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What determines Initial Coin Offering success: A cross-country study

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Abstract

We investigate the determinants of ICO campaigns' presence and success using data on 503 initial coin offerings (ICOs) from 60 countries that took place between 2015 and 2018. We took individual project perspective and country-wide perspective into account. Our findings show that expert ratings, insider retention, and resource-related signals, such as the number of team members and advisors, contribute positively to ICO funding success and post-ICO activity. Conversely, organizing presale and bonuses contribute negatively. Moreover, we established that countries' financial system development and ICO-related legal certainty boost the crypto-market. More importantly, we also document that countries' cultures foster ICO market development.

Keywords: Initial Coin Offering, corporate finance, innovation, entrepreneurship,

JEL codes: G10, L26, M13, O30

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1. Introduction

Entrepreneurs require funding to develop their new products or services that can be substantial for highly innovative ventures due to high research and development costs. In the past, many new ventures such as Apple, Skype, or Facebook used Angel Investors or Venture Capitalist to finance their early stages of the ventures. However, the development of social media and blockchain technology led to new ways of raising capital in recent years.

Initial Coin Offering (ICO) is one of the new methods to raise capital for entrepreneurs' projects by selling digital coins or tokens[2]. The crypto-market is growing in terms of the number of digital coins, its market capitalization, and volume traded on the market. There are 4,431 cryptocurrencies traded, and their market capitalization was close to 257 billion USD as of July 2020[3]. However, the market is dominated by Bitcoin that represents around 65% of the value and trade on the market.

The digital coins or tokens acquired in ICO give certain rights, as the right to use the platform service that is being developed or ownership right. Nonetheless, the payment varies and depends on the nature of the ICO's structure and the participants' activities (Financial Stability Board, 2018). The coins or tokens can be exchanged for other crypto-assets or even potentially fiat currencies in the secondary market. ICOs are a mix of crowdfunding and blockchain. Yet, at the same time, however quite similar to Initial Public Offering (IPO), its uniqueness lies in basing the entire process on crypto-assets and avoiding the usual regulations and restrictions on IPOs (Allen et al. 2020). Moreover, there is no one commonly accepted taxonomy of the new-type assets, one can assume that the term "crypto-asset" has the widest scope. European Banking Authority (2019) defines crypto-assets very broadly as a type of private assets that

[2] A crypto-asset (broadest category) may also be defined as a digital representation of the value or rights that may be transferred and stored electronically. This is done using distributed ledger technology or similar technology (*Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on Markets in Crypto-assets, and amending Directive (EU) 2019/*1937; COM(2020) 593 final; 2020/0265 (COD)). Crypto-assets are sometimes equated with the category of cryptocurrencies. The most important are Bitcoins (BTC) and Ether (ETH). While terminological simplification is quite convenient, in our opinion, the distinction between cryptocurrencies and the broader category of crypto-assets is justified due to the different functions of these tools. While cryptocurrencies are intended to be used for settlement in the first place, tokens issued during ICOs are essentially closer to shares.

[3] https://www.coinlore.com/

depend primarily on cryptography and distributed ledger technology. It presents three basic categories of crypto-assets, which include: payment, exchange, currency tokens, investment tokens, and utility tokens.

In the process of ICO, the company issues tokens: investment or utility tokens to finance a business venture, usually at an early development stage. Investors can engage in the project and receive tokens. Tokens may have features of financial instruments, or incorporate some utility rights, in particular, right to use the product or service when finally launched on the market. The venture is presented to the public often with a document called *White Paper*. Moreover, the company organizes a marketing campaign to raise interest in the planned business venture and prepares the supporting blockchain-based infrastructure. Ethereum has been so far the platform for the vast majority of the ICOs (over 84% in 2018) (Pozzi, 2019). Tokens may be traded directly or on the crypto-assets exchanges.

The innovative technology involved and the lack of legal provisions (regulatory gap) or relatively less stringent regulatory framework has made ICO a flexible and quite convenient funding mechanism for start-up companies. The global scale of ICO is economically significant toward the end of our sample period. The total amount raised worldwide in 2018 is almost $11.4 billion, while in 2017, it amounts to $10 billion (Pozzi, 2019). However, the dynamic growth of ICO has significantly declined since 2019. One explanation for the situation is the declining trust in the market by investors.

ICO is a new phenomenon in the financial system and remains a largely under-explored area of research. Understanding the determinants of ICO presence and success would be of immense interest to the broad audience. In this paper, we strive to shed light on the factors that foster or hamper the ICOs market in the period of its flourishing development. To do this, we conduct research based on two pillars. First, we focus on the individual ICO project perspective, such as the elements of the ICO strategy chosen by the issuer company (ICO beneficiary). Second, we aim to establish the country-level factors that shape widely-understood conditions for ICO as a new fundraising method in the economy.

We contribute to the literature twofold by investigating project-level ICO's success determinants and country-level determinants. First, we supplement the existing research by exploring interlinkages between ICO successes, including post-ICO company performance and a set of variables related to the strategy of a particular ICO project. Our study allows us to verify the thesis that the ICO campaign success factors

are well described by signaling theory (Spence, 1973). However, signals need to be chosen carefully with a deep understanding of specific ICO market features. We believe that this research is essential from a practical business perspective and as an empirical contribution to the signaling theory.

Second, we extend the existing studies, particularly Huang et al. (2020), employing the number of ICOs as dependent variables and successful ICOs. Additionally, we explore a wide range of potential independent country-level variables such as technology, financial, cultural, legal, and policy uncertainty affecting the ICOs. Moreover, our analyses shed light on the issue of whether the interlinkages between national culture dimensions by Hofstede (1980) and fundraising campaigns' successes are similar in the case of IPOs and ICOs.

The rest of the paper is organized as follows. Section 2 reviews shortly the two main strands of empirical research in finance in this article refers. Section 3 describes our data and methodological approach. The empirical results are presented and discussed in Section 4, and Section 5 concludes.

2. Literature review

ICO is a new phenomenon. Consequently, the literature that focuses directly on ICO remains limited. ICO resamples IPO, thus, we will focus on the literature related to corporate finance. First, information asymmetry may play a role in the ICO market, owing to the lack of disclosure obligations. Due to the low transparency in the ICO procedures, one can expect that investors may try to assess the attractiveness of investment by tracing signals sent by a company (Ahlers et al., 2015).

The signaling theory (Spence, 1973) suggests that founder involvement and/or presence of well-respected professional investors are positively associated with the success of a given fundraising campaign on new business ventures, as these factors send a positive message about the company to the public (Ahlstrom and Burton, 2006; Jääskeläinen, 2006; Schwienbacher, 2007). As the aim of a company conducting ICO should be to maximize the difference between expected remuneration (financing obtained) and signaling cost, one may assume that signals sent by thin-capital start-ups would not be resource-consuming.

Based on the signaling theory, ICO issuers need to send a strong signal to mitigate information asymmetry concerning project quality and founder credibility to increase the chances of success. Ahlers et al. (2015) analyzed the determinant of success

by comparing donation crowdfunding, reward-based crowdfunding, and lending crowdfunding. They argued that assessing entrepreneurial signaling to small investors is the most relevant methodology for studying equity crowdfunding. Similarly, Courtney et al. (2016) documented that the usage of media in promoting fundraising campaigns and prior experiences increase the likelihood of crowdfunding success. Vismara (2016) found that the founders' equity retention may signal their beliefs in the project and contribute to fundraising success. While Mollick (2013) shows that management team composition may be a part of the signaling strategy and foster the fundraising campaign.

ICO is a close substitute for IPO or fundraising, including all the attributes of funding mechanisms. ICO has several attributes that lead to its popularity as fractional ownership, ease of transferability, and liquidity (Amsden and Schweizer, 2018). However, whether an investor can cash out depends on ICO success and the coins' tradability. Henceforth, investors' proper due diligence is of utter importance due to the lack of regulations and adequate screening mechanism. Accordingly, sending the right signal to the investors may determine the success of the ICO.

Amsden and Schweizer (2018) showed that CEO characteristics and team size is an important signal on venture quality, positively correlated with ICO success. De Jong et al. (2018) reported that ICOs are more successful when they disclose more information to investors and have a higher quality rating by cryptocurrency experts. Moreover, they reported that refraining from offering bonus schemes, shorter planned token sale durations, and larger project teams increase the likelihood of successful fundraising. Giudici and Adhami (2019) examined the relationship between governance issues and ICO success. They documented that the project team and advisory committee size are positively and significantly correlated with ICO success. Correspondingly, Fish (2019) showed that technical white papers and high-quality source codes increase the amount raised in ICOs. Feng et al. (2018) documented that providing technical details in the white paper can be an effective way to signal an ICO project's quality.

Implementing the project owners' efficient signaling activities is crucial in overcoming the problem of significant information asymmetry present in the ICO procedure. However, there are also vital environmental and country-level determinants of fundraising success. There is a scarcity of literature investigating features of a favorable environment for ICO business. The empirical study by (Huang et al., 2020) was aimed at exploring, the force behind the emergence of ICOs across countries. The

authors indicated developed financial systems, public equity markets, advanced digital technologies, flourishing crowdfunding sector presence, and ICO-friendly regulations. However, the literature focused on traditional financing methods, such as IPOs bringing context to our study. Gupta et. al (2018) contributed interestingly to institutional finance by providing an empirical study on associations between culture and IPO market. Based on the second pillar of our research we can verify whether similar mechanisms and interlinkages between deeply rooted institutions and the ICO market exist.

3. Data and research strategy

The initial sample consisted of 2,568 ICOs listed on ICObench[4], made public from August 2015 until September 2018. We retrieved details about the ICO either from ICObench or the company's website. However, the detailed information on ICO is available only for a limited number of projects. As a result, the final sample consisted of 503 ICOs from 60 countries worldwide. The sample represents 20% of the original sample, and in our opinion, is representative of the overall sample. Figure 1 presents the geographic distribution of the sample.

[Figure 1]

Conversely, the visual analysis presents a significant distribution of the ICOs across the countries over the sample period. The figure shows some countries with a relatively higher number of ICOs than others. Figure 2 shows the top ten countries by the number of ICOs in 2018. Thus, the countries with the largest number of ICOs are the United States, Singapore, and the United Kingdom, respectively. Notwithstanding, the largest number of ICOs do not correspond with the fundsraised, as shown in Figure 3. The first three countries with raised funds are Singapore, the United States, and the United Kingdom, respectively. The following countries however differ between the number of ICOs and the fundraised. The existing ICOs' geographic dispersion shows, in our opinion, that country-level factors may be important for the ICO market's development.

[Figure 2 and 3]

[4] https://icobench.com/

3.1 ICO-level variables

In our study, we included capped and uncapped ICOs. However, the capped ICOs present the vast majority (de Jong et al, 2018). In an uncapped ICOs, the token supply is unlimited, and/or its price is priorly unknown. Conversely, in the capped ICOs, the company sells a limited number of tokens at a given price. The company may set two funding goals in a capped ICO: a soft cap and a hard cap. Similar to classic crowdfunding, the ICO team might choose to set up a soft cap, which is a minimum amount to be raised. If this amount is not reached, the ICO does not take place, and the company returns funds to participants. The team of a beneficiary company usually sets a hard cap, which is the maximum amount that can be raised in the ICO. An ICO takes place only if the funds raised exceed the given soft cap, even if the hard cap has not been reached. In some ICOs, the hard cap is provided. Nonetheless, such a process may not be well received by potential investors (Bachmann et al., 2019). Henceforth, an ICO without a hard cap is rare in the ICO market.

In our study, we employed two dependent variables to reflect funding success. The first variable is a binary variable *Softcap* that takes the value 1 if the ICO reaches its minimum threshold, and 0 if otherwise. In some of the ICOs, there is no soft cap. Consequently, our variable takes the value 0. Similarly, the second binary variable *Hardcap* equals 1 if the maximum amount had been raised, and 0 if otherwise. In those cases where no soft cap or hard cap was raised, the binary variables equal 0, respectively. The data on hard cap and soft cap for the project in our sample we retrieve from ICObench.

Additionally, we follow the development of the ICO and examine whether the project was successful. In our study, we employed three measures of ex-post success. Our first measure was a proxy for the survival of the project. We measured it using a binary variable *Online* that takes the value of 1 if the project website was still online in March 2019 and 0 if otherwise. The information about whether a project is still alive was checked using the Google search tools. Our second measure was strongly related to the first measure and the activity of the project on Twitter. The binary variable *Twitter* equals 1 if the company's official Twitter account running the ICO has tweeted at least once since 1st January 2019. The data is extracted from Twitter and has been recovered on March 12, 2019. Lastly, we measure ICO tradability by employing the variable *Coinmarket* that takes the value 1 if the token sold in ICO is listed on

Coinmarketcap as of March 2019, and 0 if otherwise. Coinmarketcap is an extensive and transparent tracking website that has strict guidelines for listing a new token. A new token to be tracked by Coinmarket must be publicly and actively traded on at least two quality exchanges recognized by the website.

In the regression, we controlled several characteristics of the ICO process that may determine its success and post-performance (De Jong et al., 2018). The variable *Duration* provided control for the length of the ICO process. The variable is measured in days as the difference between the end and the ICO start date. It uses the actual end date and not the planned duration as it accounts for ICO that reach their hard cap before the end date, therefore stopping the fundraising campaign.

We provided control for the *Rating* of the ICO that may play an important role in taking into account the asymmetric information problem during the process. The rating is proxied by the ICO rating displayed on ICObench that has a maximum grade of five showing a high-quality ICO and a minimum of 0 depicting a poor-quality ICO. This rating considers two different types of ratings. The first one is the 'Benchy' rating, which is an average of four algorithmic ratings that assess the legitimacy and credibility of the team, essential information disclosed by the ICO team, product presentation[5], and project marketing and social media usage (ICObench FAQ, 2019). The second rating is made by blockchain and ICO experts voluntarily. The experts' rating is the average rating of three components: the team, vision, and product. The weight associated with an expert rating depends on the number of ICO reviewed by such an expert and their overall knowledge recognized by the community. When no expert rating is available, the Benchy rating has a weight of 100% but as more experts rate the ICO, the weight of the Benchy rating is diminished to a minimum of 20%, ensuring that the overall rating is not biased by experts who would be paid by projects.

Additionally, we controlled the number of *Advisors* in the ICO disclosed priorly. We may assume that a higher rating and number of advisors is positively related to ICO success and its post-performance. Similarly, we provided control for the size of the project using the variable *Team*, which reflected the number of team members disclosed before the ICO. We assumed that size of the project is positively related to its success.

[5] Whitepaper availability and quality along with videos and articles presenting the project.

Moreover, we provided control for the number of tokens kept by the team or insiders using the variable *Insider,* which presented the number of tokens kept by insiders to the total supply of the ICO token.

In the ICO process, the entrepreneurs can offer investors one of the three different types of tokens: security token, utility token, and currency token. Utility tokens can be exchanged for a product or service now or in the future. It can also be exchanged for voting right depending on how a specified community or platform acts. A utility token does not bear any right to profits for investors. However, they may exchange it for a product or service at a given time. Conversely, security tokens are designed to bear financial rights (Grundy, 2018). The tokens allow the holder to receive a share of the profits of a company and can additionally bear voting right regarding the operations of the project. Consequently, they resemble securities but remain unregulated. We used dummy variables *U-Token* and *S-Token* if the proposed token type is a utility or security in the ICO, or non, respectively. The currency token (*C-Token*) is captured in the regressions as constant. This type of token is, in the assumptions of issuers and users, similar to traditional currency, but it can only be used in a specific environment. Subsequently, it does not bear any rights, whether financial or non-financial and is solely considered as a medium of exchange.

The variable *Presale* is a dummy variable equal to 1 if a presale was organized and equal to 0 if otherwise. The variable *Bonus* is a binary variable that takes the value of 1 if a bonus was offered to early investors and 0 if otherwise.

The variable *GitHub* is a dummy variable that takes the value of 1 if there was a GitHub repository before the launch of the ICO and 0 if otherwise. The data has been extracted from GitHub with the help of a Google Chrome extension that displays the creation date of the repository (lvarayut, 2017). The *roadmap* is a dummy variable that equal to 1 if the roadmap details future milestones for at least two years and 0 if otherwise, or if there is no roadmap shared by the ICO team.

We provided a proxy for the performance of the cryptocurrency market using the market return on Ethereum (ETH) relative to the US dollar as most of the ICOs in our sample are launched on the ETH blockchain. We used the market return of the ETH over for two months (*ETH*) and expected that it would be strongly associated with ICO success.

The final variables are related to investment. The dummy variable *Investment* equal to 1 if there is a minimum investment required to be able to invest in the ICO and

0 if otherwise. The variable *Crypto* presents the number of cryptocurrencies accepted as a means of payment to participate in the ICO. Lastly, the variable *Fiat* is a dummy variable that equal to 1 if the ICO accepts fiat currencies (Dollar, Euro, Yuan, and other government-issued currencies) as a means of payment to participate in the ICO and 0 if otherwise.

In Panel A Table 1 we present basic descriptive statistics for the variables used in our study for the ICO-level regressions. The detailed information regarding the explanatory variables used in the research are presented in the Appendix in Table A1. We checked the pairwise correlation of all the variables, but do not report them for brevity[6]. We took into account the correlations between the variables in the selecting variables procedure (*From-General-To-Specific*) to minimize the multicollinearity problem in the following estimations.

[Table 1]

3.2 Country-level variables

In the analysis of the country-level determinates, we retrieved data from ICObench and used three alternative dependent variables. The first dependent variable presents the number of *ICO*s in a given country. The second dependent variable reflects the number of *Softcap* reaches in a given country. The third and last dependent variable is the number of *Hardcap* reaches in a given country. To the best of our knowledge, the first dependent variable proxy provides the overall activity of ICOs in a given country. We hope that the results will shed some light on the ICOs' geographic dispersion presented in Figure 3. The second and third dependent variables are proxying for the ICOs' successes, which differ across.

To include a wide country-level perspective to the research we employ set, financial system-related, legal system-related, national culture, and policy uncertainty proxies. We provided control for financial system development using the IMF composite indicators Financial Development Index (*Fin. Dev.*). The index is built to aggregate information of three dimensions, that is, depth, access, and efficiency of financial markets and financial institutions. However, ICO is a funding tool for young and daring entrepreneurs, thus quite similar to private equity funding. It is also a

[6] The results are available upon request.

decentralized and strongly tech-based process. It would be essential to verify, whether countries with advanced financial systems are also favorable markets for ICOs.

Legal issues shape the environment for ICOs. First, as ICO is a relatively new financial phenomenon, it may face various challenges related to legal uncertainty and lack of a solid dedicated regulatory scheme that may hamper its development. Thus, we added to our research binary variable *Legal certainty* that takes value 0, if ICO is banned or ignored in a particular jurisdiction (legal uncertainty arises). As well, the value 1 in the case of proper regulations by applicable laws and/or guidelines explaining the legal status and obligations according to the token type (regulatory certainty). We did not consider as a certainty if the regulator's activity is limited only to issuing warnings. Or if some ICO market practices had been assessed as suspicious. The variable is based on the authors' expert judgment made on the data presented in the comparative reports by PricewaterhouseCoopers (2018) and EY (2017).

Additionally, we take into consideration legal system origin by employing binary variables denoting particular system types. We follow La Porta et al. (1998, 1999) and identify the legal origin of each country's company or commercial law, based on common law and civil law origins. La Porta et al (1998) argued that stock markets tend to be underdeveloped in civil law countries compared to common law countries. Henceforth, we expect to observe a positive correlation between ICO and common law legal origin. Conversely, we expect a negative correlation between ICO and the civil law countries.

We further extend our analysis by employing two proxies of national culture dimensions using Hofstede (Hofstede, 2011; Hofstede and Minkov, 2013) measures. In particular, Long- versus Short-Term Orientation (*LTI*) and Indulgence versus Restrained (*IVR*). There is a growing agreement in the literature that culture, its dimensions, and components like social trust significantly affect a vast array of financial phenomena. They influence investor decisions (Karolyi, 2016), constraints (El Ghoul and Zeng, 2016; Boubakri and Saffar, 2016), company financial and social performance (Frijns et al., 2016; Cai et al., 2016), and outcomes of M&A processes (Lim et al., 2016). Gupta et. al (2018) confirmed that there is also a link between culture and the IPO market. They established that, in particular, power distance and long term orientation is strongly related to IPO success. The aspect of the cultural dimension of ICO has not been studied so far. Consequently, to the best of our knowledge, this study is the first to analyze culture’s impact on ICO presence and success.

Lastly, we investigated potential relations between the ICO market and the level of uncertainty in the economy using the uncertainty measures taken from the comprehensive research by Baker, Bloom, and Davis (2015). We assume that uncertainty may be a vital factor in shaping the attitudes of buyers and issuers in the ICO process. Further, we believe that rising uncertainty deteriorates ICO funding campaigns. On the one hand, a high global uncertainty level may discourage people from financial markets including the ICO. On the other hand, it may only discourage them from traditional financial equity and debt markets. ICOs may be perceived as an alternative class of assets.Thus, they may become more popular in times of rising general uncertainty, when trust toward traditional financial intermediation fails.

Including all the above mentioned independent variables, in particular, the institutional ones, allows us to discuss the nature of ICOs as a new funding tool for entrepreneurs. In Panel B Table 1 we present basic descriptive statistics for the variables used in the negative binomial regression models with robust standard errors. All the details of indexes, most of which are quite complex, used in the study are summarized in Appendix Table A1.

3.3 Methods

We built separate databases and used different methodological approaches in two strands of our research. First, we followed De Jong et al. (2018) and employed a logit model to investigate determinants of ICO success and a post-ICO performance of the business venture. In the estimation tables, we report odds ratios. Thus, the value of less than one indicates the negative relationship between the particular independent variable and our measure of ICO success. Contrary, the odd ratio bigger than one is associated with the positive relationship between the given independent variable and achieving the ICO funding success or post-ICO performance success by the given business project.

In the first strand of the research, we focused on the factors that are related to the strategy of individual ICO. Next, we paid attention to the country-level independent variables. As our dependent variables in this pillar are the number of ICOs and the number of ICOs successes (*softcap* and *hardcap* reaches) in a given country, we employed negative binomial regression models with robust standard errors, similar to Huang et al. (2020). The negative binomial model is a type of generalized linear model, in which the dependent variable is a count of the number and follows the negative

binomial distribution. This means that the values of the independent variable are the non-negative integers (Zwilling, 2013). Negative binomial regression is a generalization of Poisson regression, that allows loosening the assumption that the variance is always equal to the mean[7]. Negative binomial models have been so far used in a similar context. For example, Haddad and Hornuf (2019) used it to study the determinants of FinTech startups and Dushnitsky (2016) on crowdfunding platform formation.

4. Results

In this section, we present first the results for the determinants of ICO success and the company's post-ICO performance using individual fundraising data. Next, we present the results explaining the ICO activity using country-level data.

4.1.ICO perspective

In Table 2 we present the estimation results; the odds ratios of the logit model of ICO success. In columns (1)-(5) the dependent variable is *Softcap*, while in columns (6)-(10) the dependent variable is *Hardcap*. As expected, we found a positive influence of expert rating provided by ICObench on the odds of achieving success by the ICO. The coefficients are statistically significant at a 1% level in all the specifications. Moreover, the results indicate that a high rating, ceterius paribus, increases the chances of ICO success by 50% and 75% for *softcap* and *hardcap*, respectively. In our opinion, the results show that the rating serves as a tool for information asymmetry reduction, which is consistent with the signaling theory (Spence, 1973). In line with this, insider retention contributes positively to the odds ratio of reaching *hardcap* during the ICO, which is also consistent with the finding of Vismara (2016).

The number of team members and the number of advisors shows at a very basic level the composition and power of the team involved in the project. The model confirms that the higher those numbers are, the higher the probability of ICO success. The positive contribution of those two variables is also confirmed as far as post-ICO performance is concerned in Table 3. Revealing the number of the crew may build positive publicity at the fundraising stage and then it simply refers to the company

[7] Refer also to: *Negative Binomial Regression* – description in Chapter 326 of NCSS statistical software: https://ncss-wpengine.netdna-ssl.com/wp-content/themes/ncss/pdf/Procedures/NCSS/Negative_Binomial_Regression.pdf

resources that allow for better market performance. As expected, positive tendencies on the ETH market are also positively associated with the ICO successes, because ETH price changes may be treated as a proxy for the sentiment towards the whole market of crypto-assets. Moreover, we see the positive association between insider retention and ICO success, but only in case, if the success is measured by reaching *hardcap*. Once again, in our opinion, the results confirm the importance of signals in ICO.

Surprisingly, we found that bonus and presale programs have a negative impact on the probability of success of the ICO campaign (odds ratios less than one). In our opinion, it could indicate that too active/aggressive promotion may discourage people from investing in tokens as some doubts may arise. It seems quite justified, especially by taking into consideration the potentially low level of trust towards ICOs and tokens business among publicity, as it is still considered as a new, unregulated segment of the financial market.

The role of other examined variables for reaching *softcaps* and *hardcaps* in the ICO process by companies is limited, in particular, the model does not show the significance of minimum investment requirements and presenting a long-term roadmap for future milestones.

Moreover, we provided control in our estimations for industry represented by a particular company that is looking for financing through issuing tokens[8]. We found that companies offering wide business services have weaker perspectives on the ICO market. The case is similar for the entertainment firms, but only when reaching *hardcap* in the ICO process is concerned as dependent variable

[Table 2]

In Table 3 we present the results of the models focused on the simple post-ICO performance measures. In columns (1)-(4) the dependent variable is the binary variable showing website availability as a proxy of post-ICO activity. In columns (5)-(8) the dependent variable is the binary variable *Coinmarket*, while in columns (9)-(12) it is the binary variable *Twitter*.

The results show that the ICOs reaching hardcap and with a high rating are very likely to be successful in the future. Similarly, the results indicate that a high number of staff members and advisors is positively related to the probability of successful ICO-post performance. The coefficients for all four variables are significant in all the

[8] The full results including industry dummies are available upon request.

specifications at a 1% level. Additionally, we find that ETH market performance relative to US dollars also increases the odds of the token being traded. It seems logical, yet the contribution of this variable to the probability of post success is smaller. In our opinion, the results documents that what determines the post-performance of the ICO is the project and not the situation of the crypto-market.

In line with previous results, we find that ICO with minimum investment requirement, presales, and bonus schemes are less likely related to a successful ICO-post performance. The coefficients are significant at least at a 5% level in all the specifications. In our opinion, it shows that presales and bonuses are signals of risky ICOs, therefore, less likely to be successful.

[Table 3]

4.2 Country-level perspective

In Table 4 we present the results (coefficients) of the negative binomial regression models focused on potential environmental, country-level determinants of ICOs presence and successes in providing companies with financing. In Table 4 we use the total number of ICOs as a dependent variable in the columns (1)-(3) and the number of *softcap* and *hardcap* reached in the columns (4)-(6) and (7)-(9), respectively.

Our results show positive and statistically significant coefficients for countries' financial development and activity of ICOs in all the specifications at a 1% level. Financial development is strongly related to economic development, technological development, and the attractiveness of a particular country for investors in the private equity asset classes. We repeat our estimations using the alternative variables and we find that the results are unchanged, yet we do not report them for brevity. Henceforth, in our opinion, the results indicate that ICOs activity is strongly related to its economic and financial development, which is not surprising. Thus, ICOs should not be treated today as part of an alternative financial system, but rather as a supplementary solution on the markets, where the traditional financial products are available. Moreover, we claim that ICO, however decentralized financing form, has something in common with venture capital as both forms are focused on innovative and risky businesses. As a result, it is not surprising that markets that are attractive for venture capital are also attractive for tokens issuances.

Next, we control for legal origin and legal certainty. We find weak evidence that the common law, in general, supports the ICO market versus civil law countries. Modigliani and Perotti (2000) argued that legal institutions determine the degree of

financial development and the financial structure of a country. They argued that market-based systems flourish in environments with strong institutions While, Ergungor (2004) presents evidence that countries with common law financial systems are more likely to be market-oriented than civil law countries. In the author's opinion, this evolution is a result of effective rule of law in common law countries, which improves shareholder and creditor rights protection. Our results document that the legal origin is only explaining the development of the ICOs market.

We find, however, strong positive and statistical relation between legal certainty and ICO activity in the country. In our opinion, it shows that ICOs are more likely were proper regulations, applicable laws or guidelines explaining the legal status and obligations associated with tokens issuance, are important for the development of the crypto-market. We are aware, however, that apart from regulations – both hard and soft law provisions – the supervisory approach (*law in action*) plays a significant role, especially for new markets as ICOs. Our models do not include this aspect directly and we leave it for future studies.

We control also the potential factors related to uncertainty on the markets measured by economic policy uncertainty indexes and find little evidence of associations between economic policy uncertainty and ICOs presence. In contrast, to our expectation, we do not find that economic policy uncertainty determines the activity of the ICO market. We use alternative variables proxying for economic policy uncertainty, which are not reported for brevity, yet none of them enters the specification significantly.

Lastly, we control further for culture-related factors that may determine the ICO activity in a country. We find that the indulgence index is negatively and statistically related to the activity of ICOs in the country. The coefficient, however, is statistically significant at 10% and only in columns (2) and (5). In opposition, long term index is positively and statistically significant in all the specifications at a 5% level. Our results are only partially in line with Gupta et al. (2018), who documented that countries with high power distance, high collectivism, and long-term orientation were positively associated with higher levels of IPO activity. We find, however, that the other variables

proxying for a cultural dimension are not statistically significant in none of the regressions, which we do not report for brevity[9].

The ICO market is unregulated, in particular, there are not compulsory transparency standards or investor protection schemes. Our results, however, indicate that investors are more likely to invest in ICOs projects that send strong signals about their quality. In line with it, we find that ICO activity is higher in countries with less indulgent culture, which have societies that see indulgence and attention to duty is considered equally important. In those societies, the decision is more based on rational analysis and less on impulses.

In our opinion, the results complement our previous results showing that providing additional information and sending some signals to investors contribute positively to the ICO's success. However, as the ICO issuer presents only a white book with selected information (not a prospectus or even investment memorandum), the scope of information is rather narrow. Moreover, corporate governance standards are much weaker than in the regulated capital market. Consequently, it may be more difficult for entrepreneurs to raise funds in indulgent countries.

In less indulgent countries the societies are more likely to restrain from fun and focus on long-term goals. Indeed, we find that the long term index is positively associated with ICO activity and is highly significant. The long-term index is associated with a forward-looking approach, perseverance (Zheng et al., 2012), will investment, and patience in waiting for results. It shows that ICO investors are long term investors, who expect a future payoff. Moreover, the results may reflect the perspectives for dividend policy in ICOs. Lack of dividends or low dividends policy is more acceptable in long-term oriented societies thus executives of innovative ventures in those countries may expect higher retained earnings and, as a consequence, wider scope of investment opportunities for companies (La Porta et al., 2000).

[Table 4]

[9] In the estimation the coefficients for power distance index, individualism versus collectivism, masculinity versus femininity and uncertainty avoidance index were not statistically significant in the regressions. Therefore, we decided not to report them, but are available upon request.

Summary

In recent years, ICOs have been a popular way of raising funds by entrepreneurs, which used the new opportunities given by the development of blockchain technology. We find, however, that the information asymmetry between the project team and the potential investors is high, which we attribute to the still-developing technology and the lack of regulations.

Our analysis shows that high-quality projects should try to mitigate this problem by signaling quality and disclosing more information to investors. We show that projects with high ratings and several advisers are more likely to successful ICOs and perform in the long term. In line with it, we also find that large teams with insider retention are increasing their chances of success. In contrast, we find that implementing excessive promotion tools (presale programs or bonuses for early investors) during the fundraising process may be actually in the case of the ICO market counterproductive, as they probably produce a negative sign of aggressive and, as a consequence, unreliable marketing. All in all, we show that surprisingly rather costly and resource-related signals are effective as far as ICO promotion. Moreover, one can interpret the results of the study in a way that those factors contribute positively in the subsequent phases to post-ICO activities.

In terms of post-ICO performance, we confirm the fact that the hardcap was reached, the expert rating, number of staff members, as well as the number of advisors, are positively associated with all the post-ICO activity measures. Those results have been quite expected as the abovementioned factors at a very basic level show resources of particular companies-issuers.

Moreover, we find that countries' environment may determine the ICOs activity. We find that ICOs are more likely to take place and be successful in economic developed countries with good financial and ICT structure. Interestingly, we find, however, that global economic policy uncertainty does not determine the activity of ICOs.

We document the role of legal certainty, i.e. the presence of hard and soft law referring to the legal nature of ICOs and tokenized assets. Furthermore, it seems that common-law may support the development of ICO markets. The results are in line with the literature presenting that legal origin as well institutions strongly determine the development of the financial system and its structure.

Furthermore, we investigate the role of the culture of a particular country for the ICO market. We use culture dimensions developed by Geert Hofstede (1980) similarly to many previous empirical studies focused on IPOs, for example, Gupta et al. (2018). We contribute by linking culture-related factors with an innovative capital market segment, i.e. ICO. We find that ICOs are more likely to develop in less indulgent societies that focus on their responsibilities. In our opinion, it confirms that ICO investors are monitoring the market and more likely to invest in projects with high-quality signals. Moreover, we find that the ICOs market is more active in long-term oriented societies. In our opinion, the results complement our finding at once again confirms that ICO investors are looking for a high potential project with low risk, which will generate high returns in the long-term.

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Fig. 1 The geographic distribution of the number of ICOs included in the research over the period 2015-2018

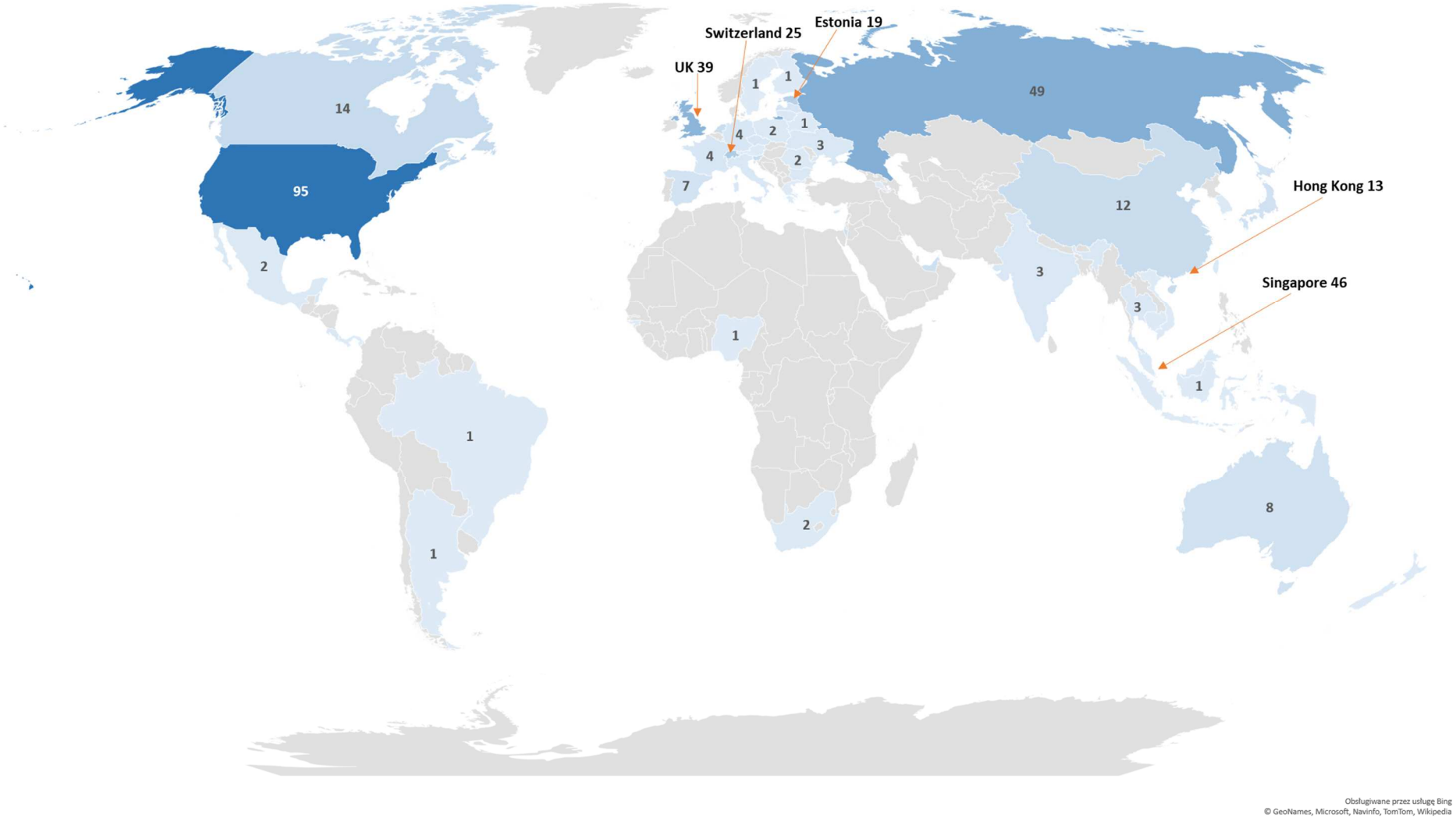
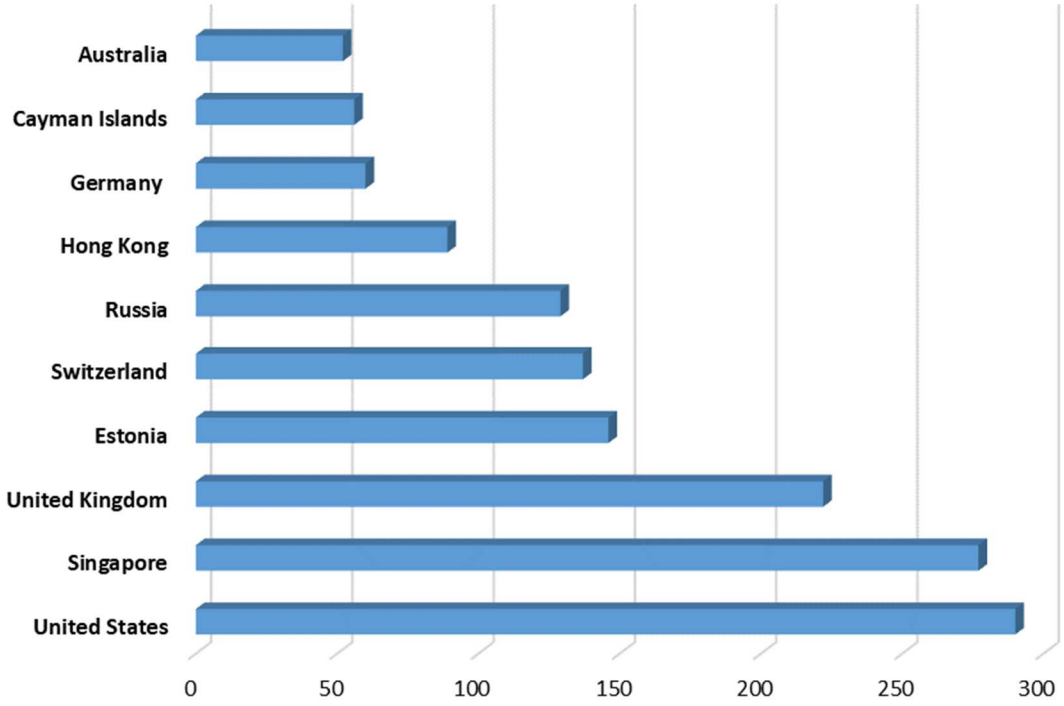
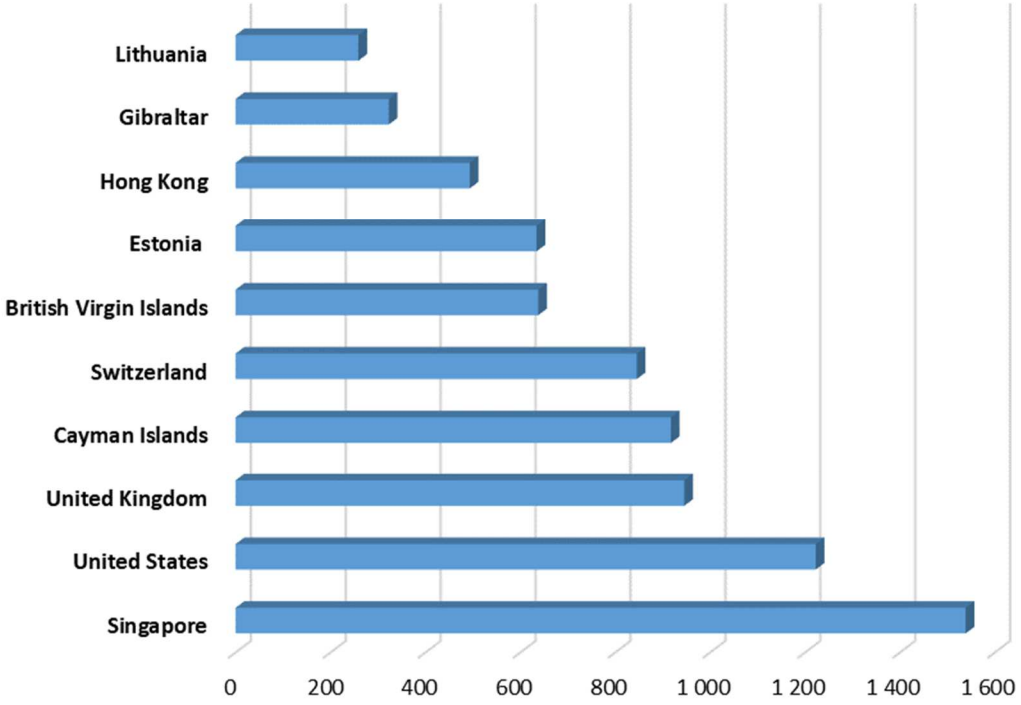


Fig. 2 Top 10 countries by number of ICOs in 2018



Source: ICObench

Fig. 3 Top 10 countries by funds raised (mln USD) in 2018



Source: ICObench

Table 1 Descriptive statistics

Variables	N	Mean	Sd	min	max
Panel A: Project-level variables					
Softcap	503	0.903	0.297	0	1
Hardcapt	503	0.354	0.479	0	1
Online	503	0.763	0.425	0	1
Coinmarket	503	0.505	0.500	0	1
Twitter	503	0.577	0.495	0	1
Duration	503	37.75	50.04	0	760
Rating	503	2.874	0.755	0.200	4.600
Advisors	503	2.636	3.587	0	19
Team	503	8.334	6.466	1	50
Insider	503	0.214	0.264	0	0.994
U-Token	503	0.718	0.451	0	1
S-Token	503	0.0855	0.280	0	1
C-Token	503	0.197	0.398	0	1
Presale	503	0.274	0.447	0	1
Bonus	503	0.439	0.497	0	1
GitHub	503	0.491	0.500	0	1
RoadMap	503	0.328	0.470	0	1
ETH	503	0.670	1.370	-0.690	6.919
Investment	503	0.199	0.399	0	1
Crypto	503	1.817	2.202	1	40
Fiat	503	0.0775	0.268	0	1
Panel B:Country-level variables					
ICOs	60	8.117	15.47	1	95
Softcap	60	7.317	14.12	0	90
Hardcap	60	2.900	5.899	0	39
Fin. Dev.	54	0.522	0.240	0.0695	0.946
Legal certainty	60	0.167	0.376	0	1
Common law	53	0.340	0.478	0	1
LTI	47	55.95	21.95	12.85	100
IVR	46	46.30	21.93	12.95	97.32
EPU	60	157.1	19.11	121.3	213.4

Table 2 The determinants of ICO success

This table presents the odds ratios of the logit model of ICO success on the set individual ICO-level variables. In columns (1)-(5) the dependent variable is the binary variable softcap, while in columns (6)-(10) the dependent variable is the binary variable hardcap. All regressors are defined in Table A1. All specifications include constants but not reported for brevity. Robust standard errors are presented in parentheses, and ***, **, and * denote statistical significance at 1%, 5% and 10%, respectively.

	Softcap					Hardcap				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Duration	0.999					0.975*				
	(0.00198)					(0.0127)				
Rating	2.450***		2.699***			1.638***		1.598***		
	(0.541)		(0.636)			(0.242)		(0.248)		
Advisors		1.140**		1.124**	1.111**		0.994		0.989	0.968
		(0.0587)		(0.0554)	(0.0573)		(0.0289)		(0.0287)	(0.0280)
Team		1.072**		1.068**	1.049*		1.038**		1.039**	1.030*
		(0.0341)		(0.0344)	(0.0293)		(0.0175)		(0.0182)	(0.0163)
Insider	0.959	1.179	1.122	0.912	0.767	1.453	2.129*	1.948*	1.931*	1.486
	(0.600)	(0.691)	(0.679)	(0.561)	(0.412)	(0.538)	(0.825)	(0.770)	(0.736)	(0.560)
U_Token	1.400	1.473	1.431	1.454	1.757	1.044	1.144	1.124	1.149	1.286
	(0.523)	(0.534)	(0.513)	(0.533)	(0.627)	(0.278)	(0.288)	(0.289)	(0.289)	(0.320)
S-Token	1.262	1.240	0.918	1.479	1.079	0.973	1.099	0.945	1.209	0.931
	(0.801)	(0.738)	(0.588)	(0.907)	(0.636)	(0.434)	(0.466)	(0.408)	(0.515)	(0.390)
Presale		0.355***	0.350***				0.651*	0.610**		
		(0.116)	(0.119)				(0.158)	(0.147)		
Bonus	0.226***			0.252***		0.537***			0.463***	
	(0.0815)			(0.0891)		(0.116)			(0.0987)	
GitHub	0.444**		0.511*			0.887		0.885		
	(0.170)		(0.186)			(0.187)		(0.192)		
RoadMap		0.727	0.733	0.740			1.066	0.953	1.089	
		(0.231)	(0.249)	(0.233)			(0.228)	(0.208)	(0.234)	

ETH	1.274	1.348**	1.277*	1.273		1.336***	1.424***	1.423***	1.382***	
	(0.191)	(0.202)	(0.189)	(0.193)		(0.114)	(0.110)	(0.115)	(0.106)	
Investment	0.850	0.843	0.816	0.925	0.692	0.952	0.869	0.879	0.957	0.754
	(0.320)	(0.307)	(0.313)	(0.345)	(0.262)	(0.253)	(0.219)	(0.225)	(0.247)	(0.185)
Crypto			0.936*					0.824**		
			(0.0332)					(0.0740)		
Fiat	0.583		0.791	0.774		1.511		1.440	1.203	
	(0.343)		(0.529)	(0.426)		(0.583)		(0.555)	(0.432)	
Ind. dummy	No	No	Yes	No	Yes	No	No	Yes	No	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	503	503	503	503	503	503	503	503	503	503
Pseudo R^2	0.118	0.0805	0.118	0.105	0.0568	0.132	0.0578	0.0870	0.0740	0.0255

Table 3 The determinants of ICO post performance

This table presents the odds ratios of the logit model of ICO post-performance on the set individual ICO-level variables. The dependent variable is the binary variable Online in columns (1)-(4), in columns (5)-(8) it is the binary variable Coinmarket, and in columns (9)-(12) it is the binary variable Twitter. All regressors are defined in Table A1. All specifications include constants but not reported for brevity. Robust standard errors are presented in parentheses, and ***, **, and * denote statistical significance at 1%, 5% and 10%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Online				Coinmarket				Twitter			
Hardcap	4.101***	4.517***			2.634***	3.008***			2.392***	2.786***		
	(1.276)	(1.362)			(0.590)	(0.635)			(0.543)	(0.600)		
Rating	2.554***		3.007***		3.070***		3.270***		4.196***		4.355***	
	(0.465)		(0.538)		(0.529)		(0.593)		(0.835)		(0.837)	
Advisors		1.144***		1.128***		1.116***		1.109***		1.127***		1.124***
		(0.0502)		(0.0492)		(0.0340)		(0.0332)		(0.0406)		(0.0405)
Team		1.067***		1.078***		1.063***		1.076***		1.082***		1.096***
		(0.0233)		(0.0237)		(0.0179)		(0.0191)		(0.0200)		(0.0214)
Insider	0.581	0.731	0.835	0.765	0.510*	0.642	0.676	0.699	0.982	1.164	1.142	1.239
	(0.251)	(0.319)	(0.351)	(0.328)	(0.205)	(0.244)	(0.267)	(0.264)	(0.381)	(0.439)	(0.438)	(0.463)
U-Token	0.947	0.909	0.965	0.945	1.050	1.034	1.085	1.029	0.821	0.846	0.865	0.829
	(0.276)	(0.272)	(0.284)	(0.261)	(0.264)	(0.254)	(0.267)	(0.247)	(0.213)	(0.214)	(0.225)	(0.205)
S-Token	0.887	0.835	0.767	0.982	0.482*	0.451*	0.444**	0.539	0.568	0.590	0.499	0.661
	(0.392)	(0.374)	(0.356)	(0.429)	(0.195)	(0.195)	(0.175)	(0.224)	(0.242)	(0.243)	(0.215)	(0.275)
Presale		0.458***	0.403***			0.605**	0.510***			0.736	0.635*	
		(0.118)	(0.104)			(0.142)	(0.119)			(0.174)	(0.155)	
Bonus	0.404***			0.360***	0.418***			0.374***	0.368***			0.361***
	(0.101)			(0.0832)	(0.0920)			(0.0777)	(0.0868)			(0.0768)
GitHub	0.835		0.873		1.032		1.049		0.610**		0.645**	
	(0.209)		(0.211)		(0.229)		(0.222)		(0.140)		(0.142)	
RoadMap		0.826	0.762	0.856		1.041	0.892	1.091		0.929	0.754	0.972
		(0.207)	(0.191)	(0.201)		(0.223)	(0.202)	(0.232)		(0.198)	(0.171)	(0.206)
ETH	0.927	0.970	1.030	1.043	1.124	1.145*	1.226**	1.197**	1.087	1.139*	1.189**	1.162**

	(0.0946)	(0.0895)	(0.0949)	(0.0905)	(0.102)	(0.0892)	(0.103)	(0.0919)	(0.0948)	(0.0892)	(0.0966)	(0.0868)
Investment	0.926	0.985	0.870	1.026	0.498**	0.536**	0.461***	0.588**	1.011	1.050	0.895	1.176
	(0.267)	(0.287)	(0.252)	(0.295)	(0.135)	(0.141)	(0.120)	(0.153)	(0.263)	(0.261)	(0.235)	(0.300)
Crypto			0.907				0.923				0.927	
			(0.0559)				(0.0674)				(0.0689)	
Fiat	0.916		1.166	1.024	0.547*		0.610	0.555	0.954		1.162	1.109
	(0.397)		(0.537)	(0.424)	(0.199)		(0.240)	(0.205)	(0.362)		(0.495)	(0.385)
Industry dummy	No	No	Yes	No	No	No	Yes	No	No	No	Yes	No
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	503	503	503	503	503	503	503	503	503	503	503	503
Pseudo R^2	0.144	0.123	0.0978	0.0820	0.183	0.126	0.139	0.113	0.193	0.117	0.151	0.114

Table 4 Country level determinants

This table presents coefficients of the negative binomial regression model of the number of ICOs in column (1)-(3), several softcap reached in columns (4)-(6), and number of hardcap reached in columns (7)-(9) in a country on a set of country-wide variables denoting diversified environmental factors. Robust standard errors are presented in parentheses, and ***, **, and * denote statistical significance at 1%, 5% and 10%, respectively.

	ICO			Softcap			Hardcap		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Fin. Dev.	2.132***	2.886***	1.711**	2.260***	2.813***	1.806***	2.746***	3.199***	2.284***
	(0.693)	(0.975)	(0.697)	(0.665)	(0.907)	(0.664)	(0.726)	(0.954)	(0.695)
Common law	0.201	0.460	1.085**	0.182	0.408	0.969**	0.0930	0.245	0.711
	(0.391)	(0.404)	(0.429)	(0.367)	(0.399)	(0.424)	(0.403)	(0.422)	(0.467)
Leg. certainty	0.949**	0.833*	0.770*	1.022**	0.912**	0.865**	1.251***	1.143***	1.130***
	(0.417)	(0.452)	(0.449)	(0.405)	(0.445)	(0.439)	(0.394)	(0.433)	(0.419)
EPU	-0.00530	-0.00570	-0.00133	-0.00381	-0.00458	-0.000430	-0.00148	-0.00497	-0.00151
	(0.0104)	(0.0100)	(0.00942)	(0.00927)	(0.00929)	(0.00888)	(0.00844)	(0.00828)	(0.00852)
IVR		-0.0201*			-0.0173*			-0.0155	
		(0.0108)			(0.0101)			(0.0108)	
LTI			0.0247**			0.0227**			0.0208*
			(0.0116)			(0.0111)			(0.0108)
Constant	1.324	1.780	-0.711	0.866	1.398	-0.909	-0.859	0.133	-1.907
	(1.713)	(1.684)	(1.901)	(1.525)	(1.556)	(1.826)	(1.434)	(1.473)	(1.775)
Observations	54	45	46	54	45	46	54	45	46
Pseudo R^2	0.0817	0.0845	0.0918	0.0936	0.0903	0.0993	0.130	0.121	0.133

Appendix Table A1 Variable definitions and data sources

Variable	Description	Source
Duration	The duration of the ICO has been computed as the difference, in days, between the end date and the start date of the ICO. This variable uses the actual end date and not the planned duration as it accounts for ICO which reached their hardcap before the end date, therefore stopping the fundraising campaign.	ICObench
Rating	The expert rating is proxied by the ICO rating shown by ICObench that range from 5 (high-quality) to 0 presenting a poor-quality ICO.	ICObench
Team	The number of team members that have been disclosed before the ICO	ICObench
Advisors	The number of advisors shows the number of advisors that have been disclosed prior the ICO	ICObench
Token	The token proposed by an ICO can be of three types: Security Token, Utility Token, and Currency Token. It is measured by two different dummy variables (*S*) and (*U*) that takes the value of 1 if the token is of the variable type and 0 otherwise.	ICObench
Github	This variable is a dummy variable that takes the value of 1 if there was a GitHub repository prior to the launch of the ICO and 0 otherwise.	GitHub[10]
Insider	Insider token retention is the amount of tokens kept by the team or insiders, expressed in percentage of the total supply of the ICO token.	ICObench
Presale	This variable is a dummy variable that is equal to 1, if a presale was organized and equal to 0 otherwise.	ICObench
Bonus	This variable is a dummy variable that take the value of 1 if a bonus was offered to early investors and 0 otherwise.	ICObench
Roadmap	This variable is a dummy variable that equals 1 if the roadmap details future milestones for at least a period of two years and 0 otherwise or if there is no roadmap shared by the ICO team.	ICObench
ETH	The performance of the ETH over two months before the starting date of the ICO.	Coinmarketcap
Invest	This is a dummy variable that equals 1 if there is a minimum investment required to be able to invest in the ICO and 0 otherwise.	ICObench ICO's website

[10] The data has been extracted from with the help of a Google Chrome extension that displays the creation date of the repository https://github.com/lvarayut/github-date-of-creation

Crypto	This variable is the number of cryptocurrencies that are accepted as a mean of payment to participate in the ICO.	ICObench
Fiat	This variable is a dummy variable that equals 1 if the ICO accepts fiat currencies (Dollar, Euro, Yuan, and other government-issued currencies) as a mean of payment to participate in the ICO and 0 otherwise.	ICObench
Fin. Dev	Average value of the composite index presenting countries financial development that range from 0 to 1.	Svirydzenka, 2016
Legal certainty	A binary variable that takes the value 1 if proper regulations by applicable laws and / or guidelines explaining the legal status and obligations according to the token type are present in the country, and 0 otherwise.	Pricewaterhouse Coopers (2018) EY (2017).
Common law	A binary variable that takes the value 1 if the countries legal origin is common law, and zero otherwise	LLSV (1997, 1998)
LTI	A high long-term orientation value shows societies that take a more pragmatic approach where they encourage thrift and efforts in modern education as a way to prepare for the future.	Hofstede, 2011
IVR	A high value of indulgence represents society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun.	Hofstede, 2011
EPU	A GDP-weighted average of national EPU indices for 20 countries.	Baker, Bloom and Davis (2015)