Institutions, regulations and initial coin offerings: An international perspective

Article *in* International Review of Economics & Finance · October 2020

CITATIONS
0

READS
60

4 authors, including:

Prabal Shrestha
KU Leuven
2 PUBLICATIONS **0** CITATIONS
SEE PROFILE

Ozgur Arslan-Ayaydin
University of Illinois at Chicago
47 PUBLICATIONS **363** CITATIONS
SEE PROFILE

James Thewissen
Université Catholique de Louvain - UCLouvain
21 PUBLICATIONS **72** CITATIONS
SEE PROFILE

INSTITUTIONS, REGULATIONS AND INITIAL COIN OFFERINGS: AN INTERNATIONAL PERSPECTIVE

Prabal Shrestha
KU Leuven, UCLouvain
prabal.shrestha@kuleuven.be

Özgür Arslan-Ayaydin
University of Illinois at Chicago
orslan@uic.edu

James Thewissen
UCLouvain
james.thewissen@uclouvain.be

Wouter Torsin
University of Liège
wouter.torsin@uliege.be

ABSTRACT

Investors and policy-makers still know little about the dynamics of initial coin offerings (ICOs) as a funding mechanism. Investors' decisions to contribute to ICOs are essentially a leap of faith given ICOs' decentralized nature coupled with the lack of regulatory oversight. Drawing on psychological theories on cognitive bias, we propose that one heuristic by which investors assess an ICO's trustworthiness is the reputation of the ICO's country of origin, which we proxy as institutional strength. Examining 2,077 ICOs from 105 countries between 2015 and 2018, we find that ICOs originating in countries with stronger institutions are more likely to be traded, raise more funds, and experience lower price volatility. This relationship is particularly relevant for countries with no or few ICO regulations. Our results show that when faced with fewer regulations and higher uncertainty, investors use an ICO's country of origin as a heuristic for the ICO's unobserved trustworthiness.

***JEL* Classification:** M13, G32, N20, O57, L26

Keywords: Initial coin offerings; trustworthiness; behavioural finance; heuristics; regulation.

Data Availability: Data are available through the public sources cited in this paper.

Declaration of Interest: None

Acknowledgments: We thank Meryem Duygun, Andriy Bodnaruk, Mikael Petitjean, Catherine D'Hondt and Kris Boudt for their valuable comments as well as the participants at the 2019 IFABS Conference (Angers, France), 2019 VSBF Conference (Hanoi, Vietnam) and 2020 AFA Annual Meeting (San Diego, US). We would also like to thank the participants of the seminars held at Katholieke Universiteit Leuven (Belgium), Université Catholique de Louvain (Belgium) and Vrije Universteit Brussel (Belgium). Part of this research was performed while Prabal Shrestha was visiting the Department of Finance at the University of Illinois at Chicago.

1. Introduction

Blockchain technologies introduced new opportunities for entrepreneurs and investors. In particular, through initial coin offerings (henceforth ICOs), entrepreneurs are able to obtain funding for their projects through the issuance of coins (tokens) that can later be exchanged by investors to access entrepreneurs' services or traded on a secondary market. However, given ICOs' decentralized nature, the large potential for scams and fraud, and the lack of regulatory oversight, investors' decision to contribute to an ICO clearly remains a leap of faith (Werbach, 2018).[1] Although prior research has established that ICOs can differentiate themselves through more informative white papers (Fisch, 2019) or the organization of pre-token sales (Adhami, Giudici, and Martinazzi, 2018), little attention has been paid to the importance of heuristics in the ICO investment decision. Inspired by behavioural theories on decision-makers' cognitive limitations and biases (Tversky and Kahneman, 1974), we contribute to the prior literature on ICOs by proposing that a relevant heuristic by which investors assess an ICO's trustworthiness is through its home location. Specifically, using a unique, hand-collected dataset on international ICOs, we use the institutional strength of the ICO's home country as a proxy for its cognitive reputation with investors and test whether it affects the success of ICO funding. We next test whether country-level regulations on cryptocurrencies moderate the importance of country reputation.

Research based on persuasion theory has long acknowledged that the rationality of decision-making agents is limited and that they systematically rely on heuristics and biases that are often universal (Chaiken, 1987). In fact, these heuristics are employed to "reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations" (Tversky and Kahneman, 1974, p. 1124). One such heuristic is the country of origin. In particular, finance research has examined the existence of cognitive biases towards certain countries in foreign direct investment and asset allocation (see, e.g., Beugelsdijk and Frijns, 2010; Paul and Jadhav, 2019; Aggarwal, Kearney, and Lucey, 2012; Kalamova and Konrad, 2010). In the case of initial coin offerings, in which uncertainty is ubiquitous, heuristics such as the country of origin are likely to play an even larger role in explaining investment allocation decisions and thus in determining entrepreneurial funding outcomes.

We exploit the institutional strength of the ICO's country of origin to investigate whether it plays

[1] There exists abundant evidence of fraudulent cryptocurrencies. One recent example is the case of OneCoin, where approximately $4.9 billion in investments went missing (Cellan-Jones, 2019). Please see https://deadcoins.com/, where over 1,000 cryptocurrency scams are listed based on user input. (That said, the classification of cryptocurrencies as scams on this website may be somewhat subjective).

an important role in explaining the number of ICOs in a country and the ICO funding outcome (that is, the amount pledged and the probability of the token being traded on the secondary market). Although institutional strength has been commonly studied as a determinant of country-specific FDI intensity (see Beugelsdijk and Frijns, 2010; Paul and Jadhav, 2019), other papers have studied different domestic attributes, such as cultural factors (Aggarwal et al., 2012) or even geographical distance. However, our choice of metric is not arbitrary. Institutions have been shown to play a crucial role in shaping the reputation of firms in a country (see Brammer and Jackson, 2012; Newburry, 2012). Perceptions concerning institutional strength are arguably of particular importance in the ICO setting, in which investors make resource allocation decisions based on relatively little verifiable information and nearly no personal contact with the entrepreneur. As argued by North (1991), "institutions exist to reduce uncertainty in the world", and institutions have been shown to play a crucial role in increasing trust, which serves as a basis for economic transactions (Zucker, 1986; Williamson, 1993; Bachmann and Inkpen, 2011; Welter, 2012). In this sense, unlike other country-specific characteristics, "institutionalized social standards ... make a systematic comparison between organizations possible and meaningful" (King and Whetten, 2008, p. 193).

In this paper, we exploit an extensive hand-collected database of over 2,077 ICOs that occurred in 105 different countries between 2015 and 2018. We compose an institutional strength measure using six Worldwide Governance Indicators, namely, (i) control of corruption, (ii) rule of law, (iii) government effectiveness, (iv) regulatory quality, (v) political stability, and (vi) voice and accountability. First, our results show that ICOs in countries with higher institutional strength are more successful (i.e., they have a higher probability of being traded on a secondary exchange and raise more funding during their offering period). This effect is economically sizeable. In fact, an increase in home-country institutional strength by one unit corresponds to an 8% increase in the probability of an ICO being traded on a secondary market and an 11% increase in the funding amount.

For a subsample of the ICOs that went on to be traded on a secondary market, we examine their ex post performance by studying their respective token price volatility. As the findings of Hooper, Sim, and Uppal (2009) and Low, Kew, and Tee (2011) indicate, the quality of governance is negatively associated with total and idiosyncratic risk on the stock market. Since the predominant nature of the cryptocurrency market is speculative, many of these coins operate in highly volatile environments (Adhami et al., 2018). We thus expect investors' perceptions concerning the legitimacy of the country where the coin is issued to lower the perceived riskiness of the investment. In turn, this should result

in lower volatility of the coin price. Consistent with our expectations, we find that ICOs originating in countries with greater institutional strength experience significantly lower volatility on the secondary market. Furthermore, consistent with our findings that investors have a more favourable outlook towards ICOs in countries with greater institutional strength, we also document that such countries display more ICO activity.

We next examine the mitigating impact of regulations on the role of institutions in the ICO market. As acknowledged by Shanaev, Sharma, Ghimire, and Shuraeva (2020), several countries have been making regulatory strides in their approach to cryptocurrencies.[2] Many countries and jurisdictions have introduced relevant regulations with the aim of curbing potential risks. However, the rigor of these regulatory actions is not consistent across the globe, and in most cases, they are still in the preliminary stage of offering thorough guidelines only. We manually categorize countries based on the presence of ICO regulations in the country and distinguish three ICO regulatory situations: (i) ICOs are unregulated, (ii) ICOs are either regulated or subject to extensive guidelines, and (iii) ICOs are strictly banned. We find that the presence of crypto-specific regulations significantly weakens the extent to which institutional strength matters in explaining ICO outcomes.

The bottom line of our results is that despite the decentralized and disintermediated nature of ICOs, institutions still matter – albeit in an indirect way – in helping investors identify successful ICOs. The positive effect of institutional background on the outcomes of ICOs suggests that investors rely on preconceptions about the country of origin as a heuristic for the ICO project's unobserved trustworthiness. We also show that these heuristic biases are particularly relevant in countries where ICO regulations are weak or absent, which indicates the heuristic's potential to substitute for the regulatory void surrounding ICOs.

Our results contribute to a better understanding of the ICO phenomenon in three ways. First, this study extends the literature on the determinants of ICO success. The closest work to ours is by Huang, Meoli, and Vismara (2020). Based on 905 ICOs, their study reveals that ICOs take place more frequently in countries with developed financial systems, public equity markets, and advanced digital technologies. They also find that the availability of investment-based crowdfunding platforms is positively associated with the emergence of ICOs, while debt and private equity markets do not have significant effects. Our paper complements their findings by showing that countries with stronger institutions have higher levels of ICO activity. We illustrate that apart from institutions' role in

[2]In particular, these authors report a statistically and economically significant impact of anti-money laundering and issuance regulations on token prices.

providing the environment for the proliferation of ICOs, the country-level institutional context also shapes investors' judgments on trustworthiness, which in turn determines individual ICO performance. In addition, a substantial portion of this study is dedicated to providing a detailed sketch of current regulatory conditions across countries. Based on this information, we show that active regulatory efforts by the authorities can mitigate investors' reliance on country-of-origin-based heuristics.

Second, few papers so far have empirically investigated the emergence of ICOs, despite their potentially game-changing role in finance. Most studies have discussed the legal or managerial aspects of this phenomenon without empirical analyses. A few exceptions are the papers by Fisch (2019), Adhami et al. (2018), Momtaz (2018), and Amsden and Schweizer (2018). Fisch (2019) investigates which signals increase the chances of success in a sample of 456 ICOs completed between March 2016 and March 2017. He shows that while patents are nonsignificant, technical white papers are an effective signal to investors and can help predict ICO success. Similarly, he finds that ICOs with high-quality code raise more capital. Adhami et al. (2018) document that an ICO's success is positively related to the presence of codes for the blockchain project and the availability of pre-sale ICOs. Furthermore, using a sample of 1,009 ICOs from 2015 to March 2018, Amsden and Schweizer (2018) document that better-connected CEOs and a larger team size are positively correlated with ICOs' chances of success. Concerning short-run performance, Momtaz (2018) finds that first-day returns on investments in ICOs range from 6.8 to 8.2%. Our study contributes to this emerging body of empirical literature by providing further evidence to support our understanding of ICOs.

Third, our results have policy implications. We enrich the debate on the appropriate institutional framework that could stimulate development around ICOs. Given the importance of institutions as a perceived signal of legitimacy, improving investor protection may be a means of furthering ICO funding success. Our conclusions concerning the dynamics of ICOs throughout the world are especially pressing given that ICOs have become widespread around the globe in a very short period. In fact, our sample shows that the number of ICOs increased by a factor of 100 in the last two years, with an accumulated total amount raised of US$20 billion, which makes the ICO market comparable to the US IPO market in 2016. This significant rise in the ICO market raises urgent regulatory concerns. However, the response across nations has been disparate, failing to provide a consistent regulatory framework across jurisdictions. Many authorities are still taking a "wait-and-see" approach, buying time to better understand the implications of this innovation before an extensive regulatory framework is provided. Our study provides empirical evidence illustrating what these regulatory efforts mean for

the development of ICOs.

This paper is organized as follows. Section 2 surveys the literature and presents the hypotheses. Section 3 summarizes the data and the methodology and further describes the international ICO trends observed in our data. Section 4 presents the regression results and robustness checks. We conclude in Section 5.

2. Literature summary and hypothesis development

2.1. ICOs and country of origin

Over the last few years, the number of available cryptocurrencies in exchange markets has significantly increased, peaking during the first half of 2018. This recent and increasing interest in ICOs can easily be explained, as they present both significant technological advantages and sources of consumer value. That ICOs provide potential consumer benefits by offering start-up companies a decentralized alternative money supply without a specific regulatory framework is widely documented. This lack of regulation gives ICOs great flexibility while raising funds and enables start-ups to raise large amounts of funding with minimal effort while avoiding costs related to compliance, governance, and mediation (Fisch, 2019).

However, at the same time, ICOs are evolving in a context of substantial uncertainty (Conley and Others, 2017). In most jurisdictions, it is still unclear whether investors can benefit from the protection of laws and regulations if ICOs are used for fraudulent or illicit activities. As mentioned by Robinson (2018, p. 898), "in 2017, initial coin offerings would explode, raising a collective $5.1 billion. All of this was done without a single registration being filed with the SEC, and many of these initial coin offerings ... were based on little more than a white paper and a few lines of sample code." This situation is exacerbated by investors lacking reliable and credible information and having little direct access to the entrepreneur behind the offering (Momtaz, 2020). For example, investors may access web-page content or the white paper supplied by the entrepreneur rather than the detailed due-diligence documents common in venture capital or angel transactions. In addition, ICOs involve nascent businesses with limited track records. In fact, many industry insiders have warned that this setting may be an optimal environment for scammers and fly-by-night entrepreneurs (Liebau and Schueffel, 2019). Due to the high investment risk involved, the US Securities and Exchange Commission (SEC) issued a warning to investors about ICOs while acknowledging their innovative potential (US Securities and Exchange

Commission, 2017).

In this context, early studies on ICOs have examined various determinants of ICO success. For example, entrepreneurs behind ICOs are able to substantially differentiate their projects by providing more informative white papers (Fisch, 2019) or by organizing pre-token sales (Adhami et al., 2018). This evidence supports the notion that the information that entrepreneurs provide to investors is verifiable and reduces information asymmetries. However, investors do not make decisions based solely on the information provided by the entrepreneur or the firm. Investors also tend to rely on heuristics and are susceptible to biases in making investment decisions (Jones and Wadhwani, 2007; Schneider and De Meyer, 1991; Tversky and Kahneman, 1974). In fact, persuasion theories from psychological research (Chaiken and Maheswaran, 1994) suggest that when signal credibility is low, as in the case of ICOs, heuristic-based decision-making becomes more prominent in forming judgments (Nestarcova, 2018). Altogether, we expect that rather than solely making rational decisions based on the information provided by entrepreneurs, investors rely more heavily on heuristics to assess trustworthiness in the ICO market than in relatively more sophisticated markets with regulatory oversight.

In this paper, we propose that the institutional background of the ICO's home location constitutes a relevant heuristic by which investors assess trustworthiness. Extant research on consumer and market behaviour acknowledges that the country of origin plays an important role in how products are evaluated (Verlegh and Steenkamp, 1999). In addition, research in finance and economics evidences the existence of cognitive biases towards certain countries in investment and other asset allocation decisions (see, e.g., Beugelsdijk and Frijns, 2010; Paul and Jadhav, 2019; Aggarwal et al., 2012; Kalamova and Konrad, 2010). In the case of ICOs, which are even riskier given their novel nature and the lack of regulations, we believe that the country of origin is capable of explaining investment decisions and consequently entrepreneurial funding outcomes.

Institutions have been shown to create familiarity and define what is legitimate in a market, which then facilitates trust between actors (Dahlstrom and Nygaard, 1995; North, 1981). Strong institutions ensure that property rights are respected, that people live up to their promises, that externalities are held in check, that competition is fostered and that information flows smoothly (Johnson, McMillan, and Woodruff, 2002). In fact, prior research has shown that institutions reduce the ambiguity surrounding the safety and security of investors' funding contribution and therefore are central in influencing various economic activities and outcomes. For example, Bell, Moore, and

Al-Shammari (2008) argue that institutions play an important role in determining the perceived legitimacy of the country of origin, driving the value of foreign IPO listings. Similarly, Bottazzi, Da Rin, and Hellmann (2016) find that the growth in generalized trust, which they argue is a function of institutions, leads to a significant increase in financial investments. Therefore, given the recency of the ICO phenomenon, the lack of evidence on what drives ICO success and the substantial uncertainty in the secondary market, investors are likely to use the institutional strength of the country of origin of the ICO as a mental shortcut to assess ICO trustworthiness. We therefore expect ICOs in countries with stronger institutions to perform better, i.e., to have a greater probability of ending in a successful outcome, to acquire more funding and to observe lower token price volatility. Moreover, given that ICOs result in better outcomes in such countries, we expect countries with stronger institutions to display greater ICO activity.

H1: *The strength of a country's institutions has a positive impact on an ICO's probability of success and the amount that it raises.*

H2: *The strength of a country's institutions reduces token price volatility.*

H3: *ICOs are more frequent in countries with strong institutions.*

2.2. Regulations as a substitute for heuristics

The premise of our research question is the notion that investors use the home country's institutional quality as a heuristic cue to assess a project's trustworthiness. However, apart from providing this indirect cue, countries are able to directly ensure investor protection by implementing regulations on cryptocurrencies and ICOs (Cohney, Hoffman, Sklaroff, and Wishnick, 2019). Regulations lead to the development of recognized standards for industry members, helping establish industry legitimacy, which, in turn, supports investors' trust (Aldrich and Fiol, 1994). The ramifications of regulatory uncertainty for investments are observed in a variety of settings, including the biotech, telecommunication, and energy sectors and even foreign investment in developing countries (Shan, Singh, and Amburgey, 1991; Cambini and Jiang, 2009; Fan, Hobbs, and Norman, 2010; Kirkpatrick, Parker, and Zhang, 2006). In contrast, clear regulations have been shown to reduce market uncertainty and influ-

ence organizational strategies and market-entry decisions, thereby raising investors' confidence (see e.g., Hadani, Bonardi, and Dahan, 2017; Cambini and Jiang, 2009; Kirkpatrick et al., 2006; Teisberg, 1993). The role of regulations in reducing uncertainty and risks helps bring credibility to economic transactions. Specific regulations render entrepreneurs' projects subject to litigation and, as a result, provide a basis for the project's legitimacy. Such increased credibility reduces the extent to which investors lean on heuristic biases when making their investment decisions (Van Dijk and Zeelenberg, 2003; Chaiken and Maheswaran, 1994).

Regulations around ICOs are still preliminary and evolving and fairly inconsistent across countries (Nestarcova, 2018). For instance, in countries such as Gibraltar and Switzerland, the authorities have introduced extensive regulations and guidelines concerning ICOs, significantly curtailing some concerning ambiguities, while in most other countries, a clear regulatory position has yet to be established. Thus, the level of uncertainty varies considerably among countries, and we expect the influence of a country's institutions on ICO activity and outcomes to vary in accordance with the status of its ICO regulations. That is, we expect that investors interpret proactive regulatory steps taken by the authorities concerning ICOs as a source of clarity. Investors are thus less reliant on error-prone instinctive judgments since explicit guidelines clarify the risks and the legal protections at hand. Put differently, we argue that ICO regulations reduce investors' reliance on trust heuristics and mitigate the impact of institutions on ICO success, token price volatility and the number of ICOs.

H4: *The existence of ICO regulations in a jurisdiction mitigates the positive effect of that country's institutional strength on ICO success, token price volatility and the number of ICOs.*

3. Methodology

3.1. Research design

Hypothesis 1 posits an impact of institutional strength on ICOs' success. We estimate the following model:

$$Success_j = \alpha + \delta \cdot Inst_j + \beta \cdot CountryControls_j + \gamma \cdot ICOControls_j + \varepsilon_j, \tag{1}$$

where ε represents Newey-West standard errors corrected for heteroskedasticity and autocorrelation. We define two measures of ICO success ($Success_j$). To estimate our first proxy of success, we follow Amsden and Schweizer (2018) and identify successful ICOs as those whose tokens subsequently go on to be traded on a secondary exchange. We use a binary variable ($TokenTrade_j$) indicating whether ICO j's token is eventually traded on the exchange coinmarketcap.com. We follow Amsden and Schweizer (2018) and Howell, Niessner, and Yermack (2019) in taking token trade as a proxy for ICO success. Given that issuing tradable tokens is a common objective of issuers, regardless of the token type, token trade acts as a consistent and unbiased indicator of ICO success. Moreover, identifying successful ICOs as those listed on a popular exchange allows us to incorporate the expert due diligence of a third party to identify successful ICOs. The second measure is the amount raised, which takes into account the magnitude of the success ($Amount_j$) (see, e.g., Fisch, 2019; Adhami et al., 2018). We use logistic regression to estimate the model with the binary success measure and use the log-link gamma distribution to estimate the model with the amount raised as the dependent variable. The log-link gamma distribution is particularly suitable for data that are continuous, strictly positive, and right-skewed and where the variance is near-constant on the log scale (De Jong and Heller, 2008).

The variable $Inst_i$ estimates the quality of institutions in country i. To construct the composite institution variable, we use the Worldwide Governance Indicators because, to our knowledge, they cover the most comprehensive set of institutional dimensions, allowing us to construct a broad-ranging representation of a country's institutional background (Kaufmann, Kraay, and Mastruzzi, 2010). The data are updated yearly and cover a large sample of countries. The potential for source bias is particularly low, as the index incorporates inputs from 30 different data sources, including household and firm surveys, commercial business information providers, non-governmental organizations, and public-sector organizations (Kaufmann et al., 2010). For these reasons, the Worldwide Governance Indicators have been widely used in studies in diverse fields focusing on country-level institutions (see, e.g., Li and Zahra, 2012; Stephan, Uhlaner, and Stride, 2015; Chortareas, Girardone, and Ventouri, 2013; Elbahnasawy, 2014).

The Worldwide Governance Indicators comprise six distinctive components of institutional quality, namely, control of corruption, rule of law, government effectiveness, regulatory quality, political stability, and voice and accountability.[3] Together, these measures encapsulate prominent institutional

[3]Rule of law captures perceptions of confidence in and adherence to society's rules, such as contract enforcement and property rights. Government effectiveness represents the quality of policy formulation and its implementation and the independence of public and civil services. Regulatory quality represents the government's ability to formulate sound policies and regulations that promote private-sector development. Political stability represents the likelihood of government destabilization by unconstitutional

attributes, such as the quality of the public sector and the judicial system, and other related topics concerning the extent of regulatory red tape, graft, and unrest. Studies centered on institutions and their impact on economic activities consistently investigate these components, individually or in various combinations, often evidencing strong correlations among them and with crucial economic indicators (see, e.g., Mauro, 1995; Knack and Keefer, 1995; La Porta, Lopez-de Silanes, Shleifer, and Vishny, 1999; Rothstein, 2011; North, Wallis, Weingast, and Others, 2009). For instance, the quality of governance, which includes the rule of law, control of corruption and government effectiveness, is found to be a reliable indicator of several socio-economic outcomes, such as economic growth and life expectancy, outperforming other related dimensions, such as measures of democracy (Rothstein, 2011). Likewise, Djankov, La Porta, Lopez-de Silanes, and Shleifer (2002) find that factors concerning regulatory quality, such as the number of procedures, official cost, and official time that start-ups face during the process of legal registration, are associated with the extent of corruption, the quality of public services, and other socio-economic outcomes. Given the prominence of all six measures in the literature and the strong associations among them, for our measure of institutional quality, we construct a composite measure that combines the six governance indicators. As the six dimensions are highly correlated, we follow Li and Zahra (2012) and use principal component analysis to construct a composite index. We use the institution scores for the past decade (2009-2018) to generate the composite score. The first principal component accounts for 82.46% of the total variance, which we calculate as follows:

$$\begin{aligned} Inst = {} & RuleOfLaw \cdot 0.4430 + GovernmentEffectiveness \cdot 0.4306 \\ & + ControlOfCorruption \cdot 0.4397 + RegulatoryQuality \cdot 0.4382 \\ & + PoliticalStability \cdot 0.3698 + VoiceandAccountability \cdot 0.3102. \end{aligned} \tag{2}$$

Hypothesis 2 focuses on the impact of institutional strength on the price volatility of issued tokens ($TokenVol_j$). We estimate the following log-link gamma GLM:

$$TokenVol_j = \alpha + \delta \cdot Inst_j + \beta \cdot CountryControls_j + \gamma \cdot ICOControls_j + \varepsilon_j \tag{3}$$

or violent means. Voice and accountability measures include freedom of expression, freedom of association, and freedom of the press.

To proxy for volatility, we follow prior literature and use an order-one standard GARCH model with a skewed Student's t-distribution (Katsiampa, 2017; Chu, Chan, Nadarajah, and Osterrieder, 2017; Klein, Thu, and Walther, 2018; Phillip, Chan, and Peiris, 2018; Bariviera, Basgall, Hasperué, and Naiouf, 2017).[4] To mitigate erroneous estimations of token volatility, we select tokens with more than 90 days of daily price data. The autoregressive model for the conditional mean and first-order GARCH model for the conditional variance can be specified as follows:

$$r_t = c + \sum_{i=1}^{s} \phi_i r_{t-1} + u_t$$

$$u_t = h_t z_t, \quad z_t \sim i.i.d(0,1),$$

where r_t is the token price return on day t, u_t is the error term, z_t is a white-noise process, and h_t is the conditional standard deviation.

To test Hypothesis 3, we estimate the following country-level model using negative binomial GLM:

$$NbrICOs_i = \alpha + \delta \cdot Inst_i + \beta \cdot CountryControls_i + \varepsilon_i, \tag{4}$$

where $NbrICOs_i$ represents the number of ICOs launched in country i in our sample.

Hypothesis 4 examines whether ICO regulations moderate the impact of institutions on the number of ICOs, ICO success and token price volatility. We re-estimate Equations 1, 3 and 4 and add the interaction variable $RegICO_i \cdot Inst_i$. $RegICO_i$ is an indicator variable that distinguishes two categories of countries. The respective categories are shown in the second column of Table 7. The first category includes countries with designated ICO regulations or an extensive set of guidelines or statements that introduce regulatory restrictions in relation to various relevant aspects of ICOs. The regulations mainly pertain to the legal status of the issued ICO tokens (mainly for tax purposes) and safeguards concerning investor and consumer protection. The second group contains countries with no specific ICO regulatory framework. The group includes countries that have issued warnings or brief

[4]We use the GARCH model given the evidence for the presence of long memory and leverage effects in bitcoin price movements (Bariviera et al., 2017).

statements but that do not take a clear regulatory stance. The second group also includes countries such as France, Russia and Italy that have released drafts and discussions of ICO regulations but have yet to implement them. We expect $RegICO_i$ to mitigate the impact of $Inst_i$ on our set of dependent variables.

3.1.1. Control variables

Given the novelty of the literature, the list of control variables included varies widely across studies, and a consensus in this regard has yet to emerge. We mainly rely on the works of Fisch (2019), Adhami et al. (2018) and Amsden and Schweizer (2018) in selecting a list of prominent ICO-level and country-level control variables. The data relating to these variables are primarily extracted from ICOBench.com and coinmarketcap.com. The descriptions of the ICO-level control variables included in our models are as follows ($ICOControls_j$):

US Restriction ($USRestrict_j$): The stance of the authorities in the US has been particularly strict towards ICOs. For instance, ICOs marketing tokens to US-based investors may have compliance obligations even if the issuing firm is not located in the country (Howell et al., 2019). Due to the added compliance burden, some issuers restrict US residents from participating in the ICO. As the US is the largest economy in the world and therefore a substantial source of capital, such restrictions may have a significant influence on an ICO's outcome.

Telegram Followers ($Telegram_j$): Prior studies document the significance of community engagement via the cloud-based messaging application Telegram for ICOs' success (Howell et al., 2019; Sharma and Zhu, 2020). We control for this by taking the number of followers on Telegram. Given its focus on security and speed and its perceived independence from large companies and governments, Telegram has become a preferred platform for many in the crypto community. In our models, we take the natural logarithm values of followers.

ICOBench Rating ($Rating_j$): ICOBench.com rates listed ICOs using a combination of a standardized algorithm and independent expert evaluation. The ratings incorporate various factors, such as the trustworthiness of the team, the quality of the product, the venture's social media presence and business strategy, and a short legal review. We incorporate the aggregate score issued by ICOBench in our analysis.

Pre-ICO Sale ($PreICO_j$): Some ICOs opt to conduct a pre-sale of tokens at a discount before the actual ICO, mainly to cover various ICO-related expenses. While a successful pre-ICO could help price discovery, generate momentum and signal endorsement, it may also indicate a lack of financial capacity and even introduce the risk of a token dump at the time of the main issuance (Amsden and Schweizer, 2018; Adhami et al., 2018). Moreover, recent studies provide contradictory evidence of the impact of pre-sales on subsequent ICO success (Amsden and Schweizer, 2018; Adhami et al., 2018).

Bonus ($Bonus_j$): Token sales in both the pre-sale and the main ICO may include bonuses, which are token offers at discounted prices aimed at generating market interest. However, bonus offers also increase the risk of the tokens being dumped in the market when bonuses are no longer offered (see, e.g., Felix and von Eije, 2019; Amsden and Schweizer, 2018; Adhami et al., 2018).

Caps Present ($Caps_j$): ICOs can specify two key thresholds, a soft cap and a hard cap. Soft caps indicate the minimum amounts targeted to be raised and are found to favourably influence ICO success Amsden and Schweizer (2018); Howell et al. (2019). However, hard caps indicate the maximum amount that the firm intends to raise. These upper limits, apart from acting as a measure of ICO success, are also put in place to maintain scarcity and preserve the value of the issued tokens.

Ethereum Platform (Eth_j): Entrepreneurs can choose to develop their own blockchain, which requires greater resources and technical ability, or choose to build on an existing blockchain, such as Ethereum, NEO or Waves. Most ICOs are managed through smart contracts or tokens based on the ERC20 and ERC223 Token Standard Contract that run on the Ethereum blockchain. Prior studies find some evidence that ICOs based on the Ethereum platform are more likely to be successful and raise more funds than ICOs based on other platforms (Fisch, 2019; Amsden and Schweizer, 2018; Fenu, Marchesi, Marchesi, and Tonelli, 2018).

Whitelist+KYC ($WhiteKYC_j$): Implementing a white list and following know-your-customer (KYC) guidelines in the ICO process is an indication of regulatory compliance. As dealing with cryptocurrencies essentially gives buyers anonymity, compliance with these measures helps verify the identity of the buyers and mitigate the potential for illicit activities. However, there is little evidence on whether this type of compliance affects ICO success (Amsden and Schweizer, 2018).

Currencies Accepting ($NumbCurr_j$): Offering investors the option to use different currencies reduces the number of steps needed to complete the investment, thereby easing the transaction process.

Nevertheless, exchanging capital between currencies is relatively simple and cheap, and therefore, accepting more currencies may not have any significant role in ICO success (Howell et al., 2019).

Fiat Accepting ($Fiat_j$): Accepting fiat contributions could expand the pool of investors beyond those owning cryptocurrencies. However, it may signal a lack of confidence in the venture's own capacity to complete the ICO with just cryptocurrency investors (Amsden and Schweizer, 2018). Furthermore, smart contracts cannot ensure that fiat contributions are returned if the soft cap is not reached.

Team ($Team_j$): This variable looks not at individual quality but at aggregate capacity, measured by the total number of team members involved. A simple head count of the team could indicate the scope of the project and the capacity to handle the ICO process and the various tasks required to successfully implement the project. Previously, studies by Amsden and Schweizer (2018) and Tasca, Cerchiello, and Toma (2019) have found a significant positive relationship between the success of ICOs and the number of team members working on the project.

Average Ether Price ($PriceEth_j$): Ether is the cryptocurrency generated by the Ethereum platform and currently has the second-highest market capitalization in the cryptocurrency market. Given that most ICOs are supported by the Ethereum blockchain, payments for tokens in ICOs are predominantly made in ether (along with bitcoin) (Fisch, 2019).[5] The price of ether directly affects the amount raised by ICOs in terms of US dollars; moreover, rising ether prices may reflect market sentiment encouraging ICO investments. However, investors may also view high ether prices as a greater opportunity cost. We control for the average daily ether closing prices during the duration of the ICO. Amsden and Schweizer (2018) find a negative relationship between ether prices at the start of the ICO and the probability of the issued tokens being traded.

We further include country-specific variables representing the socio-economic conditions in country i in 2018 ($CountryControls_i$). The variable ($TaxHaven_i$) indicates whether the specified ICO country is a tax haven based on a list of 52 tax havens prepared by Hines (2010). Amsden and Schweizer (2018) finds no significant relationship between the tax haven status of the ICO country and the outcome of the offering; however, they rely on a different list prepared by the OECD. We opt to use the Hines (2010) list, as it is argued to be less affected by the internal biases that the OECD list has been

[5]The bitcoin price is not included since we observe a substantial correlation between the ether and bitcoin prices (0.76).

criticized as displaying (Palan, 2009). In addition, we control for prominent macro-level attributes that are likely to influence the extent of entrepreneurship development and ICO adoption and that are reasonably independent of institutional quality. We include natural logarithms of population (Pop_i) and the tertiary education enrolment rate ($TertiaryEdu_i$).

All variables are briefly defined in Table 1.

< Insert Table 1 about here >

4. Results

4.1. Data selection

Collecting data and conducting empirical tests on ICOs are particularly challenging because ICOs circumvent centralized institutions. ICOs relieve ventures of the need to rely on a central authority, and therefore, ventures may directly and exclusively provide all the relevant ICO information on their websites.[6] In addition, after the ICOs have culminated, ventures may choose to remove most of the ICO-related information from their websites to adjust to the shift in focus. Therefore, the task of gathering data on the complete population on ICOs is practically infeasible. However, due to the emergence of third-party ICO-tracking websites that archive information on ICOs, we are still able to gather detailed information about a considerably large pool of ICOs. In this paper, we use one of the prominent ICO-listing websites, ICOBench.com. This website has been used often in prior literature and allows us to compile an extensive dataset consisting of over 2,000 ICOs launched between April 2015 and September 2018. In fact, Amsden and Schweizer (2018) state that ICOBench.com provides the most accurate and detailed information for the largest number of ICOs. We supplement this dataset with additional information from the website coinmarketcap.com to obtain data on the post-ICO prices of the issued tokens (Amsden and Schweizer, 2018; Howell et al., 2019). Since ICOs come in different shapes and sizes, we try to mitigate the influence of extreme cases. For instance, some ICOs, such as those of EOS and TaTaTu, were extremely successful, raising over USD 4 billion and USD 500 million, respectively. Given the exceptionality of such cases, we winsorize the extreme amounts of raised values in our study sample to the 99th percentile. Our final sample consists of a total of 2,077

[6]Due to the decentralized nature of the blockchain, ICOs can opt out of associating themselves with any jurisdiction. In fact, Adhami et al. (2018) find that many ICO projects cannot be attributed to a specific country, and a significant portion (12.2%) of these authors' sample adopts a "decentralized governance" mechanism. In our sample, we find 79 (3.18%) ICOs that did not specify a location or that stated the location as "worldwide".

ICOs from 105 countries.

For Hypothesis 4, we need to identify the regulatory situation concerning ICOs for each country in our sample. Due to a lack of systematized secondary data on the issue of cryptocurrency regulation, we resort to manual primary data collection from the websites of national central banks and a range of reputable traditional media sources such as the New York Times, Bloomberg, Reuters, the BBC and the Financial Times. The data on regulations are provided in Table 7, which lists and describes the regulatory situation in the sample countries based on information available in August 2019.

4.2. Summary statistics

In Table 2, we provide the summary statistics of our sample variables for both ICO- and country-specific variables. We observe that 25.4% of the ICOs eventually issue tokens traded on coinmarketcap.com and that each ICO raises approximately USD 11.27 million on average. Furthermore, the GARCH volatility estimates range between 0 and 7.93. The aggregate institution scores range between -3.881 and 4.586, with a mean score of 2.307, which indicates that most of the ICOs are based in countries with higher institutional development.[7] We find that the average number of ICOs per country is 13.82.

< Insert Table 2 about here >

With respect to the ICO-specific control variables, we find that 27.3% of the ICOs originate in countries considered tax havens. We also find that nearly half (45.7%) of the ICOs feature a pre-ICO sale, and 45.3% feature some kind of bonus in the pre-sale or in the main ICO. Similar proportions are observed by Amsden and Schweizer (2018) and Adhami et al. (2018). Furthermore, two-thirds (68.7%) of the ICOs specify either a soft or a hard cap. Strikingly, 87.9% of the ICOs are based on the Ethereum blockchain. This prominence of Ethereum-based ICOs is consistent with the findings of other empirical studies (Amsden and Schweizer, 2018; Fenu et al., 2018). Similarly, we find that one-third (36.9%) of the observations are characterized by compliance with either white list or KYC protocols or with both. On average, an ICO offers almost two (1.9) currency alternatives for investors to execute the token purchase, and 2.1% of the ICOs allow purchases with fiat currency as an option. Furthermore, we find that the ICO projects on average have approximately 12 team members and

[7]The institution variables are assigned only to those ICOs that indicate a specific location. It should also be noted that the Worldwide Governance Indicator scores are not available for four jurisdictions that have hosted ICO activity (Curaçao, Gibraltar, Isle of Man, and New Caledonia); these observations are not included in our study sample (54 observations).

advisors on board. Ether prices fluctuate remarkably during our sample period, ranging from the lowest point of USD 1.07 to the highest value of USD 1,291.92. The average ether price is USD 545.18. The table also provides the average institution score, population and the level of enrolment in tertiary education among the countries included in the country-level analysis (0.07, 44.09 million and 41.90%, respectively).

Table 3 provides the estimated correlation coefficients between the variables included in our analyses. As hypothesized, we find a significant positive correlation between our measure of institutional strength and the probability of success, amount raised, and ICO frequency. We also find a highly significant and negative relationship between institutional strength and ICO token price volatility. Furthermore, we observe a considerable correlation between the two success measures. With regard to ICO-level control variables, we find some degree of correlation between ICOBench ratings and other ICO attributes, particularly compliance with white list and/or KYC protocols and the number of team members. In addition, we observe notable correlations among the country-level socio-economic variables, particularly institutions, ICO regulations and tertiary education enrolment.

< Insert Table 3 about here >

4.3. ICOs around the world – A heterogeneous development

Figure 1 shows the evolution of ICOs over time. The earliest token sales of ICOs occurred as recently as July 2013 with Ethereum (3700B = $2.3 m) in the United Kingdom and in 2014 with Karmacoin in the United States. Figure 1a illustrates the evolution of ICOs' monthly success rates over time. We find that ICO success significantly decreased in 2017, coinciding with a significant increase in the number of ICOs, indicating an increase in competition and potentially the presence of lemons in the market. Figure 1b shows that the total amount raised per month steadily fluctuated around USD one billion per month between 2017 and 2018. In total, between 2015 and 2018, the cumulative amount raised by ICOs equalled USD 20 billion (Figure 1c). Furthermore, with regard to the average volatility among the tokens traded in a secondary market, Figure 1d shows that the figures range between 0.5 and 1.5. In Figure 1e, we see that the number of ICOs mushroomed in early 2017 with 905 ICOs, peaking during the first half of 2018 with 1,347 ICOs. We then observe a slowdown in the following months.

< Insert Figure 1 about here >

In Panel A of Table 4, we split our sample by geographical region.[8] We observe striking heterogeneity in ICO activity across the different regions. In terms of the probability of being traded on a secondary market, ICOs in East Asia and the Pacific (0.30) lead the way, followed by projects launched in Latin America and the Caribbean (0.29). The two regions with the highest amounts raised through ICOs were North America (USD 7,539,538,461) followed by Europe and Central Asia (USD 6,196,169,708). On the other hand, South Asia displayed the least ICO activity (42 ICOs) and raised the lowest amount (USD 163,387,796). The ICOs based in South Asia also performed worst in terms of their success rate (0.10), and among the tokens that were issued and traded, those of South Asian ICOs faced the most price volatility (1.88). We clearly see that Europe and Central Asia (1,157 ICOs) lead the ICO market in terms of frequency, while East Asia and the Pacific region (506 ICOs) and North America (430 ICOs) also display a considerable amount of activity.

< Insert Table 4 about here >

Panel B of Table 4 ranks the top 30 countries in terms of the success rates, amounts raised, volatility and frequency of ICOs. We observe that ICOs based in known tax havens, such as the Cayman Islands and British Virgin Islands, raise significant amounts, despite being fewer in number. We observe that among the ICOs with tokens traded on a secondary market, those based in Saint Vincent and the Grenadines, Latvia, the Philippines, Panama and Mexico display the highest volatility, suggesting a greater level of speculative behaviour surrounding the tokens from these ICOs. The top five countries with the highest number of ICOs in our sample are the United States, Singapore, the United Kingdom, Russia and Switzerland. The ICOs in these five countries represent 45.8% of those in the sample. Note the presence of tax-haven countries such as Gibraltar, Cyprus, the British Virgin Islands, the Seychelles and Panama in the top 30, which indicates that ICO locations are to an extent chosen in consideration of a country's tax policies.

4.3.1. ICO regulations

Figure 2 illustrates the heterogeneity and dynamism of ICO regulations throughout the world. The challenge for authorities is to curb potential risks while avoiding the danger of stifling innovation. While some countries have embraced cryptocurrencies as a new means of financing, others have taken more cautious positions. For instance, Switzerland has positioned itself as one of the leading ICO

[8]The regional classifications are based on those introduced by the World Bank. Please see http://datatopics.worldbank.org/sdgatlas/the-world-by-region.html.

hubs in the world by creating a favourable ecosystem for blockchain technology and cryptocurrencies.[9] Similarly, the authorities in Anguilla introduced the Anguilla Utility Token Offering Act (AUTO Act) of 2018, establishing the world's first cryptocurrency regulatory regime specifically for ICOs offering utility-based tokens. Malta and Gibraltar are some of the other jurisdictions that have introduced designated regulations (with the Virtual Financial Assets Act of 2018 and the Financial Services [Distributed Ledger Technology Providers] Regulations of 2017, respectively).

< Insert Figure 2 about here >

However, many other countries are less elaborate in their prudential approaches, resorting to limited guidelines outlining the potential application of existing laws. In several countries, including Austria, Germany, New Zealand and the United States, the nature and applicability of regulations are evaluated on a case-by-case basis in view of whether the issued tokens are deemed securities. One of the main regulatory hurdles stems from the variability of the legal status of the issued tokens, which triggers different taxation laws, disclosure directives and registration requirements.[10] Consequently, tax regimes relating to ICOs and crypto-transactions vary widely. For instance, in Belarus, one of the first countries to introduce regulations solely for ICOs, specific exemptions are provided for various digital asset-related transactions and activities. In several countries, among them South Africa and Romania, capital gains from trading digital currencies are taxed as income, whereas in Israel, profits from cryptocurrency mining are subject to value added tax.

The potential of the cryptocurrencies market for money-laundering and financing illicit activities is another concern for regulators. Several jurisdictions have introduced guidelines and amendments to capture digital asset trades within the purview of their respective existing regulatory frameworks (Collomb, de Filippi, and Klara, 2019). In Belarus and Malta, two countries with extensive ICO-specific regulatory regimes, the existing anti-money laundering frameworks have been extended to apply to digital asset exchanges. Such regulations are specifically targeted at digital currency exchanges and may include stipulations such as mandatory verification of the identity of clients seeking to convert cryptocurrencies into fiat (as in the Czech Republic). Similarly, in the Isle of Man, at least two of the

[9] In January 2018, the Swiss State Secretariat for International Finance (Staatssekretariat für internationale Finanzfragen, SIF) reported that it would set up a working group on blockchain and ICOs. The working group will work together with the Federal Ministry of Justice and the Swiss Financial Market Supervisory Authority (FINMA) and involve interested businesses. *(https://www.admin.ch/gov/en/start/documentation/media-releases.msg-id-69539.html).*

[10] In the United States, the "Howey test" currently governs whether an investment scheme is deemed a security (22SEC v. W.J. Howey Co., 328 US 293, 1946), whereas its European counterpart is the Markets in Financial Instruments Directive (MiFID) (Enyi and Le, 2017). For further discussion of the reconciliation of US and EU securities laws in relation to ICOs, see (Maume and Fromberger, 2019).

ICO project team members are required to be present in the country during the ICO period.

In addition, due to the risks and obscurity, some countries have taken extreme regulatory positions; in South Korea and China, for instance, ICOs are banned outright. In some countries (among them Algeria, Bolivia, Morocco, and Nepal), transactions in cryptocurrencies are prohibited, though it is unclear whether these prohibitions extend to ICOs. Furthermore, countries including Colombia, India and Pakistan have imposed indirect restrictions by barring financial institutions from dealing with cryptocurrencies.[11]

4.4. Results of the multivariate regressions

4.4.1. Institutions and ICOs

Models (1) and (2) of Panel A of Table 5 report the results for Hypothesis 1. They provide the estimations of the regressions with the dependent variables $TokenTrade$ and $Amount$. Since ICOs that did not publicly report the amount raised were dropped from the analyses, Model (2) includes only 1,083 observations. Our results show a strong and significant relationship between institutional quality ($Inst$) and the ICO outcome in terms of both the probability of tokens being traded on a secondary market ($TokenTrade$) and the amount raised ($Amount$). The impact of $Inst$ is also economically significant. A marginal increase in the aggregate measure of institutions by one unit leads to an increase in the probability of success by 0.011 (8.29%) and an increase of USD 133,495.3 (10.81%) in the amount raised.[12] We also find a significant relationship between a country's institutions and ICO token volatility. The results are reported in Model (3) and are based on 487 ICOs that successfully issued tokens and that had price data for more than 90 days. These results show that the $Inst$ coefficient is negative and highly significant at the 95% confidence level, offering support for Hypothesis 2. In fact, we find that an increase of one unit in institutional quality leads to a decrease of 10.09% in token price volatility.

< Insert Table 5 about here >

Model (4) reports the results for Hypothesis 3. It should be noted that to avoid selection bias in the country-level analyses, we also include countries that have no ICOs, resulting in a sample size of 160. As expected, we find that the coefficient on $Inst$ is positive and significant at a 99% confidence

[11] For an overview of the regulatory responses of select jurisdictions, see Kaal (2018).
[12] The marginal effects are calculated at the mean values of the continuous variables, while the dummy variables are set at 1.

level. This clearly supports the hypothesis that a country's institutional background affects the development of ICOs. In addition to being statistically significant, the estimated coefficient represents an economically important effect. Our result indicates that an increase in the aggregate institution score by one unit, with other variables held constant, on average, leads to an increase in the log of the expected number of ICOs by 37.3%. Among the control variables, we find significant results for the tax-haven status, population and education variables.[13]

Among the control variables we include in the ICO-level analyses, we find some evidence showing that ICOs based in locations considered tax havens are significantly more likely to be successful. However, this relationship is not robust in terms of its impact on token volatility. In addition, our results mostly corroborate the findings of other recent empirical studies on ICOs. With regard to ICO success, we confirm the results of Fenu et al. (2018) and find a highly significant positive relationship with the ICOBench rating, which indicates that these ratings do influence funders' decisions. We obtain significant and negative coefficients for the pre-ICO sale, bonus, caps and white list/KYC dummy variables, suggesting that having a pre-ICO sale, offering bonuses, specifying either a soft or a hard cap, or complying with white list/KYC protocols are rather detrimental to the ICO's outcome. Similarly to Amsden and Schweizer (2018) and Tasca et al. (2019), we also observe a positive relationship between team size and ICO success. In addition, we find a negative relationship between the number of currency choices offered to investors and the ICO's success. We find that the dollar amount raised is positively associated with contemporaneous ether prices. Overall, the estimates for the various control variables are largely consistent between Models (1) and (2). However, in relation to volatility, we find that our control variables are nonsignificant. These results are still consistent with those of the study by Howell et al. (2019), which also evaluates the determinants of token price volatility and finds that the impact of ICO-specific attributes is similarly largely nonsignificant.

4.4.2. The moderating impact of regulations

Panel B of Table 5 provides the results on the interaction of the ICO regulation status with the effect of institutions. In total, we identify 22 countries with ICO-related regulations, 134 countries with no regulatory stance, and four countries with prohibitions on ICOs (as of September 2018, the

[13] As a robustness check, we also conduct the analysis taking the dependent variable as the ratio of $NbrICOs$ and Pop instead of introducing Pop as a control. We observe that institutional background is still highly significant (p-value <0.01) despite the use of a population-adjusted measure of ICO activity. The results are available upon request.

last month in our sample).[14] In the ICO-level analyses, the regulatory status is assigned to each ICO observation based on the ICO's launch date; i.e., ICOs that were launched before the introduction of the respective ICO regulation are allocated to the no-regulation group. It should also be mentioned that we observe a few ICOs that were recorded as launched after a ban was introduced in their respective country locations. We drop such observations from our ICO-level analyses. Additionally, in our country-level analyses, we drop the countries that introduced outright bans on ICOs (Algeria, China, Morocco and South Korea).

While Model (5) of Table 5 shows no significant influence of the interaction term on the probability of the token being traded, we do find that the interaction term has a negative impact that is significant at the 95% confidence level on the amount raised (Model (6)), corresponding with the prediction of Hypothesis 4. We also find in Model (6) a positive coefficient for $RegICO$, which indicates that the existence of regulations surrounding ICOs increases the amount raised during the ICO. Model (7), however, shows no mitigating impact of ICO regulations on the influence of institutions on token price volatility. Note that the effect of institutional background on all four dependent variables remains highly significant. Consistent with the hypothesis, Model (8) provides further evidence in relation to the mitigating impact of regulations on the importance of institutional strength on the development of ICOs. The interaction term for $RegICO$ and $Inst$ is negative and significant at the 99% confidence level. This result indicates that the influence of a country's institutions is particularly relevant in countries where there is little or no regulation of ICOs.

4.5. Robustness tests

Our main findings that ICOs in countries with higher-quality institutions have a greater likelihood of being traded, raise more funds and experience lower price volatility align completely with our initial expectations. However, we bear in mind that the exact quantification of this effect depends on the measurement of institutions and token price volatility as well as the control variables and model specification used. Therefore, in this section, we test the robustness of our results to alternative proxies of trust and volatility. We also discuss how we mitigate self-selection biases as well as endogeneity issues. The results are reported in Table 6.

[14] We do not categorize countries that have introduced prohibitions on cryptocurrency transactions (without explicit mention of ICOs) or those that have introduced restrictions specifically on regulated financial institutions as $BANNED$ since these countries are still able to host ICOs.

4.5.1. Self-selection and endogeneity issues

We now incorporate additional robustness checks to validate our findings. As ICO issuers benefit from substantial liberty in disclosing and determining the location of their projects, the selection of ICO locations may be driven by unobserved project qualities, leading to self-selection issues. To address this, we conduct our analyses with a sample excluding ICOs based in the US, which constitute 17% of the observations in the data. Our findings, as shown in Panel A of Table 6, are still significant, and the signs remain consistent even after the exclusion. Next, we run our tests with two additional samples, one with ICOs launched in countries hosting at least 30 ICOs and the other with those hosting at least 10. Our results remain highly significant in relation to those in Models (1) and (2).

Furthermore, our findings are potentially strained by unobserved attributes at the country level that are linked with *Inst* and the ICO results. While the lack of a well-founded exogenous variable as an instrument inhibits our ability to reliably address this concern, introducing additional control variables to account for alternate explanations can be informative. Following Huang et al. (2020), we introduce country-level controls representing developments in financial markets (Global Competitiveness Index), information communication technology (ICT Development Index) and the economic situation (GDP per capita). Panel B of Table 6 shows that the impact of institutions (*Inst*) remains qualitatively consistent with that found in our main results.[15]

We further check the robustness of our findings with specific additions and variations in the control variables used in the models. First, in addition to the variable *PriceEth*, which largely reflects time-varying market fluctuations, we introduce month fixed effects. Given the distinction between soft and hard caps, we also test our results with separate dummies for each cap type. Moreover, we remove the variable *Rating*, which is inherently associated with other salient ICO attributes included in our model, to check if the results change. In all models, our results remain significant and qualitatively consistent.

4.5.2. Alternative proxies of trust

In Panel C of Table 6, we test the robustness of our results to alternative measures for both the independent and dependent variables. First, as a measure of institutional development, we consider the Corruption Perception Index (CPI) for 2018 and a composite measure of institutional dimensions

[15]Note that the correlation between *Inst* and *GCI* is 0.84, the correlation between *Inst* and *ICT* is 0.89, and the correlation between *Inst* and *GDP* is 0.85. Given the close associations between these variables, there is a potential multicollinearity issue; for this reason, these variables are not included in the main analyses.

from La Porta, Lopez-de Silanes, Shleifer, and Vishny (1998); La Porta et al. (1999). CPI scores represent the perceived levels of public-sector corruption according to experts and businesspeople on a scale from 0 to 100, with 0 being the most corrupt. We also employ the dimensions identified by La Porta et al. (1998, 1999) ((i) the anti-director rights index, (ii) an index for the rule of law, (ii) an index for the level of corruption, and (iv) an index of legal system efficiency) and take the first principal component to create a unified measure. Our results remain consistent and highly significant when we use the CPI index; however, the evidence weakens with the La Porta et al. (1998, 1999) composite measure. Second, to reflect the role of country image as a heuristic for investment decisions in ICOs, we incorporate additional variables not directly associated with institutional indicators. We include a widely used measure of societal trust based on the World Values Survey and indicators of country image based on the Good Country Index and Henley Passport Index.[16] Our results remain substantially consistent.

We also examine the impact of each Worldwide Governance Indicator individually. We find that the results for the cost of corruption, governance effectiveness, regulatory quality and the rule of law are particularly significant with regard to all three outcome variables. For the political stability variable, only the results in terms of the probability of success and ICO activity remain significant and positive. Furthermore, the coefficient for the voice and accountability variable is not significant. Last, we test our models in relation to token price volatility using alternate measures of volatility (standard deviation of daily price returns and realized volatility) and find consistent results.

< Insert Table 6 about here >

4.5.3. Alternative proxies of token price volatility

Finally, we investigate whether our results hold when we use two alternative measures of token price volatility. First, we simply take the standard deviation of the daily returns ($StdRet$), a method commonly used in measuring the volatility of commodity prices (Slade, 1991; Fleming and Ostdiek, 1999; Regnier, 2007). Second, we use realized volatility ($RealVol$), which is computed as the sum of squared returns. This indicator was introduced by Andersen and Bollerslev (1998), who argue that under appropriate conditions, it is an unbiased and highly efficient estimator of volatility (Andersen,

[16]The World Values Survey measure of trust indicates the degree of societal trust based on the response of survey participants to the question: "*Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?*" The Good Country Index is a composite measure of a country's global contribution to the common good, accounting for diverse factors such as science, culture, peace, and climate (**?**). The Henley Passport Index is a widely recognized global ranking of countries representing the travel freedom that their citizens enjoy (HPI, 2020).

Bollerslev, Diebold, and Labys, 2003; Barndorff-Nielsen and Shephard, 2002). As shown in Table 6, our results concerning the relationship between institutional background and price volatility are consistently and significantly negative, supporting the main findings. The estimated coefficients for both measures are significant at the 5% level.

5. Conclusion

The recent proliferation of ICOs is an indication of a broader shift in the public capital market, revealing the scope for tools that further decentralize and democratize existing processes of entrepreneurship and finance. Our study shows that despite reductions in distance and bureaucratic frictions, country-level background remains a key factor determining ICO investment decisions. We draw on persuasion theory to illustrate ICO investors' use of country-level institutions as a heuristic tool in making judgments about trustworthiness in investment decisions. Specifically, given the heightened information asymmetries surrounding ICOs and the generally weak regulations concerning cryptocurrencies, our findings indicate that ICOs located in countries with stronger institutional frameworks are more frequent, raise more capital, have a higher likelihood of resulting in token trade on a secondary market, and enjoy substantially lower token price volatility. Moreover, we find that while strong institutions increase investors' trust in ICOs, this effect is especially prevalent for countries where ICOs are lightly or not regulated. Our study therefore provides some evidence that countries can curb the influence of their broader institutional backgrounds by making proactive regulatory efforts to clarify their stance on ICOs. We find that the importance of institutions remains robust for alternative definitions of institutional quality, sample selections, and volatility specifications.

In aggregate, our results suggest that the heterogeneity in ICO success across the world can be partly explained by investors relying on alternative cues to infer trust and assess the riskiness associated with ICOs. Our evidence is important for policy-makers who need to establish their future approach and policies towards ICOs. Nonetheless, ICOs are still in their infancy, and there is still much to be understood in terms of what determines their adoption and success. As with the introduction of any promising new technology, speculative exuberance and hasty aversion have hindered rational assessment of these offerings. The process of optimizing ICOs' value to the public still requires more experience, more proactive effort on the authorities' part and more research. Future research should continue investigating the determinants of ICO development and the factors that mitigate the

potential risks. We need a greater understanding of the role of ICOs in entrepreneurial development and economic growth and how that role can best be played.

References

Adhami, S., G. Giudici, and S. Martinazzi (2018). Why do businesses go crypto? An empirical analysis of initial coin offerings. *Journal of Economics and Business 100*, 64–75.

Aggarwal, R., C. Kearney, and B. Lucey (2012). Gravity and culture in foreign portfolio investment. *Journal of Banking & Finance 36*(2), 525–538.

Aldrich, H. E. and C. M. Fiol (1994). Fools rush in? The institutional context of industry creation. *Academy of Management Review 19*(4), 645–670.

Amsden, R. and D. Schweizer (2018). Are blockchain crowdsales the new 'Gold Rush'? Success determinants of Initial Coin Offerings. *Working Paper, Available at SSRN 3163849*.

Andersen, T. G. and T. Bollerslev (1998). Answering the skeptics: Yes, standard volatility models do provide accurate forecasts. *International Economic Review*, 885–905.

Andersen, T. G., T. Bollerslev, F. X. Diebold, and P. Labys (2003). Modeling and forecasting realized volatility. *Econometrica 71*(2), 579–625.

Bachmann, R. and A. C. Inkpen (2011). Understanding institutional-based trust building processes in inter-organizational relationships. *Organization Studies 32*(2), 281–301.

Bariviera, A. F., M. J. Basgall, W. Hasperué, and M. Naiouf (2017). Some stylized facts of the Bitcoin market. *Physica A: Statistical Mechanics and its Applications 484*, 82–90.

Barndorff-Nielsen, O. E. and N. Shephard (2002). Econometric analysis of realized volatility and its use in estimating stochastic volatility models. *Journal of the Royal Statistical Society: Series B (Statistical Methodology) 64*(2), 253–280.

Bell, R. G., C. B. Moore, and H. A. Al-Shammari (2008). Country of origin and foreign IPO legitimacy: Understanding the role of geographic scope and insider ownership. *Entrepreneurship Theory and Practice 32*(1), 185–202.

Beugelsdijk, S. and B. Frijns (2010). A cultural explanation of the foreign bias in international asset allocation. *Journal of Banking & Finance 34*(9), 2121–2131.

Bottazzi, L., M. Da Rin, and T. Hellmann (2016). The importance of trust for investment: Evidence from venture capital. *The Review of Financial Studies 29*(9), 2283–2318.

Brammer, S. and G. Jackson (2012). How regulatory institutions influence corporate reputations: A cross-country comparative approach. *The Oxford Handbook of Corporate Reputation, Oxford University Press, Oxford*, 297–319.

Cambini, C. and Y. Jiang (2009). Broadband investment and regulation: A literature review. *Telecommunications Policy 33*(10-11), 559–574.

Cellan-Jones, R. (2019). Mystery of the disappearing 'Cryptoqueen' Ruja Ignatova. https://www.bbc.com/news/technology-49826161.

Chaiken, S. (1987). The heuristic model of persuasion. In *Social Influence: The Ontario Symposium*, Volume 5, pp. 3–39.

Chaiken, S. and D. Maheswaran (1994). Heuristic processing can bias systematic processing: effects of source credibility, argument ambiguity, and task importance on attitude judgment. *Journal of Personality and Social Psychology 66*(3), 460–73.

Chortareas, G. E., C. Girardone, and A. Ventouri (2013). Financial freedom and bank efficiency: Evidence from the European Union. *Journal of Banking & Finance 37*(4), 1223–1231.

Chu, J., S. Chan, S. Nadarajah, and J. Osterrieder (2017). GARCH modelling of cryptocurrencies. *Journal of Risk and Financial Management 10*(4), 17.

Cohney, S., D. Hoffman, J. Sklaroff, and D. Wishnick (2019). Coin-operated capitalism. *Columbia Law Review 119*(3), 591–676.

Collomb, A., P. de Filippi, and S. O. K. Klara (2019). Blockchain Technology and Financial Regulation: A Risk-Based Approach to the Regulation of ICOs. *European Journal of Risk Regulation 10*(2), 263–314.

Conley, J. P. and Others (2017). Blockchain and the economics of crypto-tokens and initial coin offerings. *Vanderbilt University Department of Economics Working Papers* (17-00008).

Dahlstrom, R. and A. Nygaard (1995). An exploratory investigation of interpersonal trust in new and mature market economies. *Journal of Retailing 71*(4), 339–361.

De Jong, P. and G. Z. Heller (2008). *Generalized linear models for insurance data*. Cambridge University Press.

Djankov, S., R. La Porta, F. Lopez-de Silanes, and A. Shleifer (2002). The regulation of entry. *The Quarterly Journal of Economics 117*(1), 1–37.

Elbahnasawy, N. G. (2014). E-government, internet adoption, and corruption: an empirical investigation. *World Development 57*, 114–126.

Enyi, J. and N. Le (2017). The legal nature of cryptocurrencies in the US and the applicable rules. *Working Paper, Available at SSRN 2995784*.

Fan, L., B. F. Hobbs, and C. S. Norman (2010). Risk aversion and CO2 regulatory uncertainty in power generation investment: Policy and modeling implications. *Journal of Environmental Economics and Management 60*(3), 193–208.

Felix, T. H. and H. von Eije (2019). Underpricing in the cryptocurrency world: evidence from initial coin offerings. *Managerial Finance 45*(4), 563–578.

Fenu, G., L. Marchesi, M. Marchesi, and R. Tonelli (2018). The ICO phenomenon and its relationships with ethereum smart contract environment. In *2018 International Workshop on Blockchain Oriented Software Engineering (IWBOSE)*, pp. 26–32. IEEE.

Fisch, C. (2019). Initial coin offerings (ICOs) to finance new ventures. *Journal of Business Venturing 34*(1), 1–22.

Fleming, J. and B. Ostdiek (1999). The impact of energy derivatives on the crude oil market. *Energy Economics 21*(2), 135–167.

Hadani, M., J.-P. Bonardi, and N. M. Dahan (2017). Corporate political activity, public policy uncertainty, and firm outcomes: A meta-analysis. *Strategic Organization 15*(3), 338–366.

Hines, J. R. (2010). Treasure islands. *Journal of Economic Perspectives 24*(4), 103–126.

Hooper, V., A. B. Sim, and A. Uppal (2009). Governance and stock market performance. *Economic Systems 33*(2), 93–116.

Howell, S. T., M. Niessner, and D. Yermack (2019, 11). Initial Coin Offerings: Financing Growth with Cryptocurrency Token Sales. *The Review of Financial Studies*. hhz131.

HPI (2020). Henley and Passport Partners Holding Limited. https://www.henleypassportindex.com/passport.

Huang, W., M. Meoli, and S. Vismara (2020). The geography of initial coin offerings. *Small Business Economics* (55), 77–102.

Johnson, S., J. McMillan, and C. Woodruff (2002). Property rights and finance. *American Economic Review 92*(5), 1335–1356.

Jones, G. and R. D. Wadhwani (2007). Entrepreneurial theory and the history of globalization. In *Business History Conference. Business and*, Volume 5, pp. 1–26. Business History Conference.

Kaal, W. A. (2018). Initial Coin Offerings: The top 25 jurisdictions and their comparative regulatory responses (as of May 2018). *Stanford Journal of Blockchain Law & Policy*, 41–62.

Kalamova, M. M. and K. A. Konrad (2010). Nation brands and foreign direct investment. *Kyklos 63*(3), 400–431.

Katsiampa, P. (2017). Volatility estimation for Bitcoin: A comparison of GARCH models. *Economics Letters 158*, 3–6.

Kaufmann, D., A. Kraay, and M. Mastruzzi (2010). The worldwide governance indicators: A summary of methodology. *Data and Analytical Issues, World Bank Policy Research Working Paper 5430*.

King, B. G. and D. A. Whetten (2008). Rethinking the relationship between reputation and legitimacy: A social actor conceptualization. *Corporate Reputation Review 11*(3), 192–207.

Kirkpatrick, C., D. Parker, and Y.-F. Zhang (2006). Foreign direct investment in infrastructure in developing countries: does regulation make a difference? *Transnational Corporations 15*(1), 143–172.

Klein, T., H. P. Thu, and T. Walther (2018). Bitcoin is not the New Gold–A comparison of volatility, correlation, and portfolio performance. *International Review of Financial Analysis 59*, 105–116.

Knack, S. and P. Keefer (1995). Institutions and economic performance: cross-country tests using alternative institutional measures. *Economics & Politics 7*(3), 207–227.

La Porta, R., F. Lopez-de Silanes, A. Shleifer, and R. Vishny (1999). The quality of government. *The Journal of Law, Economics, and Organization 15*(1), 222–279.

La Porta, R., F. Lopez-de Silanes, A. Shleifer, and R. W. Vishny (1998). Law and finance. *Journal of Political Economy 106*(6), 1113–1155.

Li, Y. and S. A. Zahra (2012). Formal institutions, culture, and venture capital activity: A cross-country analysis. *Journal of Business Venturing 27*(1), 95–111.

Liebau, D. and P. Schueffel (2019). Cryptocurrencies & Initial Coin Offerings: Are they scams?-An empirical study. *The Journal of The British Blockchain Association 2*(1), 1–7.

Low, S.-W., S.-R. Kew, and L.-T. Tee (2011). International evidence on the link between quality of governance and stock market performance. *Global Economic Review 40*(3), 361–384.

Maume, P. and M. Fromberger (2019). Regulation of initial coin offerings: Reconciling US and EU securities laws. *Chicago Journal of International Law 19*(2), 548–585.

Mauro, P. (1995). Corruption and growth. *The Quarterly Journal of Economics 110*(3), 681–712.

Momtaz, P. P. (2018). CEO emotions and underpricing in initial coin offerings. *Working Paper, Available at SSRN 3305765*.

Momtaz, P. P. (2020). Initial coin offerings, asymmetric information, and loyal CEOs. *Small Business Economics*, 1–23.

Nestarcova, D. (2018). A critical appraisal of Initial Coin Offerings: Lifting the "Digital Token's Veil". *Brill Research Perspectives in International Banking and Securities Law 3*(2-3), 1–171.

Newburry, W. (2012). Waving the flag: The influence of country of origin on corporate reputation. *Oxford Handbook of Corporate Reputation*, 240–259.

North, D. C. (1981). *Structure and change in economic history*. Norton.

North, D. C. (1991). Institutions. *Journal of Economic Perspectives 5*(1), 97–112.

North, D. C., J. J. Wallis, B. R. Weingast, and Others (2009). *Violence and social orders: A conceptual framework for interpreting recorded human history*. Cambridge University Press.

Palan, R. (2009). The history of tax havens. *History & Policy*.

Paul, J. and P. Jadhav (2019). Institutional determinants of foreign direct investment inflows: Evidence from emerging markets. *International Journal of Emerging Markets 15*(2), 245–261.

Phillip, A., J. S. K. Chan, and S. Peiris (2018). A new look at Cryptocurrencies. *Economics Letters 163*, 6–9.

Regnier, E. (2007). Oil and energy price volatility. *Energy Economics 29*(3), 405–427.

Robinson, R. (2018). The new digital wild west: Regulating the explosion of initial coin offerings. *Tennessee Law Review 85*(4), 897–960.

Rothstein, B. (2011). *The quality of government: Corruption, social trust, and inequality in international perspective*. University of Chicago Press.

Schneider, S. C. and A. De Meyer (1991). Interpreting and responding to strategic issues: The impact of national culture. *Strategic Management Journal 12*(4), 307–320.

Shan, W., J. V. Singh, and T. L. Amburgey (1991). Modeling the creation of new biotechnology firms, 1973-1987. In *Academy of Management Proceedings*, Volume 1991, pp. 78–82. Academy of Management Briarcliff Manor, NY 10510.

Shanaev, S., S. Sharma, B. Ghimire, and A. Shuraeva (2020). Taming the blockchain beast? Regulatory implications for the cryptocurrency Market. *Research in International Business and Finance 51*, 101080.

Sharma, Z. and Y. Zhu (2020). Platform building in initial coin offering market: Empirical evidence. *Pacific-Basin Finance Journal*, 101318.

Slade, M. E. (1991). Market structure, marketing method, and price instability. *The Quarterly Journal of Economics 106*(4), 1309–1340.

Stephan, U., L. M. Uhlaner, and C. Stride (2015). Institutions and social entrepreneurship: The role of institutional voids, institutional support, and institutional configurations. *Journal of International Business Studies 46*(3), 308–331.

Tasca, P., P. Cerchiello, and A. M. Toma (2019). ICOs success drivers: A textual and statistical analysis. *The Journal of Alternative Investments 21*(4), 13–25.

Teisberg, E. O. (1993). Capital investment strategies under uncertain regulation. *The RAND Journal of Economics*, 591–604.

Tversky, A. and D. Kahneman (1974). Judgment under uncertainty: Heuristics and biases. *Science 185*(4157), 1124–1131.

US Securities and Exchange Commission (2017). Investor alert: Public companies making ico-related claims. https://www.sec.gov/oiea/investor-alerts-and-bulletins/ia_icorelatedclaims.

Van Dijk, E. and M. Zeelenberg (2003). The discounting of ambiguous information in economic decision making. *Journal of Behavioral Decision Making 16*(5), 341–352.

Verlegh, P. W. J. and J.-B. E. M. Steenkamp (1999). A review and meta-analysis of country-of-origin research. *Journal of Economic Psychology 20*(5), 521–546.

Welter, F. (2012). All you need is trust? A critical review of the trust and entrepreneurship literature. *International Small Business Journal 30*(3), 193–212.

Werbach, K. (2018). Trust, but verify: Why the blockchain needs the law. *Berkeley Technology Law Journal 33*(2), 487–550.

Williamson, O. E. (1993). Calculativeness, trust, and economic organization. *The Journal of Law and Economics 36*(1, Part 2), 453–486.

Zucker, L. G. (1986). Production of trust: Institutional sources of economic structure, 1840-1920. *Research in Organizational Behavior 8*, 53–111.

6. Tables

Table 1.: Variable Descriptions

Dependent Variables	
$TokenTrade$	Indicator for whether the token is eventually traded on a currency exchange.
$Amount$	Amount raised during the coin-offering period in US dollars.
$TokenVol$	Measure of return volatility based on an order-1 GARCH model with a skewed Student's t-distribution.
$NbrICOs$	Number of ICOs launched in a country.
Independent Variables	
$Inst$	Institutional strength of the ICO country; a principal component-based aggregated measure of six Worldwide Governance Indicators.
$RegICO$	Indicator for whether ICO-related regulations or guidelines are present in the ICO country at the time of the ICO launch.
Control Variables	
$USRestrict$	Indicator for whether US-based investors are restricted from participating in the ICO.
$Telegram*$	Number of Telegram followers.
$Rating$	Aggregated score assigned to the ICO by experts from ICOBench.com.
$PreICO$	Indicator for whether a pre-ICO sale is conducted.
$Bonus$	Indicator for whether bonuses are offered during the ICO.
$Caps$	Indicator for whether a soft and/or hard cap is specified.
Eth	Indicator for whether the project blockchain is built on the Ethereum platform.
$WhiteKYC$	Indicator for whether the ICO complies with whitelisting and know-your-customer (KYC) protocols.
$NumbCurr$	Number of types of fiat and cryptocurrencies that the ICO accepts.
$Fiat$	Indicator for whether the ICO accepts fiat currencies.
$Team$	Number of members of the team behind the ICO.
$PriceEth$	Average price of ether during the ICO in US dollars.
$TaxHaven$	Indicator for whether the country is located in a tax haven (source: Hines (2010)).
$Pop*$	Country population (in millions) at the end of 2018 (source: World Bank).
$TertiaryEdu$	Latest gross enrolment in tertiary education after 2008, measured as percentage of the population in the corresponding age group (source: World Bank).

Note: * In natural logarithms

Table 2.: Descriptive Statistics

	N	Mean	Med	Std	Min	Max
ICO-level Statistics						
TokenTrade	2,077	0.255	0	0.436	0	1
Amount	1,083	11.276mil.	5.244mil.	14.858mil.	26	71.968mil.
TokenVol	487	0.474	0.139	0.972	0	7.932
Inst	2,077	2.307	3.153	1.981	−3.881	4.586
RegICO	2,048	0.352	0	0.478	0	1
USRestrict	2,077	0.22	0	0.414	0	1
Telegram	2,077	1,039.243	15	3,291.702	0	68,251
Rating	2,077	3.05	3	0.709	0.7	4.8
PreICO	2,077	0.457	0	0.498	0	1
Bonus	2,077	0.453	0	0.498	0	1
Caps	2,077	0.687	1	0.464	0	1
Eth	2,077	0.879	1	0.327	0	1
WhiteKYC	2,077	0.369	0	0.483	0	1
NumbCurr	2,077	1.906	1	1.535	1	13
Fiat	2,077	0.021	0	0.142	0	1
Team	2,077	12.246	11	7.510	1	59
PriceEth	2,077	545.183	545.779	222.221	1.07	1,291.92
TaxHaven	2,077	0.273	0	0.445	0	1
Pop	2,077	125.862	37.059	243.302	0.03	1,392.73
TertiaryEdu	2,077	70.904	73.759	19.222	3.92	126.383
Country-level Statistics						
NbrICOs	160	13.825	1	43.82	0	374
Inst	160	0.074	−0.44	2.158	−4.595	4.586
RegICO	156	0.141	0	0.349	0	1
TaxHaven	160	0.1	0	0.301	0	1
Pop	160	44.089	9.949	157.222	0.018	1,392.73
TertiaryEdu	160	41.903	38.511	29.4	0.775	126.383

Note: This table presents the descriptive statistics for the variables included in both the ICO-level and the country-level analyses. For *Amount*, we do not include ICOs that have opted out from disclosing the amount raised. The *TokenVol* measure represents observations with at least 90 days of trading records. The *RegICO* variable does not include observations for the 4 countries where bans on ICOs were introduced.

Table 3.: Correlation Table

ICO-level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)		
Dependent Variables																			
(1) *TokenTrade*																			
(2) *Amount*	0.42***																		
(3) *TokenVol*	-	-0.11***																	
Independent Variables																			
(4) *Inst*	0.10***	0.10***	-0.10**																
(5) *RegICO*	0.00	0.01	0.01	0.36***															
Control Variables																			
(6) *USRestrict*	-0.02	-0.03	0.03	0.09***	0.11***														
(7) *Telegram*	0.21***	0.22***	-0.07	0.07**	0.06**	0.03													
(8) *Rating*	0.28***	0.25***	-0.07*	0.07***	0.07***	0.26***	0.23***												
(9) *PreICO*	-0.07***	-0.03	0.01	-0.02	0.06***	0.15***	0.02	0.22***											
(10) *Bonus*	-0.08***	-0.03	0.04	-0.01	0.03	0.16***	0.05*	0.23***	0.20***										
(11) *Caps*	0.00	0.02	-0.01	0.02	0.11***	0.20***	0.08***	0.34***	0.19***	0.22***									
(12) *Eth*	0.02	0.01	-0.09**	0.05***	0.00	0.04**	0.03	0.13***	0.05**	0.07***	0.13***								
(13) *WhiteKYC*	-0.05***	0.00	0.06	0.13***	0.21***	0.47***	0.11***	0.35***	0.16***	0.17***	0.27***	0.07***							
(14) *NumbCurr*	-0.03	0.03	0.08**	-0.05***	-0.03	0.05***	0.02	0.17***	0.13***	0.12***	0.12***	-0.14***	0.11***						
(15) *Fiat*	0.00	0.05**	-0.04	0.03	0.06***	0.04*	-0.03	0.05***	0.03	0.03	0.05**	0.01	0.11***	0.16***					
(16) *Team*	0.23***	0.25***	0.00	0.07***	0.08***	0.17***	0.18***	0.50***	0.14***	0.11***	0.19***	0.06***	0.24***	0.11***	0.03				
(17) *PriceEth*	-0.04*	0.06***	-0.06	0.01	0.17***	0.03	0.00	0.03	0.13***	0.04**	0.12***	0.03	0.04*	0.05**	0.05***	0.07***			
(18) *TaxHaven*	0.11***	0.11***	0.04	0.30***	0.24***	0.21***	0.10***	0.17***	0.05**	0.03	0.08***	0.06***	0.20***	0.00	0.03	0.16***	0.04**		
(19) *Pop*	0.01	0.02	0.02	-0.25***	0.11***	-0.11***	0.01	-0.08***	-0.04**	-0.06***	-0.06***	-0.04*	-0.08***	-0.04*	-0.02	-0.07***	-0.04**	-0.31***	
(20) *TertiaryEdu*	0.04*	-0.01	-0.07	0.24***	0.32***	-0.09***	-0.03	0.00	-0.04*	-0.07***	-0.03	0.01	-0.03	-0.05**	0.01	0.00	-0.05**	-0.18***	-0.08***

Country-level

	(1)	(2)	(3)	(4)	(5)
Dependent Variables					
(1) *NbrICOs*					
Independent Variables					
(2) *Inst*	0.33***				
(3) *RegICO*	0.35***	0.48***			
Control Variables					
(4) *TaxHaven*	0.17**	0.33***	0.23***		
(5) *Pop*	0.21**	-0.07	0.04	-0.10	
(6) *TertiaryEdu*	0.32***	0.60***	0.38***	0.09	-0.02

Note: This table presents two sets of correlation matrices: one for ICO-level variables and one for country-level variables. The table shows Pearson correlation coefficients with significance levels of 10 percent, 5 percent, and 1 percent denoted with *, ** and ***, respectively.

Table 4.: Regional and Country-level ICO Summary

Location	$\%Successful$	Location	$AmountRaised(USD)$	Location	$\overline{TokenVolatility}$	Location	$ICOs$
Panel A – Geographical Regions							
East Asia and Pacific	0.3	North America	7,538,538,461	South Asia	1.88	Europe and Central Asia	1,157
Latin America and the Caribbean	0.29	Europe and Central Asia	6,196,169,708	Latin America and the Caribbean	0.8	East Asia and Pacific	506
North America	0.27	East Asia and Pacific	3,605,674,372	Middle East and North Africa	0.65	North America	430
Europe and Central Asia	0.22	Latin America and the Caribbean	1,861,854,975	East Asia and Pacific	0.64	Latin America and the Caribbean	148
Middle East and North Africa	0.2	Middle East and North Africa	460,615,891	Europe and Central Asia	0.5	Middle East and North Africa	83
Sub-Saharan Africa	0.16	Sub-Saharan Africa	201,127,809	Sub-Saharan Africa	0.35	Sub-Saharan Africa	64
South Asia	0.1	South Asia	163,387,796	North America	0.33	South Asia	42
Panel B – Top 30 Countries							
Armenia	1	United States	7,160,637,743	Saint Vincent and the Grenadines	7.58	United States	374
Saint Vincent and the Grenadines	1	Singapore	1,794,428,159	Latvia	4.08	Singapore	227
Costa Rica	0.57	Switzerland	1,594,505,077	Philippines	4.04	United Kingdom	218
Argentina	0.5	United Kingdom	1,118,294,035	Panama	3.56	Russia	199
China	0.5	Cayman Islands	892,657,454	Mexico	3.15	Switzerland	131
Finland	0.5	Russia	601,896,136	Liechtenstein	2.15	Estonia	107
Lithuania	0.5	British Virgin Islands	598,124,974	India	1.88	Hong Kong	78
Saint Kitts and Nevis	0.43	Estonia	594,236,459	Belize	1.09	Canada	56
Liechtenstein	0.4	Hong Kong	545,312,266	Malaysia	1.08	Germany	53
New Zealand	0.4	Canada	377,900,717	United Arab Emirates	1.07	Australia	51
Singapore	0.37	Gibraltar	370,008,571	Luxembourg	0.97	Netherlands	43
Slovenia	0.37	China	342,036,024	Ukraine	0.94	United Arab Emirates	38
Malaysia	0.36	Lithuania	319,574,100	Japan	0.94	Cayman Islands	37
Switzerland	0.36	Germany	287,673,441	Hong Kong	0.91	India	36
Cayman Islands	0.35	Japan	248,878,556	Austria	0.91	Gibraltar	35
British Virgin Islands	0.35	Israel	217,157,456	Bulgaria	0.9	France	31
Gibraltar	0.34	Australia	170,413,414	Spain	0.89	Slovenia	30
Colombia	0.33	Cyprus	168,974,430	Czech Republic	0.73	China	28
South Korea	0.33	Malaysia	168,374,710	Nigeria	0.71	Japan	28
Romania	0.33	France	154,757,920	China	0.66	Ukraine	28
France	0.32	Slovenia	143,277,292	Malta	0.64	Cyprus	25
Japan	0.32	India	138,332,862	Russia	0.64	Malta	25
Malta	0.32	Malta	137,384,603	Netherlands	0.61	Belize	24
Spain	0.31	Romania	115,156,842	Slovenia	0.58	Czech Republic	24
Austria	0.3	Location Unspecified	111,857,504	Singapore	0.58	British Virgin Islands	23
United States	0.28	United Arab Emirates	106,073,832	Gibraltar	0.58	Seychelles	23
Hong Kong	0.27	Belize	104,843,983	Saint Kitts and Nevis	0.45	Bulgaria	21
Bahamas	0.25	Spain	99,786,049	Estonia	0.44	South Africa	21
Cambodia	0.25	Seychelles	98,328,401	United Kingdom	0.4	Israel	20
Marshall Islands	0.25	Thailand	95,223,269	Armenia	0.35	Lithuania	20

Note: Panels A and B, respectively, present rankings of the seven geographic regions and the top 30 locations in terms of ICO success rate, total amount raised, average token price volatility (GARCH), and number of ICOs.

Table 5.: Impact of Institutional Background and Regulations on ICO Outcomes

	Panel A – Impact of Institutions				*Panel B – Impact of ICO Regulations*			
	TokenTrade GLM (Binomial) Model 1	*Amount* GLM (Log Gamma) Model 2	*TokenVol* GLM (Log Gamma) Model 3	*NbrICOs* GLM (Negative Binomial) Model 4	*TokenTrade* GLM (Negative Binomial) Model 5	*Amount* GLM (Log Gamma) Model 6	*TokenVol* GLM (Log Gamma) Model 7	*NbrICOs* GLM (Negative Binomial) Model 8
(Intercept)	**−5.395*****	**14.552*****	1.085	**−2.156*****	**−6.033*****	**14.353*****	**1.216***	**−2.295*****
	(0.486)	(0.318)	(0.663)	(0.509)	(0.538)	(0.339)	(0.710)	(0.496)
Inst	**0.108*****	**0.104*****	**−0.117****	**0.388*****	**0.153*****	**0.117*****	**−0.125****	**0.499*****
	(0.033)	(0.023)	(0.050)	(0.116)	(0.037)	(0.025)	(0.053)	(0.141)
RegICO					−0.218	**0.484***	0.500	0.349
					(0.447)	(0.285)	(1.151)	(0.435)
Inst · RegICO					−0.089	**−0.169****	−0.073	**−0.484*****
					(0.125)	(0.082)	(0.292)	(0.152)
USRestrict	−0.147	**−0.363*****	−0.040		−0.158	**−0.358*****	−0.085	
	(0.163)	(0.110)	(0.359)		(0.168)	(0.113)	(0.365)	
logTelegram	**0.124*****	0.017	**−0.054****		**0.125*****	0.016	**−0.055****	
	(0.019)	(0.014)	(0.026)		(0.019)	(0.014)	(0.027)	
Rating	**1.243*****	**0.295*****	**−0.260***		**1.279*****	**0.320*****	−0.228	
	(0.114)	(0.082)	(0.155)		(0.116)	(0.086)	(0.160)	
PreICO	**−0.522*****	**−0.144***	0.225		**−0.523*****	**−0.147***	0.187	
	(0.119)	(0.080)	(0.202)		(0.121)	(0.081)	(0.200)	
Bonus	**−0.510*****	**−0.153***	−0.049		**−0.478*****	**−0.154***	−0.007	
	(0.121)	(0.087)	(0.210)		(0.124)	(0.090)	(0.215)	
Caps	**−0.452*****	**−0.223****	0.072		**−0.454*****	**−0.240****	0.015	
	(0.132)	(0.101)	(0.206)		(0.135)	(0.105)	(0.214)	
Eth	−0.048	0.042	−0.281		0.006	0.060	−0.347	
	(0.197)	(0.139)	(0.225)		(0.203)	(0.144)	(0.235)	
WhiteKYC	**−0.984*****	−0.138	0.381		**−0.951*****	−0.136	0.367	
	(0.153)	(0.117)	(0.305)		(0.161)	(0.127)	(0.303)	
NbrCurr	**−0.106****	−0.005	0.041		**−0.099****	−0.004	0.026	
	(0.049)	(0.026)	(0.068)		(0.050)	(0.027)	(0.066)	
Fiat	0.366	**0.637****	−0.972		0.266	**0.656****	−0.830	
	(0.440)	(0.272)	(0.724)		(0.461)	(0.272)	(0.733)	
Team	**0.037*****	**0.022*****	0.011		**0.035*****	**0.023*****	0.013	
	(0.008)	(0.005)	(0.008)		(0.009)	(0.006)	(0.008)	
PriceEth	−0.000	**0.001*****	−0.000		0.000	**0.001*****	−0.001	
	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	
logPop	**0.107*****	**0.076*****	−0.050	**0.545*****	**0.129*****	**0.085*****	−0.055	**0.610*****
	(0.036)	(0.027)	(0.062)	(0.113)	(0.039)	(0.029)	(0.064)	(0.102)
TertiaryEdu	0.000	**−0.005****	−0.003	**0.039*****	0.005	−0.005	−0.005	**0.040*****
	(0.003)	(0.002)	(0.006)	(0.007)	(0.004)	(0.003)	(0.006)	(0.008)
TaxHaven	**0.613*****	**0.197***	−0.083	**3.573*****	**0.879*****	**0.307****	−0.172	**3.927*****
	(0.167)	(0.109)	(0.267)	(0.683)	(0.190)	(0.141)	(0.268)	(0.584)
AIC	1947.100	37025.632	118.777	770.076	1896.264	36405.353	118.856	745.028
BIC	2042.958	37115.407	194.166	788.639	2003.132	36504.768	202.206	769.579
Log Likelihood	−956.550	−18494.816	−41.389	−379.038	−929.132	−18182.677	−39.428	−364.514
Deviance	1913.100	2033.736	964.055	144.197	1858.264	2006.893	935.568	140.127
Num. obs.	2077	1083	487	163	2048	1065	477	159

Note: Panel A of this table presents the results for the models relating to Hypotheses 1 to 3 on the impact of institutional strength on ICO success, token price volatility and the number of ICOs. Models (1) and (2) in Panel A relate to *TokenTrade* and *Amount*, respectively, while Model (3) relates to token price volatility (*TokenVol*). Model (4) in Panel A tests Hypothesis 3 and estimates the impact of institutions on the number of ICOs in a country (*NbrICOs*). Panel B presents the results for the models relating to Hypothesis 4 on the moderating role of ICO regulations in the impact of institutions on ICO success, volatility and ICO activity. *, ** and *** denote statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, based on a two-sided t-test.

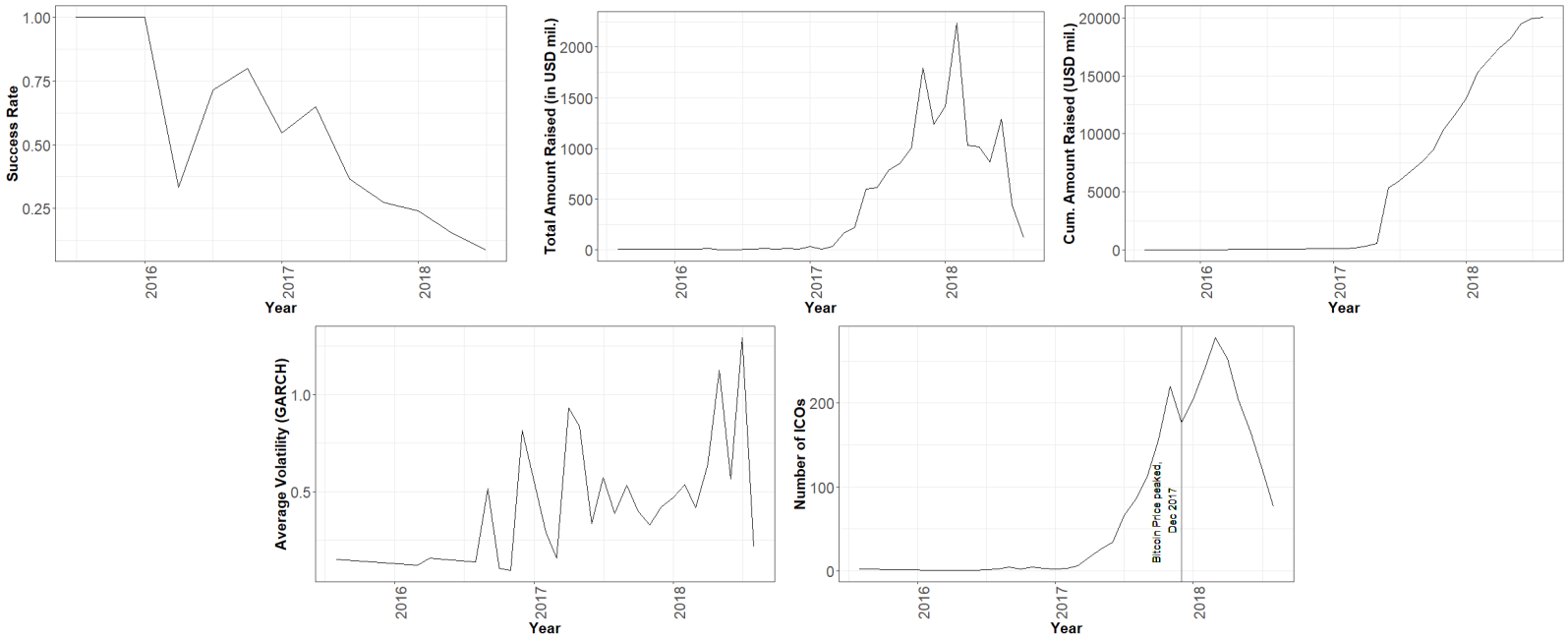
Table 6.: Robustness Tests

Dependent Variable:	*TokenTrade*	*Amount*	*TokenVol*	*NmbICOs*
	GLM (Binomial)	GLM (Log Gamma)	GLM (log Gamma)	GLM (Negative Binomial)
	(1)	(2)	(3)	(4)
Panel A: Sub-sample Tests				
Excluding United States-based ICOs				
Inst	**0.098****	**0.082***	**−0.112****	**0.386*****
	(0.034)	(0.024)	(0.053)	(0.114)
ICOs from Countries with >=30 ICOs				
Inst	**0.136*****	**0.140*****	−0.102	−0.102
	(0.044)	(0.030)	(0.067)	(0.226)
ICOs from Countries with >=10 ICOs				
Inst	**0.100*****	**0.101*****	**−0.128****	**0.162***
	(0.035)	(0.025)	(0.053)	(0.084)
Panel B: Additional Control Variables				
Additional Country-level Controls				
Inst	**0.167***	**0.165****	−0.079	**0.29***
	(0.096)	(0.076)	(0.131)	(0.157)
Month Fixed Effects				
Inst	**0.127*****	**0.116*****	**−0.040*****	
	(0.037)	(0.024)	(0.051)	
Separate Soft- and Hard-cap Dummies				
Inst	**0.107*****	**0.100*****	**−0.121*****	
	(0.034)	(0.022)	(0.049)	
Excluding Rating Variable				
Inst	**0.111*****	**0.117*****	**−0.121*****	
	(0.032)	(0.023)	(0.051)	
Panel C: Alternative Measures				
Institution Measures				
Inst (*CPIIndex*)	**0.009****	**0.007*****	**−0.015*****	**0.041*****
	(0.003)	(0.002)	(0.005)	(0.013)
Inst (*LaPorta*)	**0.201****	0.038	**−0.296****	**0.737*****
	(0.080)	(0.053)	(0.126)	(0.117)
Trust Measures				
Trust (*WVS*)	**3.144***	**2.024***	−1.252	**0.029****
	(1.551)	(0.798)	(0.911)	(0.014)
Trust (*GoodCountry*)	**0.006****	**0.005*****	**−0.004***	**0.017*****
	(0.002)	(0.001)	(0.003)	(0.004)
Trust (*Passport*)	**0.008*****	**0.007*****	**−0.007***	**0.021*****
	(0.002)	(0.001)	(0.003)	(0.004)
Worldwide Governance Indicators				
Cost_of_Corruption	**0.180*****	**0.122*****	**−0.232****	**0.647*****
	(0.062)	(0.042)	(0.097)	(0.219)
Governance_Effectiveness	**0.287*****	**0.178*****	**−0.263****	**0.936*****
	(0.080)	(0.054)	(0.122)	(0.250)
Political_Stability	**0.294*****	0.096	−0.276	**0.425***
	(0.101)	(0.069)	(0.168)	(0.236)
Regulatory_Quality	**0.202*****	**0.137*****	**−0.231****	**0.875*****
	(0.068)	(0.046)	(0.106)	(0.292)
Rule_of_Law	**0.229*****	**0.159*****	**−0.250****	**0.677****
	(0.066)	(0.044)	(0.101)	(0.274)
Voice_and_Accountability	0.082	**0.106****	**−0.221****	**0.723*****
	(0.066)	(0.044)	(0.098)	(0.258)
Alternative Volatility Measures (Dependent Variable)				
	SD Daily Returns	*Realized Volatility*		
Inst	**−0.030****	**−0.025****		
	(0.012)	(0.012)		

Note: This table presents the estimated coefficients for the main variable of focus, institutional background, obtained from the various robustness tests discussed in Section 4.5. *, ** and *** denote statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, based on a two-sided t-test.

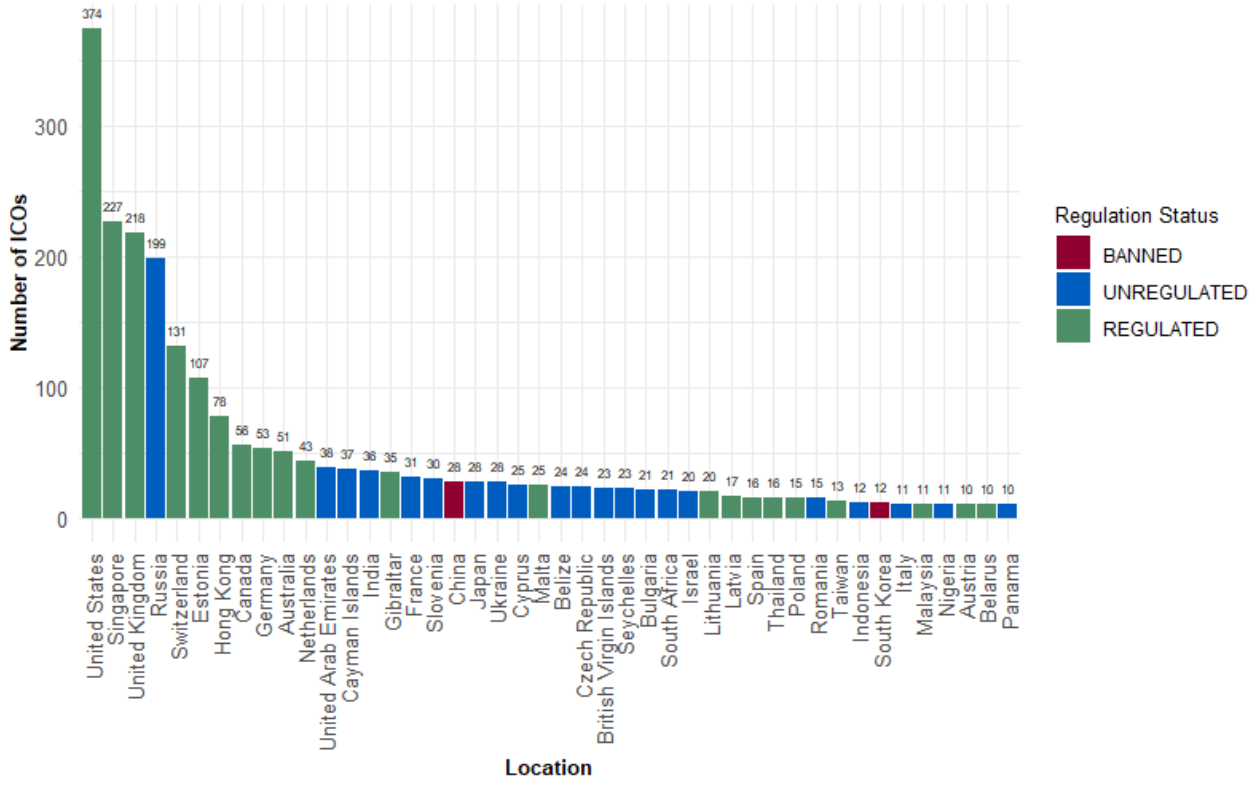
7. Figures

Figure 1.: Figure caption



The figures illustrate monthly trends in the number of ICOs, success rate (in %), total amount raised (in million USD), cumulative amount raised (in million USD) and average volatility (GARCH) between 2015 and 2018. In the figure for the amount raised, the observation for the EOS ICO is not included, given its inordinate influence on the data.

Figure 2.: Number of ICOs by Location and Regulatory Status



Note: The figure indicates the number of ICOs in countries hosting at least 10 ICOs. The bars are color-coded to reflect the jurisdictions' regulatory status, based on the information available in August 2019, which goes beyond our sample period.

8. Online Appendix

Table 7.: Status of ICO Regulation

Country	Regulatory Status	Detail	Month
Afghanistan	Unregulated	Considering sovereign crypto bonds.[17]	Apr-19
Andorra	Unregulated	No regulations, but warnings issued.[18]	Sep-18
Anguilla	Regulated	Anguilla Utility Token (AUTO) Act defines and regulates utility tokens that do not have a security feature.[19]	May-18
Argentina	Unregulated	No regulations, but warnings issued in relation to bitcoin.[20]	May-14
Armenia	Unregulated	No information appears to be available.	Mar-18
Australia	Regulated	Guidance issued for ICOs regarding legal obligations for coin or token offerings.[21]	Sep-17
Austria	Regulated	Guidelines published on how regulators view ICOs from a financial services regulatory perspective.[22]	Oct-18
Bahamas	Unregulated	No legislation specifically for ICOs, but according to central bank, regulations for a system of national electronic payments services also applicable to cryptocurrencies.[23]	Mar-18
Bangladesh	Unregulated	Banned use of bitcoin.[24]	Dec-17
Barbados	Unregulated	Regulatory sandbox to assess feasibility of fintech innovations established by Central bank and Financial Services Commission (FSC).[25]	Oct-18
Belarus	Regulated	Presidential decree released on development of digital economy taxation and foreign exchange control relating to cryptocurrencies and establishment of legal environment for ICOs.[26]	Mar-18
Belgium	Regulated	Guidelines issued identifying a number of national and European laws that may apply to some ICOs.[27]	Nov-17
Belize	Unregulated	No information appears to be available.	-
Bosnia and Herzegovina	Unregulated	According to central bank, no plans to limit tradings in virtual currencies.[28]	Jan-18
Brazil	Regulated	Issued statement on ICOs and indicated that ICO tokens that meet definition of securities must meet criteria outlined in Securities Act.[29]	Mar-18
Bulgaria	Unregulated	Market for cryptocurrencies and ICOs monitored by Financial Supervision Commission, mainly in relation to money-laundering and other abuses.[30]	Jul-18

[17] https://www.asiatimes.com/2019/04/article/kabul-tunis-in-sovereign-crypto-bond-race/
[18] https://www.afa.ad/en/coneix-lafa/actualitat-afa/alertes/afa-advertencia-2018-03-09
[19] https://anguillafinance.ai/utility-token-offering/?s=
[20] https://www.infotechnology.com/internet/El-Banco-Central-argentino-considera-riesgoso-operar-con-bitcoins-20140528-0003.html
[21] https://asic.gov.au/about-asic/news-centre/find-a-media-release/2017-releases/17-325mr-asic-provides-guidance-for-initial-coin-offerings/
[22] https://www.fma.gv.at/en/fma-spotlight-on/fma-focus-initial-coin-offerings/
[23] https://www.centralbankbahamas.com/download/031486300.pdf
[24] http://www.dhakatribune.com/business/banks/2017/12/27/bangladesh-bank-ban-bitcoin/
[25] http://www.centralbank.org.bb/regulatory-sandbox/sandbox-news/article/9432/central-bank-of-barbados-and-financial-services-commission-announce-the-establi
[26] https://www.belarus.by/en/press-center/news/belarus-digital-economy-development-ordinance-comes-into-force_i_0000076762.html
[27] https://www.fsma.be/sites/default/files/public/content/EN/Circ/fsma_2017_20_en.pdf
[28] https://vijesti.ba/clanak/389130/o-kriptovalutama-se-potrebno-detaljno-informirati-ulozeni-novac-nije-osiguran
[29] http://www.cvm.gov.br/subportal_ingles/menu/international/ico_statement.html
[30] https://www.esma.europa.eu/sites/default/files/library/esma22-106-1338_smsg_advice_-_report_on_icos_and_crypto-assets.pdf

Cambodia	Unregulated	No regulations, but warnings issued in relation to bitcoin.[31]	Dec-17
Canada	Regulated	Issued statement specifying that ICOs may be subject to laws adopted by Canadian securities regulatory authorities, including trade reporting rules.[32]	Aug-17
Cayman Islands	Unregulated	No information appears to be available.	-
Chile	Unregulated	No information appears to be available.	-
China	Banned	"Announcement on Preventing Financial Risks from Initial Coin Offerings" banning ICOs in China jointly issued by seven central government regulators.[33]	Sep-17
Colombia	Unregulated	Prohibitions introduced on financial institutions.[34]	Jun-17
Congo	Unregulated	No information appears to be available.	-
Costa Rica	Unregulated	No regulations, but statement provided on cryptocurrencies.[35]	Oct-17
Croatia	Unregulated	No regulations, but statement provided on cryptocurrencies.[36]	Sep-17
Curaçao	Unregulated	No information appears to be available.	-
Cyprus	Unregulated	No regulations, but warnings issued to investors about virtual currencies.[37]	Feb-14
Czech Republic	Unregulated	Amendments made to anti-money laundering legislation in relation to virtual currency service providers.[38]	Nov-16
Denmark	Regulated	No specific rules, but current laws remain applicable according to the design of the ICO.[39]	Nov-17
Ecuador	Unregulated	Warnings issued in relation to use of bitcoin.[40]	Jan-18
Estonia	Regulated	Regulated by applicable laws, particularly Securities Market Act, Consumer Protection Act, and Money Laundering and Terrorist Financing Prevention Act.[41]	Sep-18
Finland	Regulated	ICO tokens considered securities; regulations applicable to issuing securities apply.[42]	Nov-17
France	Unregulated	Draft bill (PACTE) that establishes legal framework for ICOs prepared and adopted.[43]	Apr-19
Georgia	Unregulated	No regulations, but warnings issued.[44]	Dec-17
Germany	Regulated	Guidelines issued in relation to application of current laws to ICOs.[45]	Mar-18
Ghana	Unregulated	Does not acknowledge any online currency and has expressed concerns.[46]	Feb-18

[31] https://www.khmertimeskh.com/94114/bitcoin-risky-business-nbc-warns/
[32] https://www.osc.gov.on.ca/en/SecuritiesLaw_csa_20170824_cryptocurrency-offerings.htm
[33] http://www.pbc.gov.cn/goutongjiaoliu/113456/113469/3374222/index.html
[34] https://actualicese.com/carta-circular-52-de-22-06-2017/
[35] https://www.bccr.fi.cr/seccion-noticias/Noticia/Posicion_bccr_criptomonedas.aspx
[36] https://www.hnb.hr/-/moguci-rizici-povezani-s-ulaganjima-u-virtualne-valute?inheritRedirect=true&redirect=https%3A%2F%2Fwww.hnb.hr%2Fpretraga%3Fp_p_id%3Dcom_liferay_portal_search_web_portlet_SearchPortlet%26p_p_lifecycle%3D0%26p_p_state%3Dmaximized%26p_p_mode%3Dview%26_com_liferay_portal_search_web_portlet_SearchPortlet_mvcPath%3D%252Fsearch.jsp%26_com_liferay_portal_search_web_portlet_SearchPortlet_keywords%3Dinitial%2Bcoin%2Boffering
[37] https://www.centralbank.cy/en/announcements/07022014
[38] https://www.zakonyprolidi.cz/cs/2016-368
[39] https://www.dfsa.dk/en/News/Press-releases/2018/Ico-statement-131117
[40] https://www.bce.fin.ec/index.php/boletines-de-prensa-archivo/item/1028-comunicado-oficial-sobre-el-uso-del-bitcoin
[41] https://www.fi.ee/en/investment/aktuaalsed-teemad-investeerimises/virtuaalraha-ico/legal-framework-initial-coin-offering-estonia
[42] https://www.finanssivalvonta.fi/en/banks/fintech–financial-sector-innovations/virtuaalivaluutan-tarjoajat/frequently-asked-questions-on-virtual-currencies-and-their-issuance-initial-coin-offering/
[43] https://www.amf-france.org/en_US/Reglementation/Dossiers-thematiques/Fintech/Vers-un-nouveau-regime-pour-les-crypto-actifs-en-France
[44] https://www.nbg.gov.ge/index.php?m=340&newsid=3247&lng=geo
[45] https://www.bafin.de/SharedDocs/Downloads/EN/Merkblatt/WA/dl_hinweisschreiben_einordnung_ICOs_en.html
[46] https://www.bog.gov.gh/privatecontent/Public_Notices/Digital%20and%20Virtual%20Currencies%20Operations%20in%20Ghana.pdf

Gibraltar	Regulated	Introduced Financial Services (Distributed Ledger Technology Providers) Regulations of 2017.[47]	Jan-18
Greece	Unregulated	No regulations, but warnings issued.[48]	Feb-18
Guernsey and Jersey	Regulated	Published ICO guidelines allowing ICOs with relaxed regulatory framework.[49]	Jul-18
Guinea-Bissau	Unregulated	No information appears to be available.	-
Hong Kong	Regulated	Issued a statement that digital tokens may be classified as securities as defined by Securities and Futures Ordinance (SFO).[50]	Sep-17
Hungary	Unregulated	No regulations, but warnings issued.[51]	Dec-17
India	Unregulated	Regulated financial institutions prohibited from dealing with virtual currencies.[52]	Apr-18
Indonesia	Unregulated	No regulations, but warnings issued on virtual currencies.[53]	Jan-18
Ireland	Unregulated	No official position, but issue of regulation of ICOs addressed in a recent policy speech.[54]	Jan-18
Isle of Man	Regulated	Proceeds of Crime (Business in the Regulated Sector) Order of 2015 amended to bring businesses involved in virtual currencies under oversight of Financial Services Authority (FSA).[55]	Apr-15
Israel	Unregulated	Committee for examination and regulation of ICOs established; recommended a heavily regulated cryptocurrency issuance platform.[56]	Mar-18
Italy	Unregulated	Discussion document about ICOs and crypto-asset exchanges published; may lead to introduction of specific regulations.[57]	Mar-19
Jamaica	Unregulated	No regulations on ICOs, but looking to facilitate crypto-trading on Jamaican Stock Exchange.[58]	Aug-18
Japan	Unregulated	Report published by government-backed study group proposing regulation of ICOs, but recommendations yet to be implemented.[59]	Dec-18
Kazakhstan	Unregulated	Reports of preparation of legislative amendments prohibiting purchase and sale of cryptocurrencies, but evidence of enactment of proposed amendments not found.[60]	Mar-18
Kenya	Unregulated	No regulations, but warnings issued on virtual currencies.[61]	Dec-15
Kyrgyzstan	Unregulated	No information appears to be available.	-
Laos	Unregulated	Transactions with virtual currencies by financial institutions prohibited.[62]	Oct-18
Latvia	Regulated	ICO projects required to obtain authorization to make public offerings or to provide investment services.[63]	Nov-17
Liechtenstein	Regulated	Regulation passed on tokenization, virtual asset service providers and blockchain focusing on protecting investors, preventing money-laundering and establishing clarity.[64]	Sep-17

[47] http://www.gfsc.gi/uploads/DLT%20regulations%20121017%20(2).pdf
[48] https://www.bankofgreece.gr/Pages/el/Bank/News/Announcements/DispItem.aspx? Item_ID=5981&List_ID=1af869f3-57fb-4de6-b9ae-bdfd83c66c95
[49] https://www.jerseyfsc.org/media/2003/2018-07-12_jfsc-issues-ico-guidance-note.pdf
[50] https://www.sfc.hk/web/EN/news-and-announcements/policy-statements-and-announcements/statement-on-initial-coin-offerings.html
[51] https://www.mnb.hu/sajtoszoba/sajtokozlemenyek/2017-evi-sajtokozlemenyek/rendkivuli-kockazatot-hordoznak-az-ico-befektesek
[52] https://www.rbi.org.in/scripts/NotificationUser.aspx? Mode=0&Id=11243
[53] https://www.bi.go.id/en/ruang-media/siaran-pers/Pages/sp_200418.aspx
[54] https://www.centralbank.ie/news/article/financial-regulation-and-technological-change-gerry-cross
[55] https://www.iomfsa.im/media/2365/icoguidanceforapplicants.pdf
[56] http://www.isa.gov.il/sites/ISAEng/1489/1511/Pages/eitinot220318.aspx
[57] https://www.bancaditalia.it/pubblicazioni/qef/2019-0484/QEF_484_19.pdf
[58] https://www.jamstockex.com/jamaica-stock-exchange-and-blockstation-sign-historic-agreement-bringing-regulated-digital-asset-trading-to-investors/
[59] https://www.fsa.go.jp/en/news/2019/20190828/Overview_of_the_policy_agenda.pdf
[60] https://sputniknews.com/asia/201803301063085023-kazakhstan-digital-currency-mining-ban/
[61] https://www.centralbank.go.ke/images/docs/media/Public_Notice_on_virtual_currencies_such_as_Bitcoin.pdf
[62] http://www.vientianetimes.org.la/freeContent/FreeConten_Don.php
[63] https://www.fktk.lv/en/media-room/other-publications/fcmc-alerts-investors-about-a-new-financial-investment-service-initial-coin-offering-ico-and-associated-risks/
[64] https://www.fma-li.li/files/fma/fma-factsheet-ico.pdf

Lithuania	Regulated	National regulatory and legal regime possibly applicable to specific to ICO models.[65]	Oct-17
Luxembourg	Regulated	No specific rules but current laws applicable according to design of ICO.[66]	Mar-18
Macedonia	Unregulated	No regulation, but warnings issued.[67]	Sep-16
Malaysia	Regulated	ICO issuers required to comply with relevant regulations relating to payments and currency matters and anti-money laundering guidelines.[68]	Dec-18
Malta	Regulated	ICOs regulated by Virtual Financial Assets Act.[69]	Jul-18
Marshall Islands	Unregulated	Experimenting with blockchain with aim of future issuance of digital coins.[70]	Feb-18
Mauritius	Regulated	Securities Act of 2005 and any regulations issued thereunder, including requirement for a prospectus, applicable to ICOs.[71]	Apr-19
Mexico	Regulated	Depending on ICO characteristics, tokens possibly deemed securities and their public offering subjected to conditions and limitations.[72]	Dec-17
Monaco	Unregulated	No regulations, but warnings issued to investors.[73]	Nov-18
Netherlands	Regulated	Potential issuers required to properly analyse extent of overlap with financial regulations and supervision before launching ICOs.[74]	Dec-18
New Caledonia	Unregulated	No information appears to be available.	-
New Zealand	Regulated	For ICOs providing a financial product or service, all promotional material required to comply with fair dealing provisions.[75]	Oct-17
Nigeria	Unregulated	No regulations, but warnings issued to investors.[76]	Jan-17
Norway	Unregulated	No regulations, but warnings issued to investors.[77]	Nov-17
Pakistan	Unregulated	Prohibition on dealing in virtual currencies/tokens introduced.[78]	Apr-18
Panama	Unregulated	No information appears to be available.	-
Peru	Unregulated	No information appears to be available.	-
Philippines	Unregulated	Recently called for input on proposed ICO regulations.[79]	Mar-19
Poland	Regulated	ICO projects required to obtain authorization for public offerings or provision of investment services.[80]	Nov-17
Portugal	Unregulated	No regulations, but warnings issued to investors.[81]	Nov-17
Romania	Unregulated	No regulations, but warnings issued to investors.[82]	Jan-19
Russia	Unregulated	Draft law on digital financial assets published by Ministry of Finance.[83]	Jan-18
Saint Kitts and Nevis	Unregulated	No information appears to be available.	-

[65] https://www.lb.lt/uploads/documents/files/Pozicijos%20del%20virtualiu%20valiutu%20ir%20VV%20zetonu%20platinimo%20EN.pdf
[66] http://www.cssf.lu/fileadmin/files/Protection_consommateurs/Avertissements/W_ICOS_140318_eng.pdf
[67] http://www.nbrm.mk/ns-newsarticle-soopshtieniie_na_nbrm_28_9_2016.nspx
[68] http://www.bnm.gov.my/index.php?ch=en_press&pg=en_press&ac=4783
[69] https://www.mfsa.mt/fintech/vfa-faqs/
[70] https://rmiparliament.org/cms/ library/category/37-2018.html?download=410:p-l-2018-53-declaration-and-issuance-of-the-sovereign-currency-act,-2018
[71] https://www.fscmauritius.org/media/70864/guidance-note-on-securities-tokens.pdf
[72] https://www.gob.mx/cnbv/prensa/comunicado-conjunto-la-shcp-banxico-y-la-cnbv-alertan-al-publico
[73] http://www.ccaf.mc/en/news/event/warning-on-crypto-assets-ico?
[74] https://www.afm.nl/en/professionals/onderwerpen/ico
[75] https://www.fma.govt.nz/compliance/cryptocurrencies/fair-dealing-and-initial-coin-offers/
[76] https://www.cbn.gov.ng/out/2017/fprd/aml%20january%202017%20circular%20to%20fis%20on%20virtual%20currency.pdf
[77] https://www.finanstilsynet.no/markedsadvarsler/2017/initial-coin-offerings-icoer—advarsel-til-investorer-og-foretak/
[78] http://www.sbp.org.pk/bprd/2018/C3.htm
[79] http://www.sec.gov.ph/wp-content/uploads/2018/12/Notice-and-Proposed-Rules-on-Initial-Coin-Offering.pdf
[80] https://www.knf.gov.pl/knf/en/komponenty/img/The_KNFs_statement_on_selling_socalled_coins_or_tokens_ICO_60238.pdf
[81] http://www.cmvm.pt/en/Comunicados/Comunicados/Pages/20180119.aspx
[82] https://www.bnro.ro/page.aspx?prid=14338
[83] http://www.cbr.ru/eng/press/pr/?file=05092017_160022eng2017-09-05t15_59_51.htm#highlight=initial%7Ccoin%7Coffering

Saint Lucia	Unregulated	No information appears to be available.	-
Saint Vincent and the Grenadines	Unregulated	No information appears to be available.	-
Samoa	Unregulated	No information appears to be available.	-
Serbia	Unregulated	No regulations, but warnings issued to investors.[84]	Oct-14
Seychelles	Unregulated	Draft framework for a fintech regulatory sandbox proposed.[85]	Nov-18
Singapore	Regulated	Guidance provided in relation to application of securities laws to ICOs; tokens possibly regulated if deemed capital market products under Securities and Futures Act.[86]	Nov-17
Slovakia	Unregulated	No regulations, but warnings issued to investors.[87]	Nov-13
Slovenia	Unregulated	No regulations, but warnings issued to investors.[88]	Sep-17
South Africa	Unregulated	Consultation paper on crypto assets introduced by joint working group of several regulatory bodies.[89]	Apr-18
South Korea	Banned	All forms of blockchain funding methods regardless of technical terminology prohibited by Financial Services Commission (FSC).[90]	Sep-17
Spain	Regulated	No specific rules, but current laws applicable according to design of ICO.[91]	Feb-18
Sweden	Unregulated	No regulations, but related warnings issued.[92]	Nov-17
Switzerland	Regulated	Guidelines on regulatory treatment of ICOs published by Swiss Financial Market Supervisory Authority (FINMA).[93]	Feb-18
Taiwan	Regulated	Tokens issued after ICOs considered securities; possible criminal liability for failures to obtain authorization.[94]	Jun-18
Tanzania	Unregulated	No information appears to be available.	-
Thailand	Regulated	Two Royal Decrees published by Thai Government Gazette, one regulating ICOs and the other amending Revenue Code to collect capital gains taxes on cryptocurrencies.[95]	May-18
Turkey	Unregulated	No information appears to be available.	-
Ukraine	Unregulated	No specific regulations, but securities not allowed to be issued in form of tokens in a blockchain register under existing Ukrainian legislation.[96]	Nov-17
United Arab Emirates	Unregulated	ICOs not regulated by Securities and Commodities Authority (SCA), but under Regulatory Framework for Stored Values and an Electronic Payment System, all transactions in virtual currencies deemed prohibited.[97]	Jan-17
United Kingdom	Regulated	Recently issued guidelines stating that current laws are applicable according to design of ICO.[98]	Jul-19

[84] https://www.nbs.rs/internet/latinica/scripts/showContent.html?id=7607&konverzija=yes
[85] https://www.fsaseychelles.sc/fintech-regulatory/
[86] https://www.mas.gov.sg/-/media/MAS/Regulations-and-Financial-Stability/Regulations-Guidance-and-Licensing/Securities-Futures-and-Fund-Management/Regulations-Guidance-and-Licensing/Guidelines/Guide-to-Digital-Tokens-Offering-last-updated-on-5-April-2019.pdf
[87] https://www.nbs.sk/en/press/all-press-releases/press-release/_narodna-banka-slovenska-s-warning-to-the-public-on-bitcoin
[88] https://www.bsi.si/en/media/1138/financial-stability-board-warning
[89] https://www.fsca.co.za/Regulatory%20Frameworks/Documents%20for%20Consultation/CAR%20WG%20-%20Consultation%20paper%20on%20crypto%20assets.pdf#search-=initial%20coin%20offering
[90] http://www.fsc.go.kr/info/ntc_news_view.jsp?bbsid=BBS0030&page=1&sch1=&sword=&r_url=&menu=7210100&no=32085
[91] http://www.cnmv.es/Portal/verDoc.axd?t=%7b62395018-40eb-49bb-a71c-4afb5c966374%7d
[92] https://www.fi.se/sv/publicerat/nyheter/2018/olampligt-for-konsumenter-att-investera-i-virtuella-valutor/
[93] https://www.finma.ch/en/news/2018/02/20180216-mm-ico-wegleitung/
[94] https://www.fsc.gov.tw/ch/home.jsp?id=96&parentpath=0&mcustomize=news_view.jsp&dataserno=201806220002&aplistdn=ou=news,ou=multisite,ou=chinese,ou=ap_root-,o=fsc,c=tw&dtable=News
[95] https://www.bot.or.th/Thai/MonetaryPolicy/ArticleAndResearch/FAQ/FAQ_126.pdf
[96] http://www.fst-ua.info/wp-content/uploads/2019/01/Cryptocurrency_Paper_Sept2018_en.pdf
[97] https://www.centralbank.ae/en/pdf/notices/Regulatory-Framework-For-Stored-Values-And-Electronic-Payment-Systems-En.pdf
[98] https://www.fca.org.uk/news/statements/initial-coin-offerings

United States	Regulated	No specific rules but current laws applicable according to design of ICO.[99]	Dec-17
Vanuatu	Unregulated	No information appears to be available.	-
Venezuela	Unregulated	No ICO-specific regulations, but legal framework for cryptocurrency industry provided by new bill.[100]	Jan-19
Vietnam	Unregulated	Relevant companies and funds directed not to engage in any issuance, transaction or brokerage activities related to cryptocurrencies.[101]	Jul-18
Virgin Islands, British	Unregulated	No information appears to be available.	-
Virgin Islands, US	Unregulated	No information appears to be available.	-

Note: The table provides information on ICO-related regulations in the 105 jurisdictions that we found to have hosted at least one ICO as of September 2018. In the second column of the table, the regulatory status of each country (Regulated (ER), Unregulated (UR) or Banned (B)) is shown based on the information available in August 2019, which goes beyond our sample period. The third column provides a brief description of the regulatory status, and the fourth column provides the month in which the regulation-related action occurred.

[99] https://www.sec.gov/ICO

[100] http://www.minci.gob.ve/wp-content/uploads/2019/01/Gaceta-Oficial-Decreto-Constituyente-sobre-el-Sistema-Integral-de-Criptoactivos.pdf

[101] https://sbv.gov.vn/webcenter/portal/en/home/sbv?_afrLoop=22151117375015577#%40%3F_afrLoop%3D22151117375015577%26centerWidth%3D80%2525%26leftWidth%3D10%2525-%26rightWidth%3D10%2525%26showFooter%3Dfalse%26showHeader%3Dfalse%26_adf.ctrl-state%3Dpca5h5tl_4