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How do Initial Coin Offerings succeed? The role of legal systems on the success

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## **How do Initial Coin Offerings (ICOs) succeed? The role of legal systems on the success**

### **Abstract**

This research scrutinizes the role of regulatory frameworks within the Initial Coin Offering (ICO) market and their influence on the fundraising success of innovative ventures, as well as their impact on secondary market returns. Analysing a dataset of 4,521 ICO projects from May 2015 to June 2023 in 104 countries, we find evidence supporting a positive association between regulatory presence and funds raised during ICOs. Our study adopts a holistic approach grounded in signalling theory and reveals that a regulated environment positively influences the relationship between a Whitepaper and funds raised, implying the presence of the certification hypothesis in the ICO market. However, contrary to expectations, the existence of regulatory framework does not significantly attract high-quality investors focused on team information to mitigate risks at early stages. While regulatory interventions do not greatly affect post-ICO returns, they do impact investors' perception of issuer signals, particularly regarding governance. Our findings indicate that regulators assume a certifying role during the funding stage, concurrently bolstering the value ascribed to governance-related signals in the post-ICO stage.

**Keywords:** Initial Coin Offerings, Success, Regulatory Framework, Tokens, Signalling Theory

### Sumário:

Esta investigação examina o papel das estruturas regulatórias no mercado das *Initial Coin Offerings* (ICO) e a sua influência no processo de angariação de fundos para financiar empreendimentos inovadores, bem como o seu desempenho no mercado secundário. Ao analisar um conjunto de dados de 4.521 projetos de ICO de maio de 2015 a junho de 2023 em 104 países, encontramos evidências que corroboram uma associação positiva entre a presença regulatória e a captação de fundos durante as ICOs. Este estudo adota uma abordagem holística baseada na teoria da sinalização e revela que um contexto regulamentado influencia positivamente a relação entre a existência de um *Whitepaper* e o montante dos fundos angariados, tornando implícita a hipótese da certificação nos mercados de ICO. Contrariamente às nossas expectativas, durante a fase de angariação de fundos de uma ICO, uma estrutura regulatória bem desenvolvida não atrai significativamente investidores de elevada qualidade que se foquem na qualidade da informação disponível sobre o tamanho da equipa de projeto para mitigar os riscos. Por outro lado, embora as estruturas regulatórias por si só não pareçam influenciar de forma significativa os retornos no mercado secundário, elas têm um impacto considerável na perceção dos investidores em relação aos sinais emitidos pelos emissores, especialmente em relação à estrutura governativa desses empreendimentos. Desta forma, os resultados obtidos sugerem que os reguladores assumem um papel de certificação durante a fase de angariação de fundos, reforçando simultaneamente o valor que os investidores atribuem aos sinais relacionados com a estrutura governativa na fase de transação no mercado secundário.

**Palavras-Chave:** Initial Coin Offerings, Sucesso, Sistemas Jurídicos, Tokens, Teoria da Sinalização

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## 1. Introduction

Accessing financial resources is one of the most important challenges faced by innovative ventures all over the world (Fisch, 2019) mainly due to high uncertainty, information asymmetry, and asset intangibility surrounding new ventures (Gompers and Lerner, 2001). As a result, it is not a surprise that these ventures attract mainly risk-prone institutional investors (e.g., venture capitalists, hedge funds) looking for high-risk projects with potentially high-rewards (Gompers and Lerner, 2001). Somehow, institutional investors have been not covering all financing gaps faced by these ventures and some of its characteristics has been leaving constantly these new ventures with insufficient capital. The lack of flexibility, the inadequate maturities and covenants of its financial instruments, the highly prolonged and regulated processes involved (Chen, 2019), and the preference of the institutional investors for larger firms/projects (Lopez-de-Silanes et al., 2018), opens a space for new financing alternatives targeting new ventures (Parra & Winter, 2022). The digitalization of finance may provide the technologies that will enable the access for capital for firms and afford new possibilities for non-institutional investors, while surpassing some inefficiencies that still exist in the traditional markets (Buchak et. al, 2018).

The FinTech and daily use of digital services opened a new bunch of opportunities for entrepreneurs that aim to collect resources for the development of their ventures (Alshater et al., 2022). The digital revolution and the new era of blockchain in particular may offer a valuable opportunity to democratize entrepreneurial finance by making it easier to raise funds for marginalized and underrepresented groups of entrepreneurs, including rural and ethnical minorities entrepreneurs (e.g., Fisch et al., 2020). Among prominent Fintech business models are the Initial Coin Offerings, referred by Bellavitis et al (2020: 1) as “the most recent innovation in entrepreneurial finance” and as “one of the major innovations that characterize the digital revolution of financial markets” by Fisch et al. (2020: 1).

ICOs are blockchain- based applications that contribute to developing digital currency, coins, and cryptocurrencies (Alshater et al., 2022). ICOs raise capital by issuing and then selling tokens to a crowd of investors (Fisch, 2019) through blockchain- based applications, being tokens, a digital asset that corresponds to a value intended to provide utility or to function as securities (Sameeh, 2018). Alshater et al. (2022) points out that these cryptographically protected digital units of value are emerging as a new class of digital assets, with most tokens being unusable at the time of the ICO, and instead providing the token holder with a promise of future rewards (Fisch and Momtaz, 2020). Considered a strong contender to fill the gap of early-stage financing, ICOs can be seen as “a subtype of crowdfunding available only to certain kinds of entrepreneurial projects” (Bogusz et al.,2020:1108). Sharing this vision, Alshater et al (2022) argue that ICOs and equity crowdfunding

will lead the next phase of the evolution of entrepreneurial finance as the primary sources of early-stage financing for blockchain platforms. The interplay of blockchain technology, cryptocurrency, ICOs, and crowdsourcing for early-stage entrepreneurs is thus calling more and more attention from researchers, practitioners, policy makers, and regulators.

However, the emergence of the ICOs is not a consensual topic itself. In the past, crowdfunding growth also grounded in the promise of democratization of financial capital, something that now we understand as not being totally fulfilled (Bogusz et al., 2020) as some underrepresented groups of entrepreneurs still be marginalized in that market. The volatile nature of the ICO market and its complexity, the rapidly evolving regulatory environment, decentralization, and the scandals surrounding some companies trading crypto assets has been contributing to puzzling of the topic. Because of that, researchers and regulators have been calling attention to the risks associated with ICOs, namely those arising from low regulation, exaggerated expected returns, and the lack of transparency (Roosenboom et al., 2020). These challenges have been imposing high pressure on regulation. At the same time, some authors (e.g., Howell et al., 2020; Alshater et al., 2022) highlighted the heterogeneous response and approaches that the regulators of each geography have been carrying on answering that pressure. While some regulators are banning the ICO market, others try to open the market by promoting ICO-hubs with friendly regulatory frameworks.

Despite offering an opportunity for entrepreneurs to develop innovative ideas, products and services, the research on the topic is yet recent and considerably underdeveloped, with the literature even have facing difficulties defining the topic itself, opening several research gaps (Chitsazan et al. 2022). The existing literature does not provide a consensus on the concept of an ICO and the understanding on its performance is still limited, as most of the research limits it to the pre-launching or launching phase, while other extent the concept to a post-launch stage (Masiak et al., 2020), therefore limiting the development of theory-building in this field of research.

Despite its growing role in the field of the entrepreneurial finance and the advances in the study of the success factors of this new capital raising methodology, ICOs still controversial as well as the role that the legal systems should assume on the market. The gaps on the literature are especially noticeable when it comes to studying the role of regulators and contextual factors in the success of these ventures and the role that regulations/legislation may play in the importance of the signals that founders send to investors. According to Chitsazan et al. (2022), little attention has been paid to legal context of each country which is an “huge potential for future research on the determinants of ICO success” (p. 17), an open avenue that we address in this piece of research. We ground this study on the assumption that legal context and market risks may exert a relevant influence on the value and quality signals sent by issuers and third-party institutions on ICOs performance.



In that sense, in this research, we argue that to understand the ICO performance a dynamic and holistic approach is needed, which must include the examination of the influence context factors such as the geography and regulations (Bellavitis et al., 2020). So, to fill the presented gaps on the literature, we examine the role played by the regional environment in the success of ICOs, merging literature on crowdsourcing' success factors and regulatory framework contributing to the theory-building in the field of ICOs. By studying the impacts that legal systems play on the ICOs, we provide cues for regulators to boost this form of financing for entrepreneurs, making at the same time the market safer for investors and less exposed to unfortunate scams which still exist in the world of ICOs and Blockchain in general. For entrepreneurs trying to collect the necessary financial sources to develop their ideas, this study provides useful information on the individual factors that may help to minimize the odds of ex-post ICO' failure and how it relates with regulatory framework.

The focus of this research is to understand the role that the regulatory framework of each jurisdiction has been playing over the last couple of years on the ICOs market. To doing so, we ground our research on signalling theory (Spence, 1973), examining how does regulatory interventions in ICO market affect the signalling value of success factors of ICOs and crowdfunding pointed out by the literature. Additionally, we adopt a phase-based view of the ICO process as the framework to structure the findings of these research, a practice that is in line with the methodology that has been used by literature on ICOs (Chitsazan et al. 2022). In this way, we measure the success in two ways, depending on the phase we are assessing– i) measured by the amounts raised, to examine the success during the ICO, and, ii) measured by the return on investment in the post-ICO phase, i.e., after the ICO' end-date. Using a phase-based view of the ICO, we ensure that we are using the right success variables according to the existent literature. For the last, literature in ICO performance still quite fragmented, and most of them examines specific aspects or dimensions of ICOs at a given point in time, usually looking at short time periods, which is in contrast with the rapid and dynamic evolution of the ICO industry (Bellavitis et al., 2020; Alshater et al, 2023) and markets. By contrast, we adopt a dynamic and holistic approach to study the ICO performance.

In summary, this study offers mixed evidence on the role played by ICO-specific legal framework on the ICO success and post-ICO performance. We do observe a favourable impact of a regulated environment on the relationship between a whitepaper and the amounts raised, implying the presence of the certification hypothesis in the ICO market. However, contrary to expectations, our results challenge the notion that an ICO-specific regulatory framework attracts high-quality investors who prioritize corporate governance signals to mitigate risks at the early stages. While regulatory interventions do not significantly affect post-ICO returns, they do exert influence on investors' perception of issuer signals, particularly regarding governance, in ICO' funding stage. These findings suggest that the limited policies implemented by regulators alone do not play a

substantial role in the success of ICOs. However, investors perceive them as certifiers during the funding stage, contributing to the value attributed to governance-related signals in the post-ICO stage.

Section 2 provides a brief overview on ICO concepts, market challenges and regulatory overview of the ICOs. Section 3 reviews the literature on regulatory field of the fintech's and ICOs and the potential role played by the context on the signaling mechanism and, consequently, on the ICO performance. Section 4 describes the data, variables, and method. Section 5 reports the results and discusses the main findings. Section 6 concludes.

## **2. ICO concepts and market challenges – an overview**

Chitsazan et al. (2022:1) describes "ICOs as a new method of raising funds for entrepreneurs to realise and develop their business ideas". As pointed out by Fisch et & Momtaz (2020:6), ICOs allow startups and new ventures to raise large amounts of capital by "avoiding the costs of compliance and intermediaries" which can be attributed, at least in part, to the fact that they are often very lightly regulated (Chen and Bellavitis, 2019). Hence, through ICOs, entrepreneurs seeking funding can bypass the prolonged and highly regulated processes that come from more traditional financing sources (Chen, 2019). This may explain why the growth of the total amount raised from ICOs between 2017 (USD 5.38 billion)<sup>1</sup> and 2019 (USD 3.33 billion) (Haffke et al. 2020), exceedingly early-stage venture capital investments in that period (Sunnarborg 2017).

Despite the potential for entrepreneurs to foster innovative ventures, researchers and regulators have been expressing apprehensions about the risks associated with Initial Coin Offerings (ICOs). Some of these concerns encompass inadequate regulation, a lack of transparency, and the overinflation of expected returns (Roosenboom et al., 2020). The absence of regulation in the ICO market has placed token buyers in a position with few legally enforceable rights, thereby empowering opportunistic token issuers (Howell et al., 2020). Additionally, the heavy reliance on digital platforms entails potential frictions and frauds (Alshater et al. 2022), even more relevant in a highly unregulated global-process of raising capital which can be an easy target for phishing and hacker activities (Hornuf et al., 2022). Therefore, ICO's market is still seeing a source of illegal activities and fraudulent schemes that affect investors but also issuers, providing a new outlet for cryptocurrency money laundering (Forgang, 2019; Barone & Masciandaro, 2019). Tiwari et al. (2020) estimated that around 10% of the ICOs funds have been lost to fraud. According to the authors, despite making the funding process much faster and cheaper than other traditional sources

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<sup>1</sup> ICOs become popular after the first five ICOs issued by *Tezos*, *Filecoin*, *Kin*, *Blockstak*, and *BAT* which raised around US\$674 million in 2017 (Barone & Masciandaro, 2019)

of funding, the low compliance with securities regulations on ICO markets and the lack of due diligence provides an opportunity for fraudsters to easily carry out their operations.

In sum, frauds, exit scams, digital attacks, volatility, and speculative nature still quite present on the ICO process. These challenges have been imposing high pressure on regulation in the last years leading to heterogeneous reaction by the governments in many geographies, in part because financial regulation is subject to national legislation, impacting the ICO regulation geographically (Bellavitis et al., 2020). For example, Howell et al., (2020: 3933) stated that “the geographic distribution of ICOs appears to reflect emerging international regulatory competition between countries seeking to attract a portion of the fast-growing market”. In fact, we have regions that are almost trying to become ICOs hubs by creating regulatory frameworks that attract blockchain ventures (e.g., Singapore and Switzerland); others that, not being restrictive are launching with some frequency warnings to the market (e.g., USA and Germany); and finally some regions that are adopting quite restrictive regulatory frameworks and, on the limit, are banning ICOs (e.g., China and South Korea). As pointed out by Bellavitis et al., (2020), governments and regulators must carefully balance the upsides and downsides of the ICOs regulation when they are interested in attracting and promote the growth of innovative ventures and, particularly, the ICOs’ market.

The absence of a properly regulatory framework will still challenging investors to look to alternative strategies to mitigate their risk exposure. In this scenario, Tiwari et al. (2020) highlighted several crucial steps regarding the due diligence process that investors should undertake. These steps aim to mitigate or reduce exposure to the aforementioned challenges and enable an assessment of the issuer's proposal. They include conducting a detailed reading of the ICO white paper, thoroughly analyzing the value proposition of the offered product or service (known as Offering's Utility), examining ICO Ratings and Reviews from various sources, and conducting management due diligence, which involves conducting background checks on key executives of the venture. In response to the unregulated nature of ICOs, an alternative has emerged in the market that caters to risk-averse investors, namely Security Token Offerings (STOs). The emergence of STOs followed the ICO bubble (Lambert et al., 2021). This innovative method of raising funds, unlike ICOs, is backed by tangible real-world assets. Lambert et al. (2021:4) define security tokens as "digital representations of investment products, recorded on a distributed ledger, subject to regulation under securities laws." Furthermore, security tokens fall under the purview of securities laws, thereby classifying them as regulated securities.

ICO scams have been revealed quite costly for investors and ruin the reputation of the ICOs. Hence, it became necessary for the genuine issuers to provide as much information as possible, “to differentiate themselves from ICO scams and gain the trust of investors”, Tiwari et al. (2020:19). At the same time, ICO’s market uncertainties must push policymakers to exert more efforts on

regulation, given that the lack of regulation facilitates opportunistic behaviour and even fraud, further exacerbating uncertainty (Huang et al., 2020). Despite considered essential for the evolution of the industry (Bellavitis et al., 2020), the challenges of implementing more regulation on this market are particularly difficult given the relevance of keeping an efficient trade-off between the “need for a regulatory framework specific to ICOs that protects investors whilst maintaining the low-cost advantage of ICOs as a method of raising funds” Tiwari et al. (2020:25). Zetzsche et al. (2018) propose using existing financial regulations to address the unregulated nature of the ICO market. Financial regulators should be empowered to request information, enabling enforcement through cooperation among agencies. According to the authors, fraudulent ICOs could face asset freezes, and insufficiently disclosed ones might be banned, and focus should be devoted on ICO intermediaries and providers, with stronger regulatory requirements like asset segregation and minimum capital. In sum, a well-defined regulatory framework could establish clarity that, in turn, would encourage compliance from issuers and facilitate the analysis of the investors evaluating the extent of compliance of the venture and extrapolating the risks of that particular ICO.

### **3. Regulation framework and ICOs success – Research hypotheses**

According to the Australian authorities, ICO must be conducted in a manner that promotes investor confidence and complies with applicable law<sup>2</sup>. However, the ICO’s market is still full of frauds because of the information asymmetry that, in the end, results in the investors’ inability to assess noisy signs covering opportunistic behaviours from entrepreneurs looking to raise more funds in a short period, which can lead to investor’s losses and ICO’ platforms failure (Alshater et al., 2022). In line with this, Zetzsche et al. (2018:19) states that potential participants are sometimes given so little financial information that “their decision to fund the ICO cannot be based on a rational calculus.”

In fact, ICOs’ market decentralization and disintermediation exacerbate information asymmetries between the issuers and investors (Hornuf et al., 2022; Howell et al., 2020; Bellavitis et al., 2020). In that sense, the context surrounding the ICOs must not be discarded from the success factors analysis. Country-level variables can serve as tools to determine ICOs investment decisions (Alshater et al., 2022), namely its legal system, and the sentiments of local government (Chitsazan et al, 2022; Huang et al., 2020). Some of the main risks of the market, namely those arising from information asymmetries, can be somehow alleviated by a better quality of the information disclosed by the issuers, and we argue that this quality may be influenced by the market regulation. Hence, most of the literature still rooting for a better regulatory framework on the ICOs

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<sup>2</sup> <https://asic.gov.au/regulatory-resources/digital-transformation/crypto-assets/>

market (e.g., Alshater et al., 2022) which, despite its decentralized nature, may contribute to reduce investor's uncertainty and risk exposure. In traditional financing markets, the regulatory structure influences the types of investors attracted to the market and their investment strategies (Romano, 1993). In that sense, we understand that a country with a specific legal framework attracts high-quality investors, i.e., jurisdictions with already issued regulations or, at least, warnings will attract investors with higher quality that will demand more information by the issuers to do their due diligences and will be more efficient in reading the signals that the issuers give. These ideas are aligned with of La Porta et. al (1997), who find that countries with poorer investor protections, measured by both the character of legal rules and the quality of law enforcement, have smaller and narrower capital markets. In this sense, we advocate that policymakers can play a key role in developing effective policies and strategies that facilitate fundraising through ICOs and contributing for its regional success.

In sum, we argue that an ICO-specific regulatory framework will bring more transparency and protection to investors as it will require more compliance, which in our view will not only improve the information issuers provide to the market, but also drive bad issuers (e.g., fraudsters) away from attempting to raise capital through ICOs as they cannot comply and exceed a due diligence process. In other words, we posit that regulators may act as a (third-party) quality certificatory. According to Booth and Smith (1985:266), "third-party certification increases the flow of capital to firms where asymmetric information would otherwise lead to reduced investment.". In this sense, based on the certification hypothesis, formally, we hypothesise that:

**H1a:** *The success of the ICOs is higher in jurisdictions with an ICO-specific regulatory framework.*

**H1b:** *The post-ICO performance is higher in jurisdictions with an ICO-specific regulatory framework.*

In traditional financing markets, the study of the relationship between the legal/regulatory framework and the development of the market is not a novelty. Shleifer and Vishny (1997) found that countries with stronger legal systems tend to have more developed financial markets and attract higher-quality investor, an argument that is in line with other authors (e.g., Colin Mayer, 2013). In the context of ICO, Chitsazan et al, (2022) conceptualized the role played by the legal framework to examine issuers' decisions about quality/quantity/type of signals they want to disclose for the investors in order to maximize the ICOs' success, arguing that "contextual factors facilitate or hinder this exchange of signals, thus influencing investors' final ICO participation decisions and their actual investments in ICO projects" (2020:15). In this sense, we argue that jurisdictions with more advanced regulatory/legislative frameworks, not only increase the chances of an ICO succeed (i.e., H1) but, for issuers, also increase the importance of providing trustfully information/signals in order to, at least, comply with the relevant laws and/or regulations. According to La Porta et. al

(2000:5), “investors recognize a risk of expropriation, penalizing firms that fail to contractually disclose information about themselves and to contractually bind themselves to treat investors well.” Hence, we posit that the regulatory framework influences the value of issuer’s quality signals as predictors of ICO’ success and post-ICO performance.

Grounded on the signalling theory, literature examined the signalling role played campaigns’ white paper on ICO success (e.g., Zhang et al., 2019; Fish, 2019). An ICO whitepaper can be defined as an executive summary, illuminating essential aspects of the ICO and playing a vital role in captivating investor interest. It achieves this by presenting a comprehensive overview of the market landscape and articulating the anticipated impact of the token within it. As such, these documents are fulfilled with relevance as they inform the investors not only about technical information but also the whole strategy of the venture, detailing the token being issued, the roadmap for the project, the team, the legal structure and so on. Indeed, despite being communicated on an unregulated context, in some cases whitepapers tend to be structured following certain characteristics compared to a regulated prospectus (Campino et al., 2022).

In line with H1, we argue that an ICO-specific regulatory framework will bring more transparency and protection to investors as it will require more compliance. In such environment, we understand that a regulator will become not only a certifier for the information provided by the issuer, but also ensure that the issuer keeps complying after raising the capital. In this scenario, the best ventures will be eager to send the right signals to distinguish themselves from others (Spence, 1973). Whitepaper is a possible way of communicating the attributes of the project.

We understand that the issuers will look for a certification that give them some kind of competitive advantage when trying to raise capital on the market (Booth and Smith, 1985). As such, we argue that an ICO-specific regulatory framework will not only increase the importance of providing the signals, i.e., releasing a Whitepaper, but will also act as a certifier of the information that is provided by the issuer, improving the chances of being a step ahead of the competition and raising the capital needed. Additionally, regulators will ensure that after raising the capital they need, ICO’ issuers keep compliant with the law and with the attributes that they released and. As a result, we argue that the post-performance is also improved by the additionally protection provided to investors. That said, we build the following hypotheses:

**H2a:** *The positive relationship between whitepaper and the success of the ICOs is higher in jurisdictions with an ICO-specific regulatory framework.*

**H2b:** *The positive relationship between whitepaper and the post-ICO performance is higher in Jurisdictions with an ICO-specific regulatory framework.*

According to OECD, the purpose of corporate governance is “to help build an environment of trust, transparency and accountability necessary for fostering long-term investment, financial stability and business integrity” (2015:7). Corporate governance can be referred to a system of practices, rules, and processes by which a company is directed and controlled. In general, corporate governance can be seen as pivotal for the maintenance of accountability, ethical behaviour, and transparency within an organization. Durnev & Kim (2005) found that firms that practice high-quality governance have greater growth opportunities. According to John Coffee (2002), regulatory frameworks play a crucial role in shaping corporate governance practices and must protect investors, enhancing their confidence and, as a result, attracting high-quality investors who value transparency and accountability. In the same line, Klapper & Love (2002) in their research on corporate governance, investor protection, and performance in emerging markets, the authors find that better investor protection and regulatory frameworks positively affect transparency and corporate performance. In the same piece of research, the authors found governance and performance is lower in countries with weak legal environments, suggesting that improving the legal system should remain a priority for policymakers. As such, we posit that in a context of asymmetric information between the issuers and the investors, as it is the ICOs’ market, the presence of ICO-specific regulatory framework will create mechanisms that incentivize the issuers to constitute governance structures strong enough that ensures the compliance with the law and the reduces the moral hazard at any stage of the venture.

Leuz et al. (2009) discovered that foreign investors tend to allocate fewer funds to firms located in countries with inadequate outsider protection and disclosure mechanisms, as well as ownership structures that foster governance issues. Moreover, well-developed regulatory frameworks tend to attract and retain for a longer period higher-quality investors (e.g., Colin Mayer, 2013), which underscores the need for ventures in these regions to establish robust governance structures that demonstrate lower exposure to moral hazard risks. Drawing on the signalling theory, compliant and strong issuers are motivated to transmit signals to the public, showcasing their attributes and gaining a competitive advantage over their counterparts. The composition of a venture's team is among the critical signals addressed within the context of corporate governance in the ICO market. The significance of both the quality and size of the team in a launching venture has been extensively documented as a quality signal in the literature examining the success factors of ICOs (e.g., Amsden & Schweizer, 2018; Burns and Moro, 2019). Overall, according to the literature, projects with larger teams and multiple advisors are more likely to achieve success during ICOs and exhibit superior performance in the long run.

Ahmad et. al (2021) argues that the high information asymmetry that still exists between the project team and the potential investors can be attributed to not only the still-developing technology

but also the lack of regulations in the market. As a result, we posit that jurisdictions with issued ICO-specific regulatory framework, will create the right incentives to more transparency and more quality information. In order to be compliant with a regulated context, ventures will feel the need for a stronger governance and will comprehend the importance of releasing those signals to the market showing, for instance, a well constituted project team. ICO-specific regulatory framework will attract high-quality investors that will attribute more value to the presence of good information about the team as they understand that it can contribute for more compliance and lower moral hazard's risks at any stage of the venture. We argue that this interpretation by the crowds will help improve the ICOs' success and will be more punitive to the ventures that give weak signals about their governance in context of ICO-specific regulations. Considering this, we propose the following hypothesis:

**H3a:** *The positive relationship between team's size and the success of the ICOs is higher in jurisdictions with an ICO-specific regulatory framework.*

**H3b:** *The positive relationship between team's size and the post-ICO performance is higher in Jurisdictions with an ICO-specific regulatory framework.*

## 4. Data, method, and variables

### 4.1. Data

To this date, there is no standard and universal data source for ICOs (Aslan et. al, 2023). To test our research hypotheses, we rely on a unique dataset covering ICOs issued from May/2015 to June/2023, covering 4,521 projects in 127 countries from six different continents, collected from different data aggregator websites (i.e., mainly from ICOmarks, ICODrops, ICOholder, CoinCheckup, and CoinMarketCap). We considered that such a long period is crucial for the objectives of our study as it allows us to analyse the dynamics of the success of ICOs as more regulators intervene in the market as a whole. Additionally, a dataset constituted by such a variety of countries and regulatory approaches is important to really observe the impacts that regulatory framework has been having on the ICOs market in general.

The process of gathering data to study ICOs have become even more difficult in 2020, when the website ICObench, the platform the was used by most of the empirical researchers on the field and recognized by researchers and investors as the most completed website, stopped updating information on ICOs and then, going completely offline. Without a coherent and reliable source that could comprise all the variables needed (Belitski & Boreiko, 2021), the data on this research was mainly gathered from the website aggregator ICOmarks (<https://icomarks.com/>) that, by using web scraping's methods, enabled us to get information to constitute the database that we needed. As these web sites have some data flaws, we then complete the information regarding some variables



by using other data aggregators as ICO Drops (<https://icodrops.com/>), ICOholder (<https://icoholder.com/>) and CoinCheckup (<https://coincheckup.com/>), specially gathering information about variables that were pivotal for our research as, the amount raised, ICO price, and country.

Regarding the post-ICO, the process demanded significant efforts as we look for and gathered information about all the ICOs manually to collect the much and more reliable information as possible. As such, we follow the literature and, in absence of the ICObench, we focus our search in the website CoinMarketCap (<https://coinmarketcap.com/>), a strategy quite present on the literature in the field (e.g., Roosenboom et al., 2020; Fisch & Momtaz, 2020). To complement the limited data, we have also gathered data from the following websites: WorldCoinIndex (<https://www.worldcoinindex.com/>), Coinranking (<https://coinranking.com/>) and CoinFi (<https://www.coinfi.com/>). Despite these efforts, we acknowledge the post-ICO trading data still poor, especially for ventures that occur before 2018. For the last, the market context related factors, such the Bitcoin information, was taken from the platform Yahoo Finance (<https://finance.yahoo.com/>).

#### 4.2. Method

When analysing the ICO success, the literature has been presenting mainly two different approaches. The first uses a standard OLS model (e.g., Campino et. Al, 2022; Roosenboom et al., 2020), to regress the success of the ICO as the log of the total amounts raised. The second defines the success of the ICO as a binary outcome- i.e., the ICO' Hard or Soft Cap was reached or not-, relying on logistic regressions (e.g., Roosenboom et al., 2020). In this research, we use the standard OLS, as we define the ICO success as the natural log of the funds raised in each venture (to test H1a, H2a, and H3a) and the post-ICO performance, as the natural log of return on investment (ROI) after 30 and 90 days post the end of the ICO (to test H1b, H2b, and H3b).

Empirically, to test hypotheses H1a, H2a, and H3a, we run the equations 1, 2, and 3, respectively, as follows:

$$\ln(\text{Amount Raised}_i + 1) = \beta_0 + \beta_1 \text{RegulatedCountry}_{jt} + \beta_2 \text{WhitePaper}_i + \beta_3 \text{TeamSize}_i + \sum_{k=1}^4 \delta_k \text{Control Variables}_{ji} + \varepsilon_{ji} \quad \text{eq.1}$$

$$\ln(\text{Amount Raised}_i + 1) = \beta_0 + \beta_1 \text{RegulatedCountry}_{jt} + \beta_2 \text{WhitePaper}_i + \beta_3 \text{TeamSize}_i + \beta_4 (\text{RegulatedCountry}_{jt} * \text{WhitePaper}_i) + \sum_{k=1}^4 \delta_k \text{Control Variables}_{ji} + \varepsilon_{ji} \quad \text{eq.2}$$

$$\begin{aligned} \ln(\text{Amount Raised}_i + 1) = & \beta_0 + \beta_1 \text{RegulatedCountry}_j + \beta_2 \text{WhitePaper}_i + \\ & \beta_3 \text{TeamSize}_i + \beta_4 (\text{RegulatedCountry}_j * \text{TeamSize}_i) + \\ & + \sum_{k=1}^4 \delta_k \text{Control Variables}_{ji} + \varepsilon_{ji} \end{aligned} \quad \text{eq.3}$$

Similarly, to test the post-ICO success hypotheses (i.e., H1b, H2b, and H3b) and, using a similar for the ROI 90 days, we run the following equations:

$$\begin{aligned} \ln(\text{ROI}_{30d}_i + 1) = & \beta_0 + \beta_1 \text{RegulatedCountry}_{jt} + \beta_2 \text{WhitePaper}_i + \\ & \beta_3 \text{TeamSize}_i + \sum_{k=1}^4 \delta_k \text{Control Variables}_{ji} + \varepsilon_{ji} \end{aligned} \quad \text{eq.4}$$

$$\begin{aligned} \ln(\text{ROI}_{30d}_i + 1) = & \beta_0 + \beta_1 \text{RegulatedCountry}_{jt} + \beta_2 \text{WhitePaper}_i + \\ & \beta_3 \text{TeamSize}_i + \beta_4 (\text{RegulatedCountry}_{jt} * \text{WhitePaper}_i) + \\ & \sum_{k=1}^4 \delta_k \text{Control Variables}_{ji} + \varepsilon_{ji} \end{aligned} \quad \text{eq.5}$$

$$\begin{aligned} \ln(\text{ROI}_{30d}_i + 1) = & \beta_0 + \beta_1 \text{RegulatedCountry}_{jt} + \beta_2 \text{WhitePaper}_i + \\ & \beta_3 \text{TeamSize}_i + \beta_4 (\text{RegulatedCountry}_{jt} * \text{TeamSize}_i) + \\ & + \sum_{k=1}^4 \delta_k \text{Control Variables}_{ji} + \varepsilon_{ji} \end{aligned} \quad \text{eq.6}$$

where *Regulated Country*<sub>jt</sub> is a binary variable that takes the value of 1 if the ICO has occurred on a *j*<sup>th</sup> country where there was a regulatory intervention on ICO market in the year *t*; *WhitePaper*<sub>i</sub> is a binary variable that takes the value of 1 if the *i*<sup>th</sup> ICO campaign has a WhitePaper; *TeamSize*<sub>i</sub> represents the number of elements that constituted the team of the *i*<sup>th</sup> ICO;  $\beta$ s are the estimated parameters of the main covariates,  $\delta_k$  are the estimated parameters of the set of *k* control variables;  $\varepsilon$  is the error term of the regression.

### 4.3. Variables

Table 1 displays variables definition and the data source.

**Table 1**  
 Variables definition and source

Variable	Definition	Source
<b>Dependent variables</b>		
<u>ICO success</u>		
Amount Raised	Total amount of funds raised in the ICO funding stage, quoted in dollars.	ICOMarks, ICOHolder
<u>Post-ICO performance</u>		
ROI_30d	Return on investment after of the token after 30 days post-ICO end-date.	CoinMarketCap, WorldCoinIndex, Coinranking, CoinFi
ROI_90d	Return on investment after of the token after 90 days post-ICO end-date.	CoinMarketCap, WorldCoinIndex, Coinranking, CoinFi
<b>Main covariates</b>		
Regulated Country	Equal to 1, if the ICO was occurred in a country where, at the time of the end-date, there was a regulatory framework in place on Initial Public Offerings, 0 otherwise	ICOMarks
WhitePaper	Equal to 1, if there is an available WhitePaper on the Website Aggregator, 0 otherwise	ICOMarks
TeamSize	It represents the number of elements that constituted the team of each ICO	ICOMarks
<b>Control variables</b>		
<u>ICO characteristics</u>		
Bonus	Equal to 1, if there was Bonus at any stage of the ICO, 0 otherwise	ICOMarks
ERC20	Equal to 1, if it is an Ethereum-based token, 0 otherwise	ICOMarks
<u>Market characteristics</u>		
Bitcoin_Price	Bitcoin price, quoted in dollars	Yahoo Finance
Bitcoin_Return_30day	Bitcoin returns of the last 30 days	Yahoo Finance

#### 4.3.1. Dependent Variables

As mentioned, to test the ICOs success during the funding stage, we use the natural log ( $Amount\ raised + 1$ ) of the funds raised, quoted in dollars, in each venture. This is a measure of success that has been commonly used by many authors that have been studying the success factors of the ICOs (e.g., Biliski & Boreiko, 2021; Campino et. Al, 2022), and in similar fields as Venture Capital funding (e.g., Fisch, 2019) and in crowdfunding (e.g., Ahlers et al., 2015). Whenever there was no data fund on the values that we have gathered on the ICO, that venture was not taking into account in our analysis. As such, our database was reduced to 1,611 ICOs. Other approaches have also been quite present in the literature as defining the success of the funding process as getting funds equal or above the stipulated soft cap (e.g., Aslan et. al, 2023, Adhami et al., 2018) or even the hard cap.

On the other hand, to study the post-ICO success, we looked at the natural log of the ROI (plus one) after 30 and 60 days post the ICO end-date. It was eliminated from the sample ICOs for which there was no information about post-ICO trading or that, even existing information on post trading, there was no data to test the intervals (30 and 90 days that we were testing). As such, our sample was significantly reduced to 348 and 576 observations for the 30- and 90-days post ICO end date's analysis, respectively.

#### 4.3.2. Main covariates

Starting by the premiss that legal systems may impact the ICOs environment (hypotheses H1a,b), we defined the variable *Regulated Country<sub>j</sub>* as binary variable that assumes the value of 1 in case of the ICO was issued in a geographic location where there was regulatory activity on ICOs at the year  $t$ , and 0 otherwise. We start by using the report of PricewaterhouseCoopers (<https://www.pwc.ch/en/industry-sectors/financial-services/fs-regulations/ico.html>) to collect data from the many countries where there was ICO activity on our database. Then, as the report did not cover all the period of our research, we have consulted the reports of LegalLink (<https://www.legalink.ch/>), to gather more updated information about the countries where, by the report of PWC, had no regulatory activity by the end of 2018 or that were not covered by this report. It is also important to note that countries where there were only warnings issued and we didn't find any evidence of regulatory activity were treated as unregulated geographies. Similarly, geographies where the ICOs were banned, were also treated as unregulated.

We rely on data about the disclosure of the whitepaper and on the number of elements that constitute the issuer's team, respectively, to measuring quality signals that the issuers send to the investors about firm's characteristics and project's roadmap and the corporate governance effects. *WhitePaper* , is a binary variable that assumes the value of 1 in the presence of the whitepaper and 0 otherwise. The information was gathered from the website aggregator ICOmarks and it was assumed that the availability at the time we have consulted the website would mean that the WhitePaper could be consulted at the time of the ICO, and vice-versa. *TeamSize<sub>i</sub>* represents the number of elements that constituted the team of each ICO. Whenever no information was disclosure, the number of team members was assumed to be 1, the minimum value. Similarly, to the WhitePaper, we considered that the information available in the website aggregator ICOmarks at the time we have consulted, was the same before the end date of the ICO.

To examine the moderating effects of legal environment on the relationship between the issuer/ICO quality signals and the ICO success and ex-post-performance (hypotheses H2 and H3, respectively) we rely on the following interactions: *Regulated Country* x *WhitePaper* (hypothesis H2a and H2b) and, *Regulated Country* x *TeamSize* (hypotheses H3a and H3b).

#### 4.3.3. Control variables

The set of control variables includes two binary variables related with the ICO characteristics, *Bonus* and *ERC20*. First, we do expect that the presence of a bonus scheme reduces the success of the ICO, both on the founding stage, as on the post-ICO. Roosenboom et al. (2020) hypothesizes that in the founding stage, this comes by the fact that the use of the Bonus scheme may send a signal that the project is having difficulties and struggling to attract sufficient interest on the ICO. In the same research, the authors argue that the bonus scheme's participants may be tempted to "engage in flipping and sell the tokens at a profit (at ICO price) once the tokens launch on a secondary market" (2020:19). Then, we gave attention to the platform where the ICO was built and argue that Ethereum-based tokens, also known as ERC20, will have a positive impact on the success of the ICOs. In line with Fisch (2019), this platform "defines the rules that certain transactions need to follow in order to meet and enable greater interoperability between transaction parties in the Ethereum ecosystem" (2019:10), and we do expect that investors will understand that as a positive signal for higher future utility.

Our control variables also measure market related factors and, specially, the dynamics of cryptocurrencies, whose impact of the success of the ICOs, both in the funding or post-stage, are widely addressed in this fields (e.g., Momtaz, 2020; Masiak, et. al, 2020). In that sense, we control the market dynamics through two variables *Bitcoin\_Price<sub>i</sub>* and *Bitcoin\_Return\_30day<sub>i</sub>*. The Bitcoin is one of the premiers' methods of payment for tokens and, as such, the amount raised on the ICOs can be highly dependent on the value of the Bitcoin. Additionally, a higher Bitcoin price generally indicates a more positive market sentiment (Fisch, 2019). Therefore, we expect that higher Bitcoin price have a positive impact over the success of these ventures. Additionally, to control the market momentum we use the 30day return of Bitcoin.

#### 4.4. Descriptive statistics

The descriptive statistics are reported on the Table 2. The sample is composed by 4.521 projects from may/2015 to June/2023, comprising more than 127 different countries (see Appendix 1). Among all the samples, only 1,610 have the amount raised disclosed, significantly shortening the sample for the funding stage analysis. The amounts raised on this sample have values between 0 to 575 million dollars and a higher standard deviation, demonstrating the heterogeneity between projects. When it comes to post-ICO analysis, the heterogeneity between values is still significant but the sample is smaller, reflecting the difficult task of gathering reliable data for this type of research in this field. The difference between the observation between the 30 and 90 days post-ICO, comes by the fact that a significant number of ICOs has only track trading data for dates that go beyond one-month post-ICO.

**Table 2**  
Descriptive Statistics

Variable	Obs.	Mean	Median	St.Dev.	Min	Max
<b>Dependent variables</b>						
<u>ICO success</u>						
Amount raised	1,610	7,147,060	1,967,158	21,644,441	0	575,000,000
<u>Post-ICO performance</u>						
ROI_30d	387	3.772	0.567	17.343	0.000	182.083
ROI_90d	578	3.198	0.263	14.481	0.000	206.250
<b>Main covariates</b>						
Regulated Country	4,521	0.522	1.000	0.500	0.000	1.000
WhitePaper	4,521	0.933	1.000	0.250	0.000	1.000
TeamSize	3,998	8.349	7.000	5.318	1.000	48.000
<b>Control variables</b>						
<u>ICO characteristics</u>						
Bonus	4,521	0.115	0.000	0.319	0.000	1.000
ERC20	4,521	0.708	1.000	0.455	0.000	1.000
<u>Market characteristics</u>						
Bitcoin_Price	4,521	11,200	7,501	11,285	236	65,521
Bitcoin_Return_30day	4,521	0.173	0.150	0.154	-0.160	0.637

When it comes to the independent variables, it is noticeable that more than 93% of the sample have a disclosed WhitePaper and, if we look only to the sample that has disclosed amounts raised, this percentage increases to 94.8%. Regarding the team size of the projects, the high standard deviation demonstrates the heterogeneity of the sample. Additionally, on the final sample, only 11.5% of the project had bonus attributed and more than 70% were Ethereum-based tokens.

Regarding the market related controls, they present significant standard deviations, demonstrating the dynamics and volatility in the markets related with cryptocurrencies, highlighting the interval between the min and the maximum value of the Bitcoin. It is also important to note that these values are significantly influenced by the timings were the projects that composed this database have occurred. We note that more than 50% of the projects have its end-date in 2018, and only 11% have occurred after Jan/2021 (see Appendix 2).

Table 3 displays the correlation matrix between independent variables to examine if collinearity is a problematic in our equations. As we can observe none of the variables have high correlation. The maximum value (0.17) is between the variables ERC20 and the presence of a WhitePaper, and the minimum value (-0.22) is between the variables ERC20 and the Bitcoin Price. Hence, collinearity is not an issue in our estimates.

**Table 3**  
 Correlation Matrix

	<i>Regulated Country</i>	<i>WhitePaper</i>	<i>TeamSize</i>	<i>Bonus</i>	<i>ERC20</i>	<i>Bitcoin_Price</i>	<i>Bitcoin_Return_30 day</i>
Regulated Country	1.000	-	-	-	-	-	-
WhitePaper	0.117	1.000	-	-	-	-	-
TeamSize	0.109	0.086	1.000	-	-	-	-
Bonus	0.021	0.024	-0.002	1.000	-	-	-
ERC20	0.108	0.171	0.070	0.034	1.000	-	-
Bitcoin_Price	-0.161	-0.098	-0.195	0.158	-0.221	1.000	-
Bitcoin_Return_30 day	-0.023	-0.032	-0.010	0.003	-0.001	-0.005	1.000

## 5. Findings

### 5.1. Funding stage success

Table 4 reports the estimations for the impacts of the country’s regulatory frameworks on the success of the funding stage of the ICOs as well as on the value of quality signals provided by the entrepreneurs for the investors. Columns I.1-I.3 introduces the main covariate variables. Column II adds the control variables. Finally, Column III.1-III.2 reports the estimated moderating effects of the regulatory framework on the relationship between the ICO success and whitepapers (III.1), and the team size (III.2).

The variable *RegulatedCountry* reports a positive and statistically significant coefficient in Column I.1 (p-value<0.01) and I.2 (p-value<0.05). However, when we introduce the variable *TeamSize* (Column I.3) and the control variables (Column II - i.e., full model) the coefficient is not statistically significant. Based on the full model, without interactions, the results thus do not support our Hypothesis H1a. Overall, we do not find evidence that investors take the regulatory framework as relevant to engage in ICOs. This result thus raises doubts about the role played by policymakers in developing effective policies and strategies that facilitate fundraising through ICOs and contributing for its success.

As expected, Column II shows that ICOs reporting a *WhitePaper* have a higher ability to raise more funds (p-value<0.10). Similarly, issuers with larger teams (*TeamSize*) tend to have higher success (p-value<0.01). When examining the moderating effect of a regulated context on the relationship between ICO success and whitepapers (Column III.1), the estimations reveal a positive and statistically significant coefficient for the interaction *RegulatedCountryxWhitepaper* (p-value < 0.1); but the estimations for the constitutive terms of the interaction (i.e., *RegulatoryCountry* and *Whitepaper*) are not statistically significant (p-value>0.1). These results thus reveal that despite the non- statistically significant effect of whitepapers on countries not regulating ICOs ( $\beta_{WhitePaper} = 0.174$ , p-value>0.1), whitepapers exert a positive signalling effect on the ICO success in jurisdictions with issued regulation on ICOs ( $\beta_{Regulated\ Country*WhitePaper} = 1.704$ , p-value<0.1). But this effect is only

marginal considering its p-value. Even so, this finding is partially in line with our Hypothesis H2a supporting our expectations that legal systems enhance the importance of disclosing a project' quality signals for the success of ICOs. Indeed, the context seems to influence how investors interpret and value the presence of a whitepaper. Nonetheless, we still have reservations regarding the relationship between the implemented legal systems and the issuers' ability to raise higher amounts of funds through ICOs as the results also reveal that the regulatory framework itself do not exert a statistically effect on the amount raised when dissociated with project's quality signals ( $\beta_{\text{regulated country}} = -1.457$ ,  $p\text{-value} > 0.10$ ). Overall, these results points to a joint effect of regulatory framework and quality signals from whitepapers on ICO success.

**Table 4**  
OLS model - ICO success

	Dependent Variable: $\log(\text{Amount raised} + 1)$					
	Column I			Column II	Column III	
	Main covariates			[+] Controls	[+] Interactions	
	I.1	I.2	I.3	II	III.1	III.2
<b>Main covariates</b>						
Regulated Country (RC)	0.451*** (0.161)	0.392** (0.162)	0.155 (0.161)	0.178 (0.159)	-1.457 (1.014)	0.608* (0.331)
WhitePaper		1.319*** (0.440)	0.823* (0.473)	0.818* (0.472)	0.174 (0.518)	0.793* (0.475)
TeamSize			0.091*** (0.014)	0.088*** (0.014)	0.089*** (0.014)	0.116*** (0.020)
<b>Interactions</b>						
RC x WhitePaper					1.704* (1.025)	
RC x TeamSize						-0.046* (0.028)
<b>Controls</b>						
<u>ICO characteristics</u>						
Bonus				-0.609** (0.307)	-0.609** (0.307)	-0.606** (0.307)
ERC20				0.279 (0.178)	0.284 (0.177)	0.267 (0.177)
<u>Market characteristics</u>						
Bitcoin_Price				>-0.001** (0.000)	>-0.001** (0.000)	>-0.001** (0.000)
Bitcoin_Return				0.484 (0.496)	0.472 (0.496)	0.497 (0.496)
Constant	13.401*** (0.119)	12.181*** (0.430)	11.994*** (0.475)	12.060*** (0.516)	12.648*** (0.549)	11.843*** (0.527)
Observations	1.611	1.611	1.504	1.504	1.504	1.504
R-squared	0.005	0.013	0.032	0.043	0.046	0.045

Robust standard errors reported in branches.

\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$



Column III.2 reports a negative and statistically significant coefficient for the interaction  $RegulatedCountry \times TeamSize$  (p-value < 0.1) and positive coefficients for constitutive terms of the interaction. Examining the signalling effect of the  $TeamSize$ , these estimations reveal strong evidence that, in absence of a regulatory framework in place, an increase of number of elements of the venture's team plays a positive effect on the amounts that the issuers may expect to raise ( $\beta_{TeamSize} = 0.116$ ; p-value < 0.01). The negative coefficient of the interaction term size (i.e.,  $\beta_{Regulated\ Country \times TeamSize} = -0.046$ , p-value < 0.10) suggests that the positive marginal effect of the team on the ICO success is lower for the regulated countries than for non-regulated countries. These findings thus reject the Hypothesis H3a. Nonetheless, the results show that the joint effect of regulatory framework and the team size on the ICO success is positive ( $\beta_{Regulated\ Country} = +0.068 + \beta_{TeamSize} = +0.116 + \beta_{Regulated\ Country \times TeamSize} = -0.046 > 0$ ). In sum, these findings suggest that the relevance of the team size, as a proxy for quality signal about the strength of corporate governance, decreases for investors on ICOs issued in countries with a regulatory framework. In fact, such a signal may hold greater importance within an unregulated framework in which investors face higher risks of opportunistic behaviour. These results are partially in line with the substitution hypothesis of Johnson & Yi (2019) that states that the market forces incentivize the issuers to adopt governance mechanism as a signal for the investors in the absence of a regulatory involvement that would bind the behaviour of the issuers.

When it comes to market controls variables, the presence of a Bonus scheme appears to be, as we do expected, a negative contributor for the amounts raised on a ICO process (Column II and III, p-value < 0.05). Being an Ethereum-based coin does not influence the ICO success. Finally, our estimations on market related control factors and, specifically, on the dynamics of the cryptocurrency market, shows evidence that are not totally according to what we expected. The variable  $Bitcoin\_Return\_30day_i$ , which serves as a representative of market momentum, exhibits no statistically significant effect on the success of the ICO. These findings are not in accordance with our initial expectations, where we hypothesized that the momentum of Bitcoin, as one of the prominent payment methods for tokens (Fisch, 2019), would reflect a more positive market sentiment and consequently lead to an increase in the potential amount raised. Surprisingly, the coefficients of the variable  $Bitcoin\_Price_i$  yield statistically significant negative results (Column II and III - p-value < 0.05), contradicting our initial expectations. Despite anticipating a considerable relationship between the success of the funding stage and a favourable sentiment towards Bitcoin's value, given its significant role as a valuation method for tokens, we found that higher quotations for Bitcoin do negatively impact the amounts raised in the ICO.

## 5.2. Post-ICO performance

Table 5 and 6 report the estimations for the impacts of the countries' regulatory frameworks on the success on the post-ICOs' stage, 30 and 90 days after the ICOs' end-date, respectively, and on the importance of the signals provided by the entrepreneurs for the investors.

Aligned with findings reported to the funding stage of the ICO, the coefficient of the variable *RegulatedCountry* in Column II of both Tables 5 and 6 lacks statistical significance. Consequently, the full model, excluding interactions, does not provide empirical support for our Hypothesis H1b. Overall, there is no discernible indication that the presence of a regulatory framework exerts an impact on investor sentiment towards tokens upon their launch in the secondary market. In fact, these results give rise to uncertainties regarding the efficacy of policymakers in devising proficient policies and strategies to foster liquidity, safety, and enhanced returns for ICOs. Contrary to our expectations and the results obtained on the funding-stage, Column II of the Table 5 and 6 shows that ICOs reporting a *WhitePaper* have not statistical significance when it comes to obtain better returns on investment after the ICO ( $p\text{-value} > 0.10$ ). Similarly, we found no evidence of a positive relationship between larger teams (*TeamSize*) and better returns after the funding stage ( $p\text{-value} > 0.1$ ).

Columns III.1 of Tables 5 and 6 illustrate the moderating effect of a regulated context on the relationship between post-ICO performance and the disclosure of whitepapers. The results fail to provide any indication of a positive interaction between *RegulatedCountry* $\times$ *Whitepaper* ( $p\text{-value} > 0.1$ ). Consequently, we are unable to substantiate the argument that whitepapers exert a positive signalling effect on ICO success, particularly in jurisdictions with established regulations on ICOs. Even the constitutive terms (*RegulatedCountry* and *WhitePaper*) show no statistical significance ( $p\text{-value} > 0.1$ ), indicating that the signalling effect of the presence of a Whitepaper loses its value once the venture reaches the end of its funding stage. As a result, we find no support for H2b, which posits that legal systems enhance the importance of disclosing project quality signals for ex-post ICO performance. In fact, whitepapers appear to have no significant impact as quality signals for investors in the secondary market, regardless of whether the countries have ICO regulations in place or not. This raises further concern about the influence of existing policies on investor attitudes or perceptions towards ICOs in the secondary market. Moreover, there is no evidence to suggest that the presence of regulatory frameworks influences investors' perception of whitepapers or their view of regulators as certifiers ensuring issuer compliance with the law and the presented attributes after the ICO process. Consequently, these findings suggest that beyond the funding stage, the presence of a Whitepaper loses signalling significance, and regulatory interventions no longer serve a certification role.

**Table 5**  
OLS model - Post-ICO Results - 30 days ROI

	Dependent variable: ln (ROI_30d +1)					
	Column I			Column II	Column III	
	Main covariates			[+] Controls	[+] Interactions	
	I.1	I.2	I.3	II.1	III.2	III.3
<b>Main covariates</b>						
Regulated Country (RC)	-0.012 (0.090)	-0.004 (0.091)	0.055 (0.093)	0.067 (0.091)	0.019 (0.471)	-0.292* (0.170)
WhitePaper		-0.097 (0.182)	-0.044 (0.214)	-0.029 (0.229)	-0.050 (0.265)	-0.009 (0.219)
TeamSize			-0.007 (0.008)	-0.002 (0.008)	-0.002 (0.008)	-0.027*** (0.010)
<b>Interactions</b>						
RC x WhitePaper					0.051 (0.484)	
RC x TeamSize						0.043*** (0.015)
<b>Controls</b>						
<u>ICO characteristics</u>						
Bonus				-0.089 (0.149)	-0.089 (0.148)	-0.088 (0.148)
ERC20				-0.037 (0.105)	-0.036 (0.106)	-0.032 (0.103)
<u>Market characteristics</u>						
Bitcoin_Price				1.43e- (0.000)	1.43e- (0.000)	1.35e-05** (0.000)
Bitcoin_Return				-0.111 (0.264)	-0.112 (0.264)	-0.094 (0.260)
Constant	0.717*** (0.063)	0.801*** (0.175)	0.768*** (0.206)	0.585** (0.270)	0.604** (0.290)	0.769*** (0.275)
Observations	387	387	336	336	336	336
R-squared	0.000	0.001	0.003	0.051	0.051	0.073

Robust standard errors reported in branches.

\*\*\*p<0.01, \*\*p<0.05, \*p<0.1

Upon examining the moderating effect of a regulated context on the relationship between post-ICO success and team size (Column III.2), the estimations unveil a positive and statistically significant coefficient for the interaction term *RegulatedCountryxTeamSize* (Table 5, p-value < 0.01; Table 6, p-value < 0.05). This affirmative effect aligns with our hypothesis H3b, standing in contrast to our observations during the funding stage, where evidence supporting the presence of the substitution hypothesis was found. When scrutinizing the signalling effect of *TeamSize*, these estimations yield compelling evidence that, in the absence of a regulatory framework, an increase

in the number of elements in the venture's team is associated with a negative and statistically significant coefficient for the ROI after the post-ICO (Table 5,  $\beta_{\text{Team Size}} = -0.027$ ,  $p\text{-value} < 0.01$ ; Table 5,  $\beta_{\text{Team Size}} = -0.022$ ,  $p\text{-value} < 0.01$ ). These results contradict our initial expectations of a positive signalling effect stemming from the constitution of the team for ICO performance. On the contrary, it appears that the presence of a regulatory framework (*RegulatedCountry*) yields a negative effect when the venture is constituted by a team with a limited number of elements, but this effect is evident only in the short-term period, specifically within the first 30 days, as thereafter, the constitutive term *RegulatedCountry* loses its statistical significance in Table 6 (Table 5, Column III.2,  $\beta_{\text{Regulated Country}} < 0$ ,  $p\text{-value} < 0.11$ ; Table 6 -  $\beta_{\text{Regulated}}$ ,  $p\text{-value} > 0.1$ ). Consequently, these results suggest that despite showing a negative impact on the returns of ICOs in countries where no regulations are issued (Table 5, Column III.2,  $\beta_{\text{Regulated Country}} < 0$ ), the team size seems to exert a positive signalling effect on the post-ICO performance in the secondary market in jurisdictions with regulations on ICOs (Table 5, Column III.2,  $\beta_{\text{Regulated Country} * \text{Team Size}} > 0$ ,  $p\text{-value} < 0.01$ ; Table 6, Column III.2,  $\beta_{\text{Regulated Country} * \text{Team Size}} > 0$ ,  $p\text{-value} < 0.05$ ). These findings indicate that the policies implemented in diverse countries hosting ICOs in recent years seem to impact investors' perception of the information quality provided by issuers concerning their governance structure, especially in the short-term. In this regard, our results partially support Hypothesis H3b, revealing that the presence of a regulatory framework attracts higher quality investors who seek and demand projects demonstrating robust governance structures, thus enabling them to mitigate the remaining moral hazard risks to which they may be exposed. Overall, and in contrast to the funding stage, the context appears to influence how investors interpret and value the team size, indicating the relevance of regulatory frameworks in shaping investors' perspectives and decisions.

**Table 6**  
OLS model - Post-ICO Results - 90 days ROI

Dependent variable: ln (ROI_90d + 1)						
	I.1	I.2	I.3	II	III.1	III.2
<b>Main covariates</b>						
Regulated Country (RC)	0.060 (0.072)	0.068 (0.073)	0.102 (0.074)	0.121 (0.074)	-0.091 (0.570)	-0.137 (0.132)
WhitePaper		-0.109 (0.177)	-0.165 (0.266)	-0.143 (0.277)	-0.233 (0.323)	-0.127 (0.267)
TeamSize			-0.006 (0.006)	-0.004 (0.007)	-0.004 (0.006)	-0.022*** (0.007)
<b>Interactions</b>						
RC x WhitePaper					0.221 (0.577)	
RC x TeamSize						0.029** (0.012)
<b>Controls</b>						
<u>ICO characteristics</u>						
Bonus				-0.171 (0.106)	-0.172 (0.105)	-0.165 (0.107)
ERC20				-0.075 (0.087)	-0.074 (0.088)	-0.069 (0.087)
<u>Market characteristics</u>						
Bitcoin_Price				7.82e-06* (0.000)	7.87e-06* (0.000)	7.45e-06* (0.000)
Bitcoin_Return				-0.214 (0.219)	-0.216 (0.219)	-0.211 (0.216)
Constant	0.568*** (0.047)	0.665*** (0.169)	0.746*** (0.259)	0.727** (0.298)	0.811** (0.341)	0.856*** (0.303)
Observations	578	578	513	513	513	513
R-squared	0.001	0.002	0.006	0.024	0.024	0.033

Robust standard errors reported in branches.

\*\*\*p<0.01, \*\*p<0.05, \*p<0.1

In relation to the remaining control variables, there are two noteworthy facts. Firstly, the control variables *Bonus* and *ERC20* hold no statistical significance in both scenarios. Along with the results obtained for the variable *Whitepaper*, there is an indication that, in the secondary market, the signals related to the ICOs' attributes begin to lose some value for the investors. Secondly, the post-ICO returns seem to be substantially influenced by market-related factors, particularly the price of Bitcoin. As anticipated, the price of Bitcoin exhibits a positive coefficient and demonstrates statistical significance in all six regressions comprising the post-ICO analysis.

## 6. Closing Remarks

Using a dataset covering ICOs issued from May/2015 to June/2023, covering 4,521 projects in 104 countries from six different continents, collected from different data aggregator websites, this research extends the limited empirical evidence on the understanding of the role that the regulatory framework of many jurisdictions has been playing over the last couple of years on the ICOs market. We posit that the extended time frame, combined with a phase-based view and a holistic approach, and rooted in well-established theories such as signalling theory, was pivotal for achieving the objectives of our study. This methodological choice enabled us to comprehensively analyse the dynamic aspects of ICO success and, to the best of our knowledge and at the time of this research, present an innovative approach to investigate the influence of legal systems on a highly unregulated domain.

Overall, our findings provide evidence mixed evidence on association between the presence of a regulatory framework and the amount raised during the ICO, as well as the Return on Investment (ROI) during the post-ICO stage. Our results do not offer evidence that the regulatory framework itself directly increases the success of the ICOs, thereby raising concerns about the effectiveness of policymakers in devising impactful measures and approaches that enable successful fundraising through Initial Coin Offerings (ICOs) and enhance overall achievements. However, during the funding stage, we found evidence indicating that investors perceive regulators as certifiers of the information provided by issuers through whitepaper, supporting the certification hypothesis. In this context, the release of a Whitepaper is valued more by investors when a regulated framework exists, assuring investors of both the validity of information and compliance with ICO regulations. Overall, these results indicate a combined impact of the regulatory framework and quality signals from whitepapers on ICO success thus reducing adverse selection problems. On the other hand, in an unregulated context, investors attribute more value to strong governance indicators (e.g., a high number of team members) rather than relying on an established regulatory framework. This suggests that the substitution hypothesis proposed by Johnson & Yi (2019) still holds, contrary to our assumptions hypothesising that a robust regulatory framework would attract high-quality investors who value team information due to its contribution to compliance and reduced moral hazards during the venture's founding stage. Regarding post-ICO performance, we have found evidence supporting a moderated effect of regulatory framework on the relationship between the number of team members and post-ICO ROI. These findings lend support to our expectations that a robust and comprehensive regulatory framework would attract investors who place greater value on strong signals of good governance, i.e., a signal that exposes less the investors to moral hazard when the project has already raised the amounts that needed, and that these positive sentiments among investors are likely to contribute to higher post-ICO performance in the long run. Additionally, we

also observed that the presence of a Whitepaper renders its signalling value when the funding stage is ended. Generally, we observed that post-ICO token ROIs are influenced more by market context (such as Bitcoin value) rather than signals provided during the funding stage or regulatory frameworks in place. In summary, our study reveals doubts about the efficacy of policymakers in formulating effective strategies and policies that promote successful ICO fundraising. Although some joint effects are evident between issuer signals and ICO success, the impact of regulatory frameworks on post-ICO performance appears to be less significant compared to market conditions.

Conducting a study on this topic is inherently challenging, particularly due to the complexities involved in gathering comprehensive and reliable information. Despite relying on a diverse range of website aggregators, our database has normal limitations. Data discrepancies among websites, especially pertaining to the dependent variables, significantly constrain our analysis. Furthermore, it is important to highlight that we have identified disparities in some variable values across diverse websites, resulting in the exclusion of those ICOs from the sample. These constraints are realities that researchers must be prepared to navigate, particularly following the shutdown of the ICObench website. Additionally, it is crucial to acknowledge that the ICO market, like the IPO market, experiences waves of activity, as evidenced by the distribution of ventures by year in our database, with the majority of ICOs occurring on or before 2018. In addition, our sample includes 104 regions, of which 50 had regulation issued on ICOs at some point in time. The diverse range of countries with varying regulatory measures reflects distinct approaches within their respective legal systems. It is important to note that not all countries have stringent regulations; some adopt more conservative approaches, while others have more appealing regulatory frameworks. Additionally, certain regions adhere to general guidelines set by supranational economic and/or political entities, such as all countries within the European Union. This diversity might have influenced the results, with certain approaches potentially yielding more positive impacts than others. Secondly, we should consider that some countries with regulatory frameworks have issued warnings over the years to alert investors about the risks and scams in the market, even before implementing regulations. In such a cautious context, the presence of a regulatory framework may not immediately attract investors who remain wary due to these cautionary statements. Thirdly, it is important to note that a significant portion of the database comprises projects funded in 2018 or earlier. During that time, many regulations were either recent or non-existent, and their effects on investor confidence may not have been immediately apparent. These historical considerations should be taken into account when interpreting the results. In sum, we posit that our limitations do not cast doubt on the accuracy of the obtained estimates. Instead, they should be viewed as catalysts for potential avenues of exploration in future research within this domain.

The research on this topic remains limited, and there are several crucial areas that warrant further investigation. Building upon one of the limitations identified in our study, future research should delve into the specific regulatory approaches adopted by countries and their impacts on ICO success and signal dynamics. Such detailed analysis can provide regulators with valuable insights to guide their regulatory interventions based on their specific agendas. Additionally, studying the temporal effects in regions where similar legislative approaches have been implemented individually can shed light on the divergent results observed. Similarly, in countries where ICO regulations have undergone progressive development, exploring the dynamics of moderated effects as the regulatory framework matures is essential. Furthermore, future research should encompass a comprehensive examination of variables representing signals provided to investors. For instance, analysing not only the presence of a Whitepaper but also its content, and broadening the range of variables related to project governance structures would enhance understanding in this field.



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## Appendix

### Appendix 1

ICOs' distribution by country

Country	No of ICOs	No of ICOs w/ WhitePaper	Average Team Size	Average Amount Raised	Average ROI - 30 days	Average ROI - 90 days
Anguilla	1	1	9.0	-	-	-
Argentina	6	6	5.3	7,712,737	-	-
Australia	74	72	8.4	5,617,600	0.28	0.04
Austria	20	20	9.9	8,550,944	-	-
Bahamas	5	5	6.4	5,072,578	-	0.01
Barbados	4	4	10.5	-	0.72	0.18
Belarus	17	17	9.4	3,796,869	2.76	0.25
Belgium	7	7	4.5	2,500,000	-	-
Belize	33	33	9.0	4,052,531	0.61	0.30
Bermuda	4	4	12.5	1,718,256	-	-
Bosnia and	2	2	11.0	2,070,410	-	-
Brazil	15	14	8.7	3,689,545	-	2.37
British Virgin	43	40	9.3	3,425,928	1.45	0.58
Bulgaria	29	27	9.8	1,099,603	0.07	0.18
Cameroon	1	1	7.0	899	-	-
Canada	79	76	7.2	11,580,173	3.33	23.62
Cayman Islands	78	73	9.5	27,967,209	0.58	1.36
Chile	6	5	5.7	27,990	-	-
China	32	27	6.2	5,909,846	2.76	1.12
Colombia	4	4	8.0	10,225,845	-	-
Costa Rica	10	7	7.3	1,921,841	0.08	0.09
Croatia	5	5	10.0	7,300,000	-	-
Cyprus	37	37	8.9	10,838,670	0.13	0.14
Czech Republic	31	31	9.2	3,352,150	27.68	13.36
Denmark	7	7	12.7	2,725,000	-	-
Dominican	2	2	9.5	23,900,000	0.03	0.07
Ecuador	2	2	9.5	-	-	-
Egypt	3	3	6.0	2,877,240	74.67	0.19
Estonia	229	225	10.4	6,495,244	1.34	0.94
Finland	4	4	8.0	391,387	-	-
France European	54	54	8.5	2,571,434	0.72	1.13
French Polynesia	1	1	6.0	-	-	-
Georgia	14	14	11.5	3,851,837	0.03	1.97
Germany	98	96	8.6	3,175,898	1.61	0.97
Ghana	1	1	6.0	45,467	-	-
Gibraltar	47	44	11.9	18,888,280	0.41	0.43
Greece	5	4	7.4	80,000	-	0.03
Guinea-Bissau	1	1	4.0	15,259,776	-	0.02
Hong Kong	123	118	9.4	5,503,184	3.31	3.48
Hungary	4	4	10.3	-	-	0.19
India	55	52	6.2	7,749,234	1.56	1.27
Indonesia	43	40	6.5	3,066,006	0.64	0.45
Ireland	21	21	10.6	1,129,626	-	0.00
Isle of Man	10	8	6.7	11,117,365	-	0.02
Israel	24	23	8.0	3,307,842	0.87	0.63
Italy	24	22	7.5	1,012,433	0.28	0.50
Japan	29	29	6.5	8,004,418	1.61	2.85
Jersey	2	2	6.5	1,000,000	-	-
Kazakhstan	7	7	8.2	10,335,827	-	-
Kenya	7	4	10.2	250,000	0.18	0.00

**Appendix 2 (Cont.)**

ICOs' distribution by country

Country	No of ICOs	No of ICOs w/ WhitePaper	Average Team Size	Average Amount Raised	Average ROI - 30 days	Average ROI - 90 days
Kosovo	1	1	12.0	-	-	-
Kuwait	1	1	4.0	-	-	-
Latvia	21	20	7.1	2,523,239	0.72	1.73
Liechtenstein	11	11	14.5	12,176,557	-	-
Lithuania	17	16	9.5	6,433,096	-	-
Luxembourg	10	9	11.1	7,568,400	0.59	0.37
Macedonia	3	3	5.3	480,000	-	-
Malaysia	18	17	7.5	31,954,955	-	0.01
Malta	68	63	11.2	5,658,884	0.66	1.60
Marshall	5	5	13.4	849,714	180.75	59.36
Mexico	12	10	8.4	13,180,000	0.48	0.11
Moldova	1	1	3.0	-	0.21	0.03
Netherlands	70	66	8.7	3,570,655	0.66	0.37
New Zealand	7	7	8.3	3,181,421	-	-
Nigeria	40	39	6.6	3,278,651	4.31	1.71
Norway	10	10	10.7	2,486,502	0.00	0.00
Not Disclosed	814	694	6.1	5,037,218	2.96	2.59
Pakistan	2	2	8.0	4,004,434	-	-
Panama	14	13	8.4	12,902,051	0.01	0.06
Perú	4	4	7.8	347,054	-	-
Philippines	23	23	8.1	4,946,500	-	-
Poland	34	34	8.1	13,895,581	0.01	0.01
Portugal	7	7	6.1	2,199,696	-	0.01
Puerto Rico	1	1	6.0	-	-	-
Republic of	1	1	3.0	-	-	-
Romania	16	15	9.3	2,921,787	-	-
Russia	216	205	8.4	3,536,384	2.13	1.18
Saint Kitts and	10	9	10.2	5,940,800	0.53	0.99
Serbia	8	8	6.7	1,922,266	1.05	0.62
Seychelles	34	32	8.1	4,504,980	0.82	0.19
Singapore	339	328	9.3	8,871,167	1.12	1.71
Slovakia	15	15	12.6	7,482,293	-	0.41
Slovenia	18	18	7.8	4,579,068	1.38	4.90
South Africa	34	30	7.8	3,733,433	-	-
South Korea	26	24	12.4	6,287,772	2.15	1.17
Spain	35	32	8.5	1,964,124	11.70	6.47
Swaziland	1	1	8.0	46,484,153	2.44	0.34
Sweden	8	8	5.3	6,642,535	0.17	1.50
Switzerland	178	169	9.3	12,100,856	14.81	10.04
Taiwan	16	15	9.0	2,630,460	1.03	69.33
Tanzania	2	2	9.5	5,512,291	-	-
Thailand	22	21	7.6	8,880,779	1.49	0.73
Tunisia	2	2	5.0	110,000	-	-
Turkey	21	18	6.8	2,064,108	0.03	0.31
Turks and	2	2	7.0	-	-	-
Ukraine	37	36	7.9	4,152,668	2.33	0.15
United Arab	54	52	8.4	10,631,840	0.64	0.84
United	387	357	8.5	7,480,489	1.16	1.49
Uruguay	1	1	-	-	-	-
USA	471	442	7.6	8,399,094	4.61	3.19
Uzbekistan	1	1	21.0	700,000	-	-
Venezuela	4	4	4.3	-	-	-
Vietnam	7	7	6.5	3,121,174	-	1.75
Zambia	1	1	5.0	-	-	-
<b>Total</b>	<b>4521</b>	<b>4219</b>	<b>8.3</b>	<b>7,147,060</b>	<b>3.77</b>	<b>3.20</b>



### Appendix 4 (Cont.)

ICOs' distribution by year

Country	Distribution of ICOs by year									
	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
n/a	0%	0%	14%	29%	7%	9%	19%	18%	4%	100%
Netherlands	0%	0%	10%	60%	20%	9%	0%	1%	0%	100%
New Zealand	0%	0%	0%	43%	29%	14%	0%	14%	0%	100%
Nigeria	0%	0%	0%	33%	38%	15%	15%	0%	0%	100%
Norway	0%	0%	0%	100%	0%	0%	0%	0%	0%	100%
Pakistan	0%	0%	0%	50%	0%	50%	0%	0%	0%	100%
Panama	0%	0%	7%	64%	14%	7%	7%	0%	0%	100%
Perú	0%	0%	0%	50%	50%	0%	0%	0%	0%	100%
Philippines	0%	0%	4%	48%	35%	4%	9%	0%	0%	100%
Poland	0%	0%	15%	65%	6%	9%	6%	0%	0%	100%
Portugal	0%	0%	0%	43%	29%	0%	0%	29%	0%	100%
Puerto Rico	0%	0%	0%	100%	0%	0%	0%	0%	0%	100%
Republic of Guinea	0%	0%	0%	0%	0%	0%	100%	0%	0%	100%
Romania	0%	0%	13%	69%	13%	0%	6%	0%	0%	100%
Russia	0%	0%	37%	54%	7%	2%	0%	0%	0%	100%
Saint Kitts and Nevis	0%	0%	10%	70%	20%	0%	0%	0%	0%	100%
Serbia	0%	0%	13%	38%	25%	25%	0%	0%	0%	100%
Seychelles	0%	0%	9%	68%	18%	3%	0%	3%	0%	100%
Singapore	0%	0%	6%	71%	19%	3%	1%	0%	0%	100%
Slovakia	0%	0%	13%	80%	7%	0%	0%	0%	0%	100%
Slovenia	0%	0%	44%	50%	6%	0%	0%	0%	0%	100%
South Africa	0%	0%	15%	71%	12%	3%	0%	0%	0%	100%
South Korea	0%	0%	23%	54%	12%	4%	4%	4%	0%	100%
Spain	0%	0%	6%	60%	14%	3%	6%	6%	6%	100%
Swaziland	0%	0%	0%	100%	0%	0%	0%	0%	0%	100%
Sweden	0%	0%	0%	63%	25%	0%	13%	0%	0%	100%
Switzerland	0%	1%	7%	66%	16%	5%	3%	2%	1%	100%
Taiwan	0%	0%	6%	81%	13%	0%	0%	0%	0%	100%
Tanzania	0%	0%	0%	50%	50%	0%	0%	0%	0%	100%
Thailand	0%	0%	14%	73%	0%	9%	5%	0%	0%	100%
Tunisia	0%	0%	0%	0%	50%	0%	50%	0%	0%	100%
Turkey	0%	0%	0%	43%	38%	5%	5%	5%	5%	100%
Turks and Caicos Islands	0%	0%	0%	100%	0%	0%	0%	0%	0%	100%
Ukraine	0%	0%	14%	57%	8%	11%	8%	3%	0%	100%
United Arab Emirates	0%	0%	9%	57%	19%	6%	2%	6%	2%	100%
United Kingdom	0%	0%	9%	57%	21%	6%	4%	1%	1%	100%
Uruguay	0%	0%	0%	0%	0%	100%	0%	0%	0%	100%
USA	0%	0%	17%	60%	15%	3%	4%	1%	0%	100%
Uzbekistan	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%
Venezuela	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%
Vietnam	0%	0%	14%	57%	14%	0%	0%	14%	0%	100%
Zambia	0%	0%	0%	100%	0%	0%	0%	0%	0%	100%
Total	0%	0%	12%	55%	16%	5%	6%	4%	1%	100%