

Crypto Governance: Analysing and Comparing Crypto Assets Trading Platforms

Sabino Correa

London Business School, London, UK

Correspondence: scorrea.sln2019@london.edu

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Abstract

The annualised volume of Crypto Exchange markets reaches the trillion dollars threshold. Due to the dispersed and decentralised nature of this market, in which each Crypto Asset trading platform works as an independent dark pool, official statistics is unavailable and there is little private research data. The objective of this paper is to present a brief overview of the global Crypto Exchange market, providing an inventory of the available Crypto Exchanges as of the end of 2018, and compare the most relevant in both quantitative and qualitative terms. From a sample representing 99% of a daily global market share, measured by trading volume, a Key Performance Indicator system is proposed and tested to evaluate the level of corporate governance (or 'crypto governance') observed at each Crypto Exchange. The outputs are compared with average fees and individual market shares. The results obtained from market data provide evidence that most of the volume is traded at Crypto Exchanges with lower governance scores, while those ranked with higher governance scores charge, on average, higher trading fees.

Keywords: *Crypto Exchanges, Crypto Governance, Crypto Currencies, Blockchain, Crypto Finance, Crypto Assets*

JEL Classifications: *D04, F02, F03, F04, F06, G01, G02, G03, O03, P02, P04*

1. Introduction

The market structure of Crypto Assets operates through, mostly unregulated, private trading platforms. These enterprises are predominantly run by tech entrepreneurs, although there are also some Venture Capital and Private Equity initiatives in the sector. Despite the controversy regarding the use of the term 'Exchange' [1], this terminology is widely used by participants in this market. Therefore, the term 'Crypto Exchange' will be adopted by this paper to refer to any kind of business, whether locally regulated or unregulated, that trades, or promotes the trading of, Crypto Assets. Currently, a comprehensive regulation framework for Crypto Exchanges does not exist, which means that only a small fraction of participants in the market are able to present accurate information about being licensed by local financial authorities.

1.1. Sources of information

Normally, consolidated reports from local authorities provide an updated list of active institutions or market statistics, for instance this information on banks and brokers is available through each country's central bank and the local securities' commission database, respectively. Due to the decentralised nature of the Crypto Exchange

market, there are no comparable information services. Nor is there an international institution similar to the Bank of International Settlements (BIS), which compiles data from countries worldwide into periodic reports or online services, opening a window on traditional worldwide banking activity. Thus, the assessment of global crypto market data requires an independent research on its own, a task which falls within the scope and aims of this paper. Therefore, information must be compiled from independent sources and overlaps purged, yet this exercise does present challenges. The deficiency of standardised information in this sector is reflected in the many different providers of information who use similar denominations but produce diverse results.

At the end of 2018, the website bitcoin.org, which is the closest available equivalent of an official source of information, listed 72 exchanges, by contrast, bitcoinwiki.org listed 219, Wikipedia listed 49 and List.Wiki listed 136. Major private resources also display inconsistent findings, for example, at the end of 2018, Howtobuybitcoin.info listed 110 exchanges, the CryptoCompare platform listed 185 exchanges and CoinMarketCap listed 229. These numbers are summarised in Table 1, and, after purging overlaps, the total number of Crypto Exchanges amounts to 473 worldwide.

Table 1. Summary of Global Crypto Exchanges Information Sources

Source	Nr.	URL:
Bitcoin.org	72	https://bitcoin.org/en/exchanges
Bitcoin.org wiki	219	https://en.bitcoinwiki.org/wiki/Cryptocurrency_exchanges_list
Wikipedia	49	https://en.wikipedia.org/wiki/List_of_bitcoin_companies
list.wiki	136	https://list.wiki/Cryptocurrency_Exchanges
How to Buy Bitcoin	110	https://howtobuybitcoins.info/#!/
CryptoCompare	185	https://www.cryptocompare.com/
Coinmarketcap.com	229	https://coinmarketcap.com/rankings/exchanges/
Net Number	473	(Total after purging overlaps)

As the market matures over the following years, consolidation of the vast number of exchanges is expected. Signals for this trend are already evident. Amongst the gross data set there were 81 extinct Crypto Exchanges and 8 that have undergone M&A processes.

A proper comparison of the substantial number of members would require some prior level of categorisation, which is a proposal examined in Section 1.2.

1.2. Categories of Exchanges

Although a taxonomic definition is beyond the scope of this paper, some conceptual aspects regarding the different structures of Crypto Exchanges should be highlighted. A formal definition would be difficult to achieve in an innovative and constantly mutating environment, but there is latitude to recognise the main concepts and qualities within the market. Therefore, four main types of Crypto Exchanges are proposed:

- **Regular Crypto Exchanges:** These exchanges resemble the traditional stocks of FX brokers, receiving Fiat currencies (money), or the tradable asset itself (Crypto Assets), allowing individuals to trade and withdraw as Fiat or Crypto afterward. The first kind of transaction is usually known as ‘*Crypto to Fiat*’, and the second as ‘*Crypto to Crypto*’. Those exchanges work as a traditional business, having a controller, administrator, registry, physical office and jurisdiction.

Examples of this type of regular Crypto Exchanges include OKEx, Binance, Coinbase and Bitstamp.

- **Decentralised Crypto Exchanges:** These are exchanges in which the transactions are not performed at a single place – just like the very concept of blockchain, the transactions are distributed along the internet. In contrast to regular Crypto Exchanges,

decentralised Crypto Exchanges can work without a traditional business framework because it is possible to implement them with neither formal registry, physical office nor jurisdiction.

Examples of this type of decentralised Crypto Exchanges include IDEX, Alcoin.io and Bisq.

- **Peer-to-Peer (P2P) Crypto Exchanges:** These are platforms that provide the information and means for two parties (the seller and the buyer) to transact directly with each other. A parallel can be drawn with the role that eBay plays between individuals trading goods.

Examples of this type of P2P Crypto Exchanges include Localbitcoins.com and Paxful.

- **Conversion Platforms:** These are available as apps that provide a similar service to that offered by regular ‘Crypto to Crypto’ Exchanges and perform the same task, while converting one digital asset into another. In spite of that, they are not formally actual regular Crypto Exchanges as they use much straightforward processes, without the requirement of opening an account prior to engaging into the first transaction. Some of those conversion platforms allow customers to use their services directly from and into their digital wallets.

Examples of conversion platforms include Shapeshift and ConsSwitch.io.

The scope of this work is limited to the assessment of regular Crypto Exchanges, as defined here. The portal coinmarketcap.com acts as the source of information for trading volumes and market share. The information used was downloaded January 1, 2019, and represents worldwide transactions recorded during the preceding 24-hour trading. All the quantitative analysis in this work only uses data for spot transactions. It avoids markets with no fees or transaction mining because they are more susceptible to irregular price support and price manipulation practices using US dollar proxies (e.g. USDT) [2].

The assessment of data for each Crypto Exchange cites the source of information as the one available on the website of each Crypto Exchange. Collateral or indirect sources of information (e.g. Wikipedia, Press or independent reviews) are not considered.

2. Academic Overview of Crypto Markets

Academic interest in cryptocurrency governance has increased. Studies range from the market structure [4], to financial networks [5] and legal aspects [6] or risks [7]. Yet, there is a scarcity of research regarding the assessment of Crypto Exchange governance. Academic evidence suggests that a significant portion of users approach digital

currencies because they want to participate in an alternative investment vehicle [3]. As pointed out by Böhme et al., Crypto Exchange trading activities work much like traditional financial markets [8].

Nevertheless, most of the crypto adopters do not seem to exercise the same level of caution found in other types of commercial dealing.

Many of the top ranked exchanges (by trading volume activity) do not fulfil the most basic governance requirements for safeguarding the interests of consumers and investors, such as the identification of company name, address or the country where it is based. This paper proposes and tests the use of a crypto governance KPI to measure and compare each Crypto Exchange governance levels. The proposed scoring system addresses some key points to provide better security for users.

The adopted criterion for selecting the exchanges that will compose the study sample was to pick top-down Crypto Exchanges, representing 99% of the total market share, measured by a daily, 24-hour global trading volume, obtained from coinmarketcap.com portal, comprising data from 00:00 to 23:59 on 31 December 2018. The 99% threshold is adopted *ad hoc*.

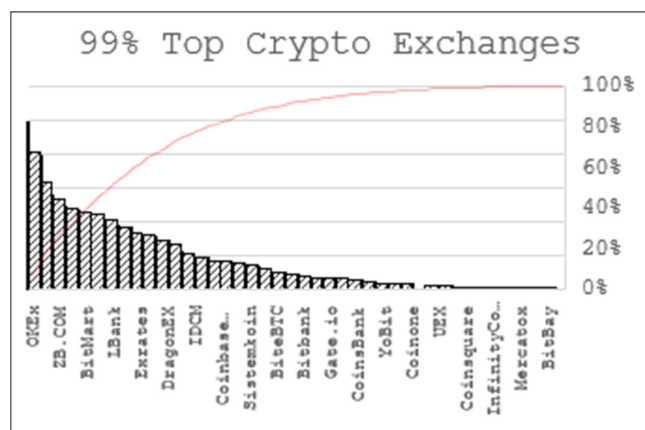


Chart 1: 99% Representative Sample Selection

The outcome of this assortment results in 78 Crypto Exchanges, which are each measured according to the crypto governance Key Performance Indicators (KPI) described in Section 3. In addition to the governance assessment, the levels of fees for a ‘taker’ trading transaction for each of the evaluated Crypto Exchanges are also measured and compared. For Crypto Exchanges that have different fees depending on the transaction value, the adopted criterion considers a standard transaction of US\$ 10,000.00.

The governance score results are framed according to the market share of each exchange and market fees, providing

some evidence on the Crypto Assets consumer’s or investor’s preferences.

3. Comparing Crypto Exchanges

In this section the proposed governance KPI criteria are described in subsection 3.1 and individual results are presented in subsection 3.2. The trading fees for each of the Crypto Exchanges are also evaluated and compared in subsection 3.3, and the cross results are displayed and analysed in subsection 3.4.

3.1. Crypto Exchanges Governance KPI

The proposed crypto governance qualitative measurement criteria are based on seven basic key questions regarding aspects of the following areas: legal compliance, years of activity in the market, jurisdiction clarity and authority regulation, as summarised in Table 2.

The KPI questions, their type and the logic of required answer are described below.

- i. Does the Crypto Exchange provide clear information about the company’s name and registry identification?
Type of Variable: Boolean (True/Yes=1 or False/No=0);
- ii. Does the Crypto Exchange provide clear information about its key personnel and management team identification?
Type of Variable: Boolean (True/Yes=1 or False/No=0);
- iii. Does the Crypto Exchange provide clear information about its controllers and investors’ identification?
Type of Variable: Boolean (True/Yes=1 or False/No=0);
- iv. Does the Crypto Exchange provide clear information about its number of years of activity in the market?
Type of Variable: Scale/Range (“No” and Less or equal to 1 year = 0; from 1 year up to less than 2 Years = 1; from 2 years up to less than 3 years = 2; more than 3 years = 3);
- v. Does the Crypto Exchange provide clear information about its jurisdiction of incorporation?
Type of Variable: Boolean (True/Yes=1 or False/No=0);
- vi. Does the Crypto Exchange present obscurity on its jurisdiction of control?
Type of Variable: Boolean (True/Yes=0 or False/No=1);
- vii. Is the Crypto Exchange authority regulated?
Type of Variable: Boolean (True/Yes=3 or False/No=0);

The KPI questions and scores are summarised in Table 2.

Table 2. KPI Score Summary

Crypto Exchanges Governance Proposed Key Performance Indicators (KPI)		
Topic	Minimum Points	Maximum Points
Legal Compliance		
Company name and Registry Identification	0	1
Key personnel and Management identification	0	1
Controllers and investors identification	0	1
Years of Activity		
Number of Years	0	3
Jurisdiction of Incorporation		
Clear Jurisdiction of Incorporation	0	1
Clarity about Controller Jurisdiction	0	1
Authority Regulation		
Clearly presents as Authority regulated	0	3
Number of Points	0	11

A more straightforward measure can be obtained using a simplified Overall Level attribution by ranges:

Table 3. Overall Governance Level

Score Range	0 to 3	4 to 6	7 and above
Overall Governance Level	Poor	Fair	Good

3.2. Comparing Crypto Exchanges Governance Scoring Results

Chart 2 summarises the distribution of results for the KPI governance evaluation for the top 78 Crypto Exchanges measured. The data provide evidence that, using the proposed criteria, most of the Crypto Exchanges currently present low governance scores.

It is remarkable that most of the KPI topics are seamlessly achieved, and (except from the 'Authority Regulated' question) they could easily be accomplished by many ordinary non-crypto businesses. Conversely, Crypto Exchanges that handle enormous volumes of monetary transactions do not offer the minimum acceptable levels of governance; some of them do not even inform properly the jurisdiction where they are located.

As shown in Chart 3, from the overall level perspective, more than two-thirds of the exchanges are in the 'Poor' level of governance range, 22% are within the 'Fair' level range, while only 10% can be classified as 'Good'.

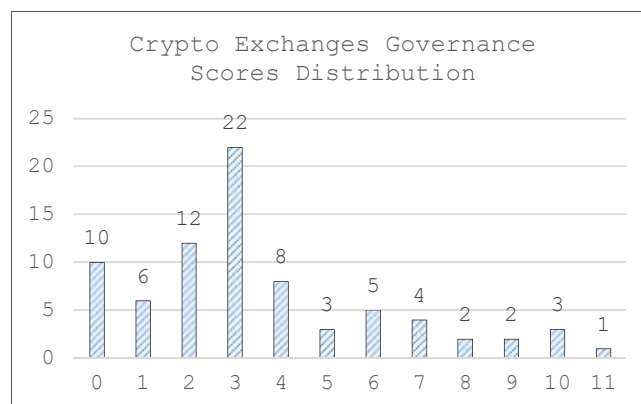


Chart 2: KPI Governance Scores Distribution

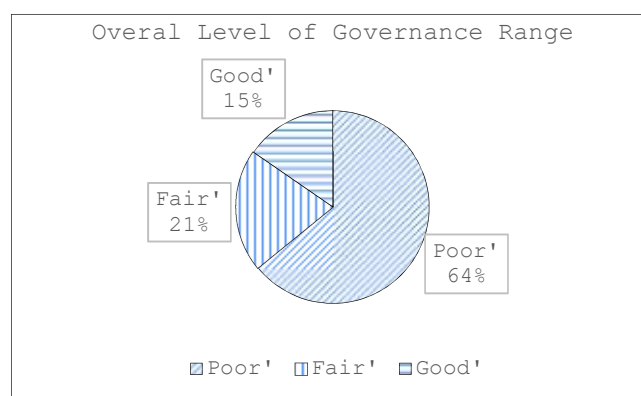


Chart 3: KPI Governance Scores Distribution

3.3. Comparing Trading Fees

To ensure a fair comparison, data regarding the trading fee at each Crypto Exchange was obtained using the same type of transaction. The adopted standard computes the fee for a 'Taker' order, which is a type of fee that can be found in all 78 components of the sample and maintains the same meaning across all the different researched exchanges. The minimum fee found for a 'Taker' order was 0.00% (which might raise questions regarding the bid/ask booking transparency, as none of the analysed exchanges present themselves as a non-profit organisation). The maximum fee currently being charged among the sampled exchanges is 1.00%. For 11 Crypto Exchanges it was not possible to find clear information about the fees, and the overall simple average fee for the group is 0.19%. The distribution of results is presented in Chart 4.

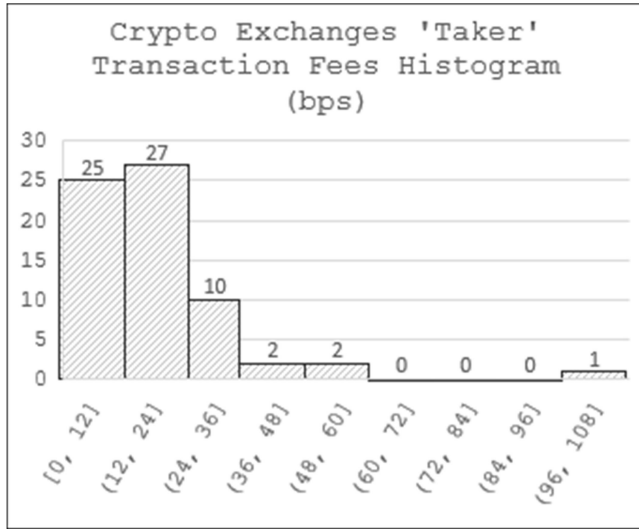


Chart 4: Frequency of Fees Histogram

3.4. Cross Results

3.4.1. Comparing Fees and Governance Scores

The cross results between Crypto Exchange governance scores, market share and fees offer a better comparison of the macro aspects of the Crypto Assets Exchanges' market. The breakdown of the simple average of the trading market fees found in this research, as illustrated in Chart 5, provides evidence that the Crypto Exchanges practicing higher levels of governance (according to this paper's criteria) are able to charge higher fees as their customers seem to be willing to pay a 'premium' for more reliable services. The cross results for crypto governance scores and average fees suggest that better governance in Crypto Exchange markets can be converted into more added value to the business. A more detailed overview on the distribution of fees per each Crypto Exchange governance score is portrayed in Chart 6. All fees are presented here in basis points (10^{-4}).

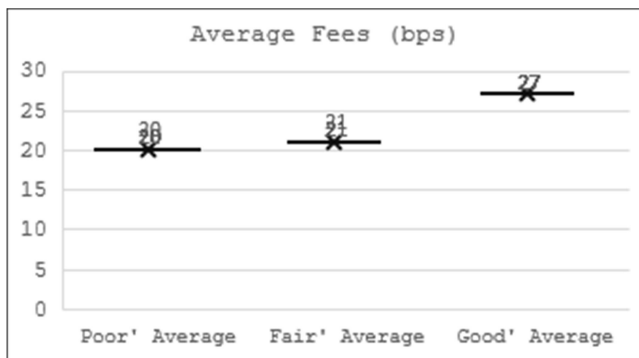


Chart 5: Average Fees by Governance Range

The individual fees chart below gives a better vision of the distribution with more accuracy about the behaviour of outliers.

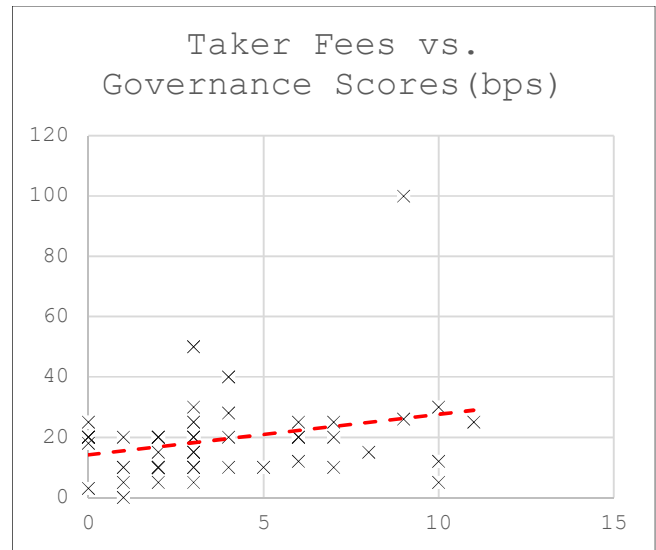


Chart 6: Fees (bps) per Exchange per Governance Score

Both average, aggregate results and individual data indicate that the well-governed Crypto Exchanges are able to charge higher fees on average. To better illustrate this point, Chart 6 highlights a linear tendency line (dashed).

3.4.2. Comparing Market Share and Governance Scores

The cross results between Crypto Exchanges' governance scores and Crypto Exchanges' market shares indicate that the major share of the global Crypto Assets Exchanges' market is currently being traded by entities with lower levels of governance (measured with this paper's criteria).

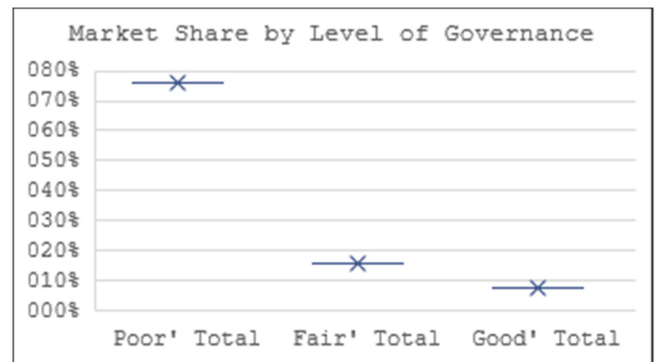


Chart 7: Market Share by Level of Governance

When individual results are observed, as shown in Chart 8, the linear tendency turns into a negative sloped line, indicating a diminished average market share for the highest governance levels (according to this paper's proposed measurement criteria).

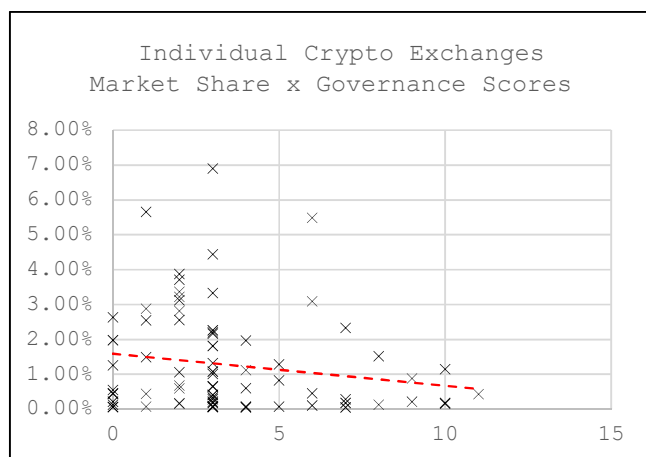


Chart 8: Individual Exchange's Market Share by Score

4. Conclusion

4.1. Summary

The research in this paper identified, from various sources of information, a large number of Crypto Exchanges (517), and from this number, a sample of 78 Crypto Exchanges was categorised and extracted that represents a 99% market share of the global Crypto Assets market, measured by the last 24-hour trading volume for the end of December 2018.

The proposed qualitative criteria applied KPI methodology to measure and compare the governance level of each sample component. The KPI provided an objective governance scale that allowed cross comparison of results with the market share and fees in individual and aggregate terms.

The cross results provided evidence that the majority of today's market share is traded at exchanges with lower levels of governance scores, according to this paper's proposed criteria. Additionally, the results also suggest that the Crypto Exchanges with better governance scores are able to charge higher fees from their customers for better quality services.

4.2. Limitations

Research that utilises a longer time series for the market share data would produce more reliable data. Yet, due to the scope limits of this work, the only plausible data available was for a short 24-hour period offered by coinmarketcap.com portal. Although the reasonably large size of the sample ($n = 78$) does offer some stability to the set, a more profound study over the matter would certainly demand a wider time series in order to improve the consistency of the results.

The absence of auditing by third parties over the trading volumes remains an important caveat for the Crypto Exchanges, especially for those categorised here as "Regular" Crypto Exchanges, although many exchanges have already adopted third-party audits for its reserves. The challenges

associated to traded volume auditing are highlighted by the Canadian Public Accountability Board [10] which reported: "When crypto-assets are commingled, a crypto-exchange reflects transactions between buyers and sellers of the same crypto-asset in its records but not on the applicable blockchain ledger (i.e., off-chain transactions). This makes it impracticable for auditors to verify the occurrence of an entity's crypto-asset transactions by referring to the applicable blockchain record." Those practical limitations for independent auditing over reported volumes by Crypto Exchanges might explain why questioning over the actual traded volume is still in place [11].

4.3. Next Steps

Finally, I would like to suggest a possible direction for further studies advancing Crypto Exchanges' governance research:

Advancing on KPI evaluation criteria, the proposed KPI criteria presented in this paper encompasses the most basic levels of governance and compliance. A deeper assessment, including auditing, KYC, AML, data security, trading volumes transparency and other key factors should be added for a better qualitative evaluation of the market components of Crypto Exchange. Additionally, a geographical breakdown that verifies preferences by countries, or global regions, would also contribute to a better understanding of the preferences of crypto investors.

Competing Interests:

None declared.

Ethical approval:

Not applicable.

Author's contribution:

SC designed and coordinated this research and prepared the manuscript in entirety.

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