

## Initial Coin Offerings: What rights do investors have (if any)?\*

Xiaoju Zhao <sup>a</sup>, Wenxuan Hou <sup>b,c</sup>, Jiafu An <sup>c,d</sup> Xianda Liu <sup>c</sup> and Yun Zhang <sup>b</sup>

<sup>a</sup> *Shanghai Institute of International of Finance Centre, Shanghai University of Finance and Economics*

<sup>b</sup> *School of Finance, Shanghai Lixin University of Accounting and Finance, Shanghai, China*

<sup>c</sup> *University of Edinburgh Business School, University of Edinburgh, 29 Buccleuch Place, Edinburgh, UK, EH8*

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<sup>d</sup> *Portsmouth Business School, University of Portsmouth, Portsmouth, UK*

Introduction to the Special Issue of Initial Coin Offerings and New Financing  
Models by *European Journal of Finance*

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\* Wenxuan Hou and Xiaoju Zhao (Guest Editors) acknowledge financial support from *Shanghai University of Finance and Economics* and are grateful to Chris Adcock (the editor) for his support for this special issue. We thank the participants at the 1st Conference on Entrepreneurial Financial Management at ESMT Berlin in 2016 and Shanghai Fintech Conference in 2017 for helpful suggestions.

## 1. Introduction

*The European Journal of Finance* special Issue Conferences on Initial Coin Offerings and New Financing Models was organized by University of Edinburgh Business School and Shanghai University of Finance and Economics at Shanghai in October 2017 and 2018. Each conference included a morning forum by key policy makers, academics, practitioners and public media and an afternoon academic sessions of 9 papers, attracting more than 100 participants from many countries. The keynote speaker for both conferences were Prof. Raghavendra Rau, Sir Evelyn de Rothschild Professor of Finance at Cambridge Judge Business School, University of Cambridge and the founder and director of the Cambridge Centre for Alternative Finance (CCAF). This was arguable the first conference series on Fintech and ICOs endorsed by an internationally excellent academic journal. Following the conference, papers were submitted under regular review process and 6 papers are published in this special issue.

In his 2017 keynote speech, Prof. Rau (Rau, 2019) indicated that China played a leading role in the Fintech market in terms of its volume (\$243 billion) and number (496) of online crowdfunding (including peer-to-peer lending) platforms, respectively accounting for 83% and 35% of the global market share in 2016, followed by the US and UK. As a featured speaker in the conference, Yiping Huang, Sinar Mas Chair Professor of Economics and the Director of the Institute of Digital Finance at Peking University, offered explanations to the Fintech growth in China. Hua and Huang (2020) attribute the development to financial repression, Chinese government's promotion and accommodative regulatory environment. While Rau (2019) concludes that crowdfunding does not yet appear to be a strong driver of financial inclusion worldwide, Hua and Huang (2020) regard financial inclusion as the most prominent feature in China.

In his 2018 keynote speech, Prof. Rau (An and Rau, 2020) discusses the ways that automation, artificial intelligence (AI) and blockchain advance the coordination in economic transactions and argue that ICOs bring about a shift of the coordination task from a limited pool

of institutional investors to literally all potential investors with an internet access. They point out that the boundaries between markets and firms are moving due to the rapid progress in technology because technologies can reduce both management costs within firms and the transaction costs in the market.

As a newly emerged financing facility for entrepreneurs, initial coin offerings (ICOs) permit young ventures to access external financing with less information frictions. Starting from 2014, the ICO market has experienced explosive growth. The amount of capital raised by over 5,500 entrepreneurial ventures, from more than 50 countries, has reached \$US 30 billion as of 2018 (Lyandres, Palazzo and Rabetti, 2018). In addition, more than 18 individual ventures have attracted more than \$100 million capital during their ICOs<sup>1</sup>. In terms of first-day returns in the secondary markets, (Momtaz, 2020) document that the first-day return amounts to 14.8%, dwarfing the figure from IPO markets. Despite the staggering growth, however, ICOs are also plagued by scams and frauds. This leads to several important questions to be discussed in this article: what drives the growth of the ICO market? What rights or protections do they have, if any?

This introduction summarizes the articles included this special issue, review the growing literature, and also provides original evidence of the investor protection on ICOs from 37 countries. We show that the anti-director rights and anti-self-dealing index are positively associated with the country-level raised fund of ICOs after controlling for economic and culture factors. The disclosure quality and investor rights as specified in the Whitepapers are generally poor and they are found to be important to raise more funds in ICOs. We argue that the lack of (self-) discipline poses a threat to investor protections. Around 60% Whitepaper do not disclose information on the use of proceeds or management team. Around 80% ICOs do not entitle investors the rights for dividend or vote. Our findings suggest the needs of regulating ICOs.

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<sup>1</sup>See <https://www.coinschedule.com/stats>.

## 2. Related literature on ICOs and Articles in this Special Issue

In this section, we first discuss recent empirical works, including the articles included in this special issue, that shed light on the economics of ICOs, and then elaborate the contributions of the selected articles in the special issue<sup>2</sup>. In particular, we organize our discussion on recent research along two specific lines of enquiry: (1) the financial consequences of ICO ventures; and (2) the real outcomes of ICO firms. For each line of research, we summarize what we have learned and distill the key insights from these studies. Following the discussion, we offer some thoughts on two important under-researched areas, namely the regulatory responses to ICOs and the profiles and motives of ICO investors. The evidence from these lines of research can potentially help us understand some puzzling facts, such as why investors are willing to invest in ICOs when they do not have much “on-the-book” protections, and when most of them are illiterate in terms of the ventures’ underlying technology. Table 1 lists the authors, year, sample size, main database, as well as the key findings of each paper covered in this review<sup>3</sup>.

[Insert Table 1 around Here]

### 2.1 ICO Samples and databases

As shown in Table 1, the sample size varies dramatically across the studies we reviewed here, ranging from 146 ventures in Burns and Moro (2018) to 889 in Florysiak and Schandlbauer (2018). Time coverage also differs, but with less degree of variation. The majority of the studies covers the years from 2014 to 2018, during which the ICO market has jointly raised approximately \$13 billion from investors around the globe (Bourveau, et al. 2018).

Among the data sources employed in these studies, icobench.com and coinmarketcap.com are the most popular ones (used in 18 and 16 studies, respectively), although, as argued in Howell,

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<sup>2</sup> Given the nature of this special issue, we focus our attention on empirical studies on ICOs, while acknowledging important theoretical works, including Li and Mann (2018), Sockin and Xiong (2018), and Cong, Li and Wang (2018).

<sup>3</sup> Papers may appear more than once in Table 1 since some studies cover several lines of enquiry as we summarized here.

Niessner and Yermack (2019) and Deng, Lee and Zhong (2018), tokendata.io and icobench.com have more comprehensive coverage and provide more information on deal characteristics. Nonetheless, even with larger coverage, these ICO aggregator websites may still face several data quality challenges (Boreiko and Sahdev, 2018). First, they do not cover the entire universe of ICO deals due to survivorship bias (Lyandres, Palazzo and Rabetti, 2018). For example, icobench.com only covers 50% of the ventures that attempted ICO. Second, since a large proportion of the data are self-reported by the venture initiators, the reliability and quality are called into questions. Lyandres, Palazzo and Rabetti (2018) raise important concerns that respondents may not be able to accurately recall the financial details and may exaggerate their success by overstating the amount of capital raised. These concerns are further substantiated by the data inconsistencies in the values of several main ICO characteristics across these websites (Lyandres, Palazzo and Rabetti, 2018).

Some studies therefore take various approaches to address these data challenges, including combing and triangulating the results across multiple sources<sup>4</sup> (Dittmar and Wu, 2018; Fisch, 2019; Adhami, Giudici and Martinazzi, 2018) and efforts to correct the potential biases (Lyandres, Palazzo and Rabetti, 2018).

[Insert Table 1 about here]

## 2.2 ICO Speed and Proceeds

This strand of literature has largely focused on four types of financial outcomes, including the amount raised from and speed of ICOs (e.g., An, et al. 2019; Fisch, 2019; Blaseg, 2018; Lee, Li and Shin, 2019), ICO underpricing (e.g., Benedetti and Kostovetsky, 2018; Dittmar and Wu, 2018; Felix and von Eije, 2019; Momtaz, 2020), exchange listing result (e.g., Amsden and Schweizer, 2018; Boreiko and Vidusso, 2019; De Jong, Roosenboom and van der Kolk, 2018; Lyandres, Palazzo and Rabetti, 2018), and liquidity and trading volume after the listing (e.g., Howell, Niessner

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<sup>4</sup> This method has its own problems. For example, lack of unique identifier for each project, the process of matching across databases is challenging and prone to errors.

and Yermack, 2019; Bourveau, et al. 2018; Florysiak and Schandlbauer, 2018). In what follows, we summarize the key insights from each stream of studies.

To begin with, the literature has identified that founders' characteristics, such as education background (An, et al., 2019), relevant working experience (Burns and Moro, 2018), social networks (Burns and Moro, 2018; Felix and von Eije, 2019), the size of the founding team (Ante, Sandner and Fiedler, 2018; Felix and von Eije, 2019), and CEO's average tenure of previous executive positions (Momtaz, 2020), are positively associated with the amount of capital raised from and speed of ICOs. The economic size of these estimates are substantial. For example, An, et al. (2019) find that if an average firm changes its status of disclosing founders' characteristics from none to any relevant information, the amount of capital it raises from an ICO would increase by \$1.75 million, representing about 11% of the average amount raised in an ICO in their sample.

Disclosure quality also matters for the amount raised from and the duration of ICOs (Fisch, 2019; Blaseg, 2018; Feng, et al. 2018; Florysiak and Schandlbauer, 2018; Boreiko and Sahdev, 2018). For example, Fisch (2019) and Blaseg (2018) show that source code availability is a strong predictor of ICO success. Rhue (2018) discovers that the quality of the source code, as measured by the number of technical bugs, is strongly, negatively associated with the final amount of capital raised and positively associated with the duration of an ICO. In addition, the quality of voluntary disclosures in white papers, whether they contain detailed project evaluations for example (Ante, Sandner and Fiedler, 2018), is also closely, positively related to the amount of funds raised via ICOs (Benedetti and Kostovetsky, 2018; Feng, et al. 2018).

Ventures' characteristics are important predictors of ICO success (measured by amount raised) as well. Those characteristics that have the highest predictive power include the type of tokens a venture offers (Benedetti and Kostovetsky, 2018), the organization of a token pre-sale (Benedetti and Kostovetsky, 2018), and the quality of the underlying business model (Felix and von Eije, 2019). Johnson and Yi (2019) in a recent study examines the effect of voluntary adoption

of corporate governance mechanisms on ICO success and find that attaching voting and cash flow rights on tokens has positive impact on the amount raised.

In addition, marketing on and attention from social media (Felix and von Eije, 2019) and external ratings on the quality of business (Fenu, et al., 2018; Lee, Li and Shin, 2019) are also correlated with the financial success of an ICO. It is worth noting that ICO firms, in order to attract more financing from investors, often send false signals to the market through whitepapers and various other platforms (Akerlof, 1978; Chod and Lyandres, 2018; Shifflett and Jones, 2018). Although initially successful, token values from these firms will quickly depreciate and are subject to higher probability of default once listed on an exchange, where the “wisdom of crowd” takes effects (Momtaz, 2019b). While not directly studying ICOs, Wang, Zhao and Sheng (2020) show the importance of soft information usage in financial transactions in Fintech markets.

Finally, An, Hou and Liu (2019a) study the effects of national institutional quality—a previously largely ignored factor—on the financial results of ICOs across the globe<sup>5</sup>. Using various identification strategies to isolate the exogenous component of the variation in institutional quality, they discover that the level of property rights protection and the quality of contract enforcement are key determinants of the total amount raised from ICOs in a given country.

### **2.3 ICO Underpricing**

A vibrant stream of work estimates the size of ICO underpricing and seeks to understand the determinants of such price differentials (Benedetti and Kostovetsky, 2018; Dittmar and Wu, 2018; Felix and von Eije, 2019; Momtaz, 2020; Florysiak and Schandlbauer, 2018; Stastny, 2018; Hu, Parlour and Rajan, 2018). According to this literature, the average (median) level of ICO underpricing ranges from 15% (3%) in Momtaz (2020) to 179.76% (12.09%) in Dittmar and Wu (2018). We make two observations here. First, ICO underpricing is substantial. Even with the most

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<sup>5</sup> In a related study, Huang, Meoli and Vismara (2018) examine the impact of the quality of a country’s financial institutions on the frequency of ICOs. They find that ICOs take place more frequently in countries with developed financial systems, public equity markets, and advanced digital technologies.

conservative estimate as in Momtaz (2020), the size of underpricing on average is 15%, which is comparable to the statistic from the initial public offering (IPO) market<sup>6</sup> (17.8%) (Bourveau, et al. 2018). Second, the estimate of ICO underpricing is very sensitive to the sample coverage and model specifications. We therefore caution the readers when interpreting these results.

Further, these studies uncover some suggestive evidence on the determinants of ICO underpricing. For example, Benedetti and Kostovetsky (2018) document that the number of Twitter followers and tweet intensity are statistically powerful predictors for the size of underpricing. Felix and von Eije (2019) show that the level of ICO underpricing is also associated with trading volumes, issue size the market sentiment.

## **2.4 Exchange Listing**

Researchers have also studied the determinants of ICO token exchange listing, a feature that is closely related with secondary market liquidity and trading volume (Metrick and Yasuda, 2011; Howell, Niessner and Yermack, 2019). Similar to the factors influencing amount raised in ICOs, exchange listing is also affected by CEO social network (Amsden and Schweizer, 2018), founding team size (Amsden and Schweizer, 2018; De Jong, Roosenboom and van der Kolk, 2018), information quality in whitepapers (De Jong, Roosenboom and van der Kolk, 2018; Bourveau, et al., 2018), and investor attention (Boreiko and Vidusso, 2018). In addition, expert ratings from various deal aggregator websites are also playing an important role in ICO exchange listing (De Jong, Roosenboom and van der Kolk, 2018). However, Boreiko and Vidusso (2018) caution readers that expert ratings appear to vary substantially across different websites and Florysiak and Schandlbauer (2018) document that once listed, ratings do not help investors differentiate the good ventures from the bad.

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<sup>6</sup> IPO data is obtained from US IPO database provided by Jay R. Ritter. The sample contains 8360 IPOs between 1980 and 2017 in the US.



Howell, Niessner and Yermack (2019) identify another important factor that determines ICO exchange listing: price changes in the Ethereum Classic (ETC) token around the time of an ICO. The underlying logic runs as follows: (1) the large majority of ICOs occur on the Ethereum blockchain and also accepts Ether (ETH) as payment; (2) the high fees charged by exchange acts as a potential barrier to being listed; and (3) high ETH prices, thus larger amount of capital raised during ICO (holding other things constant) lower the barrier to be listed. Indeed, the authors show that price changes of ETC is a statistically powerful predictor of ICO token exchange listing.

## **2.5 Liquidity, Trading Volume and Risks**

Liquidity is one of the key advantages of ICOs relative to conventional financing instruments (Metrick and Yasuda, 2011; Howell, Niessner and Yermack, 2019). On one hand, liquidity reflects market depth and attention in a token (Metrick and Yasuda, 2011). As emphasized by Sockin and Xiong (2018), token trading facilitates information acquisition by potential customers and investors and enables the “wisdom of crowd” to take effects. However, the liquidity of ICOs also allows the issuers to cash out quickly and undercuts their incentives to build successful ventures (Chod and Lyandres, 2018).

Given its importance, several studies seek to understand what determines ICO liquidity and trading volume (Bourveau, et al., 2018; Florysiak and Schandlbauer, 2018; Howell, Niessner and Yermack, 2019). Bourveau, et al. (2018), for example, find that voluntary disclosure quality and the underlying ICO quality, as measured by algorithmic and crypto-expert ratings respectively, incrementally predictor the liquidity and trading volume of ICOs. Florysiak and Schandlbauer (2018), using textual analysis, discover that the provision of excess information in addition to those contained in recent and peer firms’ whitepapers are associated with higher token liquidity and larger trading volume. Finally, Howell, Niessner and Yermack (2019) show that token liquidity and volume are significantly correlated with disclosure quality, credible commitment to the project and quality signals, similar to the factors that affect other ICO financial outcomes we discussed here.

For actively traded cryptocurrencies, derivatives are capable of being financial instruments. Shi and Shi (2019) show that South Korea's ban on Bitcoin futures significantly increases the transitory component and reduces the permanent component of intraday spot volatility, providing useful policy implications risk supervisions. Wang, Liu and Luo (2020) find that the adoption of Fintech is positively related to the risks of financial institutions. Yuan (2020) indicated problems on the stability of mining pool games for miners in the consensus economics under the framework of Blockchain.

## **2.6 The real outcomes of ICOs**

Perhaps equally important to policy makers are the real outcomes of ICOs (Howell, Niessner and Yermack, 2019; Deng, Lee and Zhong, 2018; An and Rau, 2020). A small, but insightful, stream of literature attempts to shed light on this issue. For example, Deng, Lee and Zhong (2018) leverage a sample of 541 ICO ventures to study the post-ICO technological development. Similar to the findings in the financial outcome literature, the authors document that the quality of firm disclosure and governance mechanisms, team size, and market attention are all powerful predictors of post ICO technology development.

Relatedly, Howell, Niessner and Yermack (2019), using an innovative instrument variable approach, document that token exchange listing is causally associated with a larger number of employees and a high probability of survival for issuing firms. This is an important finding as it reveals that when a token is listed on an exchange, the liquidity and reputation benefits help to build real economic activity in the crypto sector. In sum, the evidence found in this literature is highly relevant for regulators and can potentially inform policy makers on future regulations in the ICO market.

## **3. Future Research Directions**

Based on the review of the literature, we discuss two research areas currently understudied: (1) the regulatory responses to ICOs, and (2) profiles and motives of ICO investors. Findings from these lines of enquiries may help us understand some puzzling facts, such as why investors are

willing to invest in ICOs when they do not have much “on-the-book” protections, and when most of them are illiterate in terms of the ventures’ underlying technology (Lu, 2018; 2019)?

The first under-researched area is the regulatory responses to ICOs. Regulating crypto assets is challenging (Goldstein, Jiang and Karolyi, 2019; Howell, Niessner and Yermack, 2019; Gurrea-Martínez and Remolina, 2018; Kaal, 2018). Important issues such as token classification (Gurrea-Martínez and Remolina, 2018; Kaal, 2018) and therefore which laws (commodities or securities) should be used to regulate them (Brummer, Kiviat and Massari, 2018), and the risk of overregulation (Barsan, 2017; Blemus, 2017) are largely unresolved. The regulatory responses across the world are also largely divided. While some countries, such as the United Kingdom and United States, take a rather modest approach to regulate, a few nations, such as China and South Korea, prohibit ICOs completely (Kaal, 2018). The current literature in this line of research is largely coming from legal scholars (Howell, Niessner and Yermack, 2019), with few study taking a quantitative and comparative approach. Comparative studies and analyses are urgently needed since they can provide insights useful and generalizable to a wider context. As advocated in Gurrea-Martínez and Remolina (2018), however, policy makers should also take a country’s applicable law and current institutional environment into account when designing and implementing new regulations.

Second, while literature that sheds light on the real and financial outcomes of ICOs is quickly expanding, research that offers insights on the profiles of ICO investors, an important player in the ICO market, is rare. A notable exception is Fisch, et al. (2019), who conduct online surveys to study the motives and profiles of 517 ICO investors. Using factor analysis, the authors uncover that investors are driven by ideological, technological and financial motives. With regard to the relative importance attached to these motives, they document that technological motives receive the highest priority from investors, followed by financial ideological motives. Further, Fisch, et al. (2019) show that a substantial proportion of the differences in motives can be

explained by investors profiles, such as risk perception, sources of information, and demand for stick regulation.

A closely related, but distinct study is An, Hou and Liu (2019b). The authors exploit variations in national cyberattack risks to study what coping mechanisms ICO ventures have and how investors respond to these mechanisms in high attack risk environment. They find that in places with higher cyberattack risks, investors especially prefer utility tokens offered by ICOs due to the consumption value attached to them. Another exception is Lu (2019), who documents the presence of a numeraire bias in ICO market. Numeraire effect is a combination of group thinking and representativeness bias. The presence of such bias in the ICO market suggests that ICO investors often mistakenly overestimate the probability that a cryptocurrency dominated token is issued by a blockchain firm, and thus relate the fundamental value of the token to that of the Bitcoin. This finding is important since such bias, if combined with high market volatility, can undermine the ability of cryptocurrencies to serve as units of account (Lu, 2019).

#### **4. Do ICO Investors have any rights?**

This this section, we provide some original evidence on the investor protection in ICO markets. To perform our analysis, we collect the list of ICO projects and the raised fund from Token Data (tokendata.io). This database provides the raised fund in US dollars, the month of the ICOs, token sale price and a link to the Whitepapers. We identify the country origin of ICOs from Token Market (tokenmarket.net). When such information is not available, we compliment the data from the official webpage of ICOs, the Whitepapers, Twitter, Facebook and the LinkedIn page of founders and executives. We have noticed that certain ICOs deliberately conceal the information on the country origin and management team.

Our sample includes 242 ICOs in 37 countries from August 2014 to December 2017 before governments started regulating ICO markets. We observe a large increase on ICO after April 2017 where new ICO projects raised about 102 million USD and reached 648 million in June

2017 in total. In [Figure 1](#) we present the global volume of ICOs, where we observe United States (460 million USD), Switzerland (195 million USD), Israel (171 million USD), Singapore (126 million USD) and Russia (86 million USD) are the top 5 popular operating country of ICOs.

We classify ICOs into two types based on description of token (i.e. a cryptocurrency built on top of an existing blockchain) in whitepapers, namely the equity and currency types. An equity token is similar to traditional shares and investors own their given percentage of the venture. On the contrary, a currency token (or utility token) have some characteristics of a classic cryptocurrency like Bitcoin or Ethereum but provide access to a particular product or service on the platform that made the ICO.

A basic right for investors is to enjoy future cash flows, where equity holders receive dividends and debt holders have a stream of fixed interest payments (Modigliani and Miller, 1958). Voting right is a precondition for investors to exert influence on managers (Shleifer and Vishny, 1997). The “anti-director index” in La Porta et al. (1998), for example, largely focuses on it. In the case of ICOs, these two rights are not always granted to investors. Some whitepapers include a disclaimer clause by claiming that the token does not imply any right because purchasing tokens does not represent an investment. For currency-type ICOs, whether the issuer should regard users as investors is ambiguous, but failing to provide rights to investors of equity-type ICOs are likely to represent an agency problem.

We predict that these two types of rights – voting and dividend – as well as the “not-an-investment” disclaimer could influence the investor’s decision-making process and ICO outcome. To perform the analysis, we read all whitepapers and codify these rights. Variables are defined in the Table 2. The descriptive statistics in Table 3 show that the investor protection is weak in general: only 25% (15%) ICOs give investors voting (dividend) right and voting right. There are 78% ICOs which do not include a disclaimer saying that buying their tokens is not investment.

[Insert Table 2 and 3 about here]

Table 4 presents the results on the relationship between token holders' rights and total ICO fund raise on the firm level. In general, our results suggest ICO fundraising is positively linked to voting right, but not to dividend and disclaimer clause. The results are robust to the control of country-level legal institutions and culture and to the control of investor attention on ICOs and price of top cryptocurrencies. In other words, token investors in ICO value voting rights offered by ICO ventures, presumably because they able to use the power to discipline managers. It might be possible that investors believe that they can profit from capital gain and therefore dividend right is less important in their investment decision.

[Insert Table 4 about here]

Then we conduct a token holder right index for each ICO projects. The right index counts the number of the following rights granted to investors, ranging from 0 to 3, namely Voting Right, Dividend Right and No Disclaimer Clause. Table 5 shows that a higher value in the index is associated with larger ICO proceeds. We further partition the ICO sample based on their types (equity Vs currency). If the holders of currency-type ICOs do not regard themselves as investors, they should demand less on these rights. The results, however, show that the investor rights are important in both types of ICOs. These results suggest that investor protection is critical to ICO investors.

[Insert Table 5 about here]

## **5. The Disclosure in Whitepapers**

In addition to the investor right, La Porta et al. (1998) argue that disclosure rules influence investor protection in that information asymmetry gives managers opportunities to pursue private benefits. Since ICO ventures do not disclose financial report regularly, we use the information disclosed in Whitepapers to gauge disclosure quality. By focusing on the disclose of five items, namely 1) risk factors, 2) use of proceeds, 3) management team, 4) roadmap i.e. future development plan, and 5) operating country, we investigate the relationship between disclosure

items and ICO performance. Table 3 shows that the disclosure quality is poor in general for ICOs. There are 31% ICOs disclosing potential risks that the project may face; 45% disclosing how to use the raised fund, 58% disclosing information about the management team; 60% disclosing the future development plan; and 9% ICOs choose to conceal the operating country of the project.

The results of regression analyses in Table 6 show that each of them is positive related to ICO proceeds in general. The results on the disclosure of operating country is among the strongest in terms of the magnitude and significance of coefficients. This results suggest the importance of disclosure for their ICOs to attract funds.

[Insert Table 6 about here]

When we construct a Disclosure Index, which counts the number of the disclosed items listed above, ranging from 0 to 5, the results in Table 7 show that the results remain consistent. We then partition the sample based on ICO-types (equity Vs currency) and find that link between disclosure and ICO proceeds are concentrated for equity-type ICOs.

[Insert Table 7 about here]

## **6. Conclusion**

As an unregulated and controversial means of crowdfunding via use of cryptocurrency, ICO attract great public attention. Meanwhile, regulators in various countries warned the risks associated with ICOs. The Financial Conduct Authority in the UK warned that ICOs are mostly unregulated and potentially fraudulent. China's governments declared ICOs a form of unapproved illegal public financing behavior. European Journal of Finance publishes this special issue to shed light on this controversial but under-researched financing form for new ventures and inform policies with the original evidence and insights on the needs for investor protection in ICO market.

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Figure 1: The Global Volume of Initial Coin Offering in USD from Aug 2014-Aug 2017



## Table 1 Literature summary

This paper summarises the sample and findings in the literature. For main data sources: ① represents icobench.com; ② represents coinmarketcap.com; ③ represents icodrops.com; ④ represents icorating.com; ⑤ represents icodata.io; ⑥ represents tokendata.io; ⑦ represents trackico.com or icotracker.com, ⑧ represents coinschedule.com, ⑨ represents crunchbase.com; ⑩ represents tokenmarket.net; ⑪ represents icomarks.com; ⑫ represents cryptoslate.com, coindesk.com, bitcointalk or etherscan.io; ⑬ represents icoholder.com, icoalert.com, smithandcrown.co, cryptocompare.com, foundico.com, coingecko.com; ⑭ deadcoins.com or coinopsy.com.

Author/s (year)	# of ICOs	Time coverage	Main data source	Main findings
<b><i>Research on the financial consequences of ICOs</i></b>				
Benedetti and Kostovetsky (2018)	416	--2018.04	①③④⑤	Mean first-day return of 179%
Dittmar and Wu (2018)	584	2014.06--2019.03	①③④⑤⑦⑫	Median (mean) market adjusted first-day return of 12.09% (179.76%)
Felix and von Eije (2019)	279	2013.04--2018.01	①②	Median (mean) market adjusted first-day return of 26% (102%)
Hu, Parlour and Rajan (2018)	222	2013 --2017	②⑪	Median market adjusted first-day return of 115%
Momtaz (2020)	224	2013 --2018.04	②	Mean (median) market adjusted first-day return of 15% (3%)
Stastny (2018)	316	2013 --2017.09	①②⑤⑧⑩⑫⑬	Mean first-day return of 1543.71%
Adhami, Giudici and Martinazzi (2018)	253	2014 --2017.08	②⑥⑧⑨⑩⑫⑬	Factors related to amount raised: source code availability, a token presale, token utility
An et al. (2018)	715	2014.08--2018.05	①②③⑥⑦	Factors related to amount raised: founders' education, work experience, social network
An, Hou and Liu (2019a)	715	2014.08--2018.05	①②③⑥⑦	National institutional quality influences the amount raised.
Ante, Sandner and Fiedler (2018)	278	2013.07--2017.08	⑫	Factors related to amount raised: team size, network, business model quality, project
Blaseg (2018)	322	2014.01--2017.12	⑫	Factors related to amount raised: availability and quality of source codes
Boreiko and Sahdev (2018)	316	2013 --2017.09	①②⑤⑧⑩⑫⑬	Factors related to amount raised: efforts in signalling and tendency to be self-complacent
Burns and Moro (2018)	146	2017.06--2017.11	②⑥	Factors related to amount raised: leadership experience, team size
Feng et al. (2018)	441	2016.01--2018.06	①③⑥⑩⑪⑬	Factors related to amount raised: quality of voluntary disclosure in whitepaper
Fenu et al. (2018)	450	--2017.12	①	Factors related to amount raised: expert ratings on icobench.com
Fisch (2019)	423	--2018.04	①②③⑧⑩	Factors related to amount raised: quality of whitepapers, technical source codes
Johnson and Yi (2019)	580	2015.08--2017.12	②④⑦⑧	Factors related to amount raised: voluntarily adopted governance mechanisms
Lee, Li and Shin (2019)	423	2016.01--2018.12	①	Factors related to amount raised: favourable analyst opinions
Momtaz (2019a)	288	2015.08--2018.06	①②	Factors related to amount raised: CEO average tenure on previous executive positions
Momtaz (2019b)	495	2015.08--2018.11	①②⑨	Quality exaggeration in whitepapers increases amount raised during ICO but decreases
Rhue (2018)	435	--2018.03	②③	Factors related to amount raised: the number of bugs in the smart contract

Amsden and Schweizer (2018)	573	2015 --2018.03	①②⑫	Factors related to exchange listing: venture uncertainty, CEO social network, team
Boreiko and Vidusso (2018)	316	2013 --2017.09	①⑨⑪⑬	Factors related to exchange listing: extensive media coverage, investor attention
De Jong, Roosenboom and van der Kolk (2018)	630	2015.08--2017.12	①	Factors related to exchange listing: more information disclosure, transparency rating
Lyandres, Palazzo and Rabetti (2018)	878	--2018.11	①③④⑤⑪⑫⑬	Factors related to exchange listing: certification by large/institutional/venture capital
Bourveau et al. (2018)	365	2014.03--2018.06	①②⑫	Factors related to liquidity: quality rating by cryptocurrency experts
Florysiak and Schandlbauer (2018)	889	2015.08--2018.09	①	Factors related to liquidity: provision of new textual information not contained in re
Howell, Niessner and Yermack (2019)	669	--2018.04	②⑥	Factors related to liquidity: disclosure, credible commitment to the project, quality s
<b><i>Research on the real outcomes of ICOs</i></b>				
Deng, Lee and Zhong (2018)	541	2015.08--2018.07	①②⑧⑬	Technological development post ICO is associated with the quality of firm disclosure
Howell, Niessner and Yermack (2019)	669	--2018.04	②⑥	Higher employment and probability of survival
<b><i>Research on the profiles of ICO investors</i></b>				
An, Hou and Liu (2019b)	715	2014.08--2018.05	①②③⑥⑦	Investors prefer utility tokens offered by ICOs due to the consumption value attach
Fisch, et al. (2019)	517	2018.06--2018.08	Proprietary	Investors are driven by ideological, technological and financial motives
Lu (2018)	572	2017.06--2018.09	⑭	The presence of a numeraire bias in ICO market

**Table 2: Variable Definitions**

Variable Name	Description
	<i>ICO Whitepaper Dummy Variables</i>
ICO Type	A dummy variable equals one for currency-type ICOs and zero otherwise.
Right – Dividend	A dummy variable equals one if an ICO project provides dividend type repayment to its investors and zero otherwise.
Right – Voting	A dummy variable equals one if an ICO project offers voting right on the business to its investors and zero otherwise.
Right – No Disclaimer Clause	A dummy variable equals one if an ICO project does not include a section of “Disclaimer Clause” in its whitepaper claiming that the token is not an investment and zero otherwise.
Disclosure – Risk Factor	A dummy variable equals one if an ICO whitepaper includes a section of “Risk Factor” which indicate any form of risk during the business or purchasing tokens and zero otherwise.
Disclosure – Use of Proceeds	A dummy variable equals one if an ICO whitepaper includes a section of “Use of Proceeds” which introduces how company will distribute the fund they raised during ICO and zero otherwise.
Disclosure – Management Team	A dummy variable equals one if an ICO whitepaper includes introductions on the management team and zero otherwise.
Disclosure – Roadmap	A dummy variable equals one if an ICO whitepaper introduces the future development plan of the company and zero otherwise.
Disclosure – Country Unknown	A dummy variable equals one if an ICO whitepaper does not disclose the home country of their business or the headquarter and zero otherwise.
	<i>Cryptocurrency Controlling Factors</i>
Ln (Total Amount of ICO funds raised in US Dollars)	The natural logarithm of the total amount of money raised during ICO process in US dollars for each ICO project.
Cryptocurrency Price Index	Market-value weighted average of top 10 cryptocurrency price within that month of ICO issuing, including Bitcoin, NEO, Ripple, ETH, Dash, Monero, NEM, ETH classic, Litecoin and Lisk.
Investor Attention	The natural logarithm of Google Trend index by searching keywords “Initial Coin Offering”
	<i>Country-level Control Variables</i>
GDP per capita	The natural logarithm of GDP per capita adjusted by PPP in 2004.
Lnsteps	The natural logarithm of the number of bureaucratic steps of opening a new business.
Corruption	Corruption index from the World Bank’s Worldwide Governance Index’s corruption score averaged over period 1996 through 2000.
Enforce	An indicator of contract enforceability constructed by Djankov et al. (2003).
Rule of Law	A measure of a country’s law and order from International Country Risk Guide.
Individualism	An index of individualism in a given country (La Porta, Lopez-de-Silanes, and Shleifer, 2008).
Uncertainty Avoidance	A measure of a country’s average risk reference (La Porta, Lopez-de-Silanes, and Shleifer, 2008).



### Table 3: Summary Statistics

This paper presents the descriptive statistics. Variables are defined in Table 2.

	Observation	Mean	S.D.	Min	Max
<i>ICO Whitepaper Dummy Variables</i>					
Token Type	242	0.74	0.44	0.00	1.00
Right – Voting	242	0.25	0.44	0.00	1.00
Right – Dividend	242	0.15	0.36	0.00	1.00
Right – Disclaimer Clause	242	0.78	0.42	0.00	1.00
Disclosure – Risk Factor	242	0.31	0.47	0.00	1.00
Disclosure – Use of Proceeds	242	0.45	0.50	0.00	1.00
Disclosure – Management Team	242	0.58	0.49	0.00	1.00
Disclosure – Roadmap	241	0.60	0.49	0.00	1.00
Disclosure – Country Origin	242	0.91	0.28	0.00	1.00
<i>Cryptocurrency Controlling Factors</i>					
Ln (Total Amount of ICO funds raised in US Dollars).	241	14.99	2.03	6.04	19.36
Cryptocurrency Price Index	242	4.90	4.27	0.42	15.58
Media Coverage	242	7.48	0.91	5.29	9.58

**Table 4: Token Holder Rights and ICO Proceeds**

The table presents the results of regression total funds raised from ICO on four types of investors' rights provided by ICO companies. The dependent variable is the Ln (Total Amount of ICO funds raised in US Dollars). Our key interest variables are the token holders' rights offered by ICO firms, namely Voting in column (1-2), Dividend in column (3-4), and Disclaimer Clause in column (5-6). Other variables are defined in Table 2.

	(1)	(2)	(3)	(4)	(5)	(6)
	Voting	Voting	Dividend	Dividend	Disclaimer Clause	Disclaimer Clause
Rights	1.578*** (7.93)	1.318*** (4.02)	-0.368 (-0.49)	0.0949 (0.18)	-0.275 (-0.87)	0.584 (1.65)
Enforce	0.704** (2.75)		0.735** (2.90)		0.740*** (2.96)	
Rule of Law	-0.285*** (-3.24)		-0.198 (-1.44)		-0.186 (-1.36)	
GDP per capita	0.000109*** (3.87)		0.0000954** (2.44)		0.0000939** (2.49)	
Lnsteps	0.747* (1.84)		0.532 (0.95)		0.521 (0.96)	
Corruption	-0.0660 (-0.27)		-0.247 (-0.83)		-0.278 (-0.97)	
Individualism	-0.0146** (-2.43)		-0.0243*** (-3.51)		-0.0239*** (-3.81)	
Uncertainty Avoidance	0.00250 (0.47)		0.00668 (0.85)		0.00697 (0.90)	
Investor Attention		0.0557 (0.87)		0.0191 (0.23)		0.0142 (0.17)
Cryptocurrency Price Index		-0.160 (-0.56)		0.122 (0.31)		0.248 (0.64)
ICO Type		0.378 (1.22)		0.326 (1.35)		0.358 (1.41)
Country Fixed Effect						
Constant	8.130*** (6.53)	17.58*** (9.33)	9.151*** (4.77)	15.65*** (6.03)	8.993*** (4.84)	14.68*** (5.78)
Observations	134	237	134	237	134	237
R-square	0.208	0.343	0.091	0.282	0.090	0.292

**Table 5: Token Holder Right Index and ICO Proceeds**

The table presents the results of regression total funds raised from ICO on four types of investors' rights provided by ICO companies. The dependent variable is the  $\ln$  (Total Amount of ICO funds raised in US Dollars). Variables are defined in Table 2. Column (3-4) and (5-6) are based on sub-samples of equity-type ICOs and currency-type ICOs.

	(1) Full Sample	(2) Full Sample	(3) Equity	(4) Equity	(5) Currency	(6) Currency
Right Index	0.501* (1.97)	0.541** (2.60)	1.001* (2.14)	1.042*** (3.27)	0.389** (2.23)	0.476*** (3.27)
Media Coverage	-0.0721 (-0.72)	-0.0746 (-0.78)	0.437** (2.24)	0.278 (1.36)	-0.0836 (-0.80)	-0.103 (-0.99)
Cryptocurrency Price Index	0.462 (1.24)	0.448 (1.33)	-0.954 (-1.06)	-0.520 (-0.60)	0.493 (1.26)	0.537 (1.46)
ICO Type	0.717* (2.04)	0.709** (2.31)	-	-	-	-
Enforce	0.579*** (5.64)	0.837*** (3.19)	1.258* (1.99)	0.906 (1.51)	2.150*** (8.88)	0.795* (1.94)
Rule of Law	1.666*** (11.99)	-0.213* (-1.76)	-0.162 (-0.31)	0.358* (1.88)	1.768*** (10.38)	-0.329** (-2.54)
GDP per capita	-0.000153*** (-11.60)	0.0000911** (2.67)	0.000103** (2.46)	0.0000358 (0.87)	-0.000344*** (-5.75)	0.000101** (2.34)
Lnsteps	1.843*** (4.22)	0.625 (1.27)	-0.265 (-0.38)	-0.633 (-1.20)	0.827*** (3.61)	0.757 (1.25)
Corruption	-2.811*** (-17.92)	-0.418 (-1.50)	-1.230** (-2.80)	-1.904*** (-5.87)	-5.487*** (-7.23)	-0.284 (-0.66)
Individualism	0.0124 (1.51)	-0.0190** (-2.49)	-0.0789*** (-4.56)	-0.0678*** (-6.55)	-0.00209 (-0.69)	-0.00798 (-0.82)
Uncertainty Avoidance	-0.0577*** (-6.84)	0.00472 (0.77)	0.0294** (2.34)	-0.0000718 (-0.01)	-0.0685*** (-7.71)	0.00404 (0.41)
Country Fixed Effect	No	Yes	No	Yes	No	Yes
Constant	0.683 (0.38)	4.630* (1.89)	14.78** (3.16)	14.64* (1.98)	1.842 (0.89)	4.699 (1.50)
Observations	134	134	34	34	100	100
R-square	0.216	0.172	0.466	0.406	0.253	0.158

**Table 6: ICO Disclosure and Proceeds**

The table presents the results of regression total funds raised from ICO on five disclosure items in company ICO whitepapers. The dependent variable is the  $Ln$  (*Total Amount of ICO funds raised in US Dollars*). Our key interest variables are the disclosure items in company ICO whitepapers, namely Risk Factor, Usage of Proceeds Management Team, Roadmap and Operating Country. Variables are defined in Table 2.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Risk Factor	Risk Factor	Use of Proceeds	Use of Proceeds	Management Team	Management Team	Roadmap	Roadmap	Country Origin	Country Origin
Disclosure	0.243 (0.96)	0.447* (1.80)	0.617*** (3.15)	0.357 (1.44)	0.578** (2.39)	0.691* (1.99)	1.138*** (6.42)	0.561* (1.80)	2.449*** (-16.61)	4.090*** (-32.04)
Enforce	0.749*** (3.09)		0.706*** (3.04)		0.730** (2.85)		0.632*** (2.94)			
Rule of Law	-0.192 (-1.46)		-0.258* (-1.87)		-0.211 (-1.52)		-0.260** (-2.16)			
GDP per capita	0.000093** (2.54)		0.000109** (2.79)		0.000085** (2.14)		0.00011*** (3.36)			
Lnsteps	0.563 (1.04)		0.621 (1.11)		0.409 (0.70)		0.721 (1.48)			
Corruption	-0.277 (-1.01)		-0.178 (-0.66)		-0.301 (-1.03)		-0.108 (-0.39)			
Individualism	-0.0232*** (-3.88)		-0.0201*** (-3.57)		-0.0220*** (-3.56)		-0.0163** (-2.82)			
Uncertainty Avoidance	0.00683 (0.92)		0.00724 (1.07)		0.00655 (0.87)		0.000486 (0.07)			
Investor Attention		0.00743 (0.09)		0.0165 (0.20)		0.0312 (0.37)		0.0392 (0.45)		0.0200 (0.23)
Cryptocurrency Price		0.162 (0.43)		0.0935 (0.23)		-0.0988 (-0.23)		-0.0114 (-0.03)		0.123 (0.31)
ICO Type		0.239 (0.93)		0.297 (1.09)		0.335 (1.35)		0.260 (1.01)		0.301 (1.12)
Constant	8.833*** (4.76)	15.49*** (6.13)	8.594*** (4.53)	15.91*** (5.94)	9.427*** (4.88)	16.58*** (5.98)	8.439*** (5.25)	16.09*** (5.91)	15.19*** (103.06)	15.67*** (5.97)
Observations	134	237	134	237	134	237	133	236	237	237
R-square	0.091	0.291	0.110	0.288	0.107	0.298	0.164	0.296	0.112	0.282

**Table 7: Disclosure Index and ICO Proceeds**

The table presents the results of regression total funds raised from ICO on five disclosure items in company ICO whitepapers. The dependent variable is the  $LN$  (*Total Amount of ICO funds raised in US Dollars*). Variables are defined in Table 2. Column (3-4) and (5-6) are based on sub-samples of equity-type ICOs and currency-type ICOs.

	(1) Full Sample	(2) Full Sample	(3) Equity	(4) Equity	(5) Currency	(6) Currency
Disclosure Index	0.256** (2.73)	0.273** (2.87)	0.710*** (5.02)	0.771*** (5.07)	0.105 (0.93)	0.165 (1.47)
Media Coverage	-0.106 (-0.99)	-0.111 (-1.06)	0.376** (2.31)	0.260 (1.36)	-0.122 (-1.08)	-0.145 (-1.28)
Cryptocurrency Price Index	0.643* (2.00)	0.655* (2.09)	-1.039** (-2.43)	-0.748 (-1.39)	0.762** (2.18)	0.827** (2.39)
ICO Type	0.511 (1.60)	0.491* (1.77)	0 (.)	0 (.)	0 (.)	0 (.)
Enforce	0.670*** (6.84)	0.769*** (3.25)	0.447*** (5.84)	0.384 (0.61)	1.795*** (12.37)	0.748* (1.91)
Rule of Law	1.248*** (14.23)	-0.248* (-1.79)	-0.335 (-1.68)	0.147 (0.69)	1.331*** (20.82)	-0.331** (-2.27)
GDP per capita	-0.000140*** (-8.89)	0.0000890** (2.14)	0.000112*** (5.92)	0.0000288 (0.60)	-0.000264*** (-7.97)	0.0001000** (2.17)
Lnsteps	0.796*** (4.61)	0.592 (1.00)	-0.376 (-0.98)	-1.031 (-1.53)	0.137 (0.74)	0.700 (0.96)
Corruption	-2.180*** (-14.13)	-0.312 (-1.03)	-0.347 (-1.24)	-1.085*** (-3.26)	-3.872*** (-10.46)	-0.239 (-0.53)
Individualism	0.000736 (0.34)	-0.0164** (-2.74)	-0.0606*** (-10.20)	-0.0563*** (-5.30)	-0.00601*** (-9.96)	-0.00727 (-0.79)
Uncertainty Avoidance	-0.0365*** (-13.02)	0.00535 (0.79)	0.0339*** (5.03)	0.00884 (0.81)	-0.0488*** (-20.28)	0.00337 (0.31)
Constant	2.403 (1.15)	3.819 (1.47)	20.07*** (9.26)	20.09** (3.07)	1.655 (0.79)	3.115 (0.92)
Observations	133	133	34	34	99	99
R-square	0.217	0.172	0.539	0.483	0.248	0.152