Knowing Your Customer: Empirical Implications for Raising Capital through Initial Coin Offerings (ICOs)

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Abstract: Major legal jurisdictions like the European Union (EU), Switzerland and the US took a stricter stance on ICOs in the period 2017-2018 by imposing anti-money laundering (AML) provisions and know-your-customer (KYC) requirements on ICOs. Shortly after that, a sharp decrease in the number of ICOs was registered. Moreover, this study provides empirical evidence of a negative impact of the introduction of KYC procedure on the amount of raised capital in ICOs. Furthermore, the fundraising impact of additional ICO characteristics like duration, team, vision, rating, and location is also studied in the paper. The study is based on a multivariate regressional analysis of an international sample of 855 ICOs in the period 2015 – September 2019. The paper concludes that introducing a KYC requirement crowds out anonymous (presumably delinquent) investors at the cost of the raised capital. At the same time, the stricter legislation enhances the establishment of a level-playing field for all tokenized financing instruments such as ICOs, security token offerings (STOs) and initial digital offerings (IDOs) thus putting the end of the "gold rush" of the ICOs.

Keywords: Initial coin offering (ICO); Blockchain; Entrepreneurial Finance; Know Your Customer (KYC); Fintech; Cryptocurrencies

1. Introduction

Blockchain-based financing instruments like initial coin offerings (ICOs), security token offerings (STOs), and initial digital offerings (IDOs) have disrupted the traditional finance industry by providing opportunities for peer-to-peer funding. These new fundraising instruments promise low entry barriers, public tradability and high cost efficiency as compared to initial public offerings (IPOs) or venture capital and private equity fundraising. They are thus particularly alluring to start-ups. Especially young innovative businesses in the information technology sector are exploring the opportunity to raise start-up capital for their ecosystems or products by offering security, utility, or payment tokens to the broad public in a cost efficient way (Kondova and Simonella, 2019).

At the same time, the unregulated nature of the ICOs in particular has resulted in many fraudulent cases. As a result, many world jurisdictions issued in the last two years regulations addressing the fraud cases associated with ICOs. The ICO issuers on their turn started enforcing more transparency by requiring potential investors to pass know-your-customer (KYC) procedure and provide their credentials in order to participate in the ICO.

The impact of the introduction of the KYC requirement on the amount of raised capital by ICOs is of particular interest to this paper. The KYC effect is studied along with factors like ICO duration, team members, vision, product, and white paper quality that were already identified as relevant by previous authors (Adhami et al., 2018; Fisch, 2019). This paper fills an existing literature gap by providing evidence on the effect of KYC requirements on the amount of capital raised by ICOs on a dataset of 855 ICOs worldwide in the period 2017 to September 2019.

2. Blockchain Technology and Token Offerings

2.1. Blockchain Technology

Blockchain is a decentralized peer-to-peer transactional file that is electronically shared, reproduced, and dispersed, both organizationally as well as geographically (He et al., 2016; Zbinden and Kondova, 2019). The decentralization avoids transaction costs, since no instances are needed to manage individual transactions and to keep the database up to date (Nakamoto, 2008).

2.2. ICOs

ICOs are defined as a sale of a predefined number of digital tokens (coins) based on a "white paper" (document similar to a business plan) on a blockchain to the public in exchange of cryptocurrencies or fiat currencies within a limited period of time (The Federal Council of Switzerland, 2018). Due to its faster and simplified process of raising capital, ICOs offer attractive fundraising possibilities particularly for start-ups (Chohan, 2017). The ICO tokens could then be listed on a cryptocurrency exchange and be traded (Momtaz, 2019). ICOs are quite attractive from an investor's point of view due to their liquid token exchanges, which offer exit options at anytime. In comparison to the $1 billion raised through traditional venture capital flowing into the space, over $7 billion have been raised through ICO from 2017 to September 2019 (Coin Telegraph, 2019). Most of the ICOs in the last years were launched in Switzerland, the USA, Estonia, the UK and Singapore.

The regulatory authorities in these countries have responded to these developments accordingly. In Switzerland, the Swiss Financial Market Supervisory Authority (FINMA) issued guidelines which distinguish among utility tokens, payment tokens, and security tokens (FINMA, 2018). Utility tokens are tokens that are used to grant a digital access to an application by using a blockchain-based infrastructure. The utility tokens typically promise the redemption of the token in return of the ICO project's products or services once developed (Momtaz, 2019). Payment tokens (cryptocurrencies) are tokens that represent a means of payment. Security tokens represent tokens with characteristics similar to traditional securities like shares. The tokens launched under ICOs fall under the categories utility and payment tokens.

In the US, the Securities and Exchange Commission (SEC) considers the ICO tokens in general as securities. To determine whether a token falls under securities, the Howey Test is used, which is a test developed by the Supreme Court in 1946. If a token falls under securities, several disclosure and registration requirements must be fulfilled (Davies et al., 2019).

In the EU, the European Securities and Market Authority (ESMA) took a stricter stance on ICOs in November 2017 by recognising that ICOs represent a high risk to investors and requiring firms dealing with ICOs to meet relevant regulatory requirements. In 2018 the ESMA further issued guidelines classifying crytoassets as financial instruments.

There are also several empirical studies analyzing various aspects of the ICO launches. Fisch (2019), for example, examines various factors that have an influence on raised capital by ICOs. Among other things, the results show that qualitatively high source codes and technical white papers increase the amount of capital raised. Adhami et al. (2018) find out that ICOs are more successful in the existence of several factors, namely, a token pre-sale, a code source, and tokens associated with a specific service or a claim on profits of the ICO issuer.

3. Data and Variables

3.1. Data

There is currently no universal database on ICOs. Thus, the data for this analysis was compiled from several sources, namely, ICObench.com, coinmarketcap.com, and Google. The sample comprises of 855 ICOs worldwide reported on the ICObench.com platform in the period 2017 – September 2019. ICObench.com is an ICO rating platform supported by investors and financial experts. ICObench.com provides information on 5'618 ICOs as of September 2019. However, due to missing values on some of the variables used in the analysis, the data sample used for the analysis was reduced to 855 ICOs. Table 1 present the descriptive statistics of the sample.

3.2. Variables

Table 2 presents the full set of variables including information on the data source and a detailed description of the individual variables.

The dependent variable in the analysis is the amount of *Capital raised* in an ICO in USD. This is a commonly used dependent variable in entrepreneurial finance research (Mollick, 2014). The data comes from ICObench.com. It could be seen from Table 1 that the minimum raised capital in the data sample amounts to USD 761 and the maximum raised capital amounts to USD 4.2 bn. A total of USD17.4 bn were raised by the total data sample of ICOs. It can be seen from Table 3 that the largest amount of capital was raised in the year 2018. Since then the amounts of ICO capital raised have been declining along with the number of ICOs (see Table 3).

The independent variable is the *know-your-customer (KYC) requirement imposed*

on investors. The control variables are the *Number of Employees, Number of Issued Tokens, Duration of ICO (in Days), Bitcoin Price on Last Day of ICO (in USD), Total Rating, Product Rating, Vision Rating, Team Rating*, *Public Interest in Bitcoin*, *Continent*, and *GDP per capita*. The choice of variables used in the analysis is based on the findings of Adhami et al. (2018), Ahlers et al. (2015), Anglin et al. (2018), Fisch (2019), and Mollick (2014).

The variable Continent indicates the continent affiliation of the ICO according to its domicile. The variable is justified due to the different continental legal frameworks concerning ICOs that could impact the total raised capital through ICOs. It is also worth noting that the greatest numbers of ICOs in our data sample originate from the continents Europe and Asia with 389 ICOs from Europe and 253 ICOs from Asia. The top 10 countries with the largest numbers of ICOs are presented in Table 4.

The paper contributes to the existing literature by identifying as relevant two additional variables, namely KYC and the public interest in Bitcoin, and adding these to the analysis. The two new variables are discussed in detail as follows.

KYC requirements include in general identity verification as well as compliance with anti-money laundering regulations. In the area of Blockchain, Fintech, ICOs or STOs business models, the anonymous transactions with often huge transaction volumes represent a high money-laundering risk. Many authorities reacted in the last years to this risk by issuing restrictive regulations on ICOs. Moreover, the Fintech companies themselves undertook measures to verify their transactions and prevent money-laundering activities. Introducing a *KYC procedure* for potential investors in ICOs is such a measure undertaken by some ICOs. The technical details as to the exact verification procedure including the possible use of digital identity on the blockchain (Kondova and Erbguth, 2020) are not captured by the variable. In the paper, the *KY*C variable is a binary variable taking value 1 in case the ICO reports to require an identity verification of the investors and 0 with the ICO requiring no identity verification of the investors. The expected effect on the amount of capital raised is, however, not straightforward. In the long run, it is to expect though that greater transparency and security in crypto transactions should lead to greater trust and thus greater acceptance of cryptocurrencies and cryptocurrency-based financing.

The variable *Public Interest in Bitcoin* captures the public interest in Bitcoin developments. In the paper, this variable is measured as the ratio of the number of Google

searches of the term "Bitcoin" and the site's total search volume. The variable is measured on a scale of 1 to 100, with 100 indicating great public interest in the term Bitcoin measured on a monthly basis.

4. Main Analysis and Results

4.1. Research Question

The primary research question studies the effect of the KYC requirement on the amount of capital raised in ICOs. Other relevant factors as identified in Section 3.2. are also taken into consideration in the analysis.

4.2. Multivariate Analysis

The paper studies the effect of relevant factors on the amount of raised capital by undertaking a multivariate regressional analysis on a sample of 855 ICOs worldwide in the period 2015-2019. Table 5 presents the results of an OLS regressional analysis with *Capital raised (log.)* as the dependent variable. The R^2 resulting from the regression is 0.15. The Cohen effect strength is 0.42, which comes to show that the independent variable has a strong effect on the capital raised.

The independent variable is the *know-your-customer (KYC) requirement.*
The control variables are the *Number of Employees, Number of Issued Tokens, Duration of ICO (in Days), Bitcoin Price on Last Day of ICO (in USD), Total Rating, Product Rating, Vision Rating, Team Rating, Public Interest in Bitcoin, GDP per capita, and Continent*. The choice of variables used in the analysis is based on the findings of Adhami et al. (2018), Ahlers et al. (2015), Anglin et al. (2018), Fisch (2019), and Mollick (2014).

For the dependent variable, *Capital raised*, the natural logarithm is used. This is justified by the substantial difference between the minimum and maximum values. Similarly, the natural logarithm is also used for the control variables *GDP per capita* and the *Bitcoin price*. In addition, the natural logarithm is also used in the case of the variable *Number of Issued Tokens*. As already explained in Section 3.2., the *Public Interest in Bitcoin* takes values within a range of 0 to 100. The natural logarithm is also used for this variable as well so that it fits linearly to the model. The variation in the *Number of Employees* is also high, but the model assumes that the influence on the raised capital increases exponentially as the number of employees increases, so this variable is not

transformed. In the multivariate regression, the *Continent* Europe serves as the base category.

4.3. Results

Table 5 presents the multivariate regressional results.

The empirical results provide evidence of a negative effect of a KYC procedure on raised capital in an ICO. The coefficient in front of the KYC dummy variable in Tale 5 is negative and statistically significant. A possible explanation would be that the administrative costs for complying with the KYC requirement increase for investors and these costs consequently discourage their participation in an ICO. Thus the capital raised in ICO which require a KYC procedure, is on average less than the capital raised in ICOs without a KYC requirement for investors.

An alternative or complementary explanation would be that investors that are unwilling to disclose their identity for various reasons are also discouraged to invest in ICOs with a KYC requirements. Thus, the negative effect of the introduction of a KYC requirement on total capital raised is strengthened.

Another positive and statistically significant coefficient in Table 5 is the one in front of the variable *Public Interest in Bitcoin.* The variable is measured as the ratio of the Google searches of the word "Bitcoin" to total search volumes in Google. The positive coefficient in front of the variable would imply that a higher public interest in Bitcoin (due to media coverage) results on average in higher volumes of capital raised in ICOs.

Other variables with a positive statistically significant effect on the capital raised are the *Number of Employees, Number of Issued Tokens, Total Rating, Team Rating, and the GDP per capita.*

A high GDP per capita of a country implies a higher wealth of a country. Thus, the financial involvement in an ICO of investors coming from a country with higher GDP per capita proves to be higher as well.

The positive effect of the number of employees on the raised capital could be explained with the perception that a company with more employees is also more trustworthy. In addition, it is also to be expected that the productivity of such a company is also higher. Not surprisingly, better total ranking and team ranking also have a positive impact on the capital raised.

The greater the number of distributed tokens in an ICO, the higher the raised capital. This is usually related to a lower price per token, which in turn attracts more investors. As a result, the raised capital at the end is higher.

On the other hand, the one additional variable with a statistically significant negative effect on capital raised is the one on the number of days of an ICO. The longer the duration of the ICO, the lower the amount of capital raised. This could be explained by a possible interpretation of investors that a less attractive ICO would require on average a longer period to attract the targeted amount of money. Thus, such an ICO issuer would widen the time horizon in order not to miss the desired target.

Finally, the coefficient in front of the North America-based ICOs is positive and of statistical significance. This would imply that ICOs launched in North America raise on average higher capital amounts than ICOs launched in Europe (being the base continent). A closer look in the North American ICOs needs to be made in order to better understand the reasons for this difference between the two continents.

5. Conclusion

This study uses a sample of 855 ICOs worldwide to analyse the effect of a KYC procedure (identity verification procedure) in ICOs on the amount of capital raised. The results provide empirical evidence of a negative impact of the introduction of a KYC procedure on the amount of raised capital in ICOs. One possible explanation of this negative impact could be association with the possibility that a KYC requirement crowds out anonymous (presumably delinquent) investors at the cost of the additional capital raised. Another explanation, however, could be that the additional administrative burden associated with the identity verification procedure under the KYC requirements could discourage potential investors in participating in an ICO.

At the same time, the introduction of a KYC procedure in ICOs should be considered as a logical consequence of the stricter legislation on ICOs introduced by major jurisdictions worldwide. Moreover, a KYC procedure in ICOs along with a stricter legislation should be perceived as important instruments to enhance the establishment of a level-playing field for all tokenized financing instruments such as ICOs, security token offerings (STOs) and initial digital offerings (IDOs), thus putting the end of the “gold rush” of the ICOs.

In addition, the paper provides evidence of a positive and statistically significant effect of the number of employees, the number of issued tokens, total company ranking, team ranking, the GDP per capita, and the public interest in Bitcoin on the amount of capital raised in an ICO. On the other hand, the duration of an ICO is found to negatively impact the amount of the raised capital in an ICO.

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Table 1. Descriptive Statistics

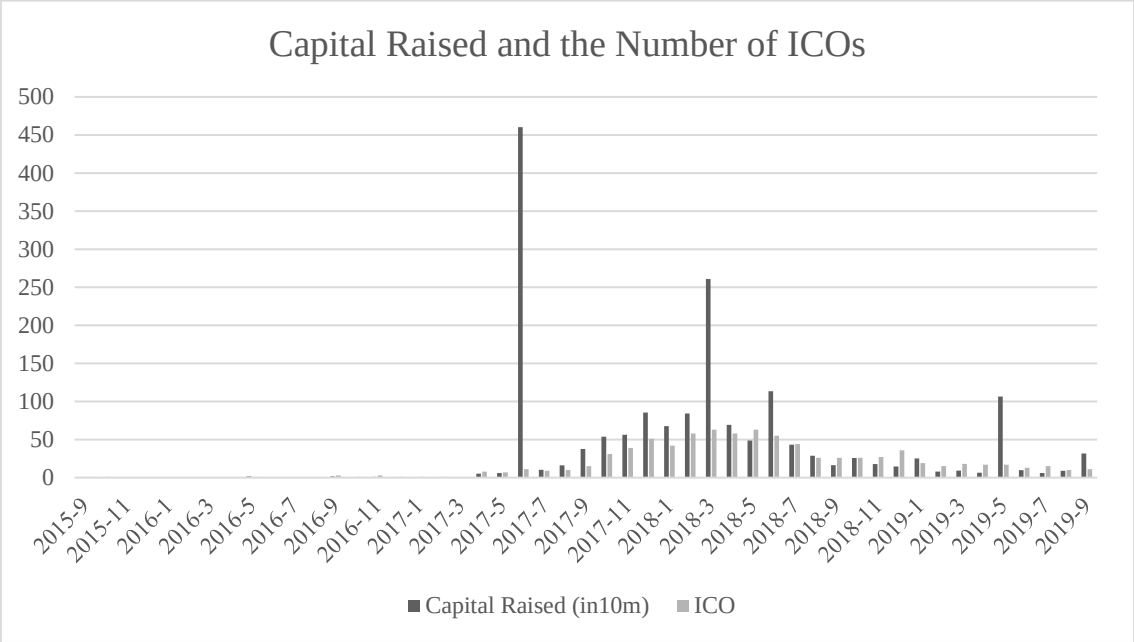
Variable	Mean	SD	Min.	Median	Max.	Data source
Dependent variable						
Capital raised	2.04e+07	1.60e+08	761	5000000	4.20e+09	ICObench
Independent variables:						
KYC	0.47	0.50	0.00	0.00	1.00	ICObench
Public Interest in Bitcoin	20.25	17.60	2.00	20.24842	77.8	Google Trends
Number of Employees	15.95	9.02	1.00	12.75	75	ICObench
Number of Issued Tokens	1.96e+10	4.78e+11	80000	15	1.40e+13	ICObench
GDP per capita	43915	26248	1509	2.01e+08	168146	Wikipedia
Duration of ICO (in days)	56.01	58.83	1.00	36	761	ICObench
Bitcoin Price on last day of ICO	7625	3304	227	7459	19497	coinmarketcap
Total Rating	3.48	0.65	1.10	3.6	4.7	ICObench
Product Rating	3.54	0.95	1.00	3.6	5.00	ICObench
Vision Rating	3.78	0.94	1.00	4	5.00	ICObench
Team Rating	3.77	0.96	1.00	4	5.00	ICObench

Notes: N = 855 ICOs.

Table 2. Variables Description

Variable	Source	Defintion
Raised Capital	ICObench.com	Amount of capital raised by an ICO.
KYC	ICObench.com	Identity verification of the ICO's investors including verification of the personal ID card, passport, or a driver's license. A binary variable taking value of 0 in case the ICO requires no identity verification of the investors and 1 with the ICO requiring an identity verification of the investors.
Number of employees	ICObench.com	The number of employees of the ICO's enterprise.
Token Sale	ICObench.com	The number of tokens of a certain ICO that can be purchased by the public. The tokens are usually purchased by crypto-currencies such as Bitcoin.
Duration	ICObench.com	The variable "Duration" denotes the duration of the individual ICOs in days.
Bitcoin Price	coinmarlketcap.com	The price of a Bitcoin in USD at the closure of the ICO.
Total Rating	ICObench.com	Rating provided by ICObench.com based on more than 20 different criteria. Variable within the range of 1 to 5 with 1 indicating most unfavorable total ranking by ICObench and 5 most favorable total ranking of the ICO.
Product Rating	ICObench.com	Rating of the product based on the evaluation of the maturity level of the product, the technology used, and the product roadmap. Variable within the range of 1 to 5 with 1 indicating most unfavorable product ranking by ICObench and 5 most favorable product ranking of the ICO.
Team Rating	ICObench.com	Ranking of the ICO team based on information about the number of team members, their background as well as any previous ICO participation. Variable within the range of 1 to 5 with 1 indicating most unfavorable team ranking by ICObench and 5 most favorable team ranking of the ICO.
Vision Rating	ICObench.com	Ranking based on the evaluation of the market potential and the number of the existing user base. Valuation and token distribution showing market cap and the process of emission and pricing of the tokens is also part of the rating. Variable within the range of 1 to 5 with 1 indicating most unfavorable ranking of the ICO vision by ICObench and 5 most favorable ranking of the ICO vision.
Continent	Own variable	The variable continent refers to the continent of belonging of the individual ICOs.
Public Interest in Bitcoin	trends.google.com	The variable shows how frequently the term "Bitcoin" appeared in the Google's search engine relative to the site's total search volume. Variable on a scale from 1 to 100 with 100 indicating the great public interest in the term Bitcoin measured on a monthly basis.
GDP per capita	wikipedia.com	The gross domestic product (GDP) per country per year.

Table. 3 Capital Raised and Number of ICOs in the Data Sample



Source: ICObench.com

Table 4. Top 10 Countries in the Data Sample with Greatest Numbers of ICOs in the Period 2015 – 2019

Country	Raised Capital	Number of ICOs
Singapore	$1’447’255’285	119
USA	$5’534’297’754	89
UK	$757’170’235	77
Estonia	$572’833’331	65
Switzerland	$824’123’032	55
Russia	$409’104’025	52
Cayman Islands	$1’024’820’983	25
Hong Kong	$252’370’128	23
British Virgin Islands	$2’003’577’172	18
Belize	$169’882’211	18

Source: ICObench.com

Table 5. OLS regression analysis on the determinants of the capital raised in ICOs (dependent variable = capital raised in USD (log.)).

Variable	Coeff.	(SE)
KYC (dummy)	-0.429	(0.145)***
Public Interest of Bitcoin (log.)	0.426	(0.149)***
Number of Employees	0.024	(0.008)***
Number of Issued Tokens (log.)	0.066	(0.030)**
GDP per capita (log.)	0.206	(0.063)***
Duration of ICO (in days)	-0.218	(0.049)***
Bitcoin Price on last day in USD (log.)	-0.136	(0.154)
Total Rating	0.252	(0.141)*
Product Rating	0.022	(0.125)
Vision Rating	-0.065	(0.141)
Team Rating	0.252	(0.123)**
Africa	0.096	(0.312)
Asia	0.137	(0.127)
North America	0.417	(0.162)***
Oceania	0.040	(0.321)
South America	0.563	(0.658)
R^2	0.153	
Observations (ICOs)	855	

Notes:* p < 0.10, ** p < 0.05, *** p < 0.01. The model includes heteroscedasticity-robust standard errors.

Cohen effect strength: $f = \sqrt{\frac{0.15}{1-0.15}} = 0.42$