Why do businesses go crypto? An empirical analysis of Initial Coin Offerings

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Abstract

Initial Coin Offerings (ICOs) allow companies and entrepreneurs to raise money through cryptocurrencies, in exchange for a 'token' that can be sold on the secondary market or used in the future to gain products or services. In the first semester of 2017 only, according to media observers, more than $ 1.2 billion were raised through ICOs, mainly from technology-driven companies in the seed or startup phase.

The ICO surge obviously attracted the attention of both investors and market authorities, given the analogies with Initial Public Offerings (IPOs). The debate about protecting investors from frauds and speculation bubbles as well as hampering money laundering and other illegal practices through cryptocurrencies is gaining momentum, while the ICO potential benefits (e.g. reducing the financing gap for new technology ventures, allowing the design of 'smart contracts' with pledgers and opening secondary markets for exits and trade) are still far to be fully investigated.

In this work we provide the first comprehensive description of the ICO phenomenon analyzing a sample of 253 offerings occurred from 2014 to August 2017. We find that the success rate is quite high (81.0%); projects are originated mainly in the US, Russia, UK and Canada. The project objective is predominantly related to fintech services, to the development of a blockchain, or to the issuance of new cryptocurrencies. ICO tokens grant contributors the right to access to platform services in 68% of the cases, governance powers in 24.9% of the cases ad profit rights in 26.1% of the cases. The secondary market for ICO tokens is quite liquid on the first day of trading, and the initial underpricing is positive (median value +24.7%).

Keywords: Initial Coin Offerings, Cryptocurrencies, Blockchain

This version: September 30th, 2017

1. Introduction

The rise and funding success of Initial Coin Offerings (ICOs) around the world is posing a number of puzzling questions to finance researchers as well as to market authorities. Out of any regulation, which normally applies to business tapping retail investors, dozens of developer teams and entrepreneurs are collecting money in absence of official prospectuses, with no particular protection for contributors and providing a very limited set of information. Provided that it is not clear if the tokens offered in ICOs in exchange for money may represent a financial security (and probably the answer may be different in different countries), the fact is that ICOs represent a new and unexplored source of finance for innovating projects. This work is the first to address the specific characteristics of Initial Coin Offerings in the finance literature[1]. We analyze a sample of 253 ICOs occurred from 2014 to August 2017. We find that the success rate is quite high (81.0%); projects are originated mainly in the US, Russia, UK and Canada. The project objective is predominantly related to the development of a blockchain, or to the issuance of new cryptocurrencies, or other fintech services. ICO tokens grant contributors the right to access to platform services in 68% of the cases, governance powers in 24.9% of the cases ad profit rights in 26.1% of the cases. The secondary market for ICO tokens is quite liquid on the first day of trading, and the initial underpricing is large (mean value +919.9%, median value +24.7%).

The remainder of this work is organized as follows. Section 2 introduces the institutional framework of cryptocurrencies and ICOs. Section 3 describes the sample and outlines the main characteristics of the nascent ICO market. Section 4 concludes with a preliminary discussion and a research agenda for the future.

[1] As at September 24th, 2017, on the SSRN web site only three papers were listed, citing "initial coin offerings" (Enyi and Le, 2017; Venegas, 2017; Yadav, 2017), but none of them carries on a quantitative analysis of the deals. On Scopus only an article from the Economist was listed (see in the References). ResearchGate hosts the paper by Conley (2017), that does not analyse empirical data as well.

2. Cryptocurrencies and initial coin offerings

In 2009 Satoshi Nakamoto, a pseudonymous for probably a team of developers, released its Bitcoin paper (Nakamoto, 2009) and the source code on the Internet, allowing the birth of the first 'cryptocurrency' after the early proposal of the B-money ideated by Dai (1988). In January 2009 New Liberty Standard opened the first Bitcoin trading platform (the initial exchange rate was 1,309.03 bitcoin for one US dollar) and in February 2010 the first payment in Bitcoin was processed, to buy two pizzas, at the price of $ 10,000. In the 2010s the Bitcoin started to gain attention; the first big company to accept Bitcoin was the Wordpress online publishing platform while Overstock.com, Zynga, TigerDirect followed. Today hundreds of large companies worldwide accept Bitcoin for their services including Amazon, Bloomberg, Microsoft, PayPal, Subway, Target, Tesla[2]. In 2017 the proposal for a bitcoin ETF investment vehicle that would be easily accessible to retail investors have been rejected by the US Securities and Exchange Commission. Yet, other financial products like ETNs (listed in countries like Sweden that, contrary to the US, allowed the issuance) and CFDs (derivative products) that replicate the Bitcoin price performance are made available on the markets by brokers.

Bitcoins may be generated by a mining process, solving a wasteful computational problem and receiving in exchange newly minted coins. It is possible to convert these coins with fiat money by simply going through a dedicated exchange platform such as Poloniex or Bitfinex. Bitcoin's protocol intentionally makes mining more and more difficult, meaning that gaining control of a majority of the network would be extremely expensive. The increasing scarcity of the primary issue of new bitcoins – and allegedly the strong demand by wealthy people willing to 'hide' cross-border money flows[3] – sustained the value of the Bitcoin on the market. As of August 2017 the price of one Bitcoin on the Internet is quoted $ 4,119

[2] A comprehensive list of companies accepting payments in Bitcoin is published in http://www.ebay.com/gds/100-Companies-That-Accept-Bitcoins-As-Payment-/10000000206483242/g.html

[3] See https://www.ft.com/content/bad16a88-d6fd-11e6-944b-e7eb37a6aa8e

(it was virtually zero when it first started to trade, in July 2010) and the performance from January 2017 is +315%.

After the Bitcoin, a plethora of cryptocurrencies (i.e. a digital or virtual currency that uses cryptography for security) have been created: Ethereum (born in 2015), Fabric, Corda, Ripple, and many others. As of August 2017, 900 are estimated to be active around the world and the whole capitalization of cryptocurrencies is exploding with a total market value overcoming $100 billion (source: Coinmarketcap.com).

Cryptocurrencies rely on 'blockchain' technologies to create a distributed system of certification and integrity on the Internet, whenever payment transactions occur. Using basic cryptographic tools, individuals who do not know one another reach consensus about the state of the cryptocurrency blockchain without having to rely on a central trusted party, like a central bank (which is normally guaranteeing for the value of banknotes and national currencies). When a cryptocurrency transaction is recorded, a new 'block' that upgrades the account positions of the two parties on the shared ledger is generated, with no need to obtain certification from a third entity (e.g. a bank or a payment agent). The settlement is obtained through a 'consensus protocol' allowed by the 'distributed ledger' technology.

A distributed ledger (DL), as opposed to a centralized ledger like a clearing house or a stock exchange, is essentially an asset database that can be shared across a network of multiple sites, geographies or institutions (Vaizeyv and Hancock, 2016). All participants within the network can have their own identical copy of the ledger. Any changes to the ledger are reflected in all copies in minutes, or in some cases, seconds. The security and accuracy of the assets stored in the ledger are maintained cryptographically through the use of 'keys' and signatures to control who can do what within the shared ledger. Entries can also be updated by one, some or all of the participants, according to rules agreed by the network itself. DL technologies may be permissioned or permissionless, meaning that the consensus protocol (i.e. the set of cryptographical rules in charge of running the DL) may be enforced by anyone or

just by a selection of nodes; Bitcoin is an example of permissionless DL while Corda is a permissioned one.

The interest of the economic world around blockchain and DL technology rose because of the possibilities this technology is expected to deliver, through the capability to decentralize information storage and management across thousands of different memories spread all over the world without a trusted party as a central and only keeper of the validity of the system[4]. Focusing on cryptocurrencies, a number of studies tried to analyze the political economy of the phenomenon (Karlstrøm, 2014; Ennis, 2016; Ametrano, 2016; Bjerg, 2015; Stephanie and Wang, 2014) and explore its impact on traditional market failures stemming from information asymmetry and moral hazard (Schrijvers & al, 2016) (Johnson et al., 2014; Teo, 2015; Davidson et al., 2016). Cryptocurrencies attracted also the attention of policymakers, as a number of public institutions issued statements and created task-forces to study the topic (ESMA, 2017; Condo et al., 2016; Vaizeyv and Hancock, 2016). Despite the claim that blockchains allow secure transactions, it has been possible for hackers to perform malevolent actions exploiting flaws in the system or in some ancillary services linked to blockchains (Faggart, 2017); for example it was possible to steal several millions in Bitcoin from the Japanese platform Mt. Gox in 2014 and $50 million in Ether during the DAO attack in 2016.

As soon as cryptocurrencies were discovered to be a new mean to clear payments, the opportunity to use cryptocurrencies to raise finance immediately rose, through Initial Coin Offerings. ICOs may be defined as open calls for funding promoted by project initiators, where cryptocurrencies are provided in

[4] An example is a paper from Goldman Sachs (Boroujerdi and Wolf, 2015) envisaging that blockchains would have been able to "make central banks retire". The nascent literature on blockchains depicts the range of applicability nearly as wide as the Internet itself (van der Veer and Gielen, 2016). Applications other than cryptocurrencies include financial markets (Biella and Zinetti, 2016), custodian services, supply chain management and trade finance (Ream et al., 2016), Internet-of-Things (Dorri et al., 2016), policy making (Condos et al., 2016). See also Morgan (2016). Banks like BNP Paribas are experimenting blockchains to settle payments among companies (see https://group.bnpparibas/en/press-release/bnp-paribas-completes-real-time-blockchain-payments).

exchange for tokens that can be sold on the secondary market or used in the future to gain products or services[5].

One of the first ICOs was organized by the DAO (Decentralised Autonomous Organization). The campaign targeted $ 500,000 but was actually able to raise $ 150 million. The DAO was conceived to become a decentralized venture capital vehicle where funds would have allocated on the base of votes where the weight of each shareholder was based upon the quantity pledged during the ICO. According to its creator, Christoph Jentzsch, the DAO should have been able to let contributors to maintain real time control over their funds and to completely automatize through software the enforcement of governance's rules. The DAO had been built upon the Ethereum infrastructure and the rights and obligations of the firm towards the pledgers and vice versa were written in the code. Unfortunately, because of a major fault in the code.

Initial Coin Offerings typically requires the disclosure of a document ('white paper', or 'token sale term') in which a number of information are contained, regarding the IT protocols, the adopted public blockchain, the token supply, pricing and distribution mechanism, details about the project to be developed (eventually a business plan including the team description). At a given time the fundraising opens, and it will be possible for pledgers to bid for the project. Usually campaigns accept Bitcoins and Ethers, but they do not disdain to receive also commitments in fiat money through the backup of some financial institution: a notable example is the Tezos ICO that was supported by Bitcoin Suisse AG through contributions in fiat money. DL technologies theoretically allow the design of complex claim structures ('smart contracts') offered to pledgers that normally are difficult to be managed. For example, money could be released only upon occurrence of certain events as for an escrow agreement, or particular rights could be attributed to early contributors like the ownership of a token, which can be spent to obtain a service or that can be traded, or polls might be organized among pledgers.

[5] Note that the definition is very similar to the notion of a crowdfunding campaign, where traditional currency is collected (Belleflamme et al., 2014). Similarities and differences are discussed in the Conclusion.

Initial Coin Offerings raise a number of issues, which the literature is starting to address. The first issue is the optimal technical design of an ICO as to prevent any kind of fallacies in the code or simply attract contributors (Conley, 2017; Yadav, 2017). The second issue is the relationship between ICO activity and regulations (Enyi and Le, 2017). Normally, companies and entrepreneurs have to issue public prospectuses, approved my market authorities, whenever they want to tap the public of retail investors in order to collect money, in exchange for securities. Therefore, the main question is: are ICO pledgers subscribing equity securities? In the US the 'Howey test' is commonly adopted to assess what is a security or not (Bramanathan, 2017)[6]; in the EU the MiFID regulation is intended to define 'transferable securities'; other countries are characterized by similar regulations.

On July 2017 the Securities and Exchange Commission warned investors[7] about the risks of joining an ICO, stating that the DAO tokens were securities, thus subject to federal laws. In September 2017, the Commission charged two ICOs, alleged to be placing unregistered securities. Previously, the Ontario Securities Commission also advised promoters that initial coin offerings could trigger securities law requirements[8]. The European Securities and Markets Authority (ESMA), which is the EU's securities agency, has not issued any public statement on ICOs yet. Other countries, like Switzerland and Singapore, seem to adopt a friendlier approach to ICOs, as to attract fintech startups. The Australian market authority issued a document[9] stating that "ICOs have the potential to make an important contribution to the options available to businesses to raise funds and to investment options available to investors", however specifying that "an ICO must be conducted in a manner that promotes investor trust and confidence, and complies with the relevant laws".

[6] Under the Howey Test, a transaction is an investments contract if: (i) it is an investment of money (or other assets, as later case salso included) (ii) there is an expectation of profits from the investment (iii) the investment of money is in a common enterprise (iv) any profit comes from the efforts of a promoter or third party.

[7] See https://www.sec.gov/oiea/investor-alerts-and-bulletins/ib_coinofferings

[8] Interestingly, the market authority also stated that "Many uses of distributed ledger technologies have the potential to increase transparency and efficiencies in our capital markets, and we are keen to support this type of innovation". See http://www.osc.gov.on.ca/en/NewsEvents_nr_20170308_osc-highlights-potential-securities-law-requirements.htm

[9] See http://asic.gov.au/regulatory-resources/digital-transformation/initial-coin-offerings/

At the opposite, in September 2017 China and South Korea declared ICOs illegal, asking all related fundraising activity to be halted immediately, and refunds to be provided to contributors of past offerings.

3. Empirical analysis

We collected information from the Internet for 253 ICOs that occurred from 2014 to 2017, of which 205 (81.0%) successfully closed their offering. ICOs can be labelled as 'failed' for a number of reasons. The main reason for unsuccess is not having reached their minimum funding goal, in which case the general practice is to refund contributors, but this has not always been the case. However, a failed ICO may also be the result of a security flaw (i.e. a successful hacker attack) and the consecutive retirement of the sold tokens, or a suspension on a planned distribution. Moreover, an ICO may reveal itself to be a scam, or at least perceived as a scam by the online community, resulting thus in very low amount or zero amount of funding. Finally, there are cases where low demand for the token being offered results in the project promoters stopping the crowd sale.

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Figure 1. Time flows of Initial Coin Offerings

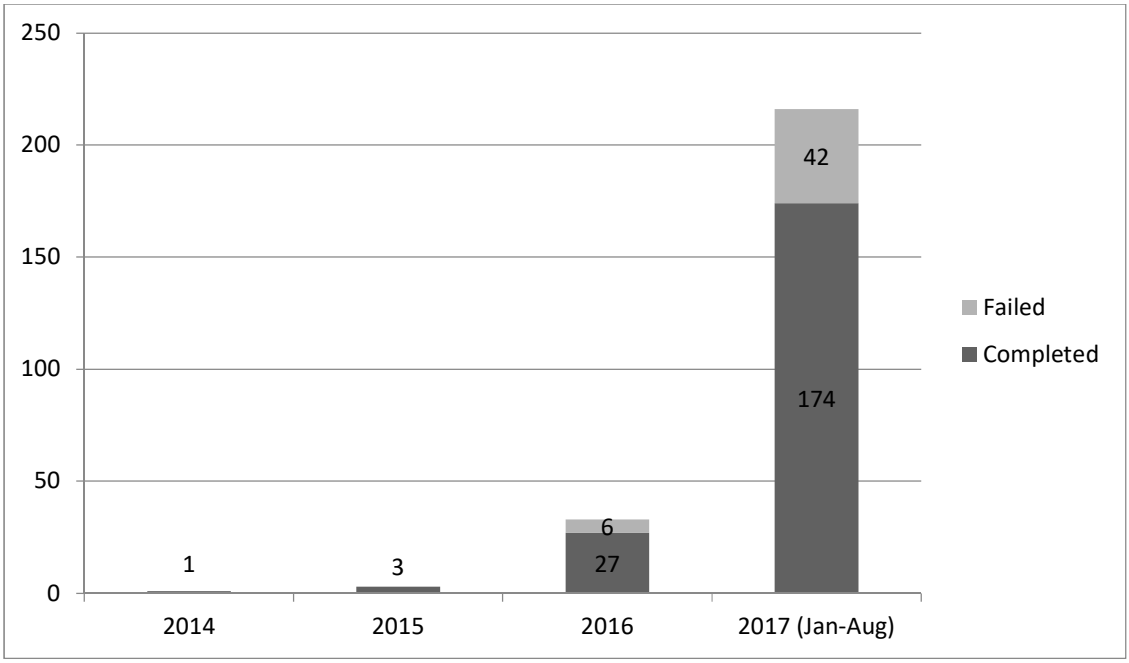

Table 1 reports some basic statistics about the sample, obtained from information available on the Web and the official 'white papers' (that is available in 213 cases, 84.2% of the sample). The ICO geographical distribution (according to the predominant nationality of the team or of the project) sees the US in the frontline (47 projects), followed by the Russian Federation (17 projects), UK (14) and Canada (11). Interestingly, some projects have been proposed from Singapore and Switzerland, countries that issued specific actions for fintech companies. Many projects cannot be attributed to a dominant country of origin, while 31 projects (12.2% of the sample) adopt a 'decentralized governance' mechanism, i.e. project promoters cooperate online from multiple locations in the world with no incorporation of the business, thus fully adopting the decentralization philosophy that is the basis of the DL technologies. In a limited number of cases (21) the white papers specify the jurisdiction that is regulating the token sale. In these instances, we often find Singapore, Gibraltar, Cayman Islands, Virgin Islands, Delaware and Estonia as choices of jurisdiction. For instance, Starta, a startup incubator project with a Russian team, has

incorporated in the friendly jurisdiction of Singapore. There is also the case of a crowdfunding platform project (Starbase) that specified in its white paper the ongoing effort to search for the "right jurisdiction" by contacting lawyers from Luxembourg, Singapore and Switzerland. The fact that the majority of the ICOs were successful despite the absence of a regulatory authority of reference for the token sale shows that investors have been quite insensitive to the regulatory issues and the lack of protective measures regarding their investments. Furthermore, most ICO promoters delegate the assessment of investment eligibility to investors themselves, i.e. the responsibility of checking whether they are eligible to invest in the token offering according to their country of residence regulations relies solely on the potential investor.

On the other hand, potential investors have been sensitive to the technological aspects of the projects being presented. Indeed, projects with full or partial code transparency account for only 20.8% of the failed offerings, while those without any code made publicly available account for 70.8% of the failures. The discrepancy is accounted for by failed ICOs on which information regarding the code availability at the time of the offering were not retrievable.

The sample ICOs succeeded in raising $ 1.939 billion, but the real amount is for sure larger, because for 34 completed deals the value is not available. The largest ICO belongs to the Swiss project Tezos, that raised about $ 232 million, in July 2017. The project aimed at providing an alternative to Ethereum with a stronger distributed governance system, through a different protocol called "Proof of Stake", instead of the "Proof of Work", and with a different approach within the language used to build smart contracts. In the sample we have 50 projects that raised $ 10 million or more.

The most popular blockchain chosen as underlying technology for the projects is not the Bitcoin (only 13 projects adopted it) but the Ethereum (143, more than 50% of the sample). This choice may be explained by the fact that the latter, differently from Bitcoin, was developed from the beginning with

the purpose to hold on itself quite complex "Turin complete" smart contracts. In 16 cases Waves is adopted, while in 56 cases the promoters aimed at developing their own blockchain.

Table 1. Initial Coin Offerings' characteristics. Sample: 253 ICOs occurred from 2014 to August 2017

Country of origin	Number	%
USA	47	18.6%
Decentralized/mixed	31	12.2%
Russian Federation	17	6.7%
UK	14	5.5%
Canada	11	4.3%
China	10	4.0%
Switzerland	10	4.0%
Singapore	9	3.6%
Others/NA	104	41.1%
Blockchain adopted		
Ethereum	143	56.5%
Own	56	22.1%
Waves	16	6.3%
Bitcoin	13	5.1%
Others/NA	25	9.9%
ICO stage		
Initial	223	88.1%
Follow-up	8	3.2%
Presale	22	8.7%
Bonuses		
Early bird	127	50.2%
Early bird + major contributor	8	3.2%
Others	3	1.2%
None/NA	115	45.4%
Code availability		
Yes	109	43.1%
No	100	39.5%
N/A	44	17.4%

In most cases (223) ICO projects were collecting money for the first time, while in 8 cases we have follow-up offerings; the remaining 22 offerings were at the presale phase, thus supposed to be followed by a more diffused ICO.

Similarly to a crowdfunding campaign, ICOs frequently reserve bonuses to early bird investors: this happens in 127 sample offerings. In 8 cases the early bird discount includes a 'major contributor' premium, i.e. a bonus for investors contributing with larger amounts. Then, 37.2% of the offerings presents no bonus scheme, while for the remaining there is no specific information about the topic.

The disclosure of the programming code source is an important variable, because it allows the community to pre-assess the technical validity of the offer and the actual state of the project. In its absence, savvy investors could imagine that there is nothing behind the ICO, and for developers it could be difficult to create other applications that may rely upon it, potentially increasing the overall value of the investment. In our sample, the code was made available in 109 cases, while in 100 cases it was not disclosed.

The funding target is difficult to be computed, because in most of the times the ICO price is defined in a cryptocurrency[10] (in 42 cases Bitcoin, in 89 cases Ethereum), but in our sample we have projects that raised in CHF (4), EUR (only 1 case) and USD (84 cases). Due to the significant volatility of cryptocurrencies, the exchange rate in USD can change a lot in a few days. Therefore, we measure the funding target using the average exchange rate computed during the ICO period (on average ICOs are open for 27 days, but the duration is very heterogeneous – some ICOs close in a few days, other are open for some months). Similarly to crowdfunding campaigns, usually a minimum and a maximum funding target are defined. The average values are equal to $ 635,617 and $ 579 million respectively. This is quite a wide range, and indeed we observe that in many cases the funding target is rather uncertain: this means that project promoters do not typically exhibit a detailed budget for future investments[11]. Moreover, some startups establish did not disclose minimum and maximum funding

[10] Note that the ICO price currency may be different from the blockchain adopted, which is described in Table 1.
[11] For the same reason, it is difficult to define a measure of 'oversubscription' comparing the demand for tokens with the ICO supply.

caps, either for the project or for the single contributor, which are supposed to prevent large market participants to manipulate the market or control the supply.

Similarly to IPOs (where both institutional investors and small retail investors are reserved tranches of securities), ICOs often are segmented into different offerings, targeted to specific investors: the community users, the project managers, bounties (i.e. rewards for contributors that supported the promoters to solve technical problems of the project or increase its value), and – obviously – the crowd of the Internet investors. The intended specific use of proceeds is detailed in 78 cases only (30.8%) and divided among software development, marketing activities and business development/operations. In 85 cases (33.6% of the sample) a presale phase was organized, reserved to selected partners, before the launch of the ICO.

Table 2. Typology of ICO projects. Sample: 253 ICOs occurred from 2014 to August 2017

Project	Number	%
Financial services/fintech	39	15.4%
Smart contracts	32	12.6%
High tech services	24	9.5%
Marketplaces and exchanges	24	9.5%
Investments/VCs/Incubators	18	7.1%
Gambling platforms	16	6.3%
Gaming	14	5.5%
Media and entertainment	14	5.5%
Payment solutions	13	5.1%
Advertising	7	2.8%
Adult entertainment and services	6	2.4%
Others/miscellaneous	46	18.2%

The sample ICOs aimed at collecting money for very heterogeneous types of projects (see Table 2). Not surprisingly, the majority of them refer to the creation of innovative financial services (39 cases), the development of new (or existing) blockchains and evolved smart contracts (32), the provision of high tech services on the blockchain (e.g. cloud computing or telecom services) (24), and the inauguration and operation of decentralized marketplaces and digital asset exchanges (24). We find also activities

that are usually considered as unethical (gambling/betting and adult services/entertainment, with 16 and 6 projects respectively). In 18 cases the ICO aimed at raising money to be invested in financial securities and funds (comprising venture capital), or developing startup incubators, some exclusively directed to the crypto-investments or green-investing. We find also curious cases, like cannabis marketplaces and the 'Star Wars' coin (the digital currency of the decentralized Star Wars community).

The rights attached to the token offered in the ICO are a key variable, because they contribute to qualify the issuance as a security offering or not. Table 3 shows that often (68.0% of the cases) ICO contributors are rewarded through an exclusive access to the services offered by the platform project. Tokens may be used as a currency in commercial transactions in 20.9% of the cases (assessment based mostly on the project's intention to create a new blockchain instead of relying on an existing one). Governance rights (like voting in decision polls) are granted in 24.9% of the ICOs while profit rights are offered in 26.1% of the cases. Contribution rights (i.e. the opportunity to determine the characteristics of the product/service to be offered) are given in 15.8% of the projects only, and are a stronger, more formal mechanism to allow for community-based innovation and product tailoring than what has been happening in the past years with reward-based crowdfunding. It is important to notice that each token may assume multiple roles and grant different rights to the holders and this adds to the difficulty of pinpointing the type of financial security that may be compared with.

Table 3. Rights attached to ICO tokens. Sample: 253 ICOs occurred from 2014 to August 2017

Right	Yes	No	N/A
Currency	53 (20.9%)	180 (71.1%)	20 (7.9%)
Access to platform services	172 (68.0%)	61 (24.1%)	20 (7.9%)
Governance decisions	63 (24.9%)	170 (67.2%)	20 (7.9%)
Profit rights	66 (26.1%)	167 (66.0%)	20 (7.9%)
Contribution rights	40 (15.8%)	193 (76.3%)	20 (7.9%)

Focusing on the 205 successful project, Table 4 highlights that the number of contributors (available for 56 projects only) is on average equal to 4,121 while the median is 2,394.

ICO tokens may be sold on a secondary market where sellers can deposit their tokens decreeing some parameters like minimum prices, accepted currencies and so on. Then exchange platforms will automatically search for best matches and execute the trade. We collected information about the trading volume on the first day (available for 133 projects) and we find that the average value is 792,034 tokens or about $1.23 million (median value 22,105 tokens or $4,279). This shows that in many cases the secondary market for ICO tokens is relatively liquid considering the absence of a fully regulated listing process. Taking stock on the IPO literature, we also computed the first-day underpricing, i.e. the percentage difference between the first-day closing price on the crypto-currency exchanges and the ICO price. The value is available for 140 observations, and it is negative for 34.7% of the ICOS; the mean value is +929.9% while the median value is +24.7%.

Table 4. ICO outcome. Sample: 205 successful ICOs occurred from 2014 to 2017

	Mean	Median	Observations
Number of contributors	4,121	2,394	56
First day trading volume (tokens)	792,034	22,034	140
First day trading volume ($)	1,232,809	4,279	140
Underpricing	+919.9%	+24.7%	140

4. Conclusions

Our analysis uncovers the characteristics of the nascent market for ICOs, where tokens are offered to the Internet users in exchange for new project and business financing.

Despite the quality of information provided by proponents is typically poor, the ICO success rate is remarkably high (81%). Project heterogeneity is quite significant, and only a minority of the campaigns can probably be considered as a security offering. We advance several concerns about the quality of the

entrepreneurial projects seeking for ICO money and future research should accurately analyze the business model and the use of funds.

Moreover, despite the existence of various web portals portraying themselves as ICO data providers, all have very limited and partial data. Further studies should scan the Internet, extracting whatever data is available from a variety of sources, including crowdsale announcement posts and the news pre- and post-campaign, but also the growing number of social media discussions on ICOs in which investors and project promoters contribute to shed some light on the processes being undertaken.

The market for ICOs shares several features of the crowdfunding realm, including low protection of contributors, limited set of information available, no relevant track record for the proponents. Probably, ICO contributors are also driven by intrinsic motivations, similarly to crowdfunding. The difference is that typically crowdfunding portals collect fiat money through traditional payments channels (banks, credit cards), while ICOs offer tokens and rely on cryptocurrency blockchains, out of any centralized control. ICO promoters are starting to implement contractual provisions to protect investors, like escrow accounts.

The research agenda on ICOs is just at the beginning. A number of questions are open: What are the benefits and threats of collecting money through cryptocurrency blockchains instead of fiat money? Should investors be better protected against the risk of frauds, both on primary and secondary markets? More generally, should ICOs be regulated? Why do online investors seem so eager to provide such a significant amount of funds to ICOs? What are the determinants of the ICO campaign success? Do ICOs have the potential to increase the efficiency of new business financing or are there just a new Ponzi scheme?

Hopefully, this empirical investigation will also be useful to the growing number of online contributors that are actively seeking ICOs in which to invest, considering that, on average, there has been an

enticing secondary market for the tokens and that a remarkable amount of money is left on the table by the project promoters, as the current underpricing levels demonstrate.

We believe that ICOs have a significant potential in funding 'decentralized' cross-country teams of developers, favoring open innovation. Despite some countries banned ICOs, others are clearly signaling the 'borders' that shall not be overcome and will probably better regulate token offerings in order to avoid frauds.

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