

CRYPTO DISPUTE RESOLUTION: AN EMPIRICAL STUDY

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Abstract

Cryptocurrencies, such as Bitcoin and Dogecoin, are taking the financial world by storm. Like all financial instruments, these cryptocurrencies and the crypto exchanges they are traded on give rise to complex legal issues. This article concerns an understudied yet crucial aspect of crypto trading, namely crypto disputes and their resolution. The sheer number and growing popularity of cryptocurrencies means that disputes arising from their trading are likely to increase, yet it remains unclear how they are being, or will be, resolved. Novel issues surrounding the identity of traders, the jurisdictional limits of domestic courts, the applicable governing law(s), and complex technical evidence may mean that traditional non-binding mechanisms—such as negotiation and mediation, as well as binding legal mechanisms—such as litigation and arbitration, may be ill-equipped in the crypto context. At the same time, tailored crypto-specific dispute resolution mechanisms are only at nascent stages of development. In this article, we take a first empirical look at the mechanisms by which cryptocurrencies and crypto exchanges choose to resolve disputes with their users. We situate our results in the larger commercial dispute resolution literature and provide a preliminary account of how and why cryptocurrencies and exchanges are making these dispute resolution choices. We find that crypto platforms predominantly resort to domestic litigation and international arbitration to resolve future disputes. Moreover, we find that the ability to prohibit class proceedings seems to be the strongest explanatory factor in crypto platforms' choice of international arbitration. In contrast, providing for the venue seems to be most strongly linked with choosing domestic litigation.

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INTRODUCTION

Bitcoin and Dogecoin have been in the news lately for a variety of reasons.² But these are not the only cryptocurrencies out there.³ Indeed, there are thousands of cryptocurrencies, which are traded on hundreds of exchanges.⁴ Like all financial instruments, these cryptocurrencies and the exchanges they are traded on give rise to complex legal issues, and with the increasing volumes of crypto trading, crypto disputes are also increasingly likely to arise.⁵ Yet these

2. See, e.g., Billy Bambrough, 'Release The Doge!'—Elon Musk Gives The Dogecoin Price A Sudden Boost As Bitcoin And Ethereum Lead The Crypto Market Lower, (July 1, 2021, 5:10 AM), <https://forbes.com/sites/billbambrough/2021/07/01/release-the-doge-elon-musk-gives-the-dogecoin-price-a-sudden-boost-as-bitcoin-and-ethereum-lead-the-crypto-market-lower-?sh=6a89612b1907> (demonstrating that these two currencies were featured recently in the news in relation to their ongoing relationship with Elon Musk).

3. See COINMARKETCAP, <https://coinmarketcap.com/all/views/all/> (last visited Aug. 22, 2021) (listing different types of cryptocurrencies).

4. *Id.*

5. See, e.g., Aweek Chakravarty, *Challenges to the Assessment of Damages Claims Involving Crypto-Assets in Investment Arbitration*, 20(2) GLOBAL JURIST (2020) (discussing the particular challenges involved in valuing various types of crypto assets as investments under treaty-based investment arbitration); Shaan Cohny & David A. Hoffman, *Transactional Scripts in Contract Stacks*, 105 MINN. L. REV. 319 (2020) (discussing whether contract law is able to resolve disputes concerning intractable bugs discovered in transactional codes in smart contracts used on blockchains).

disputes present unique challenges that traditional dispute resolution mechanisms such as litigation, arbitration, and mediation may not be equipped to overcome.⁶ The anonymity of traders, the jurisdictional limits of domestic courts, the applicable governing law(s), and especially complex technical evidence all complicate the effective resolution of disputes arising from trading of cryptocurrencies.⁷

This article is the first to empirically examine how cryptocurrencies and exchanges approach the resolution of these complex disputes with their traders and to suggest possible rationales for their dispute resolution choices. Methodologically, the article analyzes the publicly available Terms & Conditions for various cryptocurrencies and exchanges and the dispute resolution mechanisms specified in these Terms & Conditions. Some of our findings are in line with trends identified in the general commercial dispute resolution literature, while others appear to be more specific to the crypto context and point to the interests that may motivate the design of dispute resolution clauses by cryptocurrencies and exchanges.⁸

Why is the crypto trading context worthy of its own dispute resolution analysis? To answer this question, one must understand the revolutionary nature of cryptocurrencies and the unique legal issues they present. The idea of electronic currencies has been around for as long as computers have been involved in the payment systems.⁹ While banks and large businesses developed electronic payment systems early on, the idea of a standalone currency took a while to develop.¹⁰ The basic impediment was the development of a method for verifying payments and balances, also known as the “double-spending problem,” something that Bitcoin solved using computationally complex algorithms.¹¹

To understand this basic issue, consider the following example: Amisk wishes to pay Bashaw \$100 from Amisk’s bank account. Amisk has \$500, so paying Bashaw should not be a problem. If Amisk were to write a check or wire the money to Bashaw, the check or wire would say something like “please pay Bashaw \$100 from my account.” Bashaw could take the check or the wire, metaphorically speaking, to Bashaw’s bank and deposit it there. Bashaw’s bank would now have to call Amisk’s bank to see first if Amisk has \$100 and then ask that Amisk’s bank send the \$100. Alternatively, a central settlement agency, such as the Federal Reserve, can also act as the settlement intermediary whereby Bashaw’s bank presents its check to Amisk’s bank, and Amisk’s bank ensures that Amisk settles the score with Bashaw on a centralized ledger that keeps track

6. See, e.g., Chakravarty, *supra* note 4 (discussing treaty-based investment arbitration challenges).

7. See, e.g., Cohny & Hoffman, *supra* note 4 (discussing intractable bugs in smart contracts).

8. See Darcy W.E. Allen et al., *The Governance of Blockchain Dispute Resolution*, 25 HARV. NEGOT. L. REV. 75 (2019) (setting out a “Dispute Resolution Possibility Frontier” according to social efficiency and discussing binding and non-binding mechanisms in the resolution of disputes arising from smart contracts).

9. See, e.g., DAVID L. STEARNS, ELECTRONIC VALUE EXCHANGE: ORIGINS OF THE VISA ELECTRONIC PAYMENT SYSTEM (2011) (examining the VISA systems transformation from localized, paper-based bank credit card programs into a cooperative, global, electronic value exchange network).

10. *Id.*

11. See, e.g., Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, DECENTRALIZED BUS. REV. (Oct. 31, 2008), <https://www.debr.io/article/21260>.

of all these transactions. Indeed, millions of such settlements take place daily by the various branches of the Federal Reserve.¹² The other option, of course, is to dispense with a clearinghouse altogether. Instead of having a third party verify balances and transactions between the various payors and payees, a decentralized system that allowed all actors on the platform to verify payments and keep track of the balances could also work.¹³

It was in this regard that Satoshi Nakamoto's foundational paper outlining the basic structure of Bitcoin,¹⁴ a cashless and bankless monetary system, was revolutionary. Spurred by the 2008 financial collapse and the constant policy failures of the Federal Reserve, Nakamoto sought to find an alternate monetary system that would allow end-users to bypass a volatile and vulnerable payment system.¹⁵ His proposed system did not need a trustworthy third party to verify transactions but rather all users could engage in verification.¹⁶ This, in turn, dispensed with a centralized clearinghouse through the operation of a completely decentralized platform.¹⁷ The system is a true peer-to-peer system where no central authority is needed to verify what each peer has in terms of balances.¹⁸

The Bitcoin network that Nakamoto proposed uses what is known as "blockchain" technology to keep the system running.¹⁹ It allows one to buy bitcoin, and other cryptocurrencies, on various exchanges either using cash, wire transfer, or even a credit card.²⁰ While initially slow to take off, Bitcoin today is a payment system with a total market value of over \$813 trillion.²¹ Although the value of bitcoin in dollars has fluctuated quite dramatically in recent years,²² the success of Bitcoin as a virtual coin system has led to speculations that bitcoins could replace the dollar as the main currency in our economy,²³ and to

12. See FEDERAL RESERVE, <https://www.federalreserve.gov/aboutthefed.htm>. (last visited Aug. 22, 2021) (providing a general overview of the functionality of the Federal Reserve).

13. Nakamoto, *supra* note 11, at 2.

14. *Id.* We refer to the general monetary system as "Bitcoin," and the specific cryptocurrency as "bitcoin." See also PAUL VIGNA & MICHAEL J. CASEY, *THE AGE OF CRYPTO CURRENCY: HOW BITCOIN AND DIGITAL MONEY ARE CHALLENGING THE GLOBAL ECONOMIC ORDER*, 41–68 (2015) (discussing the precursors to Bitcoin and the development of cryptocurrencies).

15. See VIGNA & CASEY *supra* note 14 (discussing Sakamoto's early efforts to design the Bitcoin system).

16. Nakamoto, *supra* note 11, at 1.

17. *Id.* at 2; We use the term platform in this article generically, and not in any technical sense. We are aware that platforms can also refer to systems that execute contracts or tokens such as Ethereum. We did not find a consistent usage of the term platform as it has been used to refer to currencies and exchanges alike.

18. Nakamoto, *supra* note 11, at 1.

19. *Id.* at 2–3.

20. See generally DON TAPSCOTT & ALEX TAPSCOTT, *BLOCKCHAIN REVOLUTION: HOW THE TECHNOLOGY BEHIND BITCOIN AND OTHER CRYPTOCURRENCIES IS CHANGING THE WORLD* (2018) (providing an overview of blockchain applications).

21. As of Sept. 27, 2021. *Today's Cryptocurrency Prices by Market Cap*, COINMARKETCAP, <https://coinmarketcap.com> (last visited Sept. 7, 2021).

22. Raynor de Best, *Bitcoin Price from October 2013 to August 22, 2021*, STATISTA <https://www.statista.com/statistics/326707/bitcoin-price-index/> (Last visited Aug. 22, 2021); See also COINMARKETCAP, <https://coinmarketcap.com/> (displaying the price of one bitcoin on August 22, 2021 as \$50,026.54).

23. SAIFEDEAN AMMOUS, *THE BITCOIN STANDARD: THE DECENTRALIZED ALTERNATIVE TO CENTRAL BANKING* 212 (2018) (arguing that bitcoin has the potential to become a global sound money replacing traditional government issued money, which the author considers unsound).

the emergence of thousands of other cryptocurrencies.²⁴ At present, much of Bitcoin's utility seems to be, notwithstanding its price fluctuations, as a store of value more so than a medium of exchange or a payment system.²⁵ That being said, the recent announcement by the government of El Salvador that Bitcoin is now considered a legal tender may accelerate its usage for payments.²⁶ Indeed, some courts in the United States have found Bitcoin to be money, at least for the purposes of finding federal subject matter jurisdiction under various money laundering and securities legislation.²⁷

While Bitcoin can be viewed “as an institution that creates and enforces property rights,”²⁸ it also has limitations as a rights-enforcing system which makes for a more challenging dispute resolution environment.²⁹ For instance, Bitcoin and other cryptocurrency trading systems are unable to exercise normative judgment to resolve contractual ambiguities leading to disputes among users.³⁰ With new cryptocurrencies constantly emerging and the volume of trading on crypto exchange steadily rising,³¹ disputes between traders or between traders and trading platforms arising out of contractual ambiguities or otherwise are bound to increase as well. Scholars have identified at least three challenges associated with the resolution of such crypto disputes: the absence of a central financial authority to reverse transfers of money in case of fraud, the

24. See COINMARKETCAP, <https://coinmarketcap.com/all/views/all/> (last visited Aug. 22, 2021) (listing 11,354 cryptocurrencies).

25. See e.g., Dirk G. Bauer & Thomas Dimpfl, *The Volatility of Bitcoin and its Role as a Medium of Exchange and a Store of Value*, EMPIRICAL ECON. (2021) (empirically finding that “Bitcoin cannot function as a medium of exchange and has only limited use as a risk-diversifier,” as well as demonstrating that “Bitcoin displays store of value characteristics over long horizons.”); see also Dirk G. Bauer et al., *Bitcoin: Medium of Exchange or Speculative Assets?*, 54 J. INT’L. FIN. MKTS., INSTS. & MONEY 177 (2018) (analyzing the “transaction data of Bitcoin accounts” to show “that Bitcoins are mainly used as a speculative investment and not as an alternative currency and medium of exchange.”).

26. Nelson Renteria et al., *In a World First, El Salvador Makes Bitcoin Legal Tender*, REUTERS (June 9, 2021, 10:24 PM), <https://www.reuters.com/world/americas/el-salvador-approves-first-law-bitcoin-legal-tender-2021-06-09/>; Roger Huang, *An Economic History of El Salvador’s Adoption of Bitcoin*, FORBES (June 27, 2021, 4:06 PM), <https://www.forbes.com/sites/rogerhuang/2021/06/27/an-economic-history-of-el-salvadors-adoption-of-bitcoin/?sh=4caea9d793fd>.

27. See, e.g., *United States v. Harmon*, 474 F. Supp. 3d 76 (D.D.C. 2020) (holding that the term “money” encompasses bitcoin under the Money Transmitters Act); *SEC v Shavers*, No. 4:13-CV-416, 2013 WL 4028182 (E.D. Tex. Aug. 6, 2013) (holding that bitcoins are securities as defined by Federal Securities Law); see also, Matt Clinch, *Bitcoin Recognized by Germany as ‘Private Money’*, CNBC (Aug. 19, 2013, 10:25 AM), <https://www.cnbc.com/id/100971898>.

28. Michael Abramowicz, *Cryptocurrency-Based Law*, 58 ARIZ. L. REV. 359, 361 (2016).

29. *Id.* at 362.

30. *Id.* at 361–362. See, e.g., Kevin Werbach, *Trust, but Verify: Why the Blockchain Needs the Law*, 33 BERKELEY TECH. L.J. 487, 550 (2018) (“Too much law could stifle the blockchain or drive it underground, yet so could too little law.”); See also Kelvin F. K. Low & Eliza Mik, *Pause the Blockchain Legal Revolution*, 69 INT’L & COMPAR. L. Q. 135, 175 (2019) (“[A] detailed examination of the technology exposes both its limitations and the many misunderstandings rampant among both legal and technological cryptomaniacs. Properly decrypted, the promised blockchain legal revolution appears to be a damp, and regrettably widely distributed, squib.”).

31. For instance, the cryptocurrency Dogecoin, which was originally created as a joke, had a price per unit at around 1 cent for many years. Then in January 2021, apparently spurred by a tweet by Elon Musk, the price rallied to almost 8 cents, an 800% gain in value. *Dogecoin, the Cryptocurrency That Started as a Joke, Is Spiking*, (May 15, 2021), <https://www.nytimes.com/live/2021/02/08/business/stock-market-today>; See also Yueqi Yang, *Dogecoin Soars to New Record as Musk Fires off New Tweet*, BLOOMBERG (Feb. 7, 2021, 12:30 PM), <https://www.bloomberg.com/news/articles/2021-02-07/dogecoin-soars-again-toward-record-after-crashing-last-week> (showcasing an increase in the volume of trading on crypto-currency exchanges).

lack of access to national courts in some cases due to the anonymity of the parties involved and the associated difficulty with establishing jurisdiction, and the fact that the crypto system is “distinctively trustless,” which makes voluntary compliance less relevant.³²

In this article, we empirically explore how players in the cryptocurrency world go about resolving their disputes. While much has been written on various financial and legal aspects of cryptocurrencies, little research has been dedicated to how disputes arising in this context are resolved. Notwithstanding recent attempts to develop platform-based mechanisms specifically tailored to the crypto context,³³ we focus on platforms’ choice of litigation in domestic courts versus international arbitration as the two main dispute resolution methods employed in this context.³⁴ We constructed a database of approximately 300 cryptocurrencies and exchanges whose Terms & Conditions were publicly available on their websites.³⁵ We collected and coded information on various aspects of the dispute resolution clauses included in these Terms & Conditions. We then analyzed empirically the relative use of each mechanism, as well as its design and operation. Based on these findings, we offer an account of the crypto dispute resolution landscape and make preliminary suggestions as to what might motivate cryptocurrencies and exchanges to choose litigation, arbitration, or—at times—both.

The article is structured as follows: In Part I, we provide a basic explanation of cryptocurrencies, crypto exchanges, and the mechanics of crypto trading.³⁶ In Part II, we discuss some of the theories suggested in the literature on the choice and use of arbitration versus litigation for the resolution of commercial disputes generally. In Part III, we discuss some of the crypto disputes that have arisen, or might arise, from crypto trading and the use of arbitration, litigation, and other crypto-specific mechanisms in this context. In Part IV, we introduce our three-stage empirical study of cryptocurrencies and exchanges, which is comprised of frequency testing, correlations testing, and logistic regression, and explain our

32. Pietro Ortolani, *Self-Enforcing Online Dispute Resolution: Lessons from Bitcoin*, 36 OXFORD J. LEGAL STUD. 595, 607 (2016).

33. In addition to platform-based forums discussed later in this article, *see, e.g.*, Wulf A. Kaal & Craig Calcaterra, *Crypto Transaction Dispute Resolution*, 73(1) BUS. LAW. 109 (2017/2018) (proposing “an open-source platform ecosystem for smart contracting dispute resolution that allows users to opt in to a conflict resolution mechanism that enables more nuanced crypto solutions . . .”).

34. *See* Allen et al., *supra* note 8, at 75 (setting out a “Dispute Resolution Possibility Frontier” according to social efficiency). We also track the use of non-binding mechanisms such as negotiation and mediation, but we find that these are relatively rarely used in this context as the main or sole dispute resolution mechanism.

35. We examined 250 cryptocurrencies and 250 crypto exchanges in total. We were not able to locate the Terms & Conditions for 151 cryptocurrencies and 66 crypto exchanges on their websites. Finding those would have required the installation of their software and presumably then agreeing to the Terms & Conditions, assuming the Terms & Conditions would be available upon installation. Some of the currencies or exchanges had both arbitration and litigation specified as mechanisms for dispute resolution. We counted these observations twice, and this resulted in 304 observations in total. A list of the cryptocurrencies and exchanges included in our database and their website can be found in Appendix IV.

36. This explanation is intended to be non-technical and non-exhaustive. Our goal is simply to provide the unfamiliar reader with a basic understanding of crypto trading as context for our discussion of crypto dispute resolution.

methodology.³⁷ We present and analyze our empirical results in Part V of the article and offer conclusions in Part VI. The statistical results we refer to are set out in detailed tables and numerical outputs in Appendices I–III. A list of the cryptocurrencies and exchanges included in our database and their website can be found in Appendix IV.

I. CRYPTOCURRENCIES AND CRYPTO EXCHANGES: A BRIEF INTRODUCTION

To understand the basics of cryptocurrencies, one needs to understand basic money and banking principles. Cash is the basic building block in thinking about any payment system.³⁸ It has all the characteristics that economists require in any currency.³⁹ It is a medium of exchange, a store of value, and a unit of account.⁴⁰ But first and foremost, it facilitates exchange in the real world and overcomes the classic problem of the absence of double coincidence of wants. Let us return to our two individuals, Amisk and Bashaw. Amisk has apples and wants to buy pears. Bashaw has pears and wants to buy apples. In this situation, Amisk and Bashaw can exchange their apples and pears at an appropriate exchange rate. Now add Caroline to this equation. Caroline has candles and also wants to buy apples. Facilitating an exchange between these three individuals begins to get complicated. Adding a fourth individual and fourth good or service makes keeping track of the relative prices of all the goods and services a difficult task.

Additionally, if Amisk wishes to buy Caroline’s candles, Amisk will have to deliver the apples on the spot in order for Caroline’s candles to also be delivered on the spot. Otherwise, the two of them will have to enter into contracts for future delivery of their goods. This, of course, creates further complexity in their economic microcosm. Simply promising apples to Caroline does not guarantee that Amisk will actually have apples at the promised time of delivery. Indeed, the apples may not be available for any number of reasons. Amisk may have also entered into another contract with Bashaw for delivery of the same apples in exchange for pears. This means that the apples have been double-booked for two different contracts. All of these concerns can be easily solved by creating cash. The cash allows Amisk to pay Caroline for the candles whenever they are available. If Amisk has some remaining cash, Amisk can also pay Bashaw for the pears. The question of double-spending, that is attempting to exchange the same apples in return for different goods, does not become an issue in a pure cash economy.

37. See generally MICHAEL O. FINKELSTEIN & BRUCE LEVIN, *STATISTICS FOR LAWYERS* (Stephen E. Fienberg et al. eds., 3d ed. 2015) (explaining the standard statistical terms commonly used in legal settings).

38. See Will Kenton & Michael J. Boyle, *Cash*, *INVESTOPEDIA* (Jan. 18, 2021), <https://www.investopedia.com/terms/c/cash.asp> (explaining the basic function of money within a payment system).

39. See *Functions of Money – The Economic Lowdown Podcast Series*, FEDERAL RESERVE BANK OF ST. LOUIS, <https://www.stlouisfed.org/education/economic-lowdown-podcast-series/episode-9-functions-of-money> (last visited Aug. 22, 2021) (explaining the common characteristics and functions of money).

40. *Id.*

But cash has its own problems. Cash is cumbersome to carry around, can be stolen, and can be physically destroyed. So over time, banking created alternatives to cash, which allowed for individuals to transact with each other without these problems manifesting. To this end, banking was set up to be a neutral third party that can verify the integrity of cash transfers and balances.⁴¹ When Amisk transfers money from his account to Bashaw's account, the banking system verifies that Amisk has the cash and that when the cash is transferred to Bashaw's account Amisk's balance is reduced by the amount transferred and Bashaw's balance is increased by the corresponding amount. Notwithstanding occasional problems of fraud in its various forms afflicting the system, banks and the banking system, generally speaking, have maintained a stable and efficient system that assures the world of the integrity of transfers and balances among various accounts.⁴² A system so wonderful, one would think, would hardly give anyone reason to complain.

Yet, the financial collapse and resulting recession of 2008 solidified the doubt that many had in the existing banking system and its dependence on the various central banking systems.⁴³ The problem that those who attempted to create alternate payment systems faced was that of ensuring the integrity of the balances and transfers with no centralized verification system.⁴⁴ Nakamoto's Bitcoin system dispenses with a clearinghouse altogether.⁴⁵ Instead of having a third party verify balances and transactions between the various payors and payees, his proposed decentralized system allows all actors on the platform to verify payments and keep track of the balances.⁴⁶ As already noted, the Bitcoin network that Nakamoto proposed uses what is known as "blockchain" to keep the system running.⁴⁷

In very simple terms, the Bitcoin system works as follows. Suppose Amisk has 100 bitcoins that Amisk obtained either by purchasing them or by earning them in the Bitcoin system.⁴⁸ Amisk would have the bitcoins stored in his digital secure wallet. The wallet is digital in that it is a computer file that contains basic information about Amisk and his bitcoin balance.⁴⁹ It is secure in that there is a password or encryption that prevents outsiders from altering the contents of the wallet.⁵⁰ Suppose that Amisk wants to send Bashaw ten bitcoin. Amisk's wallet

41. Liz Smith, *All About Bank-to-Bank Transfers*, SMARTASSET (Jul. 23, 2019), <https://smartasset.com/checking-account/all-about-bank-to-bank-transfers>.

42. See Adam Hayes & Michael J. Boyle, *Understanding the Role of the Fed*, INVESTOPEDIA (July 15, 2021), <https://www.investopedia.com/terms/f/federalreservebank.asp> (explaining the role of the Federal Reserve System in maintaining financial stability).

43. See *A Decade after the Great Recession, Is the Global Financial System Safer?*, KNOWLEDGE @ WHARTON (Sept. 11, 2018), <https://knowledge.wharton.upenn.edu/article/ten-years-great-recession-global-financial-system-safer/> ("[M]any of the large U.S. banks were subject to doubts about their solvency.").

44. VIGNA & CASEY, *supra* note 14 (discussing issues confronted by precursors to Bitcoin).

45. Nakamoto, *supra* note 11, at 1.

46. *Id.* at 5.

47. *Id.* at 2.

48. Amisk could have "earned" the bitcoin as a "miner," a concept explained below.

49. See Jake Frankenfield, *Bitcoin Wallet*, INVESTOPEDIA (Aug. 9, 2021), <https://www.investopedia.com/terms/b/bitcoin-wallet.asp> (explaining what a bitcoin wallet is).

50. François R. Velde, *Bitcoin: A primer*, FED. RESERVE BANK OF CHICAGO ESSAYS ON ISSUES, 317 (Dec. 2013); CHRISTIAN DECKER & ROGER WATTENHOFER, INFORMATION PROPAGATION IN THE BITCOIN NETWORK (2013).

in the Bitcoin system will send a message to Bashaw that uses Amisk's digital signature with a timestamp and the amount transferred, here ten bitcoin. The message is also broadcast to all active users or peers on the Bitcoin system. Now, a record needs to be created with the Amisk-to-Bashaw transaction being recorded for all to see. This record is a public ledger that is maintained in chain-like fashion, known as the blockchain. If a public record is not created, the classic double-spending problem arises, namely that Amisk can send another ten bitcoins to another user, Caroline, and so on without anyone figuring out that he has run out of bitcoin. If Amisk were giving cash to Bashaw, there would be no issue as once Amisk runs out of cash, there is nothing more to give. If Amisk writes a check drawn on a bank, the bank maintains the balance ledger and can verify that Amisk has enough money to cover the check. But in the Bitcoin system, there is no central authority to monitor this.⁵¹ Hence, it is up to other specific users, known as "miners," to assist in this process.⁵²

These miners are users who typically possess very high-powered computers that can perform a large number of mathematical computations very fast.⁵³ Their job is to verify that the transaction has actually taken place and that the transferor has a sufficient balance to send the specified amount of bitcoin to the transferee.⁵⁴ Therefore, the transaction of Amisk sending ten bitcoin to Bashaw can only be executed if the transaction is added to the blockchain where miners can verify it.⁵⁵ This also allows all to verify that the balances claimed by each user add up.⁵⁶

Any miner can try to add this transaction to the chain.⁵⁷ The miners are incentivized to do so, because the first one to properly add the transaction to the chain will receive a payment in bitcoin either from the system or from Amisk or both.⁵⁸ For any of the miners to add the transaction to the chain, they must solve a complex mathematical process.⁵⁹ The process takes into account the last entry in the chain (in this example nothing), the message containing the transfer of ten bitcoin including the digital signature of the sender, the identity of the recipient, and some other numbers.⁶⁰ It then generates another number called a "hash." The value of the hash must match a pre-set number that the Bitcoin system specifies.⁶¹ Without getting into too much technical detail, it can take ten minutes for a very powerful computer to process these computations to come up with the right answer.⁶² Once the miner has come up with the right hash, the transaction block is provisionally added to the chain. As more miners verify the

51. CHRISTIAN DECKER & ROGER WATTENHOFER, INFORMATION PROPAGATION IN THE BITCOIN NETWORK, 3 (2013).

52. *Id.*

53. Nakamoto, *supra* note 11, at 2–4.

54. Nakamoto, *supra* note 11, at 2–4; François R. Velde, *Bitcoin: A Primer*, FED. RESERVE BANK OF CHICAGO ESSAYS ON ISSUES, 317 (Dec. 2013).

55. Velde, *supra* note 54.

56. DECKER & WATTENHOFER, *supra* note 51, at 2.

57. Velde, *supra* note 54.

58. *Id.*

59. *Id.*

60. *Id.*

61. Nakamoto, *supra* note 11.

62. DECKER & WATTENHOFER, *supra* note 51, at 2; Nakamoto, *supra* note 11, at 4.

transaction, at some point there is a deemed consensus and the block containing the transaction (and other transactions) will be finally confirmed in the chain.⁶³ When this happens, the transaction is validated, and the ledgers that are stored on all or many of the users' computers are updated.⁶⁴ This allows the ledger to reflect the new balances for both Amisk and Bashaw. Over time, users can send and receive bitcoin from each other, with a transparent ledger that allows all to verify for all who has what and how much.⁶⁵

Since the creation of the Bitcoin system, there has been an explosion of cryptocurrencies.⁶⁶ Some, such as Ethereum, follow the decentralized model of Bitcoin,⁶⁷ while others, such as Ripple, are used by banks themselves.⁶⁸ Indeed, by our last count, there were over 5,000 such currencies with a wide range of market capitalization value.⁶⁹ The addition of new cryptocurrencies has created new dynamics in the demand for these currencies.⁷⁰ Economic actors could purchase these currencies using traditional cash, or whichever way one can earn these currencies within the currency's system.⁷¹ They could also exchange one cryptocurrency for another.⁷² This can be done privately.⁷³ For example, Amisk could message Bashaw and ask whether Bashaw was willing to sell one bitcoin for ten ethers, Ethereum's currency. Bashaw could agree, and transfer to Amisk ten ethers in the Ethereum system, while Amisk transfers one bitcoin to Bashaw on the Bitcoin system.

Alternatively, Amisk and Bashaw could both open accounts on a crypto exchange. Amisk first needs to transfer some bitcoin to the exchange's account, while Bashaw transfers some ether to the exchange's account. Now the two of them can utilize the exchange's platform to exchange their currencies with each other or with others on the exchange. Depending on the exchange and its capacity, there may be a few or many cryptocurrencies available for exchange.⁷⁴ The nature of the exchange and the relative prices at which cryptocurrencies are exchanged tend to resemble traditional exchanges where stocks and other traditional assets are traded.⁷⁵ Those wishing to sell a currency list their ask

63. DECKER & WATTENHOFER, *supra* note 51, at 1–3; Nakamoto, *supra* note 11, at 8.

64. DECKER & WATTENHOFER, *supra* note 51.

65. *Id.*

66. Liran Rosenfeld, *The Number of Cryptocurrencies is Exploding. This is How You Can Learn About the Different Altcoins and Safely Get Involved*, YAHOO! (June 1, 2021), <https://www.yahoo.com/now/number-cryptocurrencies-exploding-learn-different-124923879.html?>

67. ANTHONY LEWIS, *THE BASICS OF BITCOINS AND BLOCKCHAINS AN INTRODUCTION TO CRYPTOCURRENCIES AND THE TECHNOLOGY THAT POWERS THEM* (2018).

68. Martin Arnold, *Ripple and Swift Slug it Out Over Cross-border Payments*, FIN. TIMES (June 5, 2018), <https://www.ft.com/content/631af8cc-47cc-11e8-8c77-ff51caedcde6>.

69. *Today's Cryptocurrency Prices by Market Cap*, COINMARKETCAP, <https://coinmarketcap.com> (last visited Sept. 27, 2021) (valuing the market cap value for Bitcoin at over \$813 billion, for Birdchain over \$373,000, as well as thousands of other cryptocurrencies at \$10,000 or less).

70. *See, e.g.*, Bambrough, *supra* note 2 (detailing the volatility of meme-based bitcoin).

71. *See, e.g.*, Bauer & Dimpfl, *supra* note 25 (detailing the current workings of Bitcoin system).

72. *Id.*

73. *See generally* Jake Frankenfield, *Bitcoin Exchange*, INVESTOPEDIA (updated Aug. 9, 2021), <https://www.investopedia.com/terms/b/bitcoin-exchange.asp> (explaining how cryptocurrencies are exchanged for traditional currency and for each other).

74. Kendall Little, *Want to Buy Crypto? Here's What to Look for In a Crypto Exchange*, TIME (July 20, 2021), <https://time.com/nextadvisor/investing/cryptocurrency/what-are-cryptocurrency-exchanges>.

75. *Id.*

price, while those wishing to purchase a currency will list their bid price. The system will usually clear the asks and bids by matching them with each other.⁷⁶ When that happens, say in the case of Amisk and Bashaw, the exchange will transfer Amisk's bitcoins to Bashaw and Bashaw's ethers to Amisk. These transfers take place on the exchange, so the actual currencies are still being held by the exchange.⁷⁷ Only when Amisk or Bashaw transfer their new balances back to their personal wallets, again by way of miners who verify the transaction and add it to the blockchain, do they truly have control over their new balances.

II. LITIGATION AND ARBITRATION—AN OVERVIEW

Litigation used to be the only available, and remains the default, avenue for resolving civil disputes.⁷⁸ However, disputing parties have become increasingly dissatisfied with the cost and length of court proceedings.⁷⁹ Even if a party is ultimately successful, it may find itself engulfed in expensive discoveries, trials, and appeals for years. Businesses have also grown weary of litigation and its unpredictable jury verdicts and soaring legal costs.⁸⁰ In cross-border commercial disputes, jurisdictional hurdles, unfamiliar foreign law, divergent national policies and regulatory schemes, and the potential lack of expertise of domestic judges, are all long-time concerns associated with litigation.⁸¹ Therefore, over the past few decades a shift has been evident, both internationally and domestically in many countries, from litigation toward alternative dispute resolution mechanisms (i.e., mechanisms for the resolution of disputes outside the courtroom).⁸²

Arbitration⁸³ is said to be the most popular of such alternatives and has long been used in both domestic and international disputes.⁸⁴ Domestically in the United States, for instance, arbitration has been employed for the resolution of commercial disputes, disputes concerning securities and other financial products, as well as consumer and employment disputes. Internationally, arbitration has grown in popularity as a dispute resolution mechanism in cross-border transactions, as well as investor-State disputes pursuant to Bilateral Investment Treaties.⁸⁵ The popularity of arbitration in this myriad of contexts stems from its perception as a cost-effective, speedy, neutral, informal,

76. Jake Frankenfield, *Bitcoin Exchange*, INVESTOPEDIA (Aug. 9, 2021), <https://www.investopedia.com/terms/b/bitcoin-exchange.asp>.

77. *Id.*

78. Thomas J. Stipanowich & Ryan Lamare, *Living with ADR: Evolving Perceptions and Use of Mediation, Arbitration, and Conflict Management in Fortune 1000 Corporations*, 19 HARV. NEGOT. L. REV. 1, 9 (2014).

79. *Id.*

80. *Id.*

81. *Id.*

82. *Id.*

83. *Arbitration*, AMERICAN BAR ASSOCIATION, https://www.americanbar.org/groups/dispute_resolution/resources/DisputeResolutionProcesses/arbitration (defining arbitration as “a private process where disputing parties agree that one or several individuals can make a decision about the dispute after receiving evidence and hearing arguments.”).

84. Douglas Yarn, *The Death of ADR: A Cautionary Tale of Isomorphism Through Institutionalization*, 108 PENN ST. L. REV. 929, 930 (2004).

85. Susan Franck, *The Role of International Arbitrators*, 12 ILSA J. INT'L & COMPARATIVE L. 499 (2006).

confidential, and enforceable dispute resolution mechanism that is superior to litigation in many respects.⁸⁶

Popularity, however, comes with a price. The rise of arbitration as a common method for resolving not only purely commercial but also consumer and employment disputes, has been the object of growing criticisms pointing to problems with the strategic use of mandatory arbitration by companies in standard form consumer and employment contracts.⁸⁷ Shortcomings of the arbitral process identified in these contexts include, for instance, lack of informed consent, inequality of arms, procedural unfairness, lack of judicial oversight, and a perceived inability to vindicate statutory rights.⁸⁸ The risks of misuse of legal rules in arbitral decision-making and the absence of appeal also loom in commercial arbitrations.⁸⁹ Some commentators have identified a “flight from arbitration” as a result of such perceived problems,⁹⁰ although others have rejected this conclusion.⁹¹ Attempts to make arbitration more “litigation-like” and less informal in order to combat these criticisms have themselves been criticized for compromising arbitration’s efficiency and cost-effectiveness.⁹² Making arbitration more formal and complex indeed raises the question of how, and whether, it in fact offers an alternative to litigation at all. Reconciling these contradictory views of arbitration continues to pose a challenge, and little empirical work has been done to examine how arbitration is actually designed and used.⁹³

Although not the focus of this article, mediation⁹⁴ should also be mentioned alongside arbitration and litigation in the arsenal of dispute resolution mechanisms available to disputing parties in various contexts.⁹⁵ Some

86. Stipanowich & Lamare, *supra* note 78, at 2.

87. See, e.g., Pat K. Chew, *Comparing the Effects of Judges’ Gender and Arbitrators’ Gender in Sex Discrimination Cases and Why It Matters*, 32 OHIO STATE J. DISP. RESOL. 195, 203–06 (2017) (criticizing the use of arbitration in resolving employment-related sex discrimination complaints); David Horton & Andrea Cann Chandrasekher, *After the Revolution: An Empirical Study of Consumer Arbitration*, 104 GEO. L.J. 57 (2015) (criticizing the use of arbitration in consumer disputes); Catherine Moore, *The Effect of the Dodd-Frank Act on Arbitration Agreements: A Proposal for Consumer Choice*, 12 PEPP. DISP. RESOL. L.J. 503 (2012) (criticizing the use of arbitration in resolving securities disputes); Alexander J. S. Colvin, *An Empirical Study of Employment Arbitration: Case Outcomes and Processes*, 8 J. EMPIRICAL LEGAL STUD. 1 (2011) (criticizing the use of arbitration in resolving employment disputes).

88. Stipanowich & Lamare, *supra* note 78, at 8.

89. Stipanowich & Lamare, *supra* note 78, at 17–18.

90. Theodore Eisenberg & Geoffrey P. Miller, *The Flight from Arbitration: An Empirical Study of Ex Ante Arbitration Clauses in the Contracts of Publicly Held Companies*, 56 DEPAUL L. REV. 335, 335 (2007).

91. Christopher R. Drahozal & Quentin R. Wittrock, *Is There a Flight from Arbitration*, 37 HOFSTRA L. REV. 71, 73 (2008).

92. Stipanowich & Lamare, *supra* note 78, at 20.

93. John F. Coyle & Christopher R. Drahozal, *An Empirical Study of Dispute Resolution Clauses in International Supply Contracts*, 52 VAND. J. TRANSNAT’L L. 323, 345 (2019) (“[L]ittle empirical work has been done on the terms and provisions actually included in international arbitration agreements.”).

94. *Mediation*, AMERICAN BAR ASSOCIATION, https://www.americanbar.org/groups/dispute_resolution/resources/DisputeResolutionProcesses/mediation/ (last visited Aug. 23, 2021) (defining mediation as “a private process where a neutral third person called a mediator helps the parties discuss and try to resolve the dispute. . . . The mediator does not have the power to make a decision for the parties, but can help the parties find a resolution that is mutually acceptable.”).

95. Pon Staff, *What are the Three Basic Types of Dispute Resolution? What to Know about Mediation, Arbitration, and Litigation*, PROGRAM ON NEGOTIATION, HARVARD LAW SCHOOL (Oct. 8, 2020),

commentators have suggested that mediation has been gradually taking the place of arbitration as the preferred alternative to litigation among major corporations in part because of the increased control exercised by the parties over the outcome.⁹⁶ Mediation may also be combined with arbitration in a “multi-phase” or “stepped” dispute resolution process in which non-binding mediation is attempted before resorting to binding arbitration or litigation.⁹⁷ However, mediation has its own risks and disadvantages. Its use may be impeded by the unwillingness of other parties to participate in good faith, and its effectiveness may be hindered by its lack of finality and the risk of “compromised outcomes.”⁹⁸

With all these dispute resolution options available to them, and with none being a panacea for every type of dispute or claim, how do parties choose and design the mechanism that best suits their dispute resolution needs?⁹⁹

Scholars have advanced various theories to explain parties’ choice of litigation versus arbitration.¹⁰⁰ For instance, one theory weighs “governance benefits” (the “*ex ante* benefits provided by rules”) against “enforcement costs” (“the costs of litigating to enforce the rules governing private interaction”) involved with each option.¹⁰¹ This theory suggests that in arbitration, parties are free to devise rules and enforcement methods that may result in governance benefits outweighing enforcement costs.¹⁰² For instance, parties may choose expert decision-makers who are less likely to make mistakes, and the evidentiary burdens of the parties to prove their case may be lower.¹⁰³ Another theory views the jurisdictional choice between arbitration and litigation as designed to ensure

<https://www.pon.harvard.edu/daily/dispute-resolution/what-are-the-three-basic-types-of-dispute-resolution-what-to-know-about-mediation-arbitration-and-litigation>.

96. Stipanowich & Lamare, *supra* note 78, at 6, 16; *see also* Jacqueline Nolan-Haley, *Mediators in Arbitration*, in *THE OXFORD HANDBOOK OF INTERNATIONAL ARBITRATION* 283, 291 (Thomas Schultz & Federico Ortino, eds., 2020) (“Disenchantment with many aspects of international arbitration has opened space for mediation to blossom. The upshot is that mediators are becoming significant actors in transnational dispute resolution practice.”). The authors also note other processes, such as early neutral evaluation (“ENE”) and early case assessment (“ECA”), “fact-finding,” and “mini-trial,” which are beyond the scope of the present article.

97. Stipanowich & Lamare, *supra* note 78, at 15–16, 18–19.

98. *Id.* at 17.

99. *See generally*, Christopher R. Drahozal, *Empirical Findings on International Arbitration*, in *THE OXFORD HANDBOOK OF INTERNATIONAL ARBITRATION* 643 (Thomas Schultz & Federico Ortino, eds., 2020) (noting such factors as the cost and length of arbitration proceedings, the size of arbitral tribunals, interim measures, multi-party disputes, challenges to arbitrators, the role of tribunal secretaries, and the use of mediation); *see also* Norman E. Veasey & Grover C. Brown, *An Overview of the General Counsel’s Decision Making on Dispute-Resolution Strategies in Complex Business Transactions*, 70 *THE BUS. LAW.* 407 (2015) (presenting an overview of the choices that face a general counsel when weighing the pros and cons of litigation and alternate dispute-resolution processes, including mediation and arbitration); W. Mark C. Weidenmaier, *Customized Procedure in Theory and Reality*, 72 *WASH. & LEE L. REV.* 1865 (2015) (presenting a comprehensive picture of dispute resolution practices in commercial contracts).

100. *Arbitration vs. Litigation in the US*, *PRAC. L. PRAC. NOTE* w-006-5897 (2021), <https://us.practicallaw.thomsonreuters.com/w-006-5897>.

101. Keith N. Hylton, *Arbitration: Governance Benefits and Enforcement Costs*, 80 *NOTRE DAME L. REV.* 489, 491 (2005).

102. *Id.* at 493.

103. *Id.*; *see also*, Christopher R. Drahozal & Keith N. Hylton, *The Economics of Litigation and Arbitration: An Application to Franchise Contracts*, 32 *J. LEGAL STUDIES* 549, 550 (2003) (suggesting that contracting parties would choose the dispute resolution forum that “provides the greatest difference between deterrence benefits and dispute resolution costs.”).

that “the ‘contracting parties’ preferred substantive law is applied.”¹⁰⁴ This jurisdictional choice is meaningful, according to this theory, where substantive laws vary between litigation and arbitration (for instance, where the arbitration is conducted internationally on the basis of a different national law than that of the parties or domestically on the basis of customary law rather than a national system of law).¹⁰⁵ In addition, the jurisdictional choice between litigation and arbitration is meaningful where there is an alternative source of sanctions other than enforcement of arbitral awards by domestic courts, such as private organizations or reputational costs.¹⁰⁶ In contrast, scholars have also suggested that parties may prefer litigation over arbitration because litigation receives “a sizable government subsidy,” is funded by taxpayers, that arbitration does not.¹⁰⁷ Moreover, circumstances in which litigation may be preferable to arbitration include, for instance, when the relevant laws and contract terms are well-developed and relatively certain in application, cases with very high stakes, and when emergency relief is likely to be sought by the parties.¹⁰⁸

Many empirical studies have also examined parties’ motivation for choosing a particular dispute resolution mechanism in various contexts.¹⁰⁹ In the context of businesses choosing a dispute resolution mechanism in commercial contracts as well as in contracts with consumers or employees, a survey of Fortune 1000 companies provides an example of developing dispute resolution trends.¹¹⁰ Generally, these companies exhibited a clear preference for resolving disputes outside the courtroom,¹¹¹ with around fifty percent of companies reserving a limited role for litigation “only in cases where appropriate” or trying “to move to ADR always.”¹¹² This reflects the trend mentioned above toward “layered” dispute resolution processes involving a sequence of methods and forums before litigation is attempted, if at all. The main reasons for avoiding litigation among the survey respondents seemed to be “to save time and money and to exert control over the dispute resolution process.”¹¹³ Interestingly, providing a “satisfactory process,” “satisfactory settlement,” or “a more durable

104. Bruce L. Benson, *To Arbitrate or to Litigate: That Is the Question*, 8 EUR. J. L. & ECON. 91, 92 (1999). See also Stefan Voigt, *Are International Merchants Stupid? Their Choice of Law Sheds Doubt on the Legal Origin Theory*, 5 J. EMPIRICAL LEGAL STUD. 1, 2 (2008) (relying on choice of substantive law in arbitration clauses to conclude that common law is less efficient from the parties’ point of view than civil law).

105. Benson, *supra* note 104, at 92–93.

106. *Id.* at 92, 106–107.

107. Christopher R. Drahozal & Stephen J. Ware, *Why Do Businesses Use (or Not Use) Arbitration Clauses*, 25 OHIO ST. J. ON DISP. RESOL. 433, 447 (2010).

108. *Id.* at 450.

109. See, e.g., *id.* at 437–446 (discussing and criticizing the findings of two studies: Theodore Eisenberg & Geoffrey P. Miller, *The Flight from Arbitration: An Empirical Study of Ex Ante Arbitration Clauses in the Contracts of Publicly Held Companies*, 56 DEPAUL L. REV. 335 (2007), and Theodore Eisenberg, Geoffrey P. Miller & Emily Sherwin, *Arbitration’s Summer Soldiers: An Empirical Study of Arbitration Clauses in Consumer and Nonconsumer Contracts*, 41 U. MICH. J. L. REFORM 871 (2008)); see also, Drahozal & Wittrock, *supra* note 91 (discussing the context of franchise agreements); Julian Nyarko, *We’ll See You in...Court! The Lack of Arbitration Clauses in International Commercial Contracts*, 58 INT’L REV. L. & ECON. 6 (2019) (discussing the context of securities contracts).

110. Stipanowich & Lamare, *supra* note 78.

111. *Id.* at 31 (“Only 0.6% of companies expressed a preference for “always litigat[ing].”).

112. *Id.*

113. *Id.* at 37–38.

resolution,” were also among the reasons why most of the companies chose alternative mechanisms to litigation.¹¹⁴

But if not litigation, then what?

The same survey suggests that 98% of companies used mediation at least once in the prior three years, while 83% used arbitration, and 51% used “mediation-arbitration.”¹¹⁵ Moreover, companies reported using mediation far more than arbitration in all of the sectors included in the survey.¹¹⁶ Finally, almost 86% of the survey’s respondents indicated that their company was “likely” or “very likely” to use mediation instead of litigation for future corporate or commercial disputes, 87% for future employment disputes, and 80% for future consumer disputes.¹¹⁷ Only 50% indicated that their companies were “likely” or “very likely” to use arbitration instead of litigation in future corporate/commercial disputes, 39% in employment disputes, and 44% in consumer disputes.¹¹⁸ As for the reasons for this preference of mediation over arbitration, the main concerns expressed by the survey respondents included “the difficulty of appeal, the concern that arbitrators may not follow the law, the perception that arbitrators tend to compromise, lack of confidence in neutrals, and, increasingly, high costs.”¹¹⁹ Despite this suggested decline of arbitration, commentators have predicted that “binding arbitration is and always will be a critical and essential feature of the landscape of commercial dispute resolution” for both domestic and international disputes.¹²⁰ In the international realm at least, recent statistics of the use of arbitration appear to support this prediction.¹²¹

Against this theoretical and empirical backdrop of parties’ dispute resolution choices in the commercial context generally, we turn in the next Part to examine crypto disputes and the design and use of mechanisms for their resolution.

III. CRYPTO DISPUTES AND THEIR RESOLUTION

The need to identify effective and efficient ways to resolve internet-related disputes is not new and has spurred the evolution of “online dispute resolution”

114. *Id.* at 39.

115. *Id.* at 41–42 (noting the last option was interpreted by the authors as most likely understood by respondents as “referring to scenarios in which both mediation and arbitration were actually employed.”).

116. *Id.* at 44–45 (noting these sectors were: commercial/contract, individual employment, consumer, corporate finance, environmental, intellectual property, personal injury, products liability, real estate, and construction).

117. *Id.* at 49.

118. *Id.* at 50.

119. *Id.* at 52.

120. *Id.* at 63; *see also*, Peter Rutledge, *Convergence and Divergence in International Dispute Resolution*, 2012 J. DISP. RESOL. 49, 49 (2012) (“[T]he notions that arbitration is somehow in decline—or that its golden age has ended—are overblown.”).

121. Karen Maxwell, *Arbitration Statistics: and the Winner Is . . .*, PRAC. L. ARB. BLOG (May 23, 2017), <http://arbitrationblog.practicalaw.com/arbitration-statistics-and-the-winner-is/> (reporting that statistics concerning the use of institutional international arbitration covering the preceding decade indicated a “general upward trend” in such use).

mechanisms, including online arbitration.¹²² For instance, a model for “cyberadjudication” was proposed as early as 2001,¹²³ long before the advent of cryptocurrencies in their modern form. In the realm of e-commerce, 60 million disputes are resolved annually by eBay alone,¹²⁴ and the online Hangzhou Court of the Internet in China heard nearly 20,000 cases between 2017 and 2019 alone.¹²⁵

However, crypto disputes between traders and exchanges or between traders and cryptocurrency companies present new challenges. As noted above, these challenges may concern jurisdictional issues, applicable law(s), and, particularly, technical complexities which most distinguish crypto disputes from other online disputes.¹²⁶ With many cryptocurrencies, the actual execution of a transfer of a currency from one person to another depends on the execution of various mathematical puzzles that validate the blockchain which, in turn, allows the public ledger to be updated to reflect the transaction.¹²⁷ This means that there is a possibility that a specific transaction might not be properly recorded in the public ledger in a timely manner. This phenomenon is known as the orphaned block,¹²⁸ which occurs when at least two blocks are competing to be recognized as valid blocks in the blockchain.¹²⁹ Orphan blocks can be an issue, because if a transaction is valid but not added to the blockchain and ultimately recorded in the public ledger, the same bitcoins that were spent in the orphaned block could be used in another transaction.¹³⁰ This may lead to the double-spending problem decentralized cryptocurrencies were designed to avoid.¹³¹ In Bitcoin, the system has a built-in rule of the longest chain wins, and those transacting on Bitcoin are

122. See, e.g., Janet K. Martinez, *Designing Online Dispute Resolution*, 2020 J. DISP. RESOL. 135 (2020) (writing about an overview of the online dispute resolution landscape); Amy J. Schmitz, “Drive-Thru” Arbitration in the Digital Age: Empowering Consumers Through Binding ODR, 62 BAYLOR L. REV. 178 (2010) (exploring the potential for online binding arbitration for e-merchant related claims).

123. Michael Abramowicz, *Cyberadjudication*, 86 IOWA L. REV. 533 (2001).

124. Louis F. Del Duca, Colin Rule & Kathryn Rimpfel, *eBay’s De Facto Low Value High Volume Resolution Process: Lessons and Best Practices for ODR Systems Designers*, 6 Y.B. ARB. & MEDIATION 204, 205 (2014).

125. Alice Mingay, *Size Matters: Alibaba Shapes China’s First “Court of the Internet”*, MERCATOR INST. FOR CHINA STUDIES (Oct. 17, 2019), <https://merics.org/en/analysis/size-matters-alibaba-shapes-chinas-first-court-internet>. (noting Alibaba was a defendant in over half of the cases tried in this court).

126. Rakesh Sharma, *How are Disputes in Smart Contracts Resolved?*, INVESTOPEDIA (Oct. 27, 2020), <https://www.investopedia.com/news/how-are-disputes-smart-contracts-resolved/>.

127. HUPAYX, *How are Blockchain Transactions Validated? Consensus VS Validation*, MEDIUM (Jun. 29, 2020) <https://medium.com/hupayx/how-are-blockchain-transactions-validated-consensus-vs-validation-ada9c001fd0a>.

128. ANTHONY LEWIS, THE BASICS OF BITCOINS AND BLOCKCHAINS: AN INTRODUCTION TO CRYPTOCURRENCIES AND THE TECHNOLOGY THAT POWERS THEM 128–137 (2018).

129. Jerome Morrow, *What is an Orphaned Block*, CX.IO (Sep. 12, 2014), <https://blog.cex.io/education/what-is-an-orphan-block-9632> (reporting that in 2014, orphan blocks in Bitcoin were about 1% of blocks mined); see also Muhammad Anas Imtiaz, David Starobinski & Ari Trachtenberg, *Characterizing Orphan Transactions in the Bitcoin Network*, 2020 IEEE INTERNATIONAL CONFERENCE ON BLOCKCHAIN AND CRYPTOCURRENCY (ICBC) (2020) (analyzing 8.71×10^4 orphan transactions out of 4.20×10^6 transactions in their dataset, which suggests roughly 2% orphan rate).

130. Mitchell Grant, *Orphan Block*, INVESTOPEDIA (Jul. 19, 2021), <https://www.investopedia.com/terms/o/orphan-block-cryptocurrency.asp>.

131. *What is Double-Spending?*, CRYPTOPEDIA (Jun. 24, 2021), <https://www.gemini.com/cryptopedia/double-spending-problem-crypto> (“Double-spending would seriously damage the network and remove one of its most important features: trustless, immutable, and decentralized transactions.”).

encouraged to wait for at least six blocks before assuming the transaction has gone through.¹³² Nevertheless, the orphaned blocks, which happen not infrequently, can incorrectly lead to public speculation that somehow Bitcoin can be subject to the double-spending problem.¹³³

However, some other platforms do not have self-enforcing error correction methods.¹³⁴ Sometimes, even with proper protocols in place, not all the users agree on the specific implementation of the method. This can lead to what is known as forks in the blockchain.¹³⁵ If one adds the classic aspect of fraud by hackers on the currency platform, a dispute is even more likely to arise.¹³⁶ For example, early on in the Ethereum platform's history, some ethers were stolen by a hacker and deposited into the hacker's wallet.¹³⁷ A suggestion by the Ethereum organization to effectively reverse the transactions was accepted by a large number of users on the platform, but a few dissented.¹³⁸ The dissenters thought that the idea of reversing the transactions went against the principle that the blockchain was immutable.¹³⁹ Two chains ultimately emerged, Ethereum and Ethereum Classic. Most users switched to the new system, while the dissenters stayed on the Classic.¹⁴⁰ What this example illustrates is that the question of what to do with stolen currency on a crypto platform can lead to a significant dispute. In this case, it was settled by both sides going their separate ways.¹⁴¹

132. Colin Harper, *The Bitcoin Double-Spend That Never Happened*, COINDESK (Jan. 21, 2021, 3:08 PM), <https://www.coindesk.com/bitcoin-double-spend-that-never-happened> (“Satoshi Nakamoto said in the white paper that a transaction should only be considered final after it has six confirmations.”).

133. Sachin Meier & Jonathan Wilkins, *No, Bitcoin Was Not Double Spent*, RIVER FINANCIAL (Jan. 21, 2021), <https://blog.river.com/no-bitcoin-was-not-double-spent/> (“Bitcoin experienced an orphan block yesterday, which BitMEX Research and other media organizations misinterpreted as a double spend. However, Bitcoin’s protocol handled the orphan block as expected, and double spends remain impossible on the Bitcoin network.”); Harper, *supra* note 132 (“No coins were added to the bitcoin supply, as some headlines might lead you to believe.”).

134. Cf. Balázs Bodó, Daniel Gervais & João Pedro Quintais, *Blockchain and Smart Contracts: The Missing Link in Copyright Licensing?* 26 INT’L J.L. & INFO. TECH. 311, 331 (2018) (“[A] standardized, planetary scale, self-enforcing smart contract-based licensing infrastructure may substantially change the economic calculus in this field, making collective rights management and compulsory licensing comparatively costlier. However, this potential future scenario is still far in the horizon.”).

135. Chelsea D. Button, *The Forking Phenomenon and The Future of Cryptocurrency in the Law*, 19 UIC REV. INTELL. PROP. L. 1 (2019).

136. See generally Robert J. Anello, *Crypto Goes Corporate: Litigation Sure to Follow*, FORBES (May 26, 2021, 10:15 PM), <https://www.forbes.com/sites/insider/2021/05/26/crypto-goes-corporate-litigation-sure-to-follow/?sh=51fe691b42d1> (“As one might expect from a novel asset class with a checkered past, cryptocurrencies carry unique legal and regulatory risks.”).

137. A quick overview of this can be found in ANTHONY LEWIS, *THE BASICS OF BITCOINS AND BLOCKCHAINS AN INTRODUCTION TO CRYPTOCURRENCIES AND THE TECHNOLOGY THAT POWERS THEM* 195–198 (2018).

138. *Ethereum Classic (ETC): An ideological Rift in the Ethereum Blockchain*, CRYPTOPEDIA (June 21, 2021), <https://www.gemini.com/cryptopedia/ethereum-classic-etc-vs-eth#section-the-origin-of-ethereum-classic> (last visited Aug. 24, 2021).

139. *Id.*

140. *Id.*

141. In his master’s thesis, James Lovejoy analyzes many of the double-spending issues generally and provides examples from the Ethereum platforms. See James Peter Thomas Lovejoy, *An Empirical Analysis of Chain Reorganizations and Double-Spend Attacks on Proof-of-Work Cryptocurrencies* (May 19, 2020) (M.S. Thesis, Massachusetts Institute of Technology, available at <https://dspace.mit.edu/bitstream/handle/1721.1/127476/1193019932-MIT.pdf>).

In other platforms, litigation could be the answer. A proposed class action lawsuit pending before a federal district court in the United States may raise the question of whether a court can order a “forking” in the blockchain of the cryptocurrency Nano.¹⁴² The currency was being traded on the crypto exchange BitGrail, which was hacked and approximately \$170 million of Nano currency, known as Raiblocks or XRB, was stolen.¹⁴³ The lawsuit seeks to compel Nano to return the stolen funds by generating a “rescue fork” that would create new units of currency and restore them to those who lost their funds.¹⁴⁴ For present purposes, in addition to this lawsuit illustrating possible sources of crypto disputes, the more telling aspect is that the choice of dispute resolution mechanism is litigation. The lawsuit was first filed in 2018.¹⁴⁵ When one accesses Nano’s webpage today, its Terms & Conditions immediately start with the following:

Please read these terms and conditions of use carefully before using this site. By accessing or using the site, you agree to be bound by this user agreement. If you do not agree to these terms, do not access, visit and/or use the site.

Arbitration notice and class action waiver: You agree that disputes between you and us will be resolved by binding, individual arbitration and you waive your right to participate in a class action lawsuit or class-wide arbitration.¹⁴⁶

A search of Nano’s website in 2018 using the “wayback machine” shows no Terms & Conditions at all, let alone any mention of arbitration.¹⁴⁷ This suggests that sometimes the choice of a particular dispute resolution mechanism can emerge in response to specific disputes that arise over time.¹⁴⁸ Of course, where Terms & Conditions do not specify arbitration, litigation would be the default mechanism.

In the world of crypto exchanges, more disputes can arise if the exchange fails to surrender the currencies to their owners upon demand.¹⁴⁹ Indeed, several exchanges have recently financially collapsed, leaving those who were trading

142. The case is still in the early stages of pre-trial motions. Complaint, *Fabian v. Nano*, 2019 WL 105597 (N.D. Cal. Jan. 3, 2019) (No. 4:19-cv-00054). See also JD Alois, *NANO and BitGrail Hit by Another Class Action Lawsuit Related to Crypto Theft that Allegedly Saw \$153 Million Disappear*, CROWDFUND INSIDER (Jan. 7, 2019 9:20 AM), <https://www.crowdfundinsider.com/2019/01/143011-nano-and-bitgrail-hit-by-another-class-action-lawsuit-related-to-crypto-theft-that-allegedly-saw-153-million-disappear> (detailing the case).

143. Guillermo Jimenez, *Nano Cryptocurrency Seeks Dismissal of \$170 Million ‘Rescue Fork’ Lawsuit*, DECRYPT (Apr. 9, 2019), <https://decrypt.co/6396/nano-cryptocurrency-seeks-dismissal-170-million-rescue-fork-lawsuit>.

144. *Id.*

145. *Id.*

146. NANO, <https://nano.org/terms> (last visited August 24, 2021).

147. WAYBACK MACHINE, http://web.archive.org/web/20180915000000*/nano.org/termsive.org (last visited Aug. 23, 2021) (showing no results for a terms section on the Nano website in 2018).

148. Katie Shonk, *Choose the Right Dispute Resolution Process* (Jun. 28, 2021), <https://www.pon.harvard.edu/daily/dispute-resolution/choose-the-right-dispute-resolution-process/> (last visited Aug. 24, 2021).

149. Andrew Singer, *Safety Check: If Crypto Custodian Fails, Clients May Not Get a Full Payout*, COINTELEGRAPH (Jun. 7, 2020), <https://cointelegraph.com/news/safety-check-if-crypto-custodian-fails-clients-may-not-get-a-full-payout>.

on them with no recourse to recoup their investments.¹⁵⁰ Other disputes can arise on platforms that also allow the hosting of “smart contracts,” such as Ethereum.¹⁵¹ Smart contracts are coded self-executing agreements between parties on a blockchain.¹⁵² Their use raises unique dispute resolution concerns given the anonymity associated with the trading process and the regulatory and enforcement challenges surrounding the crypto system.¹⁵³

At present, many of these disputes are before courts or arbitral tribunals.¹⁵⁴ In addition to the Nano lawsuit discussed above, another dispute involving both litigation in the United States and arbitration concerns a trader and the crypto exchange Bittrex.¹⁵⁵ The trader had deposited a large amount of money into the exchange, but had not filled out all the required forms.¹⁵⁶ This resulted in the suspension of her account, which also meant that she was unable to access her funds.¹⁵⁷ She sued in a federal district court.¹⁵⁸ Bittrex brought a motion to compel arbitration pursuant to an arbitration clause contained in its Terms & Conditions, which the court granted.¹⁵⁹ Another lawsuit against Bittrex involved a trader whose phone was hacked leading to the theft of his passwords, which allowed the hackers to steal his cryptocurrencies.¹⁶⁰ He tried to alert the relevant

150. *Id.*

151. *Smart Contracts, Blockchain and Cryptocurrencies*, JUDICIAL ARBITRATION AND MEDIATION SERVICES, INC. (Hereinafter JAMS), <https://www.jamsadr.com/smartcontracts> (last visited Aug. 24, 2021).

152. *Id.*

153. *Smart Contracts, Blockchain and Cryptocurrencies*, JUDICIAL ARBITRATION AND MEDIATION SERVICES, INC. (JAMS), <https://www.jamsadr.com/smartcontracts> (last visited Aug. 24, 2021). A detailed discussion of smart contracts is beyond the scope of this article. In this regard, *see, e.g.*, Michael Buchwald, *Smart Contract Dispute Resolution: The Inescapable Flaws of Blockchain-Based Arbitration*, 168 U. PA. L. REV. 1369 (2020) (evaluating the role of smart contracts in dispute resolution); Max Raskin, *The Law and Legality of Smart Contracts*, 1 GEO. L. TECH. REV. 305 (2017) (examining smart contracts from a legal perspective); Jeremy M. Sklaroff, *Smart Contracts and the Cost of Inflexibility*, 166 U. PA. L. R. 263 (2017) (examining the inefficiencies and flexibilities of smart contracts); Kevin Werbach & Nicolas Cornell, *Contracts Ex Machina*, 67 DUKE L. J. 313 (2017) (examining the strengths and limitations of smart contracts).

154. For instance, Russian courts have reportedly reviewed 148 civil disputes related to the use of digital technologies between 2014 and 2018, 45% of which were related to the fulfillment of obligations under smart contracts and the use of cryptocurrencies and tokens. The rising number of cases has prompted the Russian Union of Industrialists and Entrepreneurs to create a new arbitration body to hear and resolve these disputes. *See* Lubomir Tassev, *Arbitrators to Resolve Disputes in the Russian Cryptocurrency Industry*, BITCOIN.COM (Nov. 1, 2018), <https://news.bitcoin.com/arbitrators-to-resolve-disputes-in-the-russian-cryptocurrency-industry> (describing such arbitration body). In the United States, eleven class action lawsuits were recently filed in a New York district court against Binance, Block.one, Bitmex, Tron, and several other crypto companies, alleging unlawful sales of securities. *See* Tim Copeland & Amy Castor, *Class-action Lawsuits Filed Against 11 Crypto Companies*, DECRYPT (Apr. 4, 2020), <https://decrypt.co/24532/class-action-lawsuits-filed-against-7-bitcoin-companies> (detailing the suits). For a summary of other U.S. court cases involving crypto disputes, *see* Joshua Mapperson, *Crypto in Court—Overview of the Biggest Lawsuits Worldwide*, COINTELEGRAPH (Aug. 26, 2019), <https://cointelegraph.com/news/crypto-in-court-overview-of-the-biggest-lawsuits-worldwide> (giving a detailed overview of crypto litigation).

155. *Ventoso v. Shihara*, No. 19 Civ. 03589 WL 9045083 (S.D.N.Y. Jun. 26, 2019).

156. *Id.* at *2.

157. *Id.*

158. *Id.*

159. *Id.* at *2,*4.

160. Katherine Anna Long, *After Hackers Stole \$1M in Cryptocurrency, Bellevue Venture Capitalist Launched PR Blitz Against Local Company He Blames*, SEATTLE TIMES (Jan. 11, 2020 1:06 AM), <https://www.seattletimes.com/business/technology/after-hackers-stole-1m-in-cryptocurrency-bellevue-venture-capitalist-launched-pr-blitz-against-local-company-he-blames/>.

exchange, but claims that they ignored his pleas to suspend his account.¹⁶¹ As a result, he lost over a million dollars, and his lawsuit is currently pending in a Washington state court.¹⁶²

Another crypto dispute that has recently been resolved by the Singapore International Commercial Court involves the crypto exchange Quoine and a trader, B2C2.¹⁶³ The dispute arose from several trades B2C2 had entered into on Quoine's platform, in which it sold Ethereum at a much higher rate than the going rate.¹⁶⁴ The next day, when the Chief Technology Officer of Quoine discovered that these trades had been made, he considered the exchange rate to be a highly abnormal deviation from the previous going rate and reversed the trades.¹⁶⁵ B2C2 commenced legal proceedings against Quoine before the Singapore High Court, claiming breach of contract and breach of trust.¹⁶⁶ Pursuant to the parties' agreement, the dispute was transferred to the Singapore International Commercial Court.¹⁶⁷ The Court found in favor of B2C2 on both the breach of contract and breach of trust claim, and awarded it damages.¹⁶⁸

As with all disputes of a cross-border nature, litigation of crypto disputes presents the same limitations and disadvantages discussed in Part II. Accordingly, some scholars have identified a tendency in the cryptocurrency context "towards judicialization—that is, the development of its own dispute resolution architecture."¹⁶⁹ In this regard, we identify three types of arbitration in the crypto context. The first type is traditional arbitration, which is administered by established international institutions similarly to "offline" international commercial arbitration. The second type of arbitration is online crypto-arbitration, which retains most of the fundamental features of traditional international arbitration but is administered online by new institutions. The third type of arbitration utilizes specialized internal mechanisms, which are platform-based or "on-chain"¹⁷⁰ mechanisms administered by new institutions or by the crypto platforms themselves and, in our view, differ in many ways from classic arbitration. We follow this typology in the remainder of this Part, and explore

161. *Id.*

162. *Id.* This lawsuit came on the heels of a lawsuit against AT&T, but not against any exchange, by a trader suing the company for \$200 million for allowing his SIM card information to be stolen. *Court Order Lets Terpin's Claims Against AT&T Mobility Proceed to Trial; Terpin Will File Additional Allegations to Preserve Punitive Damages Relief for up to \$200 Million*, GREENBERGLUSKER, (Feb. 25, 2020 7:53 PM), <https://www.globenewswire.com/news-release/2020/02/26/1990562/0/en/Court-Order-Lets-Terpin-s-Claims-Against-AT-T-Mobility-Proceed-to-Trial-Terpin-Will-File-Additional-Allegations-to-Preserve-Punitive-Damages-Relief-for-up-to-200-Million.html>.

163. *B2C2 Ltd v Quoine Pte Ltd* [2019] SGHC(I) 03 (Sing. Int'l Com. Ct.). On the growing phenomenon of international commercial courts generally, see, e.g., Pamela K. Bookman, *The Adjudication Business*, 45 *YALE J. INT'L L.* 227 (2020) (arguing that competition with arbitration is not the only factor in the creation of new international commercial courts).

164. *B2C2 Ltd.*, [2019] SGHC(I) 03 at 2.

165. *Id.* at 2.

166. *Id.* at 53.

167. *Id.* at 3.

168. *Id.* at 108.

169. Pietro Ortolani, *The Impact of Blockchain Technologies and Smart Contracts on Dispute Resolution: Arbitration and Court Litigation at the Crossroads*, 24 *UNIF. L. REV.* 430, 432 (2019).

170. Buchwald, *supra* note 153, at 1373.

how each type of arbitration can serve as an alternative to litigation in resolving crypto disputes.

A. *Traditional Arbitration*

Arbitration, the traditional alternative to litigation in the resolution of commercial disputes, seems to be gaining traction also in the crypto dispute resolution world.¹⁷¹ Some of the advantages of arbitration in the crypto context may include the confidentiality of the process and the parties' ability to appoint specialized decision-makers,¹⁷² as well as the straightforward enforcement of arbitral awards.¹⁷³ In addition, traditional arbitration providers have taken steps to address the unique dispute resolution needs of crypto traders. For instance, Judicial Arbitration and Mediation Services, Inc. ("JAMS"), a major arbitration provider in the United States, is creating protocols designed to support arbitration of disputes arising from blockchain activities, including smart contracts.¹⁷⁴ The American Arbitration Association ("AAA"), another major provider of arbitration in the United States, offers a webinar on "Arbitrating Blockchain, Smart Contract & Smart Legal Contract Disputes," which explains why "arbitration is ideally suited to resolve these disputes."¹⁷⁵ Arbitrations of crypto disputes have also been administered by the International Court of Arbitration of the International Chamber of Commerce ("ICC").¹⁷⁶

B. *Online Crypto-Arbitration*

In addition to traditional arbitration conducted *ad hoc* or administered by established arbitration institutions such as JAMS, the AAA, or the ICC, there are also initiatives adapting the classic arbitration model to the specific crypto dispute resolution context, while preserving some of its fundamental features.¹⁷⁷

171. James Rodgers, *Cryptocurrencies and Arbitration – A Match Made in Heaven?*, NORTON ROSE FULBRIGHT (May 2018), <https://www.nortonrosefulbright.com/en/knowledge/publications/cae35319/cryptocurrencies-and-arbitration-mdashbra-match-made-in-heaven>.

172. *Id.*

173. Enforcement of international arbitral awards is governed by the Convention on the Recognition and Enforcement of Foreign Arbitral Awards, art. 2, Jun. 10, 1958, 21.3 U.S.T. 2517, 330 U.N.T.S. 3, to which 166 states are parties. https://uncitral.un.org/en/texts/arbitration/conventions/foreign_arbitral_awards/status2.

174. *Smart Contracts, Blockchain and Cryptocurrencies*, JUDICIAL ARBITRATION AND MEDIATION SERVICES, INC. (JAMS), <https://www.jamsadr.com/smartcontracts>.

175. *Arbitrating Blockchain, Smart Contract & Smart Legal Contract Disputes*, AMERICAN ARBITRATION ASSOCIATION, <https://www.aaaeducation.org/courses/arbitrating-blockchain-smart-contract-smart-legal-contract-disputes/20prw003> (last visited Sept. 13, 2021).

176. *Aceris Law Successfully Resolves ICC Arbitration Involving the Cryptocurrency Industry*, ACERIS LAW LLC (Apr. 8, 2020), <https://www.acerislaw.com/aceris-law-successfully-resolves-icc-arbitration-involving-the-cryptocurrency-industry/> (explaining that the arbitration was reportedly subject to the law of an American State, and involved claims and counterclaims of misrepresentation, fraud, breach of contract, defamation, and unjust enrichment).

177. *Cryptonomica Arbitration Rules*, GITHUB, https://github.com/Cryptonomica/arbitration-rules/blob/master/Arbitration_Rules/Cryptonomica/Cryptonomica-Arbitration-Rules.EN.clearsigned.md (last visited Sept. 13, 2021).

One such initiative is Cryptonomica Ltd.,¹⁷⁸ the first online international arbitration institution based in London, U.K. The Cryptonomica Arbitration Rules¹⁷⁹ are based on the United Nations Commission on International Trade Law (UNCITRAL) Arbitration Rules,¹⁸⁰ a comprehensive set of procedural arbitration rules available to commercial parties that are widely used in *ad hoc* and institutional arbitrations.¹⁸¹ Appropriately for an online arbitration institution, the Cryptonomica Rules provide for the electronic submission of documents, including the parties' statements of claim and defense,¹⁸² as well as for hearings¹⁸³ and tribunal communications¹⁸⁴ to be conducted by video-conferencing.

Unlike in traditional international commercial arbitration, however, the Cryptonomica Rules provide that arbitrators are to decide "*ex aequo et bono* unless otherwise agreed by the parties," rather than on the basis of a particular national law, and in accordance with the terms of the parties' contract.¹⁸⁵ This provision is likely intended to resolve the problem of selecting a governing law to govern the resolution of complex multi-jurisdictional crypto disputes.¹⁸⁶ Also, in contrast to typical international commercial arbitration practice, the Cryptonomica Rules provide that "[u]nless otherwise agreed in writing by all the parties, arbitration awards are public."¹⁸⁷ This is an interesting provision, given that confidentiality is one of the most celebrated attributes of arbitration.¹⁸⁸ As for the cost of the arbitration, the Cryptonomica Rules set out an "Arbitration Fee" of 3% of the amount of the claim, but not less than EUR 1,000.¹⁸⁹ It is not clear whether this amount includes the arbitrators' fees¹⁹⁰ or only

178. *Cryptonomica Arbitration: Online Dispute Resolution*, CRYPTONOMICA, <https://cryptonomica.net#!/arbitration> (last visited Sept. 13, 2021).

179. *Cryptonomica Arbitration Rules*, GITHUB, https://github.com/Cryptonomica/arbitration-rules/blob/master/Arbitration_Rules/Cryptonomica-Arbitration-Rules.EN.clearsigned.md (last visited Sept. 13, 2021) [hereinafter *Cryptonomica Arbitration Rules*].

180. United Nations Commission on International Trade Law, *UNCITRAL Arbitration Rules*, <https://uncitral.un.org/en/texts/arbitration/contractualtexts/arbitration> (last visited Sept. 13, 2021).

181. *Cryptonomica Arbitration: Online Dispute Resolution*, <https://cryptonomica.net#!/arbitration> (last visited Sept. 13, 2021).

182. *Cryptonomica Arbitration Rules*, *supra* note 179.

183. *Id.*

184. *Id.*

185. *Id.*; see also Viktor Ageyev, *Cryptonomica: Ex Aequo Et Bono and New Lex Mercatoria*, CRYPTONOMICA (Apr. 19, 2019), <https://medium.com/cryptonomica/cryptonomica-ex-aequo-et-bono-and-new-lex-mercatoria-72eef36a2cd5> ("*Ex aequo et bono* is a rule that enables arbitrators to decide a case according to what . . . 'is fair (or equitable) and good.' That is also to say 'in good conscience' and notwithstanding the written legislation.")

186. Ageyev, *supra* note 185 (stating the use of this rule allows Cryptomania "to rise above the restrictions imposed by segmented, obsolete local legislation").

187. *Cryptonomica Arbitration Rules*, *supra* note 179.

188. See GARY B. BORN, *INTERNATIONAL COMMERCIAL ARBITRATION* 171, 2780–81 (2d ed. 2014) (stating confidentiality is an important advantage of arbitration and encourages efficient dispute resolution).

189. *Cryptonomica Arbitration Rules*, *supra* note 179, at Annex.

190. *Id.* (stating "[f]ees and expenses of arbitrators" refers to this "arbitration fee," but providing that the "arbitration fee shall be paid by the claimant)."

Cryptonomica’s filing fee.¹⁹¹ In any event, this amount is lower than the filing fee of some of the major existing international arbitration institutions.¹⁹²

Another online crypto arbitration initiative has been devised by CodeLegit, and includes the “Blockchain Arbitration Rules” and “Blockchain Arbitration Library” for smart contracts.¹⁹³ The Blockchain Arbitration Rules are not as detailed as those of Cryptonomica, but similarly provide for electronic communications and for hearings to take place by video conferencing.¹⁹⁴ The Blockchain Arbitration Library allows a party to a smart contract to pause its performance if it considers the other party to be in breach of their legal agreement or believes the smart contract is not running correctly.¹⁹⁵ Once triggered, the library will pause the further execution of the smart contract and start the arbitral proceeding by sending a message to CodeLegit as the “Appointing Authority” (the administrative institution).¹⁹⁶ All communications between the parties, arbitrators, and appointing authorities are encrypted and published to the public on Bitcoin and Ethereum blockchains.¹⁹⁷

Some commentators have criticized such initiatives, which they view as essentially seeking to replace established international arbitration institutions.¹⁹⁸ As one commentator notes:

[M]any proposals allow for the administration [of arbitrations] by companies with no arbitral experience. The disputes may well be with the very company administering the case. It is possible the resolution will be handled by self-proclaimed arbitrators who are untrained in the law, principles of due process and other arbitral fundamentals.¹⁹⁹

C. Specialized Platform-Based Mechanisms

The third category of dispute resolution initiatives in the crypto context includes mechanisms built into the crypto platforms which, in our view, do not

191. *Id.* Referencing “costs of arbitration,” which includes the “fees of the arbitral tribunal” and are to be fixed by the arbitral tribunal in the final award. If such “costs” in fact include the arbitrators’ fees it would be unusual in general arbitration practice for the arbitrators to fix these fees, especially when an institution is administering the process.

192. *See, e.g. Costs and Payments*, INTERNATIONAL CHAMBER OF COMMERCE, <https://iccwbo.org/dispute-resolution-services/arbitration/costs-and-payments/> (charging a filing fee of US \$5,000, which is paid by the claimant to the International Chamber of Commerce when claimant files a Request for Arbitration); *Schedule of Arbitration Costs*, THE LONDON COURT OF INTERNATIONAL ARBITRATION, https://www.lcia.org/Dispute_Resolution_Services/schedule-of-costs-lcia-arbitration-2020.aspx (charging a registration fee of £1,950 payable with the Request for Arbitration); *Rules, Forms & Fees*, AMERICAN ARBITRATION ASSOCIATION, <https://www.adr.org/Rules> (charging initial filing fees for commercial arbitrations vary depending on the amount of the claim, but the minimum fee is US \$925, payable in full by a filing party when a claim, counterclaim, or additional claim is filed).

193. *CodeLegit White Paper on Blockchain Arbitration*, CODELEGIT & DATARELLA https://docs.google.com/document/d/1v_AdWbMuc2Ei70ghITC1mYX4_5VQsF_28O4PsLckNM4 (last visited Aug. 24, 2021).

194. *Id.* The Blockchain Arbitration Rules further provide that the number of arbitrators shall be one by default and the language to be used in the arbitral proceedings shall be English.

195. *Id.*

196. *Id.*

197. *Id.*

198. Gary L. Benton, *Beyond the Bubble*, THE RESOLVER 12, 14 (2018).

199. *Id.*

resemble traditional arbitration but rather employ some internal, “on-chain,” decision-maker or tribunal.²⁰⁰ The inspiration for these initiatives may be the “multi-signature address” mechanism originally used with cryptocurrency trading systems such as Bitcoin.²⁰¹ This mechanism involves a third-party “adjudicator” who, if a dispute arises between the trading parties, will be asked to determine whether the cryptocurrencies should be transferred to the recipient or given back to the original sender.²⁰² The multi-signature address mechanism, used in over 30% of existing cryptocurrencies as of 2019, “allows private parties to set up a dispute resolution procedure that . . . is effectively able to enforce its own outcomes.”²⁰³

New platform-based dispute resolution mechanisms are being developed for resolving more complex crypto disputes.²⁰⁴ We will confine our discussion to two examples of such platforms: Kleros and Aragon. Kleros is “an open source online dispute resolution protocol which uses blockchain and crowdsourcing to fairly adjudicate disputes.”²⁰⁵ It creates a “multipurpose court system” that relies on game-theoretical economic incentives for its operation.²⁰⁶ Anyone can sign up to be a “juror” and rule on crypto disputes in which the parties’ contract specifies Kleros as the dispute resolution mechanism.²⁰⁷ Jurors are randomly selected by Kleros and are incentivized to achieve consensus by gaining or losing crypto payments depending on whether they have decided “coherently,” i.e., voted for the option chosen by the majority.²⁰⁸

A similar platform is Aragon, which offers users the “Aragon Court”²⁰⁹—a dispute resolution protocol that handles disputes that cannot be solved by smart contracts. This is achieved by having a set of jurors drafted for each dispute who

200. Buchwald, *supra* note 153, at 1372–73.

201. Ortolani, *supra* note 32, at 610.

202. *Id.*

203. Ortolani refers to the multi-signature address mechanism as a form of “transnational self-enforcing arbitration.” However, for present purposes we consider it to be a mechanism internal to crypto platforms, currencies, or exchanges, and distinct from traditional and online crypto arbitrations, discussed above, which preserve the fundamental characteristics of arbitration. Ortolani, *supra* note 169, at 435–36.

204. *See, e.g.*, Buchwald, *supra* note 153, at 1373 (detailing Ethereum’s dispute resolution systems); James Metzger, *The Current Landscape of Blockchain-based, Crowdsourced Arbitration*, 19 MACQUARIE L. J. 81, 83 (2019) (“[i]t should be noted that it is reasonably easy to post a plan for starting work on a dApp, so the list may not be entirely complete as new platforms emerge with a great deal of speed.”); Orna Rabinovich-Einy & Ethan Katsch, *Blockchain and the Inevitability of Disputes: The Role for Online Dispute Resolution*, 2019 J. DISP. RESOL., 47, 48–49 (2019) (“A new generation of private blockchain entities also emerged in recent years, promising to remedy the scalability and pace problems that were associated with transactions on Bitcoin and Ethereum. These include the NEO, EOS and IOTA, to name a few.”); Allen et al., *supra* note 8, at 88 (“The DRPF framework that we have developed and applied in this Article provides a new theoretical foundation to understand new institutional competitive dynamics in dispute resolution, and presents opportunities for further empirical analysis as blockchain based dispute resolution mechanisms continue to emerge and compete.”).

205. *About Kleros*, KLEROS, <https://kleros.io/about> (last visited Aug. 24, 2021).

206. Clément Lesaege, Federico Ast & William George, *Kleros Short Paper v1.0.7*, KLEROS (2019), https://kleros.io/static/whitepaper_en-8bd3a0480b45c39899787e17049ded26.pdf [hereinafter *Kleros Short Paper*]; *see also* Clément Lesaege, William George & Federico Ast, *Kleros Long Paper v2.0.2*, 1, KLEROS (2021), https://kleros.io/static/yellowpaper_en-8ac96b06f39f19a6a28106cf624e3342.pdf (offering more detail about the system).

207. *Kleros Short Paper*, *supra* note 206, at 5.

208. *Id.* at 4–8; *see also*, Abramowicz, *supra* note 28 (detailing cryptocurrency protocols for resolving disputes on the basis of game theory).

209. *Welcome to Aragon Court*, ARAGON COURT, <https://anj.aragon.org> (last visited Aug. 24, 2021).

will vote to guarantee a ruling.²¹⁰ The dispute resolution process of the Aragon Court is similar to that of Kleros in terms of the game-theoretic incentives system in place for jurors to reach a consensus.²¹¹ Therefore, both in terms of the decision-makers and the decision-making process, these on-chain dispute resolution mechanisms differ from traditional arbitration.

While platform-based online mechanisms such as Kleros and the Aragon Court could provide parties with private dispute resolution that is faster, cheaper, decentralized, and denationalized, they are not risk free.²¹² Potential risks include, for instance, technological and educational barriers to participation, cryptocurrency volatility, jury pool compositions, applicable laws, and economic incentives.²¹³ Commentators have also pointed to lingering policy concerns surrounding potential technological flaws (such as inability to compel discovery, issues with the incentivized voting model, and “scalability infeasibility”) that may inhibit adequate adjudication and make on-chain dispute resolution options inferior to off-chain alternatives.²¹⁴

Against this background of crypto disputes that have already arisen and that are likely to arise in the future, and some of the existing mechanisms for their resolution, we approached our empirical study with several research questions in mind, reflecting the unique features of crypto disputes.

First, are “traditional” dispute resolution mechanisms such as mediation, arbitration, and litigation used in the novel cryptocurrencies and crypto exchanges scene, or have they been predominantly replaced with mechanisms tailored for crypto disputes? On the one hand, platforms may favor specialized crypto dispute resolution forums that account for the unique features of this environment.²¹⁵ On the other hand, given the nascent stage of development of these forums, platforms may be attracted, at least initially, to more traditional mechanisms with which they are familiar.²¹⁶

Second, to the extent that traditional dispute resolution mechanisms are used, which ones are preferred by cryptocurrencies and exchanges? For instance, the international nature of crypto trading may translate into a preference by cryptocurrencies and exchanges for international arbitration over domestic litigation.²¹⁷ Such platforms may shy away from litigation in domestic courts and favor private mechanisms that are not dependent on the parties’ location and their respective legal systems.²¹⁸ Moreover, the Terms & Conditions of these cryptocurrencies and exchanges, which contain the relevant dispute resolution

210. *Aragon Court*, ARAGON HELP DESK, <https://help.aragon.org/article/41-aragon-court> (last visited Aug. 24, 2021).

211. *Id.*

212. Tonya M. Evans, *The Role of International Rules in Blockchain-Based Cross-Border Commercial Disputes*, 65 WAYNE L. REV. 1, 12–13 (2019).

213. *Id.* at 13–16.

214. Buchwald, *supra* note 153, at 1394–1420. *See also*, Rabinovich-Einy & Katsch, *supra* note 204, at 72–75 (where the authors discuss cultural, legal, and technological barriers to successful on-chain dispute resolution).

215. Rabinovich-Einy & Katsch, *supra* note 204, at 58.

216. *Id.* at 11.

217. Franck, *supra* note 85, at 499–500.

218. *Id.* at 508.

clauses in our study, are effectively standard form contracts that traders are unable to negotiate.²¹⁹ In this respect, disputes arising in the crypto context resemble consumer disputes more than commercial disputes between businesses.²²⁰ Looking at the consumer context in the United States, there appears to be much arbitration activity.²²¹ Crypto traders may well be viewed as consumers of financial services, but they might also be more sophisticated than investors in traditional securities such as stocks and bonds.²²² For instance, crypto investors may be motivated by the unique risk-return features that the crypto assets provide.²²³ As such, they may not necessarily fall within the purview of domestic consumer protection legislation.²²⁴ It is therefore interesting to examine the role of arbitration in crypto disputes involving these *sui generis* consumer traders.

Third, when cryptocurrencies and exchanges choose either arbitration or litigation, how are they designing these mechanisms? Do platforms tend to specify the venue and governing law when choosing litigation, and how do they deal with the domestic conflict of law rules? Do platforms make use of the traditionally perceived advantages of arbitration by, for instance, requiring confidentiality and for arbitrators to have relevant expertise? Examining these and other design features of the dispute resolution clauses contained in crypto Terms & Conditions would shed light both on the features of these mechanisms most valued by crypto platforms and on their possible motivation for choosing one mechanism over the other.²²⁵

Ultimately, the crypto trading context provides a unique lens through which parties' choice of litigation versus arbitration may be examined. By the same token, dispute resolution provides a unique lens through which this new and transnational environment in which crypto trading operates may be studied. In the next Part, we turn to introduce our empirical study before presenting and analyzing our results in Part V.

IV. EMPIRICAL STUDY—INTRODUCTION AND METHODOLOGY

In this Part, we introduce our empirical study of the dispute resolution choices that cryptocurrencies and exchanges make when setting up and operating their trading platforms. To conduct this study, we examined the Terms

219. Sklaroff, *supra* note 153, at 276–77.

220. Buchwald, *supra* note 153, at 1422–23.

221. Drahozal & Ware, *supra* note 107, at 472; David Horton & Andrea Cann Chandrasekher, *After the Revolution: An Empirical Study of Consumer Arbitration*, 104 GEO. L.J. 57 (2015) (empirically analyzing approximately 5,000 consumer arbitration).

222. Matt Hougan & David Lawant, *Crypto assets: The Guide to Bitcoin, Blockchain, and Cryptocurrency for Investment Professionals*, CFA INST. RSCH. FOUND. 1, 52 (2021).

223. *Id.* at 22. Crypto assets have been characterized by high return and high volatility but low correlation with the rest of the market. It is not clear what this suggests regarding the actual investors in the crypto-markets, but reveals that, as of now, crypto-assets do not conform to traditional financial models.

224. Stipanowich & Lamare, *supra* note 78, at 66. The decline of arbitration in the consumer arena may be motivated by companies' concern about consumer opposition to arbitration.

225. See Christopher R. Drahozal & Erin O'Hara O'Connor, *Unbundling Procedure: Carve-Outs From Arbitration Clauses*, 66 FLORIDA L. REV. 1945, 1955 (2015) (identifying the differing requirements for parties opting for litigation versus arbitration).

& Conditions of approximately 500 cryptocurrencies and exchanges, although we ultimately used approximately 300 of these in our study. We chose these platforms from the website “Coin Market Cap,”²²⁶ which contains many cryptocurrencies and exchanges and ranks them according to price, market capitalization, and the daily volume for exchanges. We also followed Coin Market Cap’s classification of currency and exchange. Additionally, the entry for each cryptocurrency or exchange contains a link to their respective websites. This allowed us to access the Terms & Conditions primarily associated with each of these platforms.

Using the coinmarketcap.com website, we selected the top 250 cryptocurrencies and top 250 exchanges listed on the site.²²⁷ The cryptocurrencies are ranked by market capitalization, or the price of the currency in U.S. dollars multiplied by the number of units of the currency that are circulated.²²⁸ The crypto exchanges are ranked by a web traffic factor that measures the amount of web traffic each exchange receives daily. Ultimately, these rankings are very fluid.²²⁹ Even in our sample, some cryptocurrencies and exchanges may have fallen from the top 500 while this article was going to press.²³⁰ This is not a concern, however, as the point is to create a sample of these Terms & Conditions in order to study how the crypto world proposes to resolve its disputes.

Although we were able to access the websites of all 500 cryptocurrencies and exchanges, interestingly not all the platforms had their Terms & Conditions available on their site. Presumably one would have to download the software for these cryptocurrencies and exchanges prior to being able to access their Terms & Conditions (a step which we did not take). As such, although we examined approximately 500 sites, only two thirds of the sites (approximately 300) had

226. We used this website as it lists hundreds of cryptocurrencies and exchanges, totaling over 5,000 when last accessed. The list is almost exhaustive and is updated on an ongoing basis. It has become a standard website to access and compare data for these platforms in a systematic manner. A search of Youtube and Twitter reveals many tutorials and references to the website by those in the industry. It is also the website that has been used by the Federal Government and the courts in making valuation claims regarding certain crypto platforms. *See, e.g.*, *Commodity Futures Trading Comm’n v Reynolds*, No. 1:19-CV-05631-MKV, 2021 WL 796683, at *4 n.2 (S.D.N.Y. Mar. 2, 2021) (“The Commission assessed the value of the Bitcoin that customers transferred . . . by relying on historical pricing data that was published on the website known as CoinMarketCap, <https://coinmarketcap.com/>.”); *Commodity Futures Trading Comm’n v. McDonnell*, 332 F. Supp. 3d 641, 670 (S.D.N.Y. 2018) (“The virtual currency transfers . . . were valued . . . using CoinMarketCap, a widely used website freely available at coinmarketcap.com CoinMarketCap is used frequently by news publications to report on prices of virtual currencies, including publications that focus on virtual currencies such as CoinDesk and general financial newspapers”).

227. Our data includes exchanges and currencies located in countries such as Korea, Russia, Thailand, and Seychelles. Interestingly, all of their websites were in English, and sometimes another language, and contained Terms & Conditions that resembled standard conditions that one would find in the United States, Canada, or the United Kingdom.

228. COINMARKETCAP, coinmarketcap.com (last visited Aug. 24, 2021).

229. *See* Amir Feder et al., *The Rise and Fall of Cryptocurrencies*, WORKSHOP ON THE ECON. OF INFO. SEC. 2018, at 7 (explaining that only fifty-seven cryptocurrencies have over \$1 billion market caps at the time of writing, and less-valued currencies are more likely to experience high price volatility).

230. *See Top Crypto Gainers And Losers Today*, COINMARKETCAP, <https://coinmarketcap.com/gainers-losers/> (last visited Aug. 24, 2021) (offering a “Gainers & Losers” tool that is sortable by the top 500 cryptocurrencies that recorded double-digit daily price changes to over twenty top-500 cryptocurrencies on last visit).

accessible Terms & Conditions.²³¹ We do, however, note that given that we tried to sample an equal number of currencies and exchanges, 250 each, we ended up with information on 85 unique currencies and 168 unique exchanges, which suggests that exchanges are far more likely to publicly disclose Terms & Conditions.

Our next step was to code the Terms & Conditions by whether the cryptocurrency or exchange provided for mediation, arbitration, litigation, or a platform-specific mechanism (or a combination of these) as the main mode of dispute resolution.²³² We found that mediation was rarely used (only in six cases) and only in addition to either arbitration or litigation rather than as the main, stand-alone mechanism. Moreover, only one case (the Aragon currency) referred to the Aragon Court, and two cases referred to an internal “ODR platform” or platform-based “chat.” Therefore, we focused our statistical testing and analysis on platforms’ choice of arbitration or litigation (or both).

A few examples of dispute resolution clauses found in cryptocurrencies and exchanges’ Terms & Conditions will illustrate our coding methodology. Some platforms had very simple terms. Consider for example, Bitstamp—an exchange, which has a simple dispute resolution clause that provides for litigation: “The Terms of Use shall be governed and construed in accordance with the law of England and Wales. The parties hereto agree to irrevocably submit to the exclusive jurisdiction of the courts of England and Wales.”²³³ The Bitcoin organization, in the legal section on its website, also has a dispute resolution clause that states, “The user of the Website agrees to arbitrate any dispute arising from or in connection with the Website or this disclaimer, except for disputes related to copyrights, logos, trademarks, trade names, trade secrets or patents.”²³⁴ We interpreted this provision to require both litigation for intellectual property disputes and arbitration for all other disputes.²³⁵

A note about Bitcoin, specifically, should be made here. Given that Bitcoin is probably the most decentralized of the blockchain systems and does not exist in one location or server,²³⁶ and given its robust validation system, it is not

231. In other words, approximately one third, or 218 websites, did not have visible Terms & Conditions. It should also be noted that some sites may have separate Terms & Conditions that provide for a different dispute resolution mechanism at a later stage, once a customer begins trading on the site. Even then, however, the Terms & Conditions that we examined would govern at least some disputes that may arise between the platform and traders, or between traders.

232. Many Terms & Conditions provided for arbitration as the default mechanism but specified disputes that would nonetheless go to litigation, such as those concerning intellectual property claims. In such cases, if the Terms & Conditions provided details as to the place and/or process of the litigation, we coded them as providing both for litigation and for arbitration. If the Terms & Conditions purported to provide exceptions from arbitration as the default mechanism but no further details were provided in this regard, we coded this as providing only for arbitration, although we included the presence of the exception(s) as a variable.

233. *Terms of Use*, BITSTAMP, <https://www.bitstamp.net/terms-of-use/ld/> (last visited Aug. 24, 2021).

234. *Legal Disclaimer*, BITCOIN.ORG, <https://bitcoin.org/en/legal> (last visited Aug. 24, 2021).

235. We included the same platform in both arbitration and litigation only where some concrete details (e.g., venue, etc) were provided regarding both mechanisms. Since Bitcoin’s Terms & Conditions did not contain any details regarding how litigation is to proceed, we included it only in the arbitration category.

236. Mary Ann Callahan, *What Are The Most Decentralized Cryptocurrencies?*, COINCODECAP (Aug. 16, 2021), <https://blog.coincodecap.com/most-decentralized-cryptocurrency-list/>; see also Karim Helmy, *Measuring Bitcoin’s Decentralization*, COINMETRICS (Sept. 15, 2020), <https://coinmetrics.io/measuring-bitcoins-decentralization/> (concluding that Bitcoin is “meaningfully decentralized”).

surprising that there is no detailed dispute resolution mechanism. Bitcoin operates on thousands of computers worldwide, and as such, this makes it hard to definitely state whether there is any organization that speaks or acts on behalf of the platform as a whole.²³⁷ Nonetheless, the website bitcoin.org, which was established by two of the founders of the Bitcoin system and where the original Nakamoto white paper is housed, also allows users to buy bitcoin (albeit through a third party) and instructs on how to set up a “full node,” i.e., “a program that fully validates transactions and blocks.”²³⁸ As such, an uninitiated user who wanted to learn about Bitcoin, purchase bitcoin, or even become a developer for Bitcoin would probably start at the original site.²³⁹ The site is also the one that coinmarketcap.com refers to when listing details on Bitcoin.²⁴⁰ While it is still an open question how much these Terms & Conditions are binding on those who use or visit a website, generally speaking, operators of websites tend to argue notice, actual or constructive, in all sorts of cases.²⁴¹ As such, it would be reasonable to assume that if a user chose to engage the Bitcoin system in legal action, the Terms & Conditions on bitcoin.org would be relevant. Other currencies also operate in a similar manner in that they maintain a website for the organization that provides information about the currency and instructions on how to purchase or mine the currency.²⁴²

Moreover, given the various legal actions against many of the cryptocurrencies, such as the Nano lawsuit mentioned above,²⁴³ the recent New York Attorney General’s settlement with Tether,²⁴⁴ and the Securities & Exchange Commission’s actions against Kik Interactive²⁴⁵ and against Ripple,²⁴⁶ it is clear that the organizations are not always disassociated from the

237. Timothy B. Lee, *Who is in charge of Bitcoin?*, VOX (Nov. 3, 2015, 10:03 PM), <https://www.vox.com/2015/11/3/18053552/who-is-in-charge-of-bitcoin>.

238. *Running a Full Node*, BITCOIN.ORG, <https://bitcoin.org/en/full-node> (last visited Aug. 22, 2021).

239. *Cf. Getting started with Bitcoin*, BITCOIN.ORG, <https://bitcoin.org/en/getting-started> (last visited Aug. 22, 2021) (explaining how newcomers can learn about and use bitcoin).

240. COINMARKETCAP, <https://coinmarketcap.com/currencies/bitcoin/> (last visited Aug. 24, 2021).

241. *See* Cindy Saiter & Emily Gray, *What Makes a Binding Agreement in the Modern World*, 39 CORP. COUNS. REV. 141, 146–51 (2020) (discussing the evolving enforceability by courts of online Terms & Conditions known as clickwrap and browserwrap or browserwrap); *Papa v. Harriet Carter Gifts, Inc.*, 426 F.Supp. 3d 108, 118 (W.D. Penn. 2019) (“[T]here are two predominant types of . . . contracts formed on the internet: clickwrap agreements and browserwrap agreements. Clickwrap agreements require users to click on an ‘I agree’ box after being presented with the Terms & Conditions of visiting the site. Browserwrap agreements, on the other hand, do not require affirmative consent. They simply provide the website’s terms of use on a particular page or at the bottom of a screen. Courts consistently enforce browserwrap agreements when users have actual notice. . . . If there is no evidence of actual knowledge, the validity of a browserwrap agreement turns on whether the website put a reasonably prudent user on inquiry notice of its terms.”).

242. *Cf. Today’s Cryptocurrency Prices by Market Cap*, COINMARKETCAP, <https://coinmarketcap.com/> (last visited Aug. 24, 2021) (providing a clickable link to the predominant website associated with each cryptocurrency after initially clicking on that cryptocurrency).

243. *Fabian v. Nano, LLC*, No. 4:19-CV-00054-YGR, 2019 WL 105597, ¶ 1 (N.D. Cal. Jan. 3, 2019).

244. Press Release, New York State Office of the Attorney General, Attorney General James Ends Virtual Currency Trading Platform Bitfinex’s Illegal Activities in New York (Feb. 23, 2021), <https://ag.ny.gov/press-release/2021/attorney-general-james-ends-virtual-currency-trading-platform-bitfinexs-illegal>.

245. Press Release, U.S. Securities and Exchange Commission, SEC Obtains Final Judgment Against Kik Interactive For Unregistered Offering (Oct. 21, 2020), <https://www.sec.gov/news/press-release/2020-262>.

246. Press Release, U.S. Securities and Exchange Commission, SEC Charges Ripple and Two Executives with Conducting \$1.3 Billion Unregistered Securities Offering (Dec. 22, 2020), <https://www.sec.gov/news/press-release/2020-338>.

currencies being traded. Both Tether and Nano (as well as Kin, the currency for the Kik Interactive)²⁴⁷ have Terms & Conditions on their organizations' websites, and the individuals or entities associated with these organizations have been defendants in the lawsuits or legal claims against their currency platforms.²⁴⁸ As such, we used the Terms & Conditions that appeared on the websites provided by coinmarketcap.com to collect our data.

Returning to these Terms & Conditions, in contrast to the simple terms of Bitcoin and Bitstamp, the Terms & Conditions of KuCoin, another exchange, are more complex. Their dispute resolution clause, section 21, states in relevant part:

You and KuCoin agree to notify each other in writing of any dispute within thirty (30) days of when it arises. Notice to KuCoin shall be sent to KuCoin Support Center. You and KuCoin further agree that you and KuCoin shall spend not less than three (3) months on full communication, consultation or mediation before either party submits the disputes in question for litigation. If no settlement can be reached through consultation, the litigation shall be under the jurisdiction of the court located in the place where the plaintiff has his/her/its domicile.

These Terms shall be governed by and construed in accordance with English Common Law. The International Business Companies Act 1994 is the principal legislation that governs corporates in the Republic of Seychelles.²⁴⁹

Oddly enough, KuCoin's Terms & Conditions refer to section 21 as the "Arbitration section" and caution the user that "[t]here are important legal terms provided below in the complete Terms of Use, including . . . your agreement to *arbitrate disputes*."²⁵⁰ Nonetheless, section 21 refers to litigation in a court under the English common law in a jurisdiction where the plaintiff has its domicile.²⁵¹ The section also specifies that there should be some prior informal attempt at dispute resolution through "full communication, consultation or mediation."²⁵² It does not, however, specify how these processes would operate.²⁵³

247. KIN, <https://kin.org/> (last visited Aug. 24, 2021). We did not include Kin in our dataset, as its market valuation place it below the 250 cutoff for our selection.

248. Fabian v. Nano, LLC, No. 4:19-CV-00054-YGR, 2019 WL 105597, ¶¶ 18-20 (N.D. Cal. Jan. 3, 2019); *see also* Press Release, New York State Office of the Attorney General, Attorney General James Ends Virtual Currency Trading Platform Bitfinex's Illegal Activities in New York (Feb. 23, 2021), <https://ag.ny.gov/press-release/2021/attorney-general-james-ends-virtual-currency-trading-platform-bitfinexs-illegal> (discussing the Tether suit).

249. *Terms of Use*, KUCOIN, https://www.kucoin.com/news/en-terms-of-use?lang=en_US (last visited Aug. 24, 2021).

250. *Id.* (emphasis added).

251. *Id.*

252. *Id.*

253. *Id.* Nonetheless, we considered this as a requirement for prior resolution before resorting to litigation/arbitration.

The cryptocurrency Tether's Terms & Conditions also offer a complex dispute resolution mechanism, as well as an example of a platform that provides both for arbitration and litigation.²⁵⁴ At the outset, the reader is told that there are actually two Tethers: Tether International Limited (TIL) and Tether Limited (TLTD).²⁵⁵ American customers are deemed to be dealing with TLTD, while non-American customers are deemed to be dealing with TIL.²⁵⁶ Section 6 of Tether's terms provides for two processes: One for TIL's customers and another for TLTD's customers.²⁵⁷ Non-American customers are told that their disputes with TIL are to be resolved through the "exclusive jurisdiction of the courts of the British Virgin Islands."²⁵⁸ The terms make it clear that the users also "consent to the jurisdiction and venue of the courts of the British Virgin Islands, and ... waive any objections."²⁵⁹ The terms also make it clear that any claims must be brought as individuals and not as part of a class action.²⁶⁰

On the other hand, TLTD's American customers are instructed that any dispute will be "subject to and finally resolved by confidential arbitration before a sole arbitrator in accordance with the International Institute for Conflict Prevention and Resolution Rules for Non Administered Arbitration, as amended from time to time (the 'CPR Rules')."²⁶¹ The terms specify that the "seat or legal place of the arbitration shall be San Diego, California, unless otherwise agreed by the parties."²⁶² Additionally, the "language of the arbitral proceedings shall be English."²⁶³ The number of arbitrators is set at one, and the arbitrator is empowered to "award any relief that a court of competent jurisdiction could award, including attorneys' fees when authorized by law."²⁶⁴ Additionally, for claims less than \$15,000, TLTD will "reimburse [the claimant] for all initiating filing fees that are in excess of fees you would have paid if you were proceeding in court."²⁶⁵ The prevailing party "shall be entitled to its costs of the arbitration (including the arbitrator's fees) and its reasonable attorney's fees and costs."²⁶⁶ Finally, similar to the clause for the TIL customers, the terms make it clear that the arbitration shall only be on behalf of a single claimant and not on behalf of a class or more than one party.²⁶⁷

Tether's terms are interesting for several reasons. First, it has essentially two sets of terms depending on the location of the customer, one specifying litigation and the other specifying arbitration as the dispute resolution mechanism.²⁶⁸ As such, we entered Tether twice in our dataset, once as

254. *Legal*, TETHER, <https://tether.to/legal/> (last visited Aug. 24, 2021).

255. *Id.*

256. *Id.*

257. *Id.*

258. *Id.*

259. *Id.*

260. *Id.*

261. *Id.*

262. *Id.*

263. *Id.*

264. *Id.*

265. *Id.*

266. *Id.*

267. *Id.*

268. *Id.*

specifying arbitration and once as specifying litigation. For the entry specifying litigation, we noted that a venue was specified, a governing law was specified, and a bar on class proceeding was specified.²⁶⁹ Second, the terms regarding arbitration are quite detailed in that they specify the seat of the arbitration, the number of arbitrators, the language of arbitration, the rules surrounding fees and costs, the institutional rules to be used in the arbitration, as well as the prohibition on class proceedings.²⁷⁰ In our empirical study, we set out to examine the possible linkages between these various terms in the Terms & Conditions of Tether and other platforms, the degree to which they appear together or impact one another, and the possible implications for cryptocurrencies' and exchanges' choice of arbitration versus litigation as a dispute resolution mechanism.

After designating each currency and exchange as providing for arbitration, litigation, or both,²⁷¹ we compiled a list of variables for testing. These variables pertain either to the nature of the currency/exchange (e.g., volume) or to main design features of the dispute resolution process (e.g., place of arbitration/litigation).²⁷² Some of these variables were common to both litigation and arbitration, while others were unique to arbitration.²⁷³ The twelve variables that were the most statistically meaningful are set out below in Table 2:

Table 2: Tabulation of variables

Variable	Description
Volume	The twenty-four-hour Volume of trades on an exchange for all currencies or the twenty-four-hour Volume of a specific currency traded on all exchanges and currency platforms (both measured in \$US)

269. *Id.*

270. TETHER (May 12, 2020), <https://tether.to/legal>.

271. Because we may count a currency or exchange twice if it provides for both arbitration and litigation, our final dataset contained 107 currencies and 197 exchanges. This means that 35% of our observations were currencies and 65% were exchanges. In our original data (85 Currencies and 168 exchanges), this ratio is almost the same.

272. We collected data on additional variables, but there were not sufficient observations to conduct any meaningful tests. These variables include whether a time limit is placed on claims, whether there is an opt-out option from arbitration, whether arbitrators' qualifications and selection mechanism are specified, whether the United Nations Convention on Contracts for the International Sale of Goods is expressly excluded from the governing law, whether a deadline for the arbitral award is specified, whether an in-person hearing is provided for or excluded, whether the language of the proceedings is specified, whether discovery is allowed or restricted, whether a court for appeal or enforcement is specified, and whether remedies are addressed.

273. We collected data on additional variables exclusive to litigation, but there were not sufficient observations to conduct any meaningful tests. These variables are the presence of a jury trial waiver, and whether the venue of litigation was different depending on whether the currency and exchange is the claimant or the respondent.

Exceptions ²⁷⁴	Whether any specific types of disputes, actions, or remedies were excepted from the chosen dispute resolution mechanism (for arbitration only) ²⁷⁵
Broad scope	Refers to “any/all” disputes as well as to specific disputes (for arbitration only) ²⁷⁶
Institutional rules	Institutional arbitration rules specified (for arbitration only) ²⁷⁷
Number specified	Number of arbitrators specified (for arbitration only) ²⁷⁸
Confidentiality	Confidentiality of proceedings addressed (for arbitration only)
Governing law	Substantive law (and procedural law for arbitration) specified
Conflict and choice of law rules	Conflict and choice of law rules excluded ²⁷⁹
Place specified	Seat of arbitration or venue of litigation specified
Prior resolution	Prior informal (e.g. negotiation) or formal (e.g. mediation) resolution required
Class proceedings	Class proceedings prohibited
Costs	Indication of how costs are to be paid, including attorney fees and arbitrator fees

These variables were coded “yes” or “no” depending on whether the term in Table 2 was present or absent from a cryptocurrency/exchange’s Terms & Conditions.

We then proceeded to test the data we collected in three stages. In stage one, we ran the most basic and simple empirical testing, calculating the

274. Such exceptions have also been referred to as “carve-out” provisions. On carve-outs from arbitration clauses, see, e.g., Christopher R. Drahozal & Erin O’Hara O’Connor, *Unbundling Procedure: Carve-outs from Arbitration Clauses*, 66 FLA. L. REV. 1945 (2014) (“Specifically, parties that agree to arbitration clauses commonly exclude (or carve out) certain claims or remedies from their arbitration clause . . .”).

275. In our study, the most common exception from the Terms & Conditions that provided for arbitration was intellectual property disputes concerning copyrights, logos, trademarks, trade names, trade secrets, or patents. Other common exceptions included disputes that would qualify for small claims court and claims for emergency or equitable relief. *Id.* at 1968, 1998 n. 197.

276. For instance, disputes relating to “the existence, breach, termination, enforcement, interpretation or validity” of the terms of service; issues of “arbitrability” and “enforceability” of the arbitration provision; “federal and state statutory claims, common law claims, and those based in contract, tort, fraud, misrepresentation, or any other legal theory.”

277. In terms of *institutional rules*, we coded the variable “yes” if the terms specified an institutional set of procedural arbitration rules. If there was no set of rules specified or it simply stated that the rules were to be determined, we coded this as “no.” Examples of such rules include JAMS, LCIA, AAA, SIAC, HKIAC, CPR, ICC, Malta Arbitration Centre, Bulgarian Chamber of Commerce, Estonian Chamber of Commerce, European Arbitration Chamber, Belarusian Chamber of Commerce, Indonesian National Ministry, SVG Judicial Arbitration and Mediation, and BVI International Arbitration Center.

278. *Number specified* indicates that the terms specified one, three, or one and three arbitrators. This was coded “yes” if any number was specified, and “no” otherwise.

279. These are the domestic rules that govern how a decision-maker will resolve a dispute concerning the applicable governing law when the action has a connection to more than one jurisdiction. In our study, the “governing law” variable is the actual conflict/choice of law provision, while the “conflict and choice of law rules” variable examines whether these rules of the chosen governing law are excluded.

frequency with which cryptocurrencies and exchanges choose arbitration versus litigation, as well as the frequencies with which these twelve variables appear in the Terms & Conditions. In stage two, we ran a more advanced empirical testing, examining the statistical significance of the relationships (i.e., correlations) between these variables as well as between each variable and the choice of arbitration versus litigation. As correlations do not fully reflect the complexity of these relationships, as will be explained below, we proceeded in stage three to run logistic regressions in order to obtain a more accurate picture of which variables appear most salient to the choice of arbitration versus litigation as a dispute resolution mechanism in the crypto context, and how they relate to one another. The results of this three-stage empirical analysis paint a relatively clear picture of how cryptocurrencies and exchanges design the dispute resolution clauses in their Terms & Conditions, reveal what design features appear to be most important to them, and thus allow us to make some preliminary suggestions as to why these platforms may prefer one type of mechanism over the other. Ultimately, by understanding *how* arbitration and litigation are designed and used by these cryptocurrencies and exchanges, we hope to be able to sketch a preliminary picture of *why* one method may be preferred over the other. We turn to the results of our empirical study and their analysis in the next Part.

V. EMPIRICAL STUDY—RESULTS AND ANALYSIS

In this Part, we present and analyze the results of each stage of our empirical study. We find that each stage provides slightly different results from a statistical point of view. Together, they allow us to compile a nuanced picture of *how* cryptocurrencies and exchanges design their dispute resolution clauses and hypothesize as to *why* they make these choices.

A. *Stage One: Frequencies*

1. *Choice of Mechanism*

At the first stage of the frequencies analysis, we calculated the proportion of cryptocurrencies and exchanges that provide for arbitration versus litigation. Our results can be found in Table 1 in Appendix I. They show that 59% of cryptocurrencies and 65% of exchanges prefer litigation to arbitration. That being said, the differences, even accounting for volume, were not statistically significant.²⁸⁰ This result, while basic from an empirical standpoint, is theoretically valuable since it questions the applicability in the crypto context of the studies, discussed in Part II above, that have found a statistically significant

280. We conducted a t-test for the difference in means between the overall choice of litigation versus arbitration. We also conducted a t-test for the difference in means between the currencies' choice of litigation versus exchanges' choice of litigation. In both tests, the t-statistic was statistically insignificant at the 10% level. We also ran a logistic regression with the choice of arbitration or litigation as the dependent variable and the daily trading volume or value of the supply of the currency as well as whether the platform was a currency or exchange as independent variables. The coefficients for both variables were statistically insignificant. We do not report these statistics, but they are available upon request.

decline in the use of arbitration (as opposed to litigation) in other commercial sectors. Notwithstanding the disadvantages of arbitration identified in other contexts, the novel, specialized, and transnational nature of crypto disputes, as well as jurisdictional limitations associated with domestic litigation, may drive cryptocurrencies and exchange to use arbitration as often as litigation. However, at this time it does not seem that arbitration is favored over litigation in the crypto dispute resolution context.

2. Variables

We proceeded to test the frequency with which the variables listed in Table 2 appear in the Terms & Conditions. Tables 2a to 2i in Appendix I present our results. These reveal an interesting preliminary picture of how arbitration and litigation are designed by cryptocurrencies and exchanges.

Institutional versus *ad hoc* arbitration: Where arbitration was chosen, 70% of these platforms specified institutional arbitration and only 30% chose *ad hoc* arbitration. The most commonly used institutional rules by cryptocurrencies and exchanges are those of the AAA.²⁸¹ The differences between these two types of international arbitration are significant. Institutional arbitration is conducted under a particular set of procedural rules and is typically administered by an international arbitration institution that is responsible for various procedural aspects of the arbitration, such as fixing the arbitrators' fees and constituting the arbitral tribunal.²⁸² In contrast, *ad hoc* arbitration proceeds without such an administrative authority and its accompanying pre-existing arbitration rules, although the parties may still designate a set of arbitration rules to govern the proceedings.²⁸³ This finding is not surprising, as choosing institutional arbitration reduces the risk of procedural deadlocks and technical defects in the arbitral award, increases predictability, streamlines and expedites the proceedings, and may increase voluntary compliance and judicial enforcement.²⁸⁴

Number of arbitrators: Our results indicate that it is common for cryptocurrencies and exchanges to specify the number of arbitrators (62% of cases). Moreover, most of the platforms specifying the number of arbitrators selected a single arbitrator rather than three arbitrators.²⁸⁵ This is likely intended to control the costs of the process, as an arbitration with three arbitrators would be more expensive than an arbitration with one arbitrator.

Class proceedings: Cryptocurrencies and exchanges choosing arbitration also tended to prohibit class proceedings (53% of cases). This is not surprising given the nature of crypto trading and the likelihood of claims being filed by similarly situated traders against trading platforms and exchanges. This may also

281. Eighteen Terms & Conditions specified the AAA Arbitration Rules; twelve specified the SIAC Arbitration Rules; eleven specified the JAMS Arbitration Rules; nine specified the HKIAC; and seven specified the LCIA Arbitration Rules. Other institutional arbitration rules were only selected in one to three cases.

282. GARY B. BORN, INTERNATIONAL COMMERCIAL ARBITRATION 169–71 (2d ed., 2014).

283. *Id.* at 170–71.

284. *Id.* at 171.

285. Fifty-three out of seventy cases.

be a result of some jurisdictions allowing waiver of class proceedings in the context of arbitration agreements. In contrast to arbitration, only around 16% of cryptocurrencies and exchanges choosing litigation also prohibited class proceedings. This outcome is understandable given that a waiver of class proceedings may not be available to parties to domestic litigation in many jurisdictions.

Costs: A common tendency among cryptocurrencies and exchanges choosing both arbitration and litigation is to remain silent with regard to costs issues in their Terms & Conditions (99% of cases in litigation and 77% of cases in arbitration). This tendency makes sense in litigation, where parties have little control over the ultimate costs of the court proceedings, including the allocation of attorney fees. In arbitration, however, parties do enjoy the freedom to control, to some extent at least, the costs of the proceedings, for instance by stating that each party will bear its own attorney fees. Where an arbitration institution is chosen to administer the proceedings, its rules will often address the division of administrative costs and arbitrators' fees between the parties.²⁸⁶

Governing law: The governing law was frequently included in dispute resolution clauses providing for arbitration (83% of cases). The governing law variable represents a reference to a domestic or non-national substantive law that is to govern the merits of the dispute and/or to a domestic or non-national arbitration law that is to govern the procedure of the arbitration (e.g., the American Federal Arbitration Act). It is worth noting that none of the platforms included in our database specified a "non-state law" as the governing law, such as the International Institute for the Unification of Private Law ("UNIDROIT") Principles of International Commercial Contract, the United Nations Commission on International Trade Law ("UNCITRAL") Convention on the International Sale of Goods ("CISG"), or the *lex mercatoria*.²⁸⁷

Cryptocurrencies and exchanges choosing litigation selected the governing law even more frequently than those choosing arbitration (90% of cases). This makes sense given that this is one of the few features that parties to domestic litigation of international disputes are able to choose, as well as the potential challenges concerning applicable law(s) in crypto disputes. Selecting a governing law in the context of litigation means only choosing the substantive law to govern the merits of the dispute.²⁸⁸ The procedural law governing litigation in domestic courts would typically be dictated by the civil procedure law of the jurisdiction and would not be subject to the parties' agreement.²⁸⁹ This may be an incentive for platforms to also choose the venue of the litigation.

Seat of arbitration and venue of litigation: A seat was frequently included in dispute resolution clauses providing for arbitration (56% of cases). The concept of the "seat" in international arbitration represents the legal domicile of

286. See BORN, *supra* note 282, at 178–81 (highlighting leading institutions that address administrative costs and arbitrators' fees).

287. S.I. Strong, *Limits of Procedural Choice of Law*, 39 BROOK. J. INT'L L. 1027, 1029 n. 6 (2014) ("The term *lex mercatoria* is typically used to refer to various uncodified principles of international commercial law, although there is a wide-ranging debate about the content, scope, and existence of *lex mercatoria*.").

288. *Id.* at 1028.

289. *Id.* at 1030.

the arbitration, the laws of which will provide the legal framework of an arbitration including its procedural aspects.²⁹⁰ It therefore makes sense for the governing procedural law and the law of the seat to be the same, and this is indeed a common occurrence in international arbitration generally.²⁹¹ While the substantive law that governs the merits of the disputes may well be different in international arbitration than the governing procedural law or the law of the seat, most platforms chose as the substantive and/or procedural law the law of the seat. That said, there is a visible difference in the frequency of choosing the governing law(s) vs. the seat of the arbitration. Whereas the law(s) governing the arbitration were specified by 83% of platforms, the seat of the arbitration was only specified by 56% of these platforms. The tendency to specify the governing law is understandable given the potential issues arising in this regard in the virtual and transnational crypto trading world. The lower frequency with which the seat of the arbitration was specified may reflect an underestimation or misunderstanding of the “paramount importance” of choosing the seat of an international arbitration.²⁹² For instance, the jurisdiction selected as the seat of the arbitration will be the jurisdiction where the arbitral award is “rendered” for the purpose of international enforcement under the Convention on the Recognition and Enforcement of Foreign Arbitral Awards.²⁹³

Cryptocurrencies and exchanges choosing litigation selected the venue of the litigation even more frequently than those choosing arbitration (81% of cases). As with the governing law, this makes sense given that these are the two main features that parties to domestic litigation of international disputes are able to choose, as well as the potential challenges concerning jurisdiction in crypto disputes.

Conflict and choice of law rules: The frequent selection of the substantive governing law in both litigation and arbitration may further be motivated by the desire not to leave this decision to the conflict/choice of law rules of the forum. However, in both arbitration and litigation more than half of the platforms (58% and 60% respectively) did *not* exclude the conflict or choice of law rules of the relevant domestic law, leaving open the possibility that a different substantive law will end up being applied by the arbitral tribunal or a domestic court.

Prior formal or informal dispute resolution mechanisms: Provision for such mechanisms were common where arbitration was chosen (61% of cases) but not where litigation was chosen (28% of cases). As noted above, multi-stage dispute resolution clauses are commonly used with arbitration also in other contexts, although it has been shown that “relatively fewer settlements take place during arbitration than in litigation.”²⁹⁴ In the crypto context this result may suggest that

290. See BORN, *supra* note 282, at 153 (noting that the “seat” of the arbitration may or may not be the place where the arbitration hearings are actually conducted).

291. See *id.* at 1598 (explaining that procedural law is typically the legislation of the seat).

292. See *id.* at 1536 (noting the importance of the arbitral seat in the arbitration process).

293. Convention on the Recognition and Enforcement of Foreign Arbitral Awards, art. 2, Jun. 10, 1958, 21.3 U.S.T. 2517, 330 U.N.T.S. 3; BORN, *supra* note 282, at 1541.

294. Anne van Aaken & Tomer Broude, *Arbitration from a Law & Economics Perspective*, in THE OXFORD HANDBOOK OF INT’L ARB. 874, 883 (Thomas Schultz & Federico Ortino eds., 2020) (“[A]rbitrations are often

many platforms view arbitration as a last resort mechanism that should ideally be avoided, while most platforms choosing litigation do not seem to find much value in requiring out-of-court prior resolution efforts.²⁹⁵

In sum, our frequency testing reveals that cryptocurrencies and exchanges have a slight, yet statistically insignificant, preference for litigation over arbitration. When choosing arbitration, the majority of platforms preferred institutional over *ad hoc* arbitration, most commonly choosing the AAA and its rules. The majority of platforms choosing arbitration also specified the number of arbitrators (usually one), the governing law, and the seat of the arbitration, and prohibited class proceedings. Platforms choosing litigation overwhelmingly specified the governing law and venue, but only a small percentage prohibited class proceedings. Whether choosing arbitration or litigation, only a small percentage of platforms excluded the application of conflict/choice of law rules in their Terms & Conditions, and an even smaller percentage addressed the costs of the dispute resolution process. Finally, platforms choosing arbitration tended to require prior formal or informal dispute resolution more frequently than those choosing litigation.

Platforms' choice of these different procedural and substantive dispute resolution design features may be motivated by considerations of costs, time, efficiency, risk assessment, and available resources. Our findings that cryptocurrencies and exchanges that chose arbitration also frequently specified the number of arbitrators, the governing law(s), and the seat of the arbitration, and tended to prohibit class proceedings and to provide for prior dispute resolution, may shed light on their reasons for choosing arbitration over litigation in the first place. Some of these variables represent fundamental features of international arbitration that set it apart from domestic litigation and afford parties enhanced control over the arbitral proceedings.²⁹⁶ For instance, while parties can choose the venue of the litigation and the substantive law to govern their dispute, they generally cannot select the procedural law,²⁹⁷ and they are also unlikely to be able to prevent claimants from bringing class actions in jurisdictions where this is a permitted procedure.²⁹⁸ The tendency of platforms choosing arbitration to incorporate it into a multi-stage mechanism that requires prior formal or informal dispute resolution attempts is in line with the trend in arbitration more generally. It is interesting to note, however, that some of the attributes of arbitration that one might expect to find in the crypto context, such

initiated pursuant to a multi-tier clause, which means the arbitration is only filed after contractually mandated negotiation or mediation has failed.”).

295. That said, some jurisdictions may require prior mediation as part of the litigation process. See Rafal Morek, *To Compel or Not to Compel: Is Mandatory Mediation Becoming “Popular”?*, KLUWER MEDIATION BLOG (Nov. 19, 2018), <http://mediationblog.kluwerarbitration.com/2018/11/19/to-compel-or-not-to-compel-is-mandatory-mediation-becoming-popular> (detailing new regulations for mandatory mediation).

296. See Strong, *supra* note 287, at 1030 (noting that many litigants would likely welcome the ability to choose governing procedural law like arbitration laws).

297. *Id.* (“[O]nce a matter is in litigation, the case is typically heard pursuant to the procedural norms of the forum court.”).

298. Erin O’Hara O’Connor & Christopher R. Drahozal, *Carve-outs and Contractual Procedure 2* (Pub. L. & Legal Theory, Working Paper No. 13-29, 2013).

as specifying arbitrators' expertise and confidentiality, did not feature prominently in our frequency results.

While informative, these frequency results at stage one of our analysis provide a very partial empirical picture of the choice of mechanism and each variable separately within arbitration or litigation. They do not indicate relationships between the variables and the choice of mechanism or the strength of such relationships. Therefore, at the second stage of our study we proceeded to test the correlation between these variables, as well as their correlation to the choice of arbitration versus litigation.

B. Stage Two: Correlations

Correlation testing displays certain relationships that are observable in the data, albeit without indicating the strength of these relationships. An explanation of the statistical significance of our results can be found in Appendix II. We tested correlations in our data in three stages: between the choice of mechanism and those variables in Table 2 above that are common to both litigation and arbitration, among those variables that are relevant to litigation, and among those variables that are relevant to arbitration. These separate tests allow us to observe relationships between common variables and the choice of mechanism, as well as between variables once the choice of a mechanism is made.

1. Choice of Mechanism

The first correlations test we conducted was between the choice of mechanism and those variables set out in Table 2 above that are common to both arbitration and litigation. The variables tested were: 1) governing law, 2) conflict and choice of law rules, 3) specified seat of arbitration or venue of litigation, 4) prior formal or informal resolution, 5) class proceedings, 6) costs, 7) currency/exchange. The results of the correlations test for these common variables can be found in Table 3 in Appendix II. These results provide us with a more meaningful insight into which variables, or combinations of variables, cryptocurrencies and exchanges tend to include in their Terms & Conditions when choosing either arbitration or litigation. We will confine our analysis to those variables that display the strongest empirical significance.

Seat of arbitration/venue of litigation and specifying the governing law: These variables are both positively correlated, in a statistically significant manner, with providing for litigation rather than arbitration. The correlation coefficient, i.e., the rate by which the presence of litigation is associated with the presence of a governing law, while statistically significant, is only 10%. Looking back at our frequencies testing results (table 2d), we see that platforms that chose litigation also specified a governing law 90% of the time, in contrast to platforms that chose arbitration, which specified a governing law 83% of the time. The statistical significance of the correlation tells us that the difference between 90% and 83% is significant, but the 10% tells us that the difference is only associated with 10% of the variation among the platforms. We also see that venue of litigation/seat of arbitration is statistically significant and associated

with 27% of the variation among platforms depending on what mode of dispute resolution they chose. Looking again at our frequencies testing results (Table 2f), we see that the seat of arbitration was specified 56% of the time, while venue of litigation was specified 81% of the time.

These results confirm the observation we made in stage one above that platforms more frequently specify the governing law and the venue when choosing litigation. The correlations test also adds another dimension to this observation, namely that these variables are *not* correlated in a statistically significant manner with the choice of arbitration, notwithstanding our finding in stage one that the majority of platforms choosing arbitration also specified the governing law and the seat. Therefore, it may be suggested that the ability to specify the governing law and the venue may motivate cryptocurrencies and exchanges to choose litigation, but the ability to do so in arbitration may not operate as such a motivating factor.

Prior resolution mechanisms and class proceedings: The correlations test also confirms that the high frequency with which platforms choose arbitration provides for prior resolution and prohibits class proceedings, identified in stage one of our analysis, is statistically significant. This means that there is a statistically significant correlation between platforms choosing arbitration and incorporating these two variables into the arbitration clause (specifically, knowing that platforms chose arbitration was associated with the decision to prohibit class proceedings 38% of the time and to require prior resolution 32% of the time). Again, keeping the limitations of correlations testing in mind, this may suggest that requiring prior formal or informal resolution before resorting to arbitration may make platforms feel more comfortable with the choice of arbitration, while they may not feel the need for such prior resolution when choosing litigation. Similarly, the ability to prohibit class proceedings, which is generally limited when choosing litigation, may be a motivating factor in platforms' choice of arbitration.

Costs: The correlations test also provides us with a more nuanced understanding of the costs variable. The frequencies testing in stage one of our analysis indicated that platforms infrequently address costs in their Term & Conditions both when they choose litigation (1%) and arbitration (23%). However, the correlations test reveals that the relationship between choosing arbitration (but not litigation²⁹⁹) and addressing costs is in fact statistically significant (specifically, platforms choosing arbitration were associated with including this variable 38% of the time). Again, this may suggest that the ability to address—that is, allocate or limit—the cost of the arbitration process, which is restricted in litigation, may be a motivating factor in platforms' choice of arbitration.

299. There was in fact only one case in which costs were addressed in a dispute resolution clause providing for litigation. Therefore, this correlation essentially applies in the context of arbitration.

2. *Litigation Variables*

The second correlations test we conducted was of those variables set out in Table 2 above that are relevant to litigation (in order to test their inter-relationship only in the litigation context). These variables are: 1) governing law, 2) conflict and choice of law rules, 3) specified venue, 4) prior formal or informal resolution, 5) class proceedings, 6) currency/exchange. The results of the correlations test for these litigation variables can be found in Table 4 in Appendix II. Again, we will confine our analysis to those variables that display the strongest empirical significance.

Governing law and venue: In those cases providing for litigation, specifying the governing law and the venue are positively correlated (23.5% of the time Terms & Conditions providing for one also provide for the other). This tendency may be motivated by the platforms' goal of controlling to the extent possible the law governing both the merits and the procedure for the resolution of disputes.

Governing law and class proceedings: In stage one of our analysis, we found that a prohibition on class proceedings was included in 17% of the cases providing for litigation. The correlations results indicate that such a prohibition is significantly yet negatively correlated with specifying the governing law (23% of the time Terms & Conditions providing for one do not provide for the other). This may reflect instances where cryptocurrencies and exchanges are aware that the governing law that they have specified does not permit a waiver of class proceedings, rendering such a prohibition useless.

Venue and class proceedings: The correlation results similarly indicate that a prohibition on class proceedings is significantly and positively correlated with specifying the venue of the litigation (22% of the time Terms & Conditions providing for one also provide for the other). This may reflect those cases where the law of the venue does allow for a waiver of class proceedings.

Conflict and choice of law rules, venue, and class proceedings: The correlations test reveals that excluding the application of conflict and choice of law rules is positively correlated with both specifying the venue of the litigation (21% of the time) and with prohibiting class proceedings (24% of the time). It makes sense for platforms choosing the venue of litigation to exclude the application of that venue's conflict and choice of law rules where they wish to control, to the extent possible, the law applied to the resolution of disputes and the types of claims that may be pursued (such as class proceedings).

3. *Arbitration Variables*

The third correlations test we conducted was of those variables set out in Table 2 above that are relevant to arbitration (in order to test their inter-relationship only in the arbitration context). These variables are: 1) governing law, 2) conflict and choice of law rules, 3) specified venue, 4) prior formal or informal resolution, 5) number of arbitrators, 6) institutional rules, 7) confidentiality, 8) broad scope, 9) class proceedings, 10) exceptions, 11) currency/exchange. The results of the correlations test for these arbitration

variables can be found in Table 5 in Appendix II. Again, we will confine our analysis to those variables that display the strongest empirical significance.

Governing law and conflict and choice of law rules: Specifying the governing law is strongly and positively correlated with excluding conflict and choice of law rules (39% of the time Terms & Conditions providing for one also provide for the other). This finding may suggest that when cryptocurrencies and exchanges choose a particular law to be applied by an arbitrator to the merits of their dispute, they tend to take further steps to ensure that the arbitrator will not apply any other law.

Seat and conflict and choice of law rules: Unlike in litigation, the relationship between specifying the seat of arbitration and excluding conflict and choice of law rules is *not* statistically significant. This may be the case since the law of the seat (which may be different from the governing law) may not be the law whose conflict/choice of law rules will be applicable to the arbitration.

Governing law, seat, institutional rules, and number of arbitrators: All these variables are correlated with each other in a significant and positive way. While this result does not reveal the direction of the influence or the effect of other variables, it suggests that some platforms may take a “package” approach to arbitration, addressing all the main features of the arbitral process in their dispute resolution clauses.

Prior resolution, confidentiality, and the number of arbitrators: Requiring prior formal or informal resolution of the dispute is strongly and positively correlated in the arbitration context with requiring that the proceedings shall be confidential (38% of the time Terms & Conditions providing for one also provide for the other) and specifying the number of arbitrators (42% of the time Terms & Conditions providing for one also provide for the other). These results may reflect the goal of cryptocurrencies and exchanges to resolve their disputes as privately and cheaply as possible whether by more informal means (internal resolution, mediation) or by arbitration (for instance by selecting one, rather than three, arbitrators).

Confidentiality and class proceedings: Providing that the proceedings shall be confidential is strongly and positively correlated with prohibiting class proceedings (40%). This may similarly reflect the overarching interest of cryptocurrencies and exchanges in resolving their disputes privately and on an individual basis, which may be best achieved by arbitration.

Exceptions and class proceedings: Providing for exceptions from arbitration (i.e., disputes that will be resolved by litigation notwithstanding the arbitration clause) and prohibiting class proceedings are strongly and positively correlated (49% of the time Terms & Conditions providing for one also provide for the other). This may reflect a restrictive approach by some cryptocurrencies and exchanges toward arbitration and an attempt to limit the types of disputes that may be resolved by arbitration notwithstanding choosing it as the default mechanism.

In sum, the correlation tests in the second stage of our analysis shed further light on how cryptocurrencies and exchanges design their litigation and arbitration clauses and what may motivate them to choose one mechanism over

the other to resolve their disputes. These results suggest that the ability to specify the governing law and the venue may motivate cryptocurrencies and exchanges to choose litigation, but the ability to do so in arbitration may not operate as such a motivating factor. The results also suggest that the ability to require prior formal or informal resolution before resorting to arbitration, the ability to prohibit class proceedings, and the ability to address costs issues, maybe motivating factors in platforms' choice of arbitration.

As for the inter-variable relationships, our correlation tests broadly suggest that, generally speaking, cryptocurrencies and exchanges adopt a cautionary approach to both mechanisms, designing them so that they retain control over important elements of the proceedings. In arbitration, moreover, some platforms seem to strive to minimize the costs of the process and restrict its use, if not avoid it altogether. With respect to litigation-specific variables, platforms frequently specify the venue where they also prohibit class proceedings and specify the governing law. Moreover, conflict and choice of law rules are frequently excluded where the venue of the litigation is specified and where class proceedings are prohibited. In terms of arbitration-specific variables, platforms frequently specify the governing law and exclude conflict and choice of law rules. Moreover, prior resolution of the dispute is frequently required where the Terms & Conditions provide that the arbitration proceedings shall be confidential and specify the number of arbitrators. Class proceedings are also frequently prohibited where the Terms & Conditions provide that the arbitration proceedings shall be confidential and exclude certain disputes from arbitration all together.

These raw correlations are useful for examining two-way relationships between the various variables and between variables and the choice of mechanism, but they do not indicate the direction of influence or how the variables collectively are related to each other. To do this, at the third stage of our analysis, we proceeded to test our variables using logistic regression.

C. Stage Three: Logistic Regression

The basic idea of logistic regression is to measure whether a particular relationship is statistically significant in a multi-variable setting.³⁰⁰ Regression analysis, generally speaking, allows a researcher to examine the impact of several "independent" variables, say X_1 to X_n , on a "dependent" variable, say Y . When we conduct such a regression, the results allow us to see what impact each X variable has by itself on Y , holding the other X variables constant. For example, if we were interested in the relationship between sales of apples and the price of apples as well as the incomes of consumers of apples, we could run a regression. The Y variable would be the amount of apples sold, X_1 would be the price of apples (say dollars per pound), and X_2 would be the average income of apple customers. The results of the regression would be estimates of the individual impact of the rise in the price of apples on the sales of apples holding

300. See generally MICHAEL O. FINKELSTEIN & BRUCE LEVIN, STATISTICS FOR LAWYERS 369–505 (Stephen Fienberg & Ingram Olkin eds., 2d ed. 2001) (overviewing regression analysis).

the income of apple customers constant, as well as the impact of the rise in income on the sale of apples holding the price of apples constant. This allows the researcher to explain and predict what will happen to the sale of apples in the event one or both of the explanatory variables, i.e., price and incomes, changed. In this example, if we were to simply rely on correlations, we would only capture the two-way relationship between the sales of apples and prices or the sales of apples and incomes, but not the conditional relationship between sales and prices and incomes at the same time. Another reason to use regression analysis instead of simply relying on correlations is that while two variables may be correlated with each other, the relationship may not be as robust as the correlations suggest.³⁰¹

In our study, we use logistic regression analysis to build on the results of the previous two stages, the frequencies and correlations, and estimate the collective impact of all the variables set out in Table 2 on the choice of mechanism and on each specific variable. The goal is to test what the different combinations of independent variables can explain in terms of variation in the outcomes for the dependent variable (the choice of mechanism or one specific variable). It is important to note that while these results have explanatory power, we do not argue for causality. This is for two main reasons. First, causation is not as straightforward to determine in these types of studies, especially given the limited data that is publicly available. Second, while the cryptocurrencies and exchanges are the ones designing these dispute resolution clauses, customers also have a choice as to which platform to use. Rather, we argue that our regression results reflect certain patterns and relationships that are observable in the data in a multi-variable setting. If we test a dependent variable and a set of independent variables, then if the regression analysis results in some of the independent variables having a statistically significant impact on the dependent variable, we make the observation that the data discloses a pattern whereby these independent variables can be said to be associated with (i.e., explain) the dependent variable.

As with the correlations testing in stage two of our analysis, we tested regressions in our data in three stages: between the choice of mechanism and those variables in Table 2 that are common to both litigation and arbitration, among those variables that are relevant to litigation, and among those variables that are relevant to the arbitration.

301. Suppose, for example, in a sample of workers at a particular factory there were men and women with different incomes and years of experience. Suppose also that there was gender discrimination at this factory. Even though both the men's and women's incomes increased as their experience increased, within each group of men and women of a certain experience level, men were paid more than women. Then if we simply correlated income with experience levels, we would observe a strong positive correlation. Running a regression with income as the dependent variable and experience and gender as the independent variables would reveal that while more experience led to higher income, there would be a higher income for men than women even after controlling for experience.

1. *Choice of Mechanism*

In our regression test, the dependent variable is whether a cryptocurrency or a crypto exchange chose arbitration or litigation. The independent variables are the presence or absence of those variables set out in Table 2 that are common to both arbitration and litigation:³⁰² 1) governing law, 2) conflict and choice of law rules, 3) specified seat of arbitration/venue of litigation, 4) prior formal or informal resolution, 5) class proceedings, 6) daily volume, 7) currency/exchange. The results of the regression for these common variables can be found in Table 6 in Appendix III, along with an explanation of how they should be interpreted.³⁰³ As in the previous stages, we will confine our analysis to those variables that display the strongest empirical significance.

The results of the regression reveal that whether the platform is a cryptocurrency or exchange, the volume of trading, whether a governing law is specified, and whether conflict and choice of law rules are excluded, do not have a statistically significant relationship with the choice of a dispute resolution mechanism.

Prior resolution, class proceedings, and arbitration: Requiring some prior formal or informal dispute resolution and prohibiting class proceedings are confirmed as more likely to be associated with arbitration than with litigation. This result suggests that where platforms choose to invest in a multi-stage alternative dispute resolution process, they may be more motivated to choose arbitration rather than litigation as the last stage of the process. This may be so since cryptocurrencies and exchanges place more trust in domestic courts to resolve disputes in this novel environment,³⁰⁴ and thus may not see a need to attempt prior resolution before turning to litigation. As for class proceedings, it seems that the ability to prohibit class proceedings in arbitration is a strong (in fact, the strongest of the variables we tested) explanatory factor in platforms' choice of arbitration. Indeed, if a dispute were to be litigated, the availability of class proceedings would essentially be a matter to be determined in accordance with the laws of the venue and fall outside the control of the platforms. This result therefore suggests that the ability to prohibit class proceedings, more than anything else (e.g., the ability to select institutional rules, number of arbitrators, seat, governing law, etc.), may be what motivates cryptocurrencies and exchanges to choose arbitration over litigation.

302. The costs variable was excluded from the regression testing since there was only one case in which litigation was chosen and costs were addressed. This outcome is therefore not very useful either theoretically or empirically.

303. In an ideal setting we would conduct a system of equations logistic regression where the regression in Table 7 as well as the four remaining regressions would be conducted as a simultaneous system of five equations. This is technically complicated, and at this stage we simply conducted each regression separately.

304. See generally Van Aaken & Broude, *supra* note 294, at 883 (discussing economic and behavior factors relevant to choosing method of dispute resolution); see also James Rogers, *Cryptocurrencies and Arbitration – A Match Made in Heaven?*, NORTON ROSE FULBRIGHT (May 2018), <https://www.nortonrosefulbright.com/en/knowledge/publications/cae35319/cryptocurrencies-and-arbitration-mdashbra-match-made-in-heaven> (“[I]t remains to be seen how arbitral awards may be enforced against a blockchain given its decentralized nature and that transactions are verified by a consensus mechanism.”).

Venue and litigation: The regression results confirm that providing for the venue is statistically linked to the choice of litigation. Considering that none of the other litigation or common variables proved to be statistically significant in the choice of litigation, it makes sense that choice of venue will be important for cryptocurrencies and exchanges as this choice may determine many of the other variables we tested, such as the governing law, the availability of class proceedings, the choice and conflict of law rules, and the allocation of costs. Indeed, in the virtual and transnational crypto trading world, not specifying a venue for litigation may result in prolonged and intractable forum battles.

Governing law: What we can further learn from these additional empirical results is that while most cryptocurrencies and exchanges did specify the governing law (both in arbitration and litigation) and this choice is statistically correlated with choosing litigation, it in fact does not have a statistically significant impact, when examined in the context of other variables, on either the choice of arbitration or litigation. The fact that platforms are able to specify the substantive law in both litigation and arbitration may explain why this variable is not an explanatory factor of the choice of mechanism. In contrast, platforms' limited ability to choose the governing procedural law in domestic litigation may be ameliorated by choice of venue, which these results confirm is the only statistically significant explanatory factor, of those that we have tested, of choosing litigation.

These results add yet another empirical dimension to the first two stages of our analysis discussed above. They therefore contribute to a deeper and more nuanced understanding of how and why cryptocurrencies and exchanges use arbitration or litigation. However, while informative, these results do not provide a complete answer to these questions. Therefore, we proceeded to examine more closely inter-variable relationships in arbitration and in litigation.

2. *Litigation Variables*

We conducted a series of regressions where the dependent variables for litigation were: 1) governing law; 2) conflict and choice of law rules; 3) prior resolution required; 4) venue of litigation; 5) class proceedings. We also controlled for the variables daily volume/supply of currency and currency/exchange. The results of the regression for these litigation-specific variables can be found in Table 7a–7e in Appendix III. We again focus our analysis on the most statistically significant results.

Class proceedings, governing law, conflict and choice of law rules, and prior resolution: Table 7a shows that, even though we observed in stage one of our frequencies analysis that cryptocurrencies and exchanges tend *not* to prohibit class proceedings, when they do so this is strongly linked to specifying the governing law, excluding conflict and choice of law rules, as well as requiring prior formal or informal resolution. This result suggests that in the context of litigation, cryptocurrencies and exchanges are unlikely to prohibit class proceedings where they do not specify these additional variables. This makes sense since specifying the governing law or excluding conflict and choice of law rules may indirectly allow for prohibiting class proceedings. Requiring prior

resolution is also in line with individualized dispute resolution. Interestingly, venue was not statistically significant in terms of prohibiting class proceedings even though it was in the correlations results. This may be because specifying the other three variables (governing law, conflict and choice of law rules, and prior resolution) is sufficient to explain the existence of the class prohibition clause, and specifying the venue of litigation is more a consequence of specifying the governing law (as will be discussed next) than an explanatory variable in itself.

Governing law and venue: Table 7b and 7e confirm the strong reciprocal relationship between specifying the governing law and specifying the venue of litigation. This may reflect an attempt by cryptocurrencies and exchanges to control the laws applicable to the resolution of their disputes to the extent possible in domestic litigation, both in terms of the law governing the merits and the law governing the procedure.

Conflict and choice of law, class proceedings, and venue: The regression results in Table 7c reveal a statistically significant relationship between excluding conflict and choice of law rules and both prohibiting class proceedings and specifying the venue of the litigation. This suggests that platforms that specify the venue of litigation and that prohibit class proceedings also tend to ensure that no other law is applied to the litigation than that of the forum (which may allow a waiver of class actions).

Volume/supply and currency/exchange: It is interesting to note that in all the litigation specific regressions, the volume of the crypto exchange or supply of the cryptocurrency had no significant relationship with the presence or absence of the various variables. Whether the clauses featured in the Terms & Conditions of a cryptocurrency or an exchange also generally had no significant relationship with the other variables, except with regard to exclusion of conflict and choice of law rules. Table 7c shows that currencies were more likely to exclude conflict and choice of law rules than exchanges. This may be explained by the fact that cryptocurrencies are generally less established and more volatile than the exchanges on which they are traded,³⁰⁵ which may drive these platforms to minimize uncertainty and risk in their dispute resolution clauses. Also, a crypto exchange is usually based in a particular jurisdiction and although traders are likely to be based in other jurisdictions the institutionalized nature of an exchange may reduce the risk that the law of a different jurisdiction would be found applicable. In contrast, cryptocurrencies are more fluid and although the currency company would be headquartered in a particular jurisdiction, it is more likely that disputes arising with regard to a cryptocurrency would have links to multiple jurisdictions and potentially applicable laws.

305. See Dirk G. Bauer & Thomas Dimpfl, *The Volatility of Bitcoin and its Role as a Medium of Exchange and a Store of Value*, EMPIRICAL ECONOMICS (2021) (“We find that Bitcoin markets exhibit excess volatility in the sense that the volatility is up to 10 times higher than the volatility of the exchange rates.”).

3. *Arbitration Variables*

We conducted the same series of regressions where the dependent variables for arbitration were: 1) governing law; 2) conflict and choice of law rules; 3) prior resolution required; 4) institutional rules; 5) broad scope; 6) number of arbitrators; 7) confidentiality; 8) seat of arbitration; 9) class proceedings; 10) costs. We also controlled for the variables daily volume/supply of currency and currency/exchange. The regression results for these arbitration-specific variables can be found in Tables 8a-8k in Appendix III. Some of our results confirm our correlations results in stage two, while others do not, meaning that although these variables might be correlated when examined individually, they may not have a statistically significant relationship when other variables are taken into account. Our regression results also reveal some new relationships not previously identified. As previously, we will confine our analysis to those variables that display the strongest empirical significance.

Class proceedings and exceptions: Tables 8a and 8j confirm the correlations results of stage two and show a statistically significant relationship between prohibiting class proceedings and providing for exceptions from arbitration. This relationship, moreover, can now be said to be reciprocal (i.e., it is over seven times more likely that Terms & Conditions providing for exceptions from the arbitral process also prohibit class proceedings, and vice versa). This suggests a restrictive view of arbitration adopted by some platforms, leading them to limit the use of arbitration with respect to particular types of disputes even when choosing it as the main dispute resolution mechanism.

Prior resolution, confidentiality, and number of arbitrators: Similarly, requiring prior formal or informal resolution of the dispute is confirmed as statistically significant with respect to confidentiality and specifying the number of arbitrators. This is an interesting combination of variables, which reflects both an attempt to avoid arbitration, or minimize its costs, while also emphasizing one of its main advantages—confidentiality.

Governing law and conflict and choice of law rules: While our correlations results indicated that specifying the governing law is correlated with excluding conflict and choice of law rules, our regression results show that this is not the case where the other variables are present. This means that when cryptocurrencies and exchanges choose the design features of their arbitration clauses, it may not be as common for them to pair these two features.

Conflict and choice of law rules, number of arbitrators, institutional rules, class proceedings: Similarly, while our correlations tests indicated that excluding conflict and choice of law rules is significantly linked to specifying the number of arbitrators and institutional rules, as well as to prohibiting class proceedings, the regression results show that none of these are statistically significant where other variables are involved.

Governing law: Similarly, while our correlations tests indicated a statistically significant relationship between specifying the governing law and the seat of arbitration, as well as between specifying the governing law and institutional rules, the regression analysis shows that these relationships are not

significant where other variables are examined. The fact that some of our correlations results are not confirmed by the regression analysis does not undermine our stage two findings as such. Rather, the regression results give us a sense of what are the more important variables that are driving the dispute resolution choices of cryptocurrencies and exchanges. So, while, for example, specifying the governing law and the institutional rules have some correlational relationship, i.e., when a cryptocurrency or exchange specifies the governing law(s) there is some likelihood that it will also include institutional rules, the correlation may be coincidental. What is driving the presence of governing law(s) may be, as Table 8b shows, specifying exceptions to arbitration as well as the somewhat contradictory variable of a broad arbitration clause, requiring prior resolution, and specifying the number of arbitrators. Interestingly, the relationship between governing law and prior resolution is negative, meaning that platforms tend not to include both of these features together in their arbitration clauses. This suggests that where platforms design a multi-stage dispute resolution process in which arbitration is the last step, they may be inclined to believe that the dispute will be resolved prior to arbitration and therefore a governing law clause would not be needed. At the same time, where prior resolution is not required platforms strive to ensure that their choice of governing law is applied by the arbitral tribunal.

Institutional rules: Table 8e, on the other hand, reveals that what may explain the presence of institutional rules are specifying exceptions to arbitration as well as the somewhat contradictory variable of a broad arbitration clause, and specifying the number of arbitrators. Given that these last three variables overlap with the variables explaining the presence of governing law clauses, it could also be that these three variables are simultaneously involved in the decision to specify institutional rules and the governing law.

Class proceedings and costs: A strong and reciprocal relationship is evident between prohibiting class proceedings and addressing costs, as can be seen in Table 8j. This is a new finding that was not reflected in our correlations tests in stage two. This finding suggests a cautionary approach adopted by some cryptocurrencies and exchanges to arbitration-related costs and their willingness to minimize these costs in any way possible, suggesting that these platforms may not underestimate arbitration costs as parties in other contexts tend to do.³⁰⁶ As the ability to limit the costs of dispute resolution in terms of attorney fees and class actions are limited in domestic litigation,³⁰⁷ these variables may also explain in part platforms' motivation to use arbitration.

Costs and institutional rules: This cautionary approach and the possible concern over arbitration costs are also reflected in the *lack* of a significant link

306. Van Aaken & Broude, *supra* note 294, at 883 (“[S]ome research has shown that parties often have ‘systemic over-optimism’, and underestimation of arbitration costs . . .”). However, whether arbitration is in all cases necessarily more expensive than litigation is disputed and remains empirically unproven. See Christopher R. Drahozal, *Arbitration Costs and Form Accessibility: Empirical Evidence*, 41 U. MICH. J.L. REFORM 813, 814–16 (2008) (explaining the costs of arbitration and litigation).

307. See Drahozal & Ware, *supra* note 107, at 451–52 (“[A]rbitration may decrease exposure to class actions or other forms of aggregate litigation . . .”); Drahozal, *supra* note 306, at 201 (“Attorneys’ fees are not governed by the AAA arbitration rules; instead, they are a matter of parties’ private contractual arrangements.”).

between addressing costs and providing for institutional arbitration. The fact that the presence of these two variables is not statistically meaningful suggests that cost-aware platforms may also opt for *ad hoc* rather than institutional arbitration in light of the additional costs involved with the former.

Number of arbitrators, institutional rules, and confidentiality: Our correlations results identified a statistically significant relationship between specifying the number of arbitrators and selecting institutional arbitration rules. Some of these institutional rules provide for a default number of arbitrators (usually one),³⁰⁸ which may explain the increased likelihood that the number of arbitrators will be specified in the Terms & Conditions if platforms wish to have a different number of arbitrators. This relationship is confirmed by our regressions testing as reciprocal.

Institutional rules, broad scope, and exceptions: The regression results also add two new insights with regard to institutional rules: selecting institutional arbitrations rules is strongly linked to broad arbitration clauses and to the *absence* of exceptions from arbitration. This may indicate that where cryptocurrencies and exchanges entrust arbitrators with resolving practically any dispute that may arise in the future (by providing for an arbitration clause with a broad scope and no exceptions), they are more inclined to involve an arbitration institution that will ensure the smooth operation of the proceedings. By the same token, where cryptocurrencies and exchanges select institutional rules, they are six times more likely to use a broad arbitration clause (a relationship that our correlations testing did not reveal).

Number of arbitrators, confidentiality, and class proceedings: Specifying the number of arbitrators and providing for confidentiality also have a strong reciprocal relationship, and each variable also has a statistically significant relationship with prohibiting class proceedings. This may reflect yet another effort by cryptocurrencies and exchanges to keep arbitration proceedings as private, individual, cost effective, and tightly managed as possible.

To summarize, our regressions analysis contributes several empirical insights to our results in the two previous stages. First, the regression results reveal that requiring some prior formal or informal dispute resolution and prohibiting class proceedings are more likely to be associated with arbitration than with litigation. Moreover, the ability to prohibit class proceedings is the strongest explanatory factor in platforms' choice of arbitration. The regression results also suggest that providing for the venue is the only variable that is statistically linked to the choice of litigation.

As for inter-variable relationships in arbitration, our regression results reveal a statistically significant and reciprocal relationship between prohibiting class proceedings and providing for exceptions from arbitration; between prohibiting class proceedings and addressing costs; between specifying the number of arbitrators and selecting institutional arbitration rules; and between selecting institutional arbitrations rules and using a broad arbitration clause.

308. See generally Wei Sun, *Reflections on Default Number of Arbitrators under Expedited Procedure Rules*, KLUWER ARBITRATION BLOG (Mar. 1, 2019), <http://arbitrationblog.kluwerarbitration.com/2019/03/01/reflections-on-default-number-of-arbitrators-under-expedited-procedure-rules/>.

Prior resolution of the dispute is also statistically significant with respect to confidentiality and specifying the number of arbitrators. A statistically significant and reciprocal, albeit *negative*, relationship exists between specifying the governing law and requiring prior resolution. Selecting institutional arbitrations rules is also strongly linked to the *absence* of exceptions from arbitration. Finally, specifying the number of arbitrators and providing for confidentiality have a strong reciprocal relationship, and each variable also has a statistically significant relationship with prohibiting class proceedings.

Regarding inter-variable relationships in litigation, the regression results suggest a statistically significant relationship between excluding conflict and choice of law rules, prohibiting class proceedings, and specifying the governing law. The results also suggest a strong relationship between specifying the governing law and specifying the venue of litigation, as well as between the exclusion of conflict and choice of law rules and both prohibiting class proceedings and specifying the venue of the litigation.

Finally, we note that whether the platform was a cryptocurrency or exchange, and the volume of the exchange or supply of the currency did not, for the most part, have a significant relationship with any of the variables. That being said, we note that in the arbitration regression results excluding conflict and choice of law rules, specifying the number of arbitrators, and prohibiting class proceedings were more associated with cryptocurrencies than exchanges. This overlaps with the litigation regression results in that there also excluding conflict and choice of law rules was more associated with currencies than exchanges. Again, this result may be explained by the nature of, and institutional differences between, cryptocurrencies and exchanges.

VI. CONCLUSION

Scholars and practitioners continue to debate the benefits and drawbacks of litigation, arbitration, and non-binding mechanisms such as mediation in the resolution of commercial disputes.³⁰⁹ As disputes involving crypto trading are increasingly likely to arise and to give rise to unique legal issues, it is important to understand how cryptocurrencies and exchanges approach dispute resolution in this novel environment. This article is the first to contribute to this understanding by empirically examining how cryptocurrencies and exchanges design their dispute resolution clauses and what these design choices may mean in terms of the motivation of these platforms to choose a particular dispute resolution mechanism.

It is interesting to note that notwithstanding the well-documented rise in the use of mediation and other non-binding dispute resolution mechanism in commercial dispute resolution generally, this trend is not noticeable in the crypto trading context. Similarly, while the unique nature of crypto trading and the legal issues it gives rise to may call for the development of specialized and tailored

309. See generally E. Norman Veasey, *The Conundrum of the Arbitration vs. Litigation Decision*, AM. BAR ASS'N (Dec. 15, 2015), https://qa.americanbar.org/groups/business_law/publications/blt/2015/12/07_veasey/.

platform-based dispute resolution mechanisms, only a handful are being developed and none are currently being widely used.

That leaves us with the traditional choice of arbitration versus litigation in the crypto trading context. In order to obtain a better understanding of *how* cryptocurrencies and exchanges design their arbitration and litigation clauses, and possibly draw some inferences from this design as to *why* they choose litigation or arbitration to begin with, we conducted a three-stage empirical analysis of 300 Terms & Conditions of cryptocurrencies and exchanges and their dispute resolution clauses. Our results provide a first-of-its-kind detailed picture of the basic frequency with which these platforms choose each mechanism and their main design features, how these features are correlated to the choice of mechanism and to each other, and which features are most statistically significant and may thus reasonably be viewed as potential rationales for the choice of arbitration versus litigation and the ultimate dispute resolution goals of cryptocurrencies and exchanges.

Our frequency tests in the first stage of our analysis reveal that cryptocurrencies and exchanges have a slight, yet statistically insignificant, preference for litigation over arbitration. When choosing arbitration, the majority of platforms prefer institutional over *ad hoc* arbitration, most commonly choosing the AAA and its rules. The majority of platforms choosing arbitration also specified the number of arbitrators (usually one), the governing law, and the seat of the arbitration, and prohibited class proceedings. Platforms choosing litigations overwhelmingly specified the governing law and venue, but only a small percentage prohibited class proceedings. Whether choosing arbitration or litigation, only a small percentage of platforms excluded the application of conflict and choice of law rules in their Terms & Conditions, and an even smaller percentage addressed the costs of the dispute resolution process. Finally, platforms choosing arbitration tended to require prior formal or informal dispute resolution more frequently than those choosing litigation.

Our correlation tests in the second stage of our analysis shed further light on how cryptocurrencies and exchanges design their dispute resolution clauses and what may motivate them to choose arbitration versus litigation. These results suggest that the ability to specify the governing law and the venue may motivate cryptocurrencies and exchanges to choose litigation, but the ability to do so in arbitration may not operate as such a motivating factor. The results also suggest that the ability to require prior formal or informal resolution before resorting to arbitration, the ability to prohibit class proceedings, and the ability to address costs issues, maybe motivating factors in platforms' choice of arbitration.

As for the inter-variable relationships, our correlations tests suggest that some cryptocurrencies and exchanges design both mechanisms so that they retain control over important elements of the proceedings. In arbitration, moreover, some platforms seem to strive to minimize the costs of proceedings and restrict the use of the mechanism, if not avoid it altogether. In terms of arbitration-specific variables, platforms tend to specify the governing law and exclude conflict and choice of law rules. Specifying the governing law is also correlated with specifying the seat of the arbitration, choosing institutional rules,

and specifying the number of arbitrators. All of these variables (seat, institutional rules, number of arbitrators) are also correlated with each other. Moreover, prior resolution of the dispute is frequently required where the Terms & Conditions provide that the arbitration proceedings shall be confidential and specify the number of arbitrators. Class proceedings are also frequently prohibited where the Terms & Conditions provide that the arbitration proceedings shall be confidential and exclude certain disputes from arbitration all together. With respect to litigation-specific variables, platforms frequently specify the venue where they also prohibit class proceedings and specify the governing law. Moreover, conflict and choice of law rules are frequently excluded where the venue of the litigation is specified and where class proceedings are prohibited.

Our regression results add important empirical insights to our results in the two previous stages of our analysis. First, the regression results reveal that the ability to prohibit class proceedings may be the strongest explanatory factor in platforms' choice of arbitration. In contrast, providing for the venue seems to be the variable that is most statistically linked to the choice of litigation.

As for inter-variable relationships, our regression results provide an additional lens through which the design of crypto dispute resolution clauses may be assessed, as it indicates the relative impact of each variable. For both mechanisms, the approach remains one that strives to retain maximum control through the use of features limiting jurisdiction (seat/venue) and discretion (governing law, conflict and choice of law rules). The use of arbitration is restricted through features that limit the scope and type of disputes.

In arbitration, our regression results reveal statistically significant and reciprocal relationships between prohibiting class proceedings and providing for exceptions from arbitration; between prohibiting class proceedings and addressing costs; between specifying the number of arbitrators and selecting institutional arbitration rules; and between selecting institutional arbitrations rules and using a broad arbitration clause. Specifying the number of arbitrators and providing for confidentiality have a strong reciprocal relationship, and each variable also has a statistically significant relationship with prohibiting class proceedings. Prior resolution of the dispute has a statistically significant relationship with confidentiality and specifying the number of arbitrators, and selecting institutional arbitrations rules is linked to the *absence* of exceptions from arbitration. These design choices serve either to restrict the use of arbitration in some way or to ensure external supervision over the process. A statistically significant, reciprocal, and *negative* relationship exists between specifying the governing law and requiring prior resolution, further indicating a view of arbitration as a mechanism of last resort that perhaps platforms are skeptical would be used in practice.

In litigation, our regression results reveal a statistically significant relationship between specifying the venue, prohibiting class proceedings, and specifying the governing law. The results also suggest a strong reciprocal relationship between specifying the governing law and specifying the venue of litigation, as well as between the exclusion of conflict and choice of law rules

and both prohibiting class proceedings and specifying the venue of the litigation. These features reflect attempts to ensure control over venue and governing law, or to limit judicial discretion in terms of conflict and choice of law rules and class proceedings, where possible.

The results of our study, while preliminary, shed light for the first time on how cryptocurrencies and exchanges approach dispute resolution, how they design dispute resolution clauses, which mechanisms they use, and why. Considering the novel, highly complex, and transnational environment in which cryptocurrencies and exchanges are operating, it is interesting to find that they are predominantly utilizing traditional dispute resolution mechanisms, namely domestic litigation and international arbitration. Notwithstanding the binding nature of these mechanisms, platforms seem to design them in order to maximize their control over the proceedings, and in the case of arbitration also restrict its use by using multi-staged dispute resolution processes, providing for exceptions from arbitration (particularly for intellectual property disputes), and, perhaps more than anything else, excluding class proceedings. These features of arbitration may be used by crypto platforms to minimize their legal exposure as well as to expedite dispute resolution.

More surprising in the crypto context is our finding that, in both litigation and arbitration, many platforms did not exclude the application of conflict and choice of law rules. We would have expected cryptocurrencies and exchanges to do so more frequently considering the complicated jurisdictional issues that the crypto context may give rise to. Additional crypto-specific legal issues remain largely unaddressed in the Terms & Conditions we studied, such as the expertise of decision-makers—which platforms are able to specify when choosing arbitration but few did—and the potential inadequacy of domestic law to resolve crypto disputes. Therefore, time will tell whether domestic litigation and/or international arbitration will prove to be effective and efficient in resolving crypto disputes, or whether more sophisticated and tailored dispute resolution forums will take their place. Notwithstanding the empirical limitations of our relatively small number of cases, the data that we have collected can form the basis for more extensive future research on these and other issues as crypto trading continues to increase in popularity and disputes inevitably arise.

Several avenues for further research that we left unexplored in this article should be noted. In addition to the qualitative variables we have examined, it may be worthwhile collecting and using market value data of cryptocurrencies or the dollar amount of cryptocurrencies traded on an exchange. Given the fluctuations in the market's value, sometimes in one day, the researcher would need to devise a proper methodology for averaging the value. Using financial measures such as rates of return and risk may also be useful. The size of the currency or exchange may also shed light on whether larger currencies and exchanges have a preference for one type of mechanism over another. Indeed, the sophistication of the dispute resolution clauses may be related to these various measures. It could be argued that the level of sophistication of the traders and users of various cryptocurrencies and exchanges may also have an impact

on the level of complexity of Terms & Conditions. This would require creating an index of complexity for the Terms & Conditions as well as an index of user sophistication.

As the examples we discussed throughout the paper show, some of these crypto platforms have already been sued for various allegations of fraud and regulatory infractions. Indeed, some of the platforms may be vehicles for criminal activity such as money laundering or ransomware. Some platforms may simply be Ponzi schemes masquerading as cryptocurrencies. It is hard to know in advance simply by looking at the list of currencies and exchanges, which ones are legitimate and which ones are not. Some platforms may be mostly legitimate, but some aspects of the platform or some users of the platform may be engaged in illegitimate activities. Examining the complexity of the Terms & Conditions as a function of the legitimacy of the platforms may therefore be another useful research question.

Finally, the geographic location of the cryptocurrencies and exchanges may also have an impact on the choice of dispute resolution mechanism and its design, such as governing law and arbitral institution. This would require creating a meaningful geographic coding variable. Simply coding by country will yield too many data points to generate any meaningful results. Perhaps, a geographic variable could be coded by regional clusters, e.g., East Asia, Middle East, North Africa, Europe etc., or by common legal and cultural groupings. The question would then be whether certain regions have a stronger preference for a type of arbitral institution, language of arbitration, choice of law, and so on.

APPENDIX I

Stage 1: Choice of Mechanism and Design Variables—Frequencies

* First row has *frequencies* and second row has *row percentages*

Table 1: Tabulation of Currency/Exchange by Dispute Resolution Mechanism

Currency/Exchange	Arb	Lit	Total
Currency	44	63	107
	41.12	58.88	100.00
Exchange	69	128	197
	35.03	64.97	100.00
Total	113	191	304
	37.17	62.83	100.00

Tables 2a to 2i present the frequency with which the variables in Table 2 appear in Terms & Conditions choosing arbitration vs. litigation. For all of these tables, the first row indicates the raw count, and second row has row percentages.

Table 2a: Institutional Rules

	no	yes	Total
Arb	34	79	113
	30.09	69.91	100.00

Table 2b: Number of Arbitrators

	no	yes	Total
Arb	43	70	113
	38.05	61.95	100.00

Table 2c: Confidentiality

	no	yes	Total
Arb	78	35	113
	69.03	30.97	100.00

Table 2d: Governing Law

	no	yes	Total
Arb	19	94	113
	16.81	83.19	100.00
Lit	19	172	191
	9.95	90.05	100.00
Total	38	266	304
	12.50	87.50	100.00

Table 2e: Conflict/Choice of Law Rules

	no	yes	Total
Arb	65	48	113
	57.52	42.48	100.00
Lit	115	76	191
	60.21	39.79	100.00
Total	180	124	304
	59.21	40.79	100.00

Table 2f: Seat of Arbitration/Venue of Litigation

	no	yes	Total
Arb	50	63	113
	44.25	55.75	100.00
Lit	37	154	191
	19.37	80.63	100.00
Total	87	217	304
	28.62	71.38	100.00

Table 2g: Prior Resolution

	no	yes	Total
Arb	44	69	113
	38.94	61.06	100.00
Lit	137	54	191
	71.73	28.27	100.00
Total	181	123	304
	59.54	40.46	100.00

Table 2h: Class Proceedings

	no	yes	Total
Arb	53	60	113
	46.90	53.10	100.00
Lit	159	32	191
	83.25	16.75	100.00
Total	212	92	304
	69.74	30.26	100.00

Table 2i: Costs

	no	yes	Total
Arb	87	26	113
	76.99	23.01	100.00
Lit	190	1	191
	99.48	0.52	100.00
Total	277	27	304
	91.12	8.88	100.00

APPENDIX II

Stage 2: Choice of Mechanism and Inter-variable Relationships—Correlations

In the subsequent tables, we denote statistical significance by one to three “*”. The concept of statistical significance has a technical definition that can be found in any standard statistics textbook.³¹⁰ Conceptually, it can be thought of as the level of confidence we have that, when conducting a test of a hypothesis, we are not rejecting the correct answer. This is sometimes called false positive. Throughout this article, the test is that the estimates, whether they be correlations or coefficients in logistic regressions, are not different from zero. This means that we have a 1%, 5%, or 10% level of confidence that these estimates have some meaning and are not just random noise. We denote these significance levels by the use of *p*-values. There are other statistical tests for significance, and in the regression tables below we have produced the various statistical output that was generated by Stata, the statistical package we used, at the end of each table. The reader need not be concerned by the statistics reported, but they are there for those who wish to delve deeper into the statistical analysis on their own.

310. See, e.g., MICHAEL O. FINKELSTEIN & BRUCE LEVIN, STATISTICS FOR LAWYERS 123 (3d ed., 2015).

Table 3: Pairwise correlations for common variables and all observations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Arbitration/ Litigation	1.000							
(2) Currency/ Exchange	0.060	1.000						
(3) Governing Law	0.100*	0.013	1.000					
(4) Conflict/ choice of Law Rules	-0.026	-0.257***	0.213***	1.000				
(5) Prior Resolution	-0.323***	0.032	-0.134**	0.011	1.000			
(6) Seat/ Venue Specified	0.266***	-0.040	0.267***	0.170***	0.077	1.000		
(7) Costs	-0.382***	-0.060	0.048	0.070	0.190***	0.019	1.000	
(8) Class proceedings	-0.382***	-0.204***	-0.119**	0.211***	0.361	0.116	0.373	1.000

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 4: Pairwise correlations for those variables and observations that have litigation as the dispute resolution mechanism

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) Currency/ Exchange	1.000					
(2) Governing Law	-0.010	1.000				
(3) Conflict/ choice of Law Rules	-0.271***	0.091	1.000			
(4) Prior Resolution	-0.005	-0.141*	-0.012***	1.000		
(5) Venue Specified	-0.118	0.235***	0.209***	0.102	1.000	
(6) Class Proceedings	-0.192***	-0.226***	0.237***	0.372***	0.220***	1.000

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 5: Pairwise correlations for those variables and observations that have arbitration as the dispute resolution mechanism

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Currency/ Exchange	1.000										
(2) Exceptions	-0.166*	1.000									
(3) Governing Law	0.029	-0.225**	1.000								
(4) Conflict/ choice of Law Rules	-0.232**	0.059	0.386***	1.000							
(5) Prior Resolution	0.144	0.197**	-0.068	0.025	1.000						
(6) Seat Specified	0.019	0.083	0.266***	0.153	0.275***	1.000					
(7) Number of Arbitrators Specified	0.122	0.216**	0.232**	0.268***	0.421***	0.476***	1.000				
(8) Institutional rules	-0.128	-0.095	0.273***	0.251***	0.030	0.309***	0.281***	1.000			
(9) Confidentiality	0.025	0.267***	0.045	0.121	0.378***	0.288***	0.446***	-0.061	1.000		
(10) Scope broad	-0.080	0.097	0.209**	0.151	0.211**	0.242**	0.230**	0.380***	-0.013	1.000	
(11) Class proceedings	-0.205**	0.489***	0.052	0.198**	0.159*	0.270***	0.396***	0.079	0.399***	0.116	1.000

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

APPENDIX III

Stage 3: Choice of Mechanism and Inter-variable Relationships—Logistic RegressionRegression of Choice of Dispute Resolution**Table 6: Regression of Choice of Dispute Resolution**

Arbitration/Litigation	Coef.	St.Err.	t-value	p-value	Sig
Currency/Exchange	.882	.279	-0.40	.691	
Volume of Exchange/Supply of Currency	1.002	.001	1.42	.155	
Governing Law	1.729	.744	1.27	.203	
Conflict/Choice of Law Rules	.905	.297	-0.30	.761	
Prior Resolution	3.697	1.152	4.20	0	***
Seat/Venue specified	.133	.046	-5.78	0	***
Class Proceedings	6.843	2.401	5.48	0	***
Constant	.34	.18	-2.04	.042	**
Mean dependent var	1.629	SD dependent var		0.484	
Pseudo r-squared	0.246	Number of obs		302.000	
Chi-square	98.157	Prob > chi2		0.000	
Akaike crit. (AIC)	316.128	Bayesian crit. (BIC)		345.812	

*** $p < .01$, ** $p < .05$, * $p < .1$

The interpretation of Table 6 is as follows. Each variable listed takes on a “yes” or “no” value, with the platform’s choice being coded as “arbitration” or “litigation.” The base outcome for the dependent variable, or the choice of dispute resolution, was litigation so that the coefficients reported indicate whether the platform has a higher or lower likelihood of choosing arbitration. To understand the coefficients reported, we note that these are “odds ratios.” This denotes the relative impact that the presence of a variable has (in a statistical manner) on the choice of arbitration or litigation. For example, the coefficient for class proceedings is approximately 7. This means that class proceeding is seven times more likely to be prohibited in a dispute resolution clause that provides for arbitration. Similarly, the odds ratio of 1 for volume means that the volume of trade discloses no meaningful insight into whether the platform has arbitration or litigation as its mechanism for resolving disputes, as the odds are equal for volume impacting arbitration or litigation.

Regression of Litigation-specific Variables

Table 7a

Class Proceedings	Coef.	St.Err.	t-value	p-value	Sig
Currency/Exchange	.59	.322	-0.97	.333	
Vol2	.997	.002	-1.23	.219	
Governing Law	.031	.028	-3.79	0	***
Conflict/Choice of Law	5.049	2.922	2.80	.005	***
Rules					
Prior Resolution	9.633	5.132	4.25	0	***
Venue Specified	2.091e+08	4.522e+11	0.01	.993	
Constant	0	0	-0.01	.993	
Mean dependent var		1.168	SD dependent var		0.375
Pseudo r-squared		0.401	Number of obs		190.000
Chi-square		69.003	Prob > chi2		0.000
Akaike crit. (AIC)		117.279	Bayesian crit. (BIC)		140.008

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 7b

Governing Law	Coef.	St.Err.	t-value	p-value	Sig
Currency/Exchange	1.087	.688	0.13	.895	
Vol2	.998	.002	-0.97	.334	
Class Proceedings	.043	.04	-3.42	.001	***
Conflict/Choice of Law	2.785	1.836	1.55	.12	
Rules					
Prior Resolution	.586	.366	-0.86	.392	
Venue Specified	17.575	14.416	3.49	0	***
Constant	4.201	3.289	1.83	.067	*
Mean dependent var		1.900	SD dependent var		0.301
Pseudo r-squared		0.247	Number of obs		190.000
Chi-square		30.471	Prob > chi2		0.000
Akaike crit. (AIC)		107.061	Bayesian crit. (BIC)		129.790

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 7c

Conflict/Choice of Law	Coef.	St.Err.	t-value	p-value	Sig
Rules					
Currency/Exchange	.311	.11	-3.31	.001	***
Vol2	1.003	.002	1.74	.083	*
Class Proceedings	4.641	2.482	2.87	.004	***
Governing Law	3.158	2.234	1.63	.104	
Prior Resolution	.575	.238	-1.34	.181	
Venue Specified	2.325	1.129	1.74	.082	*
Constant	.141	.119	-2.31	.021	**
Mean dependent var		1.400	SD dependent var		0.491
Pseudo r-squared		0.134	Number of obs		190.000
Chi-square		34.209	Prob > chi2		0.000
Akaike crit. (AIC)		235.536	Bayesian crit. (BIC)		258.265

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 7d

Prior Resolution	Coef.	St.Err.	t-value	p-value	Sig
Currency/Exchange	1.365	.561	0.76	.449	
Vol2	.998	.002	-0.94	.346	
Class Proceedings	7.673	3.799	4.12	0	***
Governing Law	.589	.36	-0.87	.386	
Conflict/Choice of Law Rules	.602	.248	-1.23	.218	
Venue Specified	1.533	.791	0.83	.408	
Constant	.376	.275	-1.34	.181	
Mean dependent var		1.284	SD dependent var		0.452
Pseudo r-squared		0.125	Number of obs		190.000
Chi-square		28.460	Prob > chi2		0.000
Akaike crit. (AIC)		212.357	Bayesian crit. (BIC)		235.086

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 7e

Venue Specified	Coef.	St.Err.	t-value	p-value	Sig
Currency/Exchange	.839	.422	-0.35	.727	
Vol2	.999	.002	-0.28	.779	
Class Proceedings	46245963	5.844e+10	0.01	.989	
Governing Law	20.012	16.673	3.60	0	***
Conflict/Choice of Law Rules	2.7	1.379	1.95	.052	*
Prior Resolution	1.83	1.039	1.06	.287	
Constant	.18	.172	-1.79	.074	*
Mean dependent var		1.805	SD dependent var		0.397
Pseudo r-squared		0.211	Number of obs		190.000
Chi-square		39.596	Prob > chi2		0.000
Akaike crit. (AIC)		161.751	Bayesian crit. (BIC)		184.480

*** $p < .01$, ** $p < .05$, * $p < .1$

Regression of Arbitration-specific Variables

Table 8a

Exceptions	Coef.	St.Err.	t-value	p-value	Sig
Currency/Exchange	.561	.297	-1.09	.276	
Vol2	.998	.002	-0.68	.497	
Governing Law	.108	.087	-2.77	.006	***
Conflict/Choice of Law	1.439	.8	0.65	.513	
Rules					
Prior Resolution	1.242	.726	0.37	.711	
Institutional Rules	.345	.225	-1.63	.103	
Broad Scope	1.956	1.077	1.22	.223	
Number of Arbitrators	2.566	1.987	1.22	.224	
Specified					
Confidentiality	1.285	.83	0.39	.698	
Seat of Arbitration	.776	.46	-0.43	.669	
Specified					
Class Proceedings	7.553	4.351	3.51	0	***
Costs	.972	.572	-0.05	.962	
Constant	2.425	2.228	0.96	.335	
Mean dependent var		1.482	SD dependent var		0.502
Pseudo r-squared		0.294	Number of obs		112.000
Chi-square		45.637	Prob > chi2		0.000
Akaike crit. (AIC)		135.485	Bayesian crit. (BIC)		170.825

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 8b

Governing Law	Coef.	St.Err.	t-value	p-value	Sig
Currency/Exchange	2.242	2.181	0.83	.407	
Vol2	1.001	.004	0.31	.76	
Exceptions	.056	.064	-2.52	.012	**
Conflict/Choice of Law	4.309e+08	1.815e+12	0.00	.996	
Rules					
Prior Resolution	.077	.088	-2.23	.026	**
Institutional Rules	.642	.603	-0.47	.637	
Broad Scope	5.869	5.95	1.75	.081	*
Number of Arbitrators	11.187	15.91	1.70	.09	*
Specified					
Confidentiality	2.015	2.405	0.59	.557	
Seat of Arbitration	3.426	3.268	1.29	.197	
Specified					
Class Proceedings	.691	.738	-0.35	.729	
Costs	1.901	2.682	0.46	.649	
Constant	3.745	5.956	0.83	.406	
Mean dependent var		1.830	SD dependent var		0.377
Pseudo r-squared		0.514	Number of obs		112.000
Chi-square		52.377	Prob > chi2		0.000
Akaike crit. (AIC)		75.614	Bayesian crit. (BIC)		110.955

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 8c

Conflict/choice of Law Rules	Coef.	St.Err.	t-value	p-value	Sig
Currency/Exchange	.24	.131	-2.63	.009	***
Vol2	1.001	.002	0.61	.541	
Exceptions	1.287	.733	0.44	.658	
Governing Law	55482681	6.837e+10	0.01	.988	
Prior Resolution	1.06	.6	0.10	.918	
Institutional Rules	2.322	1.465	1.34	.182	
Broad Scope	.808	.436	-0.39	.693	
Number of Arbitrators Specified	2.768	1.882	1.50	.134	
Confidentiality	1.285	.787	0.41	.683	
Seat of Arbitration Specified	.725	.399	-0.58	.559	
Class Proceedings	1.499	.912	0.67	.506	
Costs	.886	.538	-0.20	.842	
Constant	0	0	-0.02	.988	
Mean dependent var		1.429	SD dependent var		0.497
Pseudo r-squared		0.279	Number of obs		112.000
Chi-square		42.722	Prob > chi2		0.000
Akaike crit. (AIC)		136.250	Bayesian crit. (BIC)		171.590

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 8d

Prior Resolution	Coef.	St.Err.	t-value	p-value	Sig
Currency/Exchange	1.91	1.006	1.23	.219	
Vol2	1	.002	-0.05	.962	
Exceptions	1.177	.757	0.25	.8	
Governing Law	.219	.172	-1.93	.053	*
Conflict/Choice of Law Rules	1.1	.625	0.17	.867	
Institutional Rules	.544	.354	-0.93	.35	
Broad Scope	3.175	1.696	2.16	.031	**
Number of Arbitrators Specified	5.202	3.384	2.54	.011	**
Confidentiality	6.063	4.207	2.60	.009	***
Seat of Arbitration Specified	1.616	.898	0.86	.388	
Class Proceedings	.47	.328	-1.08	.28	
Costs	1.368	.924	0.46	.643	
Constant	.748	.745	-0.29	.771	
Mean dependent var	1.607	SD dependent var			0.491
Pseudo r-squared	0.277	Number of obs			112.000
Chi-square	41.573	Prob > chi2			0.000
Akaike crit. (AIC)	134.509	Bayesian crit. (BIC)			169.850

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 8e

Institutional Rules	Coef.	St.Err.	t-value	p-value	Sig
Currency/Exchange	.391	.252	-1.46	.145	
Vol2	.996	.003	-1.35	.176	
Exceptions	.296	.213	-1.69	.091	*
Governing Law	.978	.768	-0.03	.977	
Conflict/Choice of Law Rules	1.881	1.225	0.97	.332	
Prior Resolution	.557	.394	-0.83	.408	
Broad Scope	6.039	3.838	2.83	.005	***
Number of Arbitrators Specified	6.134	4.99	2.23	.026	**
Confidentiality	.384	.295	-1.25	.213	
Seat of Arbitration Specified	2.136	1.286	1.26	.207	
Class Proceedings	.86	.568	-0.23	.82	
Costs	1.046	.757	0.06	.951	
Constant	3.293	3.401	1.15	.249	
Mean dependent var	1.696	SD dependent var		0.462	
Pseudo r-squared	0.300	Number of obs		112.000	
Chi-square	41.273	Prob > chi2		0.000	
Akaike crit. (AIC)	122.231	Bayesian crit. (BIC)		157.572	

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 8f

Broad Scope	Coef.	St.Err.	t-value	p-value	Sig
Currency/Exchange	.791	.403	-0.46	.646	
Vol2	1.003	.002	1.44	.149	
Exceptions	2.044	1.136	1.29	.198	
Governing Law	3.351	2.499	1.62	.105	
Conflict/Choice of Law Rules	.849	.441	-0.31	.753	
Prior Resolution	3.105	1.642	2.14	.032	**
Institutional Rules	5.867	3.465	3.00	.003	***
Number of Arbitrators Specified	1.158	.72	0.24	.814	
Confidentiality	.452	.267	-1.35	.178	
Seat of Arbitration Specified	1.579	.816	0.88	.377	
Class Proceedings	1.335	.841	0.46	.646	
Costs	.593	.354	-0.88	.381	
Constant	.02	.023	-3.39	.001	***
Mean dependent var	1.491	SD dependent var		0.502	
Pseudo r-squared	0.203	Number of obs		112.000	
Chi-square	31.489	Prob > chi2		0.002	
Akaike crit. (AIC)	149.740	Bayesian crit. (BIC)		185.081	

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 8g

Number of Arbitrators Specified	Coef.	St.Err.	t-value	p-value	Sig
Currency/Exchange	3.696	2.808	1.72	.085	*
Vol2	1.001	.003	0.42	.676	
Exceptions	1.333	1.264	0.30	.762	
Governing Law	3.331	3.366	1.19	.234	
Conflict/Choice of Law	2.707	2.025	1.33	.183	
Rules					
Prior Resolution	4.36	3.015	2.13	.033	**
Institutional Rules	5.454	4.734	1.95	.051	*
Broad Scope	1.591	1.128	0.65	.513	
Confidentiality	10.786	11.315	2.27	.023	**
Seat of Arbitration	3.695	2.289	2.11	.035	**
Specified					
Class Proceedings	5.309	5.001	1.77	.076	*
Costs	1.34	1.156	0.34	.735	
Constant	.002	.003	-3.55	0	***
Mean dependent var	1.625	SD dependent var			0.486
Pseudo r-squared	0.507	Number of obs			112.000
Chi-square	75.090	Prob > chi2			0.000
Akaike crit. (AIC)	99.100	Bayesian crit. (BIC)			134.441

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 8h

Confidentiality	Coef.	St.Err.	t-value	p-value	Sig
Currency/Exchange	.866	.524	-0.24	.812	
Vol2	.998	.003	-0.56	.576	
Exceptions	1.13	.736	0.19	.851	
Governing Law	1.499	1.448	0.42	.675	
Conflict/Choice of Law	1.122	.698	0.19	.853	
Rules					
Prior Resolution	3.852	2.842	1.83	.068	*
Institutional Rules	.337	.271	-1.35	.176	
Broad Scope	.436	.273	-1.32	.185	
Number of Arbitrators	7.678	7.646	2.05	.041	**
Specified					
Seat of Arbitration	2.398	1.612	1.30	.193	
Specified					
Class Proceedings	4.555	3.382	2.04	.041	**
Costs	.677	.403	-0.66	.512	
Constant	.027	.04	-2.43	.015	**
Mean dependent var	1.313	SD dependent var			0.466
Pseudo r-squared	0.350	Number of obs			112.000
Chi-square	48.666	Prob > chi2			0.000
Akaike crit. (AIC)	116.457	Bayesian crit. (BIC)			151.797

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 8i

Seat of Arbitration specified	Coef.	St.Err.	t-value	p-value	Sig
Currency/Exchange	1.048	.587	0.08	.934	
Vol2	.997	.002	-1.05	.293	
Exceptions	.652	.43	-0.65	.516	
Governing Law	3.158	2.487	1.46	.144	
Conflict/Choice of Law Rules	.748	.41	-0.53	.597	
Prior Resolution	1.681	.961	0.91	.364	
Institutional Rules	2.951	1.871	1.71	.088	*
Broad Scope	1.537	.809	0.82	.414	
Number of Arbitrators Specified	3.691	2.22	2.17	.03	**
Confidentiality	2.115	1.336	1.19	.236	
Class Proceedings	1.815	1.256	0.86	.389	
Costs	1.29	.816	0.40	.688	
Constant	.067	.079	-2.30	.022	**
Mean dependent var	1.554	SD dependent var			0.499
Pseudo r-squared	0.272	Number of obs			112.000
Chi-square	41.823	Prob > chi2			0.000
Akaike crit. (AIC)	138.153	Bayesian crit. (BIC)			173.494

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 8j

Class Proceedings	Coef.	St.Err.	t-value	p-value	Sig
Currency/Exchange	.29	.184	-1.95	.051	*
Vol2	.999	.003	-0.53	.595	
Exceptions	7.483	4.569	3.30	.001	***
Governing Law	1.317	1.101	0.33	.742	
Conflict/Choice of Law Rules	1.433	.88	0.59	.558	
Prior Resolution	.325	.249	-1.47	.143	
Institutional Rules	1.076	.793	0.10	.921	
Broad Scope	1.17	.731	0.25	.802	
Number of Arbitrators Specified	4.185	3.445	1.74	.082	*
Confidentiality	5.773	4.224	2.40	.017	**
Seat of Arbitration Specified	1.404	.902	0.53	.597	
Costs	7.554	6.116	2.50	.013	**
Constant	.192	.202	-1.57	.116	
Mean dependent var	1.527	SD dependent var			0.502
Pseudo r-squared	0.413	Number of obs			112.000
Chi-square	63.974	Prob > chi2			0.000
Akaike crit. (AIC)	116.969	Bayesian crit. (BIC)			152.310

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 8k

Costs	Coef.	St.Err.	t-value	p-value	Sig
Currency/Exchange	.912	.565	-0.15	.881	
Vol2	.996	.003	-1.43	.153	
Exceptions	.82	.542	-0.30	.764	
Governing Law	3.789	3.962	1.27	.203	
Conflict/Choice of Law	.818	.51	-0.32	.748	
Rules					
Prior Resolution	1.112	.802	0.15	.883	
Institutional Rules	1.711	1.445	0.64	.525	
Broad Scope	.425	.269	-1.35	.177	
Number of Arbitrators	4.321	4.183	1.51	.131	
Specified					
Confidentiality	.616	.387	-0.77	.441	
Seat of Arbitration	1.531	.971	0.67	.502	
Specified					
Class Proceedings	10.385	8.913	2.73	.006	***
Constant	.013	.021	-2.60	.009	***
Mean dependent var	1.223	SD dependent var	0.418		
Pseudo r-squared	0.238	Number of obs	112.000		
Chi-square	28.316	Prob > chi2	0.005		
Akaike crit. (AIC)	116.616	Bayesian crit. (BIC)	151.956		

*** $p < .01$, ** $p < .05$, * $p < .1$