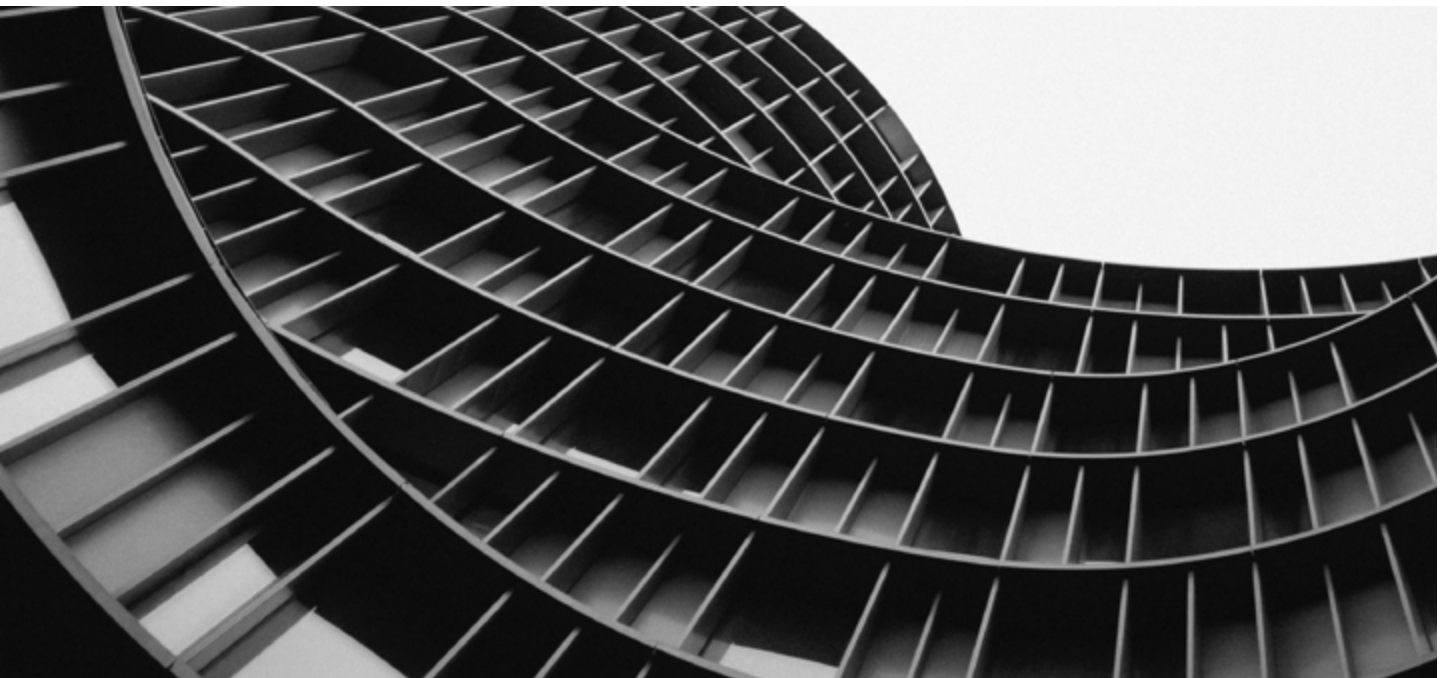
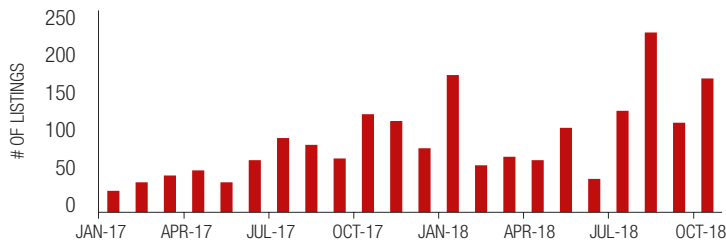
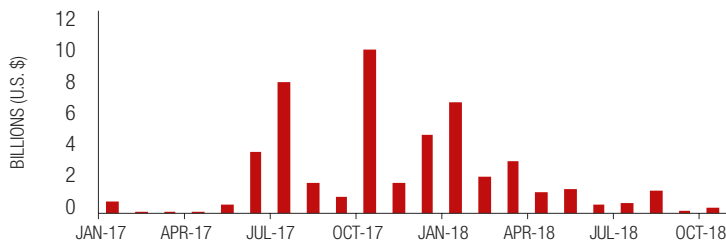
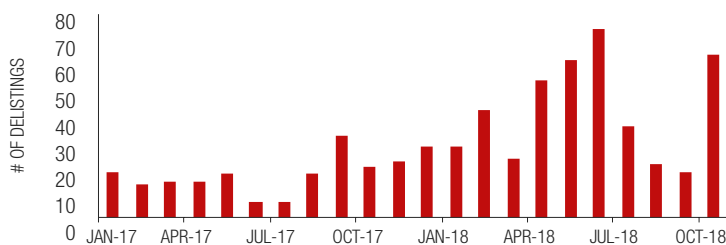
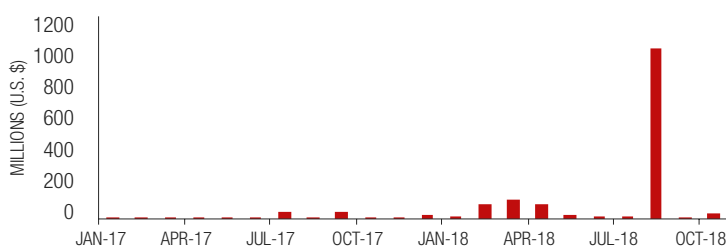


Figure 5: Listing activity**a) Number of listings****b) Listing volume****c) Number of delistings****d) Delisting volume**

3.3 Token classifications

Depending on the implemented token features, token offerings can be viewed as something between venture capital financing, a crowdfunding campaign, and an initial public offering. While, in principal, each token may have very specific characteristics that distinguish it from others, we have seen an emerging discussion about token classifications. Though there does not exist any unique standard for classifying tokens, one may broadly distinguish four types:

1. Utility tokens: charter a promise that the investor can redeem the token like a voucher for the company's products or services. These tokens do not transfer ownership and control rights, and legal investor protection for this token type is currently almost nonexistent.

2. Security tokens: are in most jurisdictions subject to securities laws as their value is based on the performance of the underlying asset. If the underlying asset performs well, the token gains value and vice versa. However, a security token does not necessarily involve an ownership stake in the third-party asset or venture.

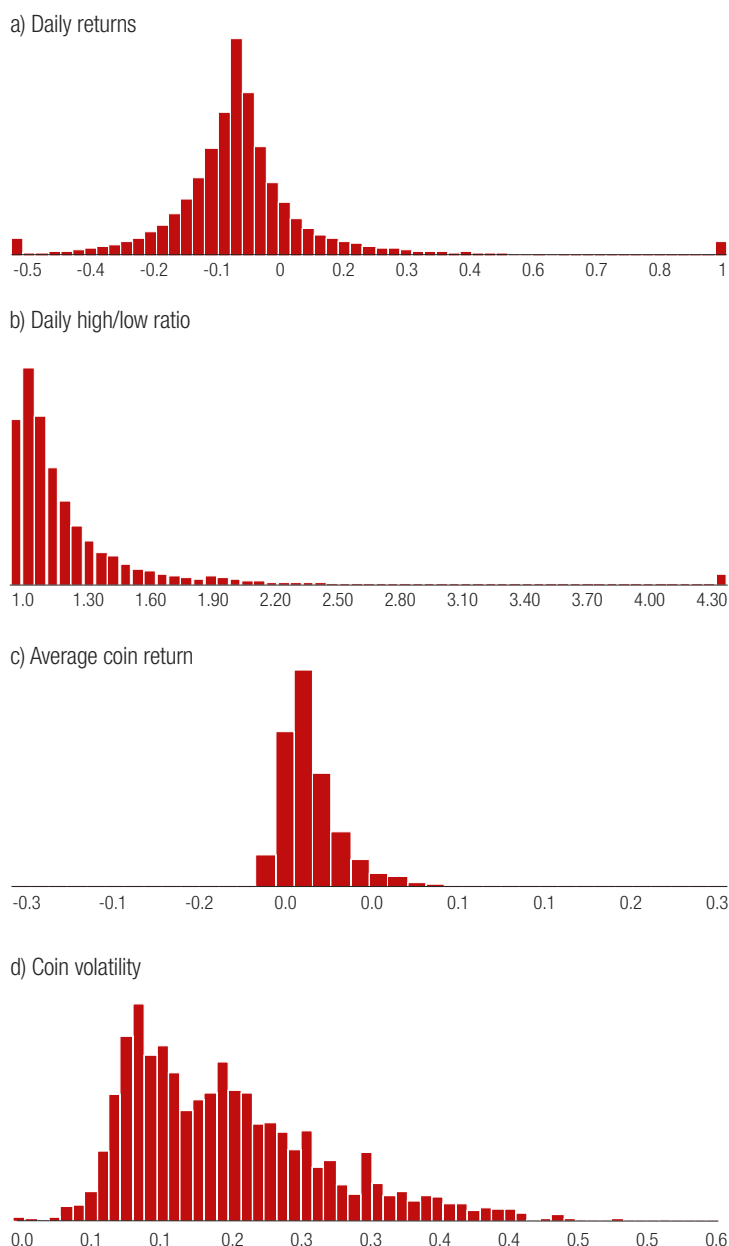
3. Equity tokens: are a sub-classification of security tokens, and constitute, in a sense, 21st century stocks, which record corporate ownership and corresponding voting rights on a blockchain. As with regular stock purchases, token holders own their given percent of the token-issuing enterprise.

4. Pure currency tokens: are digital currencies, with bitcoin being the most prominent example. In most jurisdictions they fall under asset regulations for the purpose of taxation. These tokens do not represent a stake in a third party but derive their value from regular market forces like a commodity.

Although the public discussion about tokens suggests that investors often think of tokens in the sense of stocks, empirical evidence reveals that until today the crypto market has been dominated merely by utility tokens. About 69% of all token sales can be classified into this category and overall utility tokens reflect more than 90% of total funds raised. In contrast, only 5% (or 3% of total funds raised) are reflected by security tokens, with less than a handful of them being equity tokens.

Table 1: Performance on the first listing day

	N	MEAN	SD	MEDIAN	PERCENTILES	
					25 TH	75 TH
FIRST-DAY RETURNS	2,728	0.118	0.313	-0.015	0.021	0.137
HIGH/LOW-RATIO	2,728	3.245	54.181	1.057	1.177	1.494
LISTED CAPITAL (U.S.\$MIL)	2,181	30.737	394.543	0.079	0.996	9.045
CIRCULATING SUPPLY (MIL)	2,181	145,632.4	6,330,972.0	4.830	33.059	206.353

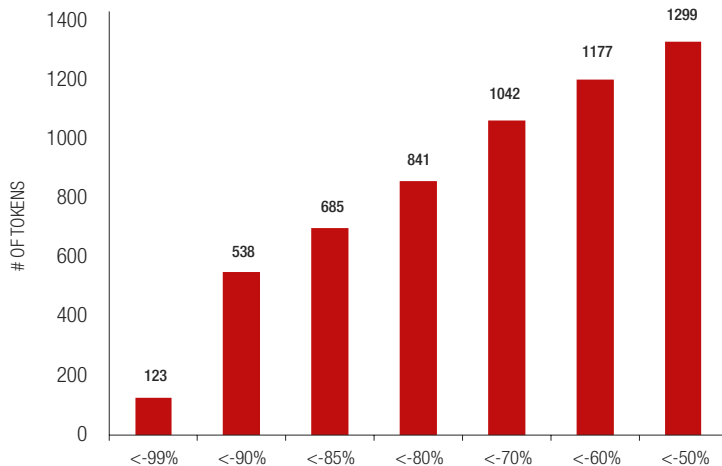
Figure 6: Risk-return characteristics of listed tokens

Despite this public view on utility tokens as quasi-stocks, they have in fact little in common with traditional equities. Among other things, it is probably the increased awareness of this mismatch between public expectations about utility tokens and their actual characteristics that has contributed to a slowdown in crypto market growth and investor interest in token offerings during the second half of 2018. The missing investor protection, the extremely uncertain upside they provide to investors, and the negative market sentiment induced by numerous examples of utility tokens that have been issued with fraudulent intent may explain a significant share of the uncertainty observed in the markets for listed crypto capital during the recent period [for a comprehensive analysis of investor sentiment in crypto markets see Drobetz et al. (2019)]. To get an overview of the historical performance of token offerings, the following section analyzes a comprehensive sample of listed tokens.

4. PERFORMANCE APPRAISAL OF LISTED TOKENS

Though not all tokens have been listed on exchange platforms after issuance, there are nevertheless market prices available for a large proportion of the overall crypto market. Using historical market data from Coinmarketcap for 2,728 listed tokens observed over the period from January 2017 through October 2018, this section presents an overview of the evolution of listed crypto capital as well as an assessment of the risk return profile and lifetime performance of the average token.

Figure 4 shows that listed market capitalization experienced a rapid increase during the second half of the year 2017 and peaked in January 2018. However, although there is a significant number of new listings during that time (see Figure 5a), the major share of the observed growth in market capitalization stemmed from

Figure 7: Overview of token-lifetime performance

a massive price increase in the dominating crypto assets; bitcoin, ethereum, and ripple. That is, the large number of token offerings and subsequent listings over our sample period has not significantly changed the market for listed crypto capital. This becomes even more obvious if we compare the total listing volume by month (Figure 5b) with the overall market capitalization. Furthermore, the decrease in market size for the period from January 2018 until October 2018 is accompanied by a notable wave of delistings (see Figures 5c and 5d). This observation is further in line with the negative trend in token offerings that we already discussed in the previous sections.

To better understand the characteristics of tokens that eventually get listed, Table 1 shows performance measures for all sample tokens on their listing day. First-day returns are significantly positive on average while median first-day returns are negative. The documented percentile values indicate that the distribution of first-day returns is right skewed with some extreme outliers driving the positive performance on average. A similar distribution is observed for token size as measured by the tokens market capitalization. The median token has a market capitalization of U.S.\$0.08 mn while the average token has a total market value of U.S.\$30.7 mn, indicating that the universe of listed crypto capital is driven by a few very large tokens. This picture is also supported when looking at the average (median) circulating supply of our sample tokens.

Emphasizing this investor perspective on token offerings, we note from Figure 6a that the distributional characteristics of daily returns over the full sample does not significantly deviate from that on the first listing day. Figure 6a reveals that the median daily token return is significantly negative. This negative median performance is accompanied by large daily fluctuations in token prices as shown by the widespread distribution of high/low ratios (Figure 6b). Analyzing the average daily performance at the token level, we see that the average token has a slightly positive daily return, though the distribution is right-skewed as well (Figure 6c). In line with the large high-low ratios, calculating daily return volatility at the token level confirms that token investments are extremely volatile and not comparable to stock investments in terms of their risk and return characteristics (Figure 6d). This average daily risk-returns profile of listed crypto assets transforms into a widespread distribution of token lifetime performance in the long run.

Although there are examples of token success stories, the majority of listed tokens shows a poor lifetime performance. Overall, 23% of all tokens that have ever been listed on an exchange platform are reported as inactive in the end. Based on our sample, only 36% of all listed tokens exhibit a positive lifetime performance. This heterogeneity in lifetime performance becomes particularly obvious in Figure 7, where 1,299 of our 2,728 tokens in the sample lose more than 50% in value over their observed lifetime. About 25% of all tokens even lose more than 85% in value. This poor long-term performance might be just a snapshot. However, it was observed during a period when token offerings have been extremely popular. Eventually, these figures demonstrate that investments in crypto assets come with substantial risks [for a more comprehensive review of the long-run performance of cryptocurrency and ICOs, see Momtaz (2018d)]. Strategies to deal with and regulate these risks will be the key to a blockchain-based capital market.

5. LESSONS LEARNED AND NEXT STEPS

Token offerings may be a significant revolution in entrepreneurial and corporate finance. The technical flexibility of smart contracts makes it possible, in principle, to conduct each financial transaction on a blockchain, thereby saving time and money for all parties involved. Additionally, token offerings enable firms to achieve goals that cannot be reached by traditional financing

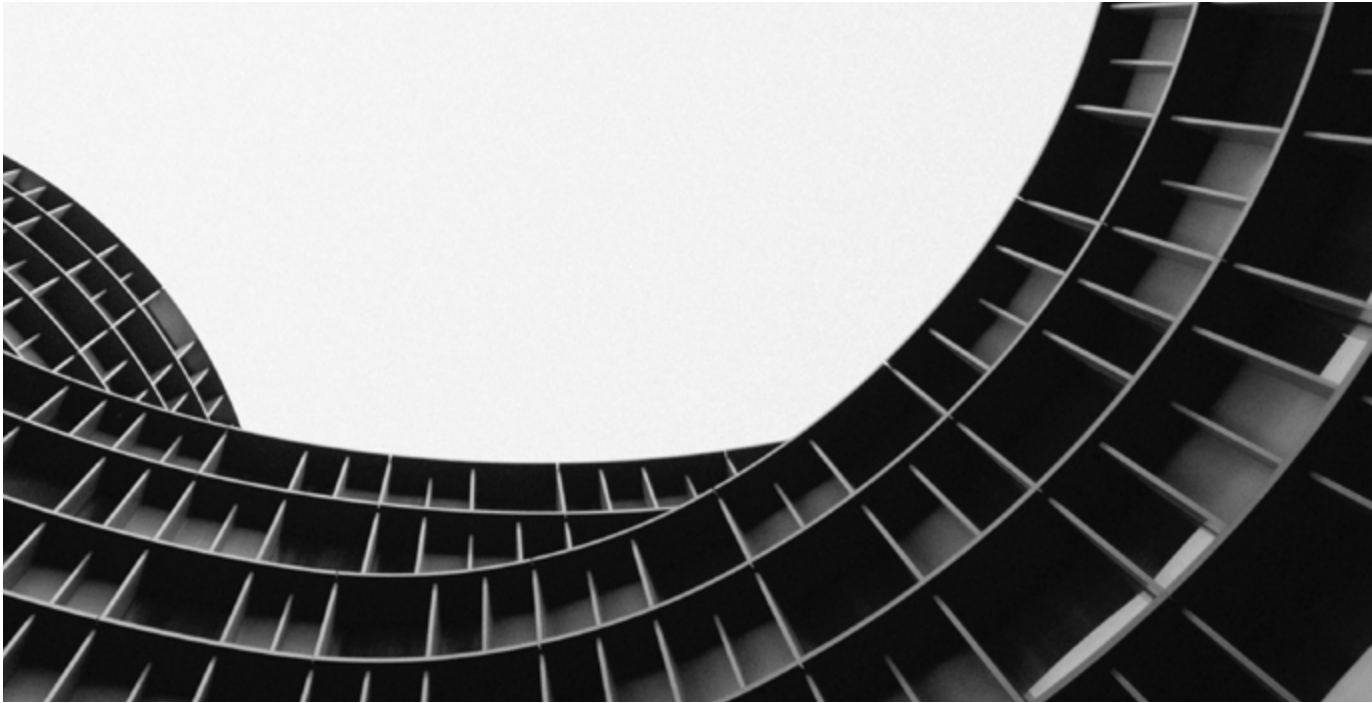
mechanisms such as the unification of the investment and payment instrument and future customer commitment [Momtaz (2019b)].

“Information asymmetries and moral hazard are the main challenges that ventures, investors, and policy-makers need to address for this new industry to flourish.”

However, for the token offerings market to mature, the blockchain-finance industry has to overcome at least two crucial roadblocks. First, perfect disintermediation creates a vacuum of trust [Rhue (2018)]. The first wave of token offerings that we witnessed over the past two years was unprecedented in terms of informational asymmetries. In the absence of hard information, investors rely on professional network profiles [Momtaz (2018c)] and the perceived emotional stability of CEOs during roadshows [Momtaz (2018a)] to gauge the quality of token offerings. But this information is by no means sufficient and hence concurrent studies of the role of information disclosure document conflicting evidence [Blaseg (2018), Howell et al. (2018)]. The high levels of informational asymmetries paired with the fact that the maximum token supply is usually fixed in a token offering may create a severe moral hazard in signaling [Momtaz (2019a), Malinova and Park (2018), Dittmar and Wu (2018)]. Fundraising firms can usually tap the market only once because the maximum token supply is predefined on immutable terms in the underlying smart contract. This may create a moral hazard because firms aim to maximize their funding

amount. Momtaz (2019a) finds that firms exaggerate information in white papers, effectively a moral hazard in signaling, which the investors only learn in the aftermarket when the token price plummets. One potential way out of this dilemma is, paradoxically, the introduction of an intermediary in the market for token offerings. An intermediary would be involved in many transactions, hence has an interest to maintain a trustful relationship with the investor base. This creates an incentive to screen and monitor a firm's signaling and information disclosure, resulting in more efficient markets. The intermediated token offering model could still be superior to traditional methods of external finance by keeping transaction costs (e.g., associated with bookbinding, record-keeping, investor communications, and the settlement of these transactions) at a minimum.

Second, regulators have to catch up with the industry developments to improve investor protection without destroying already functioning market structures. Malinova and Park (2018) report that 85% of the activity in the market for token offerings is fraudulent. There are some impediments to the regulation. First, cryptocurrencies were born partly out of a preference for privacy and the pseudo-anonymous nature of token holders' identities may be an obstacle in identifying and prosecuting shady activities. Second, and more importantly, it is not clear how any national token-law enforcer would be able to prosecute a globally distributed platform on its own. We see two potential ways going forward: one is to create incentives for blockchain-based firms to opt into a national regulation. Switzerland practices such an “opt-in” approach already successfully, creating a competitive advantage over other jurisdictions. The other, perhaps complementary way is for national regulators to form a supranational institution to create international standards and guidelines for token offerings.



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