

# Exhibit 18

**UNITED STATES DISTRICT COURT  
SOUTHERN DISTRICT OF NEW YORK**

SECURITIES AND EXCHANGE COMMISSION,

Plaintiff,

v.

RIPPLE LABS INC., BRADLEY  
GARLINGHOUSE, and CHRISTIAN A.  
LARSEN,

Defendants.

Case No. 20-CV-10832 (AT)

**Expert Rebuttal Report of Peter Easton**

November 12, 2021

## I. INTRODUCTION AND ASSIGNMENT

1. I submitted an expert report in this matter on October 4, 2021 (the “Easton Report”), in which I provided, in substance, the following opinions:<sup>1</sup>

- i. Ripple Labs Inc. (“Ripple” or “the Company”), and other companies holding cryptocurrencies (including XRP), account for those holdings as indefinite-lived intangible assets (“Intangible Assets”). Ripple properly accounts for monetary and non-monetary transfers of XRP as revenue on its income statement; and for the cost of purchases of XRP subsequently re-sold as an expense on its income statement. None of Ripple’s transactions in XRP are treated, under U.S. Generally Accepted Accounting Principles (“U.S. GAAP”), as involving a security. MoneyGram International, Inc. (“MoneyGram”), a publicly traded holder of XRP, properly accounted for its receipt of XRP in exchange for providing services to Ripple, under U.S. GAAP, as a reduction in the cost of providing those services.<sup>2</sup>
- ii. While there currently is no authoritative U.S. GAAP directly applicable to the accounting for cryptocurrencies, the available guidance, analogous U.S. GAAP, and the practices of other publicly traded companies holding cryptocurrencies are all consistent with the manner in which Ripple accounts for XRP on its balance sheet (*i.e.*, as an Intangible Asset), and are inconsistent with the notion that transactions involving cryptocurrencies (including XRP) are treated as transactions involving securities under U.S. GAAP.<sup>3</sup>
- iii. Based on my understanding of Ripple’s offers and sales of XRP as alleged in the Complaint, it would be improper for Ripple to account for those transactions as involving an offer or sale of securities under U.S. GAAP. In contrast, Ripple’s accounting for its transactions involving XRP as revenues – and not as debt or equity securities – is consistent with U.S. GAAP’s guidance for the accounting for consideration received in return for a company delivering goods, or providing or receiving services, as part of its on-going operations.<sup>4</sup>

2. I have reviewed the expert reports of Professor [REDACTED] (the “[REDACTED] Report”) and [REDACTED] (the “[REDACTED] Report”) submitted on behalf of Plaintiff Securities

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<sup>1</sup> See Easton Report, ¶¶ 1-6 and Appendix A for a summary of my qualifications along with a list of my prior testimonies given in the past five years and the articles I have written.

<sup>2</sup> Easton Report, ¶ 10.

<sup>3</sup> Easton Report, ¶ 10. As discussed later in this report, there is U.S. GAAP for debt and equity securities but not for investment contracts, as the SEC uses that term.

<sup>4</sup> Easton Report, ¶ 10.

Exchange Commission (“SEC”) and dated October 4, 2021. I have been asked by counsel for Defendant Ripple (“Counsel”) to respond to certain of the opinions proffered in the [REDACTED] Report and in the [REDACTED] Report.<sup>5</sup> This rebuttal report addresses the following issues:

- i. Do Ripple’s transfers and sales of XRP in order to, among other things, finance operations or generate funds for share repurchases support the determination, under U.S. GAAP, that the economic substance of those transactions are sales of stock as Professor [REDACTED] opines?<sup>6</sup>
- ii. Assuming, *arguendo*, as set forth in the SEC’s expert reports, that “Ripple used XRP in a similar manner as companies use stock” by, for example, compensating executives with XRP<sup>7</sup> and engaging in actions to limit the supply or otherwise support the market price of XRP (*e.g.*, through lock-up provisions, Ripple’s escrow and limited release of not more than 1 billion XRP per month, and XRP purchases),<sup>8</sup> does this require a determination under U.S. GAAP that Ripple’s transfers and sales of XRP were sales of equity or debt securities?
- iii. Does the fact that Ripple paid certain business partners and vendors for services in XRP rather than fiat currency, require a determination under U.S. GAAP that Ripple’s transfers and sales of XRP were sales of equity or debt securities?
- iv. Do MoneyGram’s disclosures in its SEC filings, with respect to the XRP it received from Ripple for facilitating international foreign exchange transactions on Ripple’s ODL platform, reflect a determination that, under U.S. GAAP, Ripple’s transfers and sales of XRP to MoneyGram constituted sales of equity or debt securities?<sup>9</sup>

## II. SUMMARY OF OPINIONS

3. Based on my academic training and teaching experience,<sup>10</sup> my familiarity with the academic literature and other references set forth in the portions of the [REDACTED] and [REDACTED] reports to which I respond, as well as my analysis and review of the record evidence and relevant

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<sup>5</sup> This report does not attempt to identify every point of agreement or disagreement with either the [REDACTED] Report or the [REDACTED] Report. Therefore, any omission of a response to a point in either of those reports does not necessarily reflect agreement with that point.

<sup>6</sup> See [REDACTED] Report, ¶¶ 44-46.

<sup>7</sup> See [REDACTED] Report, ¶¶ 9.f. and 53-54.

<sup>8</sup> See [REDACTED] Report, ¶ 47; [REDACTED] Report, ¶¶ 41-47.

<sup>9</sup> See [REDACTED] Report, ¶¶ 38-40.

<sup>10</sup> See Easton Report, Appendix A.

accounting guidance, I conclude that certain of the opinions expressed in the [REDACTED] Report and in the [REDACTED] Report disregard, or are inconsistent with, U.S. GAAP. In particular:

- i. I find Professor [REDACTED] opinion that Ripple used XRP in a similar manner to the way companies use stock incorrectly conflates the economic substance of the sales of XRP with Ripple's subsequent use of the proceeds from those sales.<sup>11</sup> However, even assuming, *arguendo*, that his opinion were informative, and accepting that Ripple used the proceeds from sales of XRP to fund operations and used XRP to compensate or incentivize executives, that would not change the conclusion under U.S. GAAP that those transactions should not be accounted for as sales of equity or debt securities.
- ii. Assuming, *arguendo*, that Ripple used mechanisms to limit the supply or otherwise support the market price of XRP (*e.g.*, through lock-up provisions, an escrow system, and purchases),<sup>12</sup> that does not mean that, under U.S. GAAP, the economic substance of those transactions were sales of equity or debt securities.
- iii. The fact that Ripple may have paid business partners and vendors for services in XRP rather than fiat currency<sup>13</sup> does not mean that, under U.S. GAAP, the economic substance of those transactions were sales of equity or debt securities.
- iv. MoneyGram's accounting for and disclosures of its receipt of XRP pursuant to its commercial agreement with Ripple do not reflect a determination that Ripple's transfers and sales of XRP to MoneyGram constituted sales of equity or debt securities. MoneyGram accounted for its commercial agreement with Ripple as an operating activity and not as an investing activity, as it would have done had its receipt of XRP been considered the receipt of a security. The disclosures were not because MoneyGram had received and subsequently sold a security, but rather because Ripple and MoneyGram had entered into a material commercial agreement as well as a separate securities purchase agreement, the combination of which triggered disclosure requirements under U.S. GAAP's guidance for related party transactions.

4. This expert report summarizes the results of my analyses, my opinions, and the supporting evidence. **Appendix A** lists the documents I have considered and relied upon in performing my analyses and reaching my opinions. I have been assisted in my work by a team of

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<sup>11</sup> [REDACTED] Report, ¶ 9 f.

<sup>12</sup> [REDACTED] Report, ¶¶ 9.c, 42-43, 53; [REDACTED] Report, ¶¶ 48-49. I have not been asked to express an opinion on whether these mechanisms do in fact limit the supply or otherwise support the market price of XRP.

<sup>13</sup> [REDACTED] Report, ¶¶ 38-40.

professionals at Compass Lexecon working under my direct supervision.<sup>14</sup> My compensation and the compensation received by Compass Lexecon is not contingent on the outcome of this litigation.

**III. RIPPLE’S ALLEGED USE OF XRP “IN A SIMILAR MANNER AS COMPANIES USE STOCK” DOES NOT, ACCORDING TO U.S. GAAP, SUPPORT AN OPINION THAT THOSE TRANSACTIONS CONSTITUTED SALES OF EQUITY OR DEBT SECURITIES**

5. The [REDACTED] Report includes the following opinion:

Ripple used XRP in a similar manner as companies use stock. Ripple employees receiving XRP were incentivized to work together to increase the price of XRP similar to the incentives of employees at public companies who work to increase company share value. XRP was also used to fund Ripple operations and to enrich Ripple’s founders, directors, and early investors.<sup>15</sup>

6. In this section, I discuss the basis for my opinion that Professor [REDACTED] opinion incorrectly conflates the economic substance of Ripple’s sales of XRP with Ripple’s subsequent use of the proceeds from those sales. I further explain the reason that, even accepting Professor [REDACTED] incorrect opinion, Ripple’s use of XRP in a similar manner as companies use stock would not change the economic substance of the transaction such that, under U.S. GAAP, those transactions would be considered sales of equity or debt securities. I also explain why Ripple’s subsequent use of the proceeds from its sales of XRP has no bearing on the appropriate accounting treatment of the sale and transfer of XRP under U.S. GAAP. In particular, I provide the basis for my opinion that, even if Ripple may have used the proceeds from sales of XRP to fund operations or to fund Ripple equity share repurchases, it does not follow that those XRP sales constituted sales of equity or debt securities.

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<sup>14</sup> Compass Lexecon is being compensated for its professional services at its standard rates. My standard rate is \$1,100 per hour, while those of my colleagues range from \$250-\$955 per hour.

<sup>15</sup> [REDACTED] Report, ¶ 9 f.

**A. Ripple’s Use of XRP To Compensate Executives**

7. The [REDACTED] Report finds that there are purported similarities between how Ripple utilized XRP and how companies utilize common stock, including Ripple’s use as compensation to reward and incentivize employees.<sup>16</sup>

8. As discussed in the Easton Report, Ripple engaged in certain non-monetary transactions in XRP to compensate its executives:

[I]n 2019 Ripple granted its CEO 250 million XRP. The XRP were transferred at the time of grant, with 50% vested at the time of grant, and the remaining vesting on a quarterly basis over the next four years. Ripple records the compensation cost as the XRP vest as general and administrative expense.<sup>17</sup>

9. Under U.S. GAAP, these non-monetary XRP compensation transactions are materially different from compensating employees with common stock. When a company issues shares to an employee as stock-based compensation, “common stock and additional paid-in-capital [equity accounts] increase in the same manner as for cash-based stock issuances.”<sup>18</sup> In other words, stock issued to an employee is accounted for similarly to stock sold to an outside investor because the employee receiving those shares has the same benefits (and the company, the same obligations) associated with stock issued to external parties. The same is not true with respect to compensation paid in XRP, which – as a matter of economic substance and under U.S. GAAP – does not result in the same obligations on the part of Ripple. As I explained in the Easton Report, “Ripple’s issuance of XRP in non-monetary transactions are distinguishable from situations in which Ripple

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<sup>16</sup> [REDACTED] Report, ¶¶ 53-56.

<sup>17</sup> Easton Report, note 71 (quoting Ripple 2020 Audited Financial Statements (“AFS”) p. 40).

<sup>18</sup> Easton, Peter D., John J. Wild, Robert F. Halsey, and Mary Lea McAnally, *Financial Accounting for MBAs*, Eighth Edition (2021) (“Easton et al. (2021)”), at 8-14.

provides shares of the Company as stock-based compensation to consultants and employees” because “the holder has no future claim to Ripple’s equity.”<sup>19</sup>

10. Moreover, employees can be compensated in many forms – cash, in-kind payments, or the provision of other benefits. Regardless of the form of payment, these non-equity forms of compensation to an employee are each accounted for as an operating expense (*i.e.*, as a component of the company’s net income from operating activities).

### **B. Ripple’s Use of Proceeds from Sales of XRP To Fund Operations**

11. To support his opinion that Ripple uses XRP in a similar manner as companies use stock, Professor [REDACTED] explains that early-stage companies often fund their operations and new investments with equity issuances.<sup>20</sup> But all companies fund their operations through either operating or financing activities, and the fact that Ripple funded its operations (in part) with sales of XRP does not mean XRP sales are security issuances.

12. U.S. GAAP requires that a company record a transaction based on the economic substance of the arrangement between the relevant parties.<sup>21</sup> I understand that Ripple’s On-Demand Liquidity product uses XRP to facilitate cross-border foreign exchange transactions. Given that XRP is integral to services that Ripple provides its customers, and is used to fund operations, the cash proceeds of Ripple’s sales of XRP are properly accounted for as revenues

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<sup>19</sup> Easton Report, ¶ 89. *See also id.*, ¶ 86 (noting that holders “of XRP have no claims against the assets or future profits of Ripple and no right to influence the operations of Ripple” nor is there any “creditor relationship between Ripple and holders of XRP”).

<sup>20</sup> [REDACTED] Report, ¶ 53.

<sup>21</sup> FASB Statement of Financial Accounting Concepts No. 8: Conceptual Framework for Financial Reporting (as Amended, August 2018), at BC3.26 (“Faithful representation means that financial information represents the substance of an economic phenomenon rather than merely representing its legal form. Representing a legal form that differs from the economic substance of the underlying economic phenomenon could not result in a faithful representation.”).



under U.S. GAAP.<sup>22, 23</sup> Cash proceeds from the sales of XRP are properly recorded as cash on the company's balance sheet to reflect cash inflows from operating activities. Any subsequent use of the cash on the company's balance sheet in a separate, independent transaction must be evaluated, and accounted for, based on the terms of that transaction, and, therefore, has no relevance to the prior accounting for the sale of XRP as revenues.<sup>24</sup> Accordingly, Professor [REDACTED] opinion is fundamentally flawed in as much as it contradicts basic analytical requirements of U.S. GAAP. In particular, Professor [REDACTED] opinion that "Ripple used XRP in a similar manner as companies use stock"<sup>25</sup> improperly disregards the economic substance of these transactions, and improperly conflates Ripple's initial sale of XRP with the subsequent use of the proceeds from those sales. To the extent that Professor [REDACTED] opinion that proceeds from the sale of XRP are used to fund operations implies that the sale was the equivalent to a sale of debt or equity securities, such an opinion is inconsistent with fundamental accounting principles.

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<sup>22</sup> Easton Report, ¶ 82 ("Ripple generates revenue from the sales of XRP to customers to facilitate cross-border payments. Ripple properly accounts for this revenue in accordance with the FASB's guidance on revenue generated from contracts with customers"), ¶ 88 ("I understand that Ripple engages in transactions in XRP in order to facilitate transactions using the ODL platform. In these circumstances, Ripple's transfers of XRP are typical operating transactions, and are, therefore, properly treated as Revenue on the income statement.").

<sup>23</sup> As I explained in the Easton Report, "[r]evenues are inflows or other enhancements of assets of an entity or settlements of its liabilities (or a combination of both) from delivering or producing goods, rendering services, or other activities that constitute the entity's ongoing major or central operations." Easton Report, note 36 (quoting FASB Statement of Financial Accounting Concepts No. 6: Elements of Financial Statements, at CON6-2).

<sup>24</sup> In contrast, transactions in which the arrangement includes a sale, but the proceeds from a sale are used to make a purchase of similar goods from the party to the original transaction, are treated as one transaction for accounting purposes under ASC 606. *See, e.g.,* Doug Carmichael, *New Revenue Recognition Guidance and the Potential for Fraud and Abuse: Are Companies and Auditors Ready?* The CPA Journal (April 2019) ("In a round-trip transaction, an entity recognizes revenue in one transaction with the customer and, in a separately structured transaction, provides the consideration to the customer that offsets the amount to be received in the revenue transaction. Some well-known examples are Qwest and Global Crossing buying and selling line capacity between them in what was, in substance, a nonmonetary exchange."), <https://www.cpajournal.com/2019/04/08/new-revenue-recognition-guidance-and-the-potential-for-fraud-and-abuse/>. In contrast with these examples, Ripple's use of the proceeds are separate, independent transactions that are not linked with the sale of XRP. Therefore, there is no basis for considering the use of the proceeds in determining the appropriate accounting for sales of XRP under U.S. GAAP.

<sup>25</sup> [REDACTED] Report, ¶ 9 f.

13. Moreover, Professor ██████ acknowledges that Ripple’s sales of XRP are, as a matter of economic substance, readily distinguishable from the sale of debt or equity securities in respects that are determinative under U.S. GAAP. Among other things, Professor ██████ acknowledges that Ripple’s sales of XRP do not grant the recipient the rights (or Ripple, the obligations) associated with the issuance of a debt or equity security:

However, Ripple enjoyed the benefits of capital raising through sale of XRP, without the costs typically associated with such sales. XRP did not grant holders any formal voting rights in the governance of Ripple. Thus, Ripple executives did not have to give up any control of company operations as they normally would when selling dilutive shares with voting rights. Additionally, by not issuing publicly traded stock Ripple was not obligated to provide regular investor disclosures of financial records and corporate activities that companies typically make.<sup>26</sup>

14. In the Easton Report, I explained that “[g]iven the substance of [Ripple’s] XRP transactions . . . it is my opinion that XRP is not a security according to U.S. GAAP.”<sup>27</sup> My opinion was based, in part, on my understanding that, as a matter of economic substance and contract, the “[p]urchasers of XRP have no claims against the assets or future profits of Ripple and no right to influence the operations of Ripple” nor is there any “creditor relationship between Ripple and holders of XRP.”<sup>28</sup>

15. Given that holders of XRP have none of the rights, and no ability to make any of the claims on Ripple that are provided to holders of debt or equity securities, there is no equivalent

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<sup>26</sup> ██████ Report, ¶ 55. Even if XRP sales are sales of equity in Ripple (they are not), the sales of XRP are not of sufficient magnitude for the executives of Ripple to “give up any control of company operations” as Professor ██████ opines. *Id.*

<sup>27</sup> Easton Report, ¶ 86.

<sup>28</sup> Easton Report, ¶ 86; *see also id.*, ¶ 88 (noting that Ripple’s accounting for sales of XRP “as Revenue on the income statement . . . is appropriate because, unlike the case for issuances of equity and debt securities, Ripple has no future obligation to the holder of XRP. In particular, based on my understanding of Ripple’s XRP Transactions, Ripple has no ‘creditor relationship’ with the purchaser of XRP, nor does the purchase of XRP provide the holder with ‘an ownership interest in’ Ripple”).

need to require Ripple “to provide regular investor disclosures of financial records and corporate activities that companies typically make” when they sell equity or debt securities to the public.<sup>29</sup>

16. Had sales of XRP been accounted for as issuances of stock (which Professor [REDACTED] claims is analogous), instead of recorded as Revenues on Ripple’s income statement, Ripple would have recorded an equity transaction on its balance sheet.<sup>30</sup> The presence of an equity balance on a company’s balance sheet reflects the claim the holder of the security has on the company’s net assets.

17. There is no equivalent claim to the company’s net assets held by an owner of XRP. As my co-authors and I explain in our financial accounting textbook for MBA students, acquirers of a company’s equity receive certain benefits that allow the holders to participate in the ongoing operations of the issuing company:

Companies raise funds by selling shares of stock to investors in addition to borrowing. But, unlike debtholders and other lenders to the company, shareholders elect a Board of Directors that hires executives to oversee the company’s operations. While interest and principal paid to lenders is fixed by contract, shareholders have no contractual return. There is, however, the potential for shareholders to receive dividends and derive large value from future price appreciation of company stock.

The stockholders’ equity section of the balance sheet reports the book value of the stockholders’ investment, as determined under accounting rules (GAAP). . . . There are two types of stockholders’ equity accounts: contributed capital and earned capital. . . . Over time, stockholders expect their equity to increase and the stockholders’ equity section of the balance sheet represents a score card, in a sense, that records how well management has performed with the capital entrusted to them by the shareholders.<sup>31</sup>

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<sup>29</sup> [REDACTED] Report, ¶ 55.

<sup>30</sup> Easton Report, ¶ 40 (“the proceeds for issuances of equity (*e.g.*, common stock, preferred stock) are accounted for as equity on the company’s balance sheet. Unlike a sale of goods held on a company’s balance sheet as inventory, there is no income statement impact (*i.e.*, no revenue or expenses) associated with issuing debt or equity.”).

<sup>31</sup> Easton et al. (2021), at 8-3.

18. Based on my understanding of Ripple’s sales of XRP (and as Professor ██████ acknowledges), no holder of XRP has a right to any of the benefits (or imposes on Ripple any of the obligations) associated with sales of common stock.

19. Nor does XRP have any of the economic substance of a debt security. Generally, the holder of a debt security expects to receive two types of cash flow streams in exchange for that investment: (1) periodic (usually semi-annual) interest payments over the life of the debt instrument; and (2) the repayment of the principal of the debt (*i.e.*, the face value on which the interest payments are calculated) as a return on investment upon maturity of the debt instrument.<sup>32</sup> But, unlike an issuer of a debt security, Ripple has no contractual or other obligation to pay a purchaser of XRP either periodic interest payments or a return of principal (*i.e.*, to purchase XRP at a given price).

20. Thus, contrary to Professor ██████ opinion, all companies fund their operations through either operating or financing activities, and the fact that Ripple funded its operations (in part) with sales of XRP does not mean XRP sales are security issuances. Ripple’s sales of XRP would not be accounted for under U.S. GAAP as the issuance of a debt or equity security.

#### **IV. RIPPLE’S ALLEGED EFFORTS TO SUPPORT THE PRICE OF XRP DOES NOT CAUSE TRANSACTIONS IN XRP TO BE TRANSACTIONS IN EQUITY OR DEBT SECURITIES UNDER U.S. GAAP**

21. The ██████ Report assumes that Ripple utilized the escrow feature of the XRP Ledger, the lock-up provisions of various contracts, and purchases of XRP from the open market,<sup>33</sup> to provide price support for XRP. From this, he reaches an opinion that these actions were important to “investment-oriented” purchasers of XRP, but not to “utility-oriented” purchasers of

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<sup>32</sup> See, e.g., Easton et al. (2021), pp. 7-9 to 7-10.

<sup>33</sup> ██████ Report, ¶¶ 41-47.

XRP.<sup>34</sup> The [REDACTED] Report concludes that Ripple's use of lock-up provisions further demonstrates that Ripple's sales and transfers of XRP were used in a manner similar to common stock.<sup>35</sup> In this section, I discuss the reasons why, as a matter of economic substance under U.S. GAAP, even assuming Ripple engaged in actions to restrict the supply of XRP, and to otherwise support the market price of XRP (e.g., through lock-up provisions, the escrow restrictions, and XRP purchases),<sup>36</sup> this does not result in Ripple's sales or transfers of XRP being treated as transactions in equity or debt securities under U.S. GAAP. In this section, I also address the reasons that Professor [REDACTED] and Mr. [REDACTED] observations about Ripple's alleged efforts to provide market price support for XRP do not alter my opinion that, as a matter of economic substance under U.S. GAAP, Ripple's sales of XRP were properly viewed as transactions in Intangible Assets and not involving securities.

#### **A. Ripple's Use of an Escrow Feature**

22. In the Easton Report, I summarized the disclosure in Ripple's audited financial statements of Ripple's escrow feature:

The Company utilizes a cryptographic escrow feature of the XRP Ledger to create certainty of [the amount of] XRP available to Ripple at any given time. The Company uses the escrow feature to establish escrow contracts that will expire on the first day of every month, with each monthly expiration representing 1 billion XRP. Only after the contracts expire do the XRP become available for Ripple's use. At the beginning of each month XRP are placed in new escrow contracts with expiration scheduled for the first month which does not yet have 1 billion XRP scheduled for escrow expiration. As of December 31, 2020, 48.2 billion XRP were subject to these time-based escrow contracts. During the years ended December 31, 2020 and 2019, of the 12.0 billion XRP released annually from escrow contracts 10.3 billion XRP and 9.4 billion XRP, respectively, were placed into new escrow contracts, with the last contract expiring on January 1, 2025.<sup>37</sup>

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<sup>34</sup> [REDACTED] Report, ¶¶ 48-49.

<sup>35</sup> [REDACTED] Report, ¶ 53.

<sup>36</sup> I am not offering an opinion on whether Ripple engaged in actions to maintain or increase the market price of XRP. However, even assuming Professor [REDACTED] and Mr. [REDACTED] opinions were well-founded, they do not result in Ripple's sales or transfers of XRP being accounted for as transactions in a security under U.S. GAAP.

<sup>37</sup> Easton Report, ¶ 45 (quoting from Ripple 2020 AFS, p. 21).

23. From the perspective of U.S. GAAP, and as a matter of economic substance, Ripple’s disclosures of the use and purpose of this escrow feature is analogous to situations in which a company selling a good or service elects to manage the amount sold into the market (*e.g.*, as with an agricultural commodity, oil, or precious metal).

24. Notwithstanding this analogy, how a company stores its inventory of goods available for sale, and whether and the extent to which it limits the supply of goods sold, is an operational decision that has no bearing on how sales of those goods are accounted for under U.S. GAAP.<sup>38</sup> Therefore, the economic substance of Ripple’s management of the total amount of XRP Ripple could sell in a given month does not support the opinion that Ripple’s transfers or sales of XRP were sales of stock under U.S. GAAP. The sale of inventory does not become a sale of a security simply because a company selling the inventory may use an escrow or other mechanism to restrict supply. Instead, as discussed above in **Section III**, what matters in determining the appropriate accounting for a transaction is the economic substance of the contractual arrangement between the buyer and seller.

#### **B. Ripple’s Use of Lock-Up Provisions**

25. The [REDACTED] Report observes that “Ripple also placed lock-up restrictions on certain sales of XRP sold in over-the-counter sales agreements to individual or institutional investors, that would mitigate selling pressure.”<sup>39</sup> According to Professor [REDACTED] these contractual provisions

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<sup>38</sup> While the method in which a company physically (or virtually) stores the inventory of goods available for sale does not impact the accounting for subsequent sales, the choice of accounting inventory methods for determining the cost of the inventory sold (*e.g.*, first-in-first-out (“FIFO”), last-in-first-out (“LIFO”), average cost, specific identification) does impact the amount of expense (cost of goods sold) recorded in connection with those sales.

<sup>39</sup> [REDACTED] Report, ¶ 9.c.

“functioned similarly to lock-up restrictions in a traditional company’s Initial Public Offering and allowed Ripple to protect the price of XRP from falling.”<sup>40</sup>

26. Professor [REDACTED] suggests that Ripple’s use of lock up restrictions has the same purpose as the use of the escrow feature (*i.e.*, to support the XRP price). However, as discussed in detail above, a decision by a company to limit the supply of goods or services in order to support pricing is an operational decision that has no bearing on the character of the asset or how those sales are accounted for under U.S. GAAP.

### C. Ripple’s Purchases of XRP

27. As I explained in the Easton Report, Ripple purchased XRP from the market in 2020 and held Purchased XRP with a cost basis of [REDACTED] as an Intangible Asset on its balance sheet as of December 31, 2020.<sup>41</sup> Ripple’s financial statements show that the amount of cash paid for Purchased XRP in 2020 was [REDACTED] (and [REDACTED] in 2019), in comparison with Revenue recognized on monetary sales of XRP of [REDACTED] in 2020 and [REDACTED] in 2019.<sup>42</sup> Ripple’s accounting for Purchased XRP as an Intangible Asset was proper, and not treated differently under U.S. GAAP from how other companies purchasing XRP (*e.g.*, MoneyGram) accounted for their purchases of XRP.<sup>43</sup>

28. In contrast, Ripple paid [REDACTED] in 2020, and [REDACTED] in 2019, to repurchase common and preferred stock.<sup>44</sup> Ripple’s repurchases of its own common stock are recorded either as a direct reduction in the Common Stock and Additional Paid in Capital accounts

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<sup>40</sup> [REDACTED] Report, ¶ 9.c.

<sup>41</sup> Easton Report, ¶ 51.

<sup>42</sup> Ripple 2020 AFS, p. 3 & 6. Ripple did not purchase any XRP in 2019. *Id.*, p. 6 & 21.

<sup>43</sup> Easton Report, ¶ 78 (citing MoneyGram 2020 10-K, p. F-45).

<sup>44</sup> Ripple 2020 AFS, p. 6.

(the accounts used to record issuances of common stock) or as Treasury Stock, which represents a reduction in the equity balance of Common Stock.<sup>45</sup> Similarly, Ripple's repurchases of preferred stock are recorded as a reduction in the equity balance of Preferred Stock.<sup>46</sup> These purchases are accounted for as a reduction in equity because those repurchases reduce the amount of total shareholder claims on Ripple's net assets and, in the case of Preferred Stock, the amount of preferred dividends owed to holders of those shares.

29. Even if Ripple's purchases of XRP were intended to serve the same purposes as its use of an escrow feature or lock-up provisions (*i.e.*, to support the price or control the supply of XRP), that doesn't result in Ripple's transactions in XRP being treated as the sales of a security under U.S. GAAP, for the reasons I describe above (*supra*, ¶¶ 12, 23-24).

**V. NEITHER RIPPLE'S USE OF XRP TO MAKE PAYMENTS IN EXCHANGE FOR GOODS AND SERVICES, NOR THE SUBSEQUENT DISPOSITION OF XRP BY THOSE COUNTERPARTIES, CAUSES RIPPLE'S TRANSACTIONS IN XRP TO BECOME A SECURITY UNDER U.S. GAAP**

30. The [REDACTED] Report offers the opinion that Ripple's transactions in XRP were designed to create "an expectation of future profit derived from the efforts of Ripple."<sup>47</sup> Mr. [REDACTED] states that "[c]reating new partnerships with financial institutions was a key aspect of the bull case for XRP," and that "Ripple's distributions of XRP to business partners were another mechanism . . . by which Ripple effectively sold XRP into the broader XRP ecosystem."<sup>48</sup> Mr. [REDACTED] points to Ripple's commercial agreement with MoneyGram as one example of such a business relationship.<sup>49</sup>

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<sup>45</sup> Ripple 2020 AFS, p. 5 & 35.

<sup>46</sup> *Id.*

<sup>47</sup> [REDACTED] Report, ¶ 8.

<sup>48</sup> [REDACTED] Report, ¶ 38.

<sup>49</sup> [REDACTED] Report, ¶ 39.



31. In this section, I discuss the basis for my opinion that neither Ripple's use of XRP as currency for the payment of services received from business partners, nor the decision by those recipients whether to sell or hold XRP, causes those transactions to constitute a sale of an equity or debt security under U.S. GAAP. Moreover, the accounting disclosures made by MoneyGram refute Mr. [REDACTED] conclusion. MoneyGram accounted for its receipt of XRP as an operating transaction pursuant to a commercial agreement with Ripple. MoneyGram made disclosures about its receipt of XRP in its audited financial statements filed with the SEC not because it had received and subsequently sold a security, but rather because Ripple and MoneyGram had entered into a material commercial agreement as well as a securities purchase agreement, the combination of which triggered disclosure requirements under U.S. GAAP's guidance for related party transactions.

**A. Ripple's Payments to Service Providers in XRP Are Not Sales of a Security Under U.S. GAAP**

32. In the Easton Report, I discussed Ripple's payment to certain service providers in XRP rather than fiat currency:

Ripple also generates non-monetary revenue from XRP transactions in which the Company pays for services with XRP. These transactions are akin to barter transactions, and are properly accounted for in accordance with the FASB's guidance on non-monetary transactions. Since the XRP that Ripple sells has a cost basis of zero, its transfer results in profit equal to the fair value of the amount of XRP transferred. As discussed above, however, these non-monetary transactions result in a net profit that approximates zero in any given period (*i.e.*, the only difference between the amount of revenue and expense recorded for non-monetary XRP transactions is the result of differences in timing between when the services are performed and Ripple pays for them by distributing XRP).<sup>50</sup>

33. I also explained why Ripple's payment in XRP was distinguishable from a payment of equity, for example the payment of stock-based compensation:

Ripple's issuance of XRP in non-monetary transactions are distinguishable from situations in which Ripple provides shares of the Company as stock-based compensation to consultants and employees.

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<sup>50</sup> Easton Report, ¶ 82 (citation omitted).

In the case of stock-based compensation, the stock options or warrants issued provide the holder with a claim on the equity of Ripple and they are accounted for as such. In contrast, Ripple's distributions of XRP as compensation to employees or as consideration to contractors are properly recorded as current period expenses for services provided. This is because, unlike for transactions involving debt, equity, or employee stock options, once the XRP is distributed, Ripple has no future obligation to the holder and the holder has no future claim to Ripple's equity.<sup>51</sup>

34. As is the case with Ripple's use of proceeds from sales of XRP (*supra*, ¶ 12), how the recipient of XRP disposes of XRP in an independent transaction is irrelevant to the proper accounting of a transaction. Therefore, neither the fact that Ripple paid certain business partners for services rendered in XRP instead of cash, nor whether those recipients continued to hold or sold the XRP, results in those transactions involving sales of stock according to U.S. GAAP.

**B. MoneyGram's Accounting for and Disclosures of Its XRP Transactions with Ripple Do Not Result in XRP Being a Security Under U.S. GAAP**

35. MoneyGram is an example of a Ripple service provider that received payment in XRP. In the Easton Report, I explained that MoneyGram disclosed that, "[a]s part of a commercial agreement with Ripple, MoneyGram received XRP for facilitating international foreign exchange transactions on Ripple's ODL platform."<sup>52</sup> MoneyGram's 2020 10-K included the following disclosure with respect to its agreement with Ripple:

In June 2019, we entered into a commercial agreement with Ripple Labs, Inc., a developer of blockchain technology and a cryptocurrency named XRP, to utilize their On Demand Liquidity ('ODL') platform, as well as XRP, for cross-border foreign exchange transaction for the Company's own account. The Company is compensated by Ripple for developing and bringing liquidity to certain foreign exchange markets, facilitated by the ODL platform, and providing a reliable level of foreign exchange trading activity. We refer to this compensation as market development fees. Per the terms of the commercial agreement, the Company does not pay fees to Ripple for its usage of the ODL platform or the related software and there are no claw-back or refund provisions. The market development fees are recorded as a reduction of the 'Transaction and operations support' line in the accompanying Consolidated Statements of Operations."<sup>53</sup>

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<sup>51</sup> Easton Report, ¶ 89 (citations omitted).

<sup>52</sup> Easton Report, ¶ 77.

<sup>53</sup> Easton Report, ¶ 77 (quoting MoneyGram 2020 10-K, p.2).

36. The Easton Report also summarized MoneyGram’s disclosures in which it accounted for the XRP it received from Ripple as an Intangible Asset.<sup>54</sup> Had MoneyGram viewed the receipt of XRP as a security, it would have accounted for its holdings of XRP as an investment in debt or equity securities.

37. The Easton Report also explained that “MoneyGram’s accounting for the fees received from Ripple in the form of XRP as a reduction in its cost of providing the XRP transactions (*i.e.*, as a contra-expense on its income statement) is consistent with the accounting treatment it would have used had the fees been paid instead with U.S. dollars.”<sup>55</sup> MoneyGram’s disclosures make clear that it viewed its commercial agreement with Ripple, including subsequent sales of XRP, as part of its operating activities and not as the sale of a security (a financing activity): “All activity related to the Ripple commercial agreement, including purchases and sales of XRP and consideration received in XRP, is presented as part of operating activities in the Consolidated Statement of Cash Flows.”<sup>56</sup>

38. In addition to a commercial agreement, Ripple and MoneyGram also entered into a securities purchase agreement (“SPA”) whereby “Ripple agreed to purchase and the Company agreed to issue up to \$50.0 million of common stock and ten-year warrants to purchase common stock.”<sup>57</sup> Ripple paid MoneyGram a total of \$50 million in two transactions during 2019 and MoneyGram accounted for “[t]he proceeds from the issuance to Ripple . . . in ‘Additional paid-in capital’ with the corresponding par value of the common stock issued in ‘Common stock’ on the

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<sup>54</sup> See Easton Report, ¶ 78.

<sup>55</sup> Easton Report, ¶ 79.

<sup>56</sup> MoneyGram 2020 10-K, p. F-45.

<sup>57</sup> MoneyGram 2019 10-K, p. F-44.

Consolidated Balance Sheets as of December 31, 2019.”<sup>58</sup> In other words, Ripple’s exercise of its rights under the SPA was accounted for by MoneyGram as the issuance of equity and a financing cash flow.

39. MoneyGram also disclosed that “[t]he Company evaluated the fair values of each element within the multiple element arrangement and determined that it was not necessary to allocate any proceeds from the SPA to the commercial agreement.”<sup>59</sup> In other words, MoneyGram considered the SPA with Ripple to be distinct from the commercial agreement, which it explicitly recognized as an operating activity and not as an investing activity as it would have done had its receipt of XRP been considered the receipt of a security.

40. Finally, as part of his argument that “the overall effect of [Ripple’s] XRP payments [to MoneyGram] was to sell additional XRP into the open market in exchange for cash,” Mr. [REDACTED] noted that “MoneyGram regularly updated its investors in public filings to the U.S. Securities and Exchange Commission about the compensation it received from Ripple.”<sup>60</sup> To the extent that Mr. [REDACTED] intended to infer as much, MoneyGram’s disclosures of its commercial agreement with Ripple in its SEC filings do not mean that its receipt of XRP represented the receipt of a security that it subsequently sold on the market. MoneyGram disclosed the commercial agreement as part of the discussion of the company’s operating results and significant accounting policies, likely due to the materiality of the commercial agreement to its operating results (*e.g.*, MoneyGram recorded \$50.2 million in “market development fees” in 2020).<sup>61</sup> Moreover, U.S. GAAP required that MoneyGram disclose both the SPA and the commercial agreement as related

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<sup>58</sup> MoneyGram 2019 10-K, p. F-44.

<sup>59</sup> MoneyGram 2019 10-K, p. F-44.

<sup>60</sup> [REDACTED] Report, ¶ 39.

<sup>61</sup> MoneyGram 2020 10-K, pp. 32, F-17, & F-45.

party transactions given that Ripple became a significant holder of MoneyGram common stock as a result of the SPA.<sup>62</sup>

41. In summary, MoneyGram's accounting for and disclosures of its receipt of XRP pursuant to its commercial agreement with Ripple are inconsistent with an interpretation that XRP is a security.

## VI. CONCLUSION

42. Based on my analysis and review of the record evidence and relevant accounting guidance, I find that certain of the opinions expressed in the [REDACTED] Report and in the [REDACTED] Report disregard, or are inconsistent with, U.S. GAAP. After consideration of those opinions expressed in the [REDACTED] and [REDACTED] reports, my opinion that sales and transactions involving XRP would not be accounted for as the offer and sale of securities under U.S. GAAP is unchanged.

I declare under penalty of perjury that the foregoing is true and correct. Executed on November 12, 2021.



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Peter Easton

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<sup>62</sup> MoneyGram 2020 10-K, p. F-44.

## **APPENDIX A**

### **List of Materials Considered**

#### **Expert Reports**

- Expert Report of [REDACTED] dated October 4, 2021
- Expert Report of Peter Easton dated October 4, 2021
- Expert Report of [REDACTED] dated October 4, 2021

#### **Ripple Financial Statements**

- Ripple Lab Inc., Consolidated Financial Statements as of December 31, 2020 and 2019 and for the years then ended and Independent Auditors' Report (RPLI\_SEC 0920429-75)

#### **SEC Filings**

- MoneyGram International, Inc. Form 10-K for the fiscal year ended December 31, 2019
- MoneyGram International, Inc. Form 10-K for the fiscal year ended December 31, 2020

#### **Accounting Guidance**

- FASB ASC 606: Revenue from Contracts
- FASB Statement of Financial Accounting Concepts No. 6: Elements of Financial Statements
- FASB Statement of Financial Accounting Concepts No. 8: Conceptual Framework for Financial Reporting

#### **Other Public Documents and Data**

- Carmichael, Doug, "New Revenue Recognition Guidance and the Potential for Fraud and Abuse: Are Companies and Auditors Ready?" *The CPA Journal* (April 2019)  
<https://www.cpajournal.com/2019/04/08/new-revenue-recognition-guidance-and-the-potential-for-fraud-and-abuse/>
- Easton, Peter D., John J. Wild, Robert F. Halsey, and Mary Lea McAnally, *Financial Accounting for MBAs*, Eighth Edition (2021)

All other

*Highly Confidential*

# Exhibit 19

UNITED STATES DISTRICT COURT  
SOUTHERN DISTRICT OF NEW YORK

SECURITIES AND EXCHANGE )  
COMMISSION, )  
 )  
Plaintiff, )  
 )  
vs. ) Case No.  
 ) 20 Civ. 10832 (AT) (SN)  
RIPPLE LABS, INC., BRADLEY )  
GARLINGHOUSE, and CHRISTIAN )  
A. LARSEN, )  
 )  
Defendants. )  
\_\_\_\_\_ )

VIDEOCONFERENCE VIDEO-RECORDED DEPOSITION OF

YESHA YADAV

New York, New York

Friday, February 11, 2022

Reported Stenographically By:  
PATRICIA A. BIDONDE  
Registered Professional Reporter  
Realtime Certified Reporter  
JOB No. 220211PBI



February 11, 2022  
9:21 a.m.

Videoconference Video-Recorded

Deposition of YESHA YADAV, held at the  
offices of Debevoise & Plimpton, 919  
Third Avenue, New York, New York, before  
Patricia A. Bidonde, Stenographer,  
Registered Professional Reporter,  
Realtime Certified Reporter, Certified  
eDepoze Court Reporter, Notary Public of  
the States of New York, New Jersey, and  
Connecticut.

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ALSO PRESENT:

CHRISTIAN BIDONDE, Legal Video Specialist

STELLA UVAYDOVAS, Paralegal, Via

Videoconference

- - -

1  
2  
3  
4 IT IS HEREBY STIPULATED AND  
5 AGREED, by and between the attorneys for  
6 the respective parties, that all  
7 objections, except as to the form of the  
8 questions, shall be reserved to the time  
9 of the trial.

10 IT IS FURTHER STIPULATED AND  
11 AGREED that the filing of the original  
12 transcript of the examination is waived.  
13  
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25

## I N D E X

EXAMINATIONS	PAGE	LINE
BY MS. STEWART	10	6
BY MR. SYLVESTER	84	12

## E X H I B I T S

NO.	DESCRIPTION	PAGE	LINE
Exhibit YY-1	Expert report of Professor Yesha Yadav.....	15	24
Exhibit YY-10	"Fintech and the Innovation Trilemma" by Yesha Yadav and Chris Bummer.....	35	4

\*\*\* EXHIBITS BOUND SEPARATELY \*\*\*

DIRECTIONS:	18	23
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## P R O C E E D I N G S

- - -

THE VIDEOGRAPHER: We are now on the record. The time is 9:21 a.m. on February 11, 2022. Audio and video recording will continue to take place until all parties agree to go off the record. Please note that microphones are sensitive and may pick up whispering and private conversations.

This is the video-recorded deposition of Yesha Yadav in the matter of Securities and Exchange Commission versus Ripple Labs, Inc., Bradley Garlinghouse, and Christian Larsen. This deposition is being held at Debevoise & Plimpton, 919 Third Avenue, New York, New York.

My name is Christian Bidonde. I am the legal video specialist on behalf of Gradillas. The certified stenographer is Patricia Bidonde on behalf of Gradillas. I am not related to any party in this action nor am I financially interested in the outcome.

1 Counsel will state their  
2 appearances for the record after which  
3 the certified stenographer will swear in  
4 the witness.

5 MS. STEWART: Ladan Stewart for  
6 plaintiff, the SEC, along with Mark  
7 Sylvester.

8 MS. ZORNBERG: Lisa Zornberg from  
9 Debevoise & Plimpton on behalf of Ripple  
10 Labs.

11 MS. BUNTING: Kristina Bunting  
12 from Paul, Weiss, Rifkind, Wharton &  
13 Garrison on behalf of Christian Larsen.

14 MR. FORD: Christopher Ford,  
15 Debevoise & Plimpton, on behalf of  
16 Ripple Labs.

17 MR. SOLOMON: Matthew Solomon  
18 from Cleary Gottlieb Steen & Hamilton on  
19 behalf of Brad Garlinghouse.

20 MS. MENTREK: Maureen Mentrek,  
21 Debevoise & Plimpton, on behalf of  
22 Ripple Labs.

23 MR. SYLVESTER: Mark Sylvester on  
24 behalf of the SEC.  
25



1 Y E S H A Y A D A V, called as a witness,  
2 having been duly sworn by a Notary  
3 Public, was examined and testified as  
4 follows:

5 EXAMINATION BY

6 MS. STEWART:

7 Q. Good morning, Professor Yadav.  
8 As I mentioned, my name is Ladan Stewart. I'm  
9 going to be asking questions on behalf of the  
10 SEC. Thank you for indulging us in this, sort  
11 of, half remote, half in-person deposition  
12 today.

13 Have you had your deposition  
14 taken before?

15 A. I have not.

16 Q. So before we begin, let's just  
17 start with some sort of rules of the road for  
18 today, the most important of which is that the  
19 court reporter in the room with you is  
20 transcribing everything that we say. So in  
21 order to make a good record for her, it's  
22 important that we don't talk over each other.

23 So if you could please wait for  
24 me to finish my question before you answer,  
25 and I'll do my best to wait until you finish

1 your answer before I ask my next question.

2 Okay?

3 A. Okay.

4 Q. And along the same lines, the  
5 court reporter can't take down nods of the  
6 head or shakes of the head. So if you can  
7 give verbal, audible answers to my questions.

8 Okay?

9 A. Okay.

10 Q. And if you don't understand any  
11 question, let me know and I will rephrase it.  
12 And if at any time you need a break, just ask  
13 me and we can go off the record. But I would  
14 ask that you answer the question that I posed  
15 to you before we take a break. Okay?

16 A. Okay.

17 MS. ZORNBERG: Ladan.

18 MS. STEWART: Yes.

19 MS. ZORNBERG: I'd like to also  
20 just put on the record, as with prior  
21 depositions, that an objection by any  
22 counsel for the defendant is sufficient  
23 to preserve it on behalf of all  
24 defendants.

25 MS. STEWART: Okay.

1 Q. Professor Yadav, is there any  
2 reason that you can't testify truthfully or  
3 accurately today?

4 A. There is not.

5 Q. Were you retained to provide  
6 expert services in this case?

7 A. I am, yes.

8 Q. Who retained you?

9 A. I've been retained by Ripple  
10 Labs, Christian Larsen, and Brad Garlinghouse  
11 and the lawyers on behalf of the defendants.

12 Q. Thank you. When were you first  
13 contacted about this engagement?

14 A. I was first contacted  
15 approximately in mid-September about this  
16 engagement.

17 Q. In September of what year?

18 A. 2021.

19 Q. And who contacted you?

20 A. I was contacted by Sam Levander  
21 and Alex Janghorbani of Cleary Gottlieb on  
22 behalf of Brad Garlinghouse.

23 Q. How much time have you spent on  
24 this engagement to date?

25 A. I can't say exactly. I would say

1 maybe over a hundred hours certainly.

2 Q. Do you mean between 100 and 150,  
3 would you say?

4 A. I would say so. I can't say  
5 exactly.

6 Q. What have you billed so far for  
7 your services in this matter?

8 A. I have not actually sent a bill  
9 yet.

10 Q. Do you plan to send a bill?

11 A. I do, yes.

12 Q. Did you take any steps to prepare  
13 for today's deposition?

14 A. I did, yes.

15 Q. What did you do?

16 A. I have reviewed my own documents  
17 in the report, and I've also prepared with  
18 counsel.

19 Q. And when you say "counsel," who  
20 are you referring to?

21 A. I'm referring to counsel for the  
22 defendants.

23 Q. Which counsel specifically did  
24 you meet with to prepare for your deposition?

25 A. I have met with counsel for

1 Ripple Labs, counsel for Brad Garlinghouse and  
2 counsel for Christian Larsen.

3 Q. Can you identify the lawyers that  
4 you've met with?

5 A. Yes, I can identify Lisa  
6 Zornberg, Christopher Ford, Meredith Dearborn,  
7 Kristina Bunting, Michael Schulman, Carly  
8 Lagrotteria, and Maureen Mentrek. I think  
9 that should be all, and Matthew Solomon as  
10 well.

11 Q. And how many sessions did you  
12 meet with counsel to prepare for your  
13 deposition?

14 A. I can't remember exactly. I  
15 would say maybe five, five or six. I can't  
16 say exactly.

17 Q. How many hours total would you  
18 say you spent with counsel in preparing for  
19 your deposition?

20 A. Again, I can't say exactly. I  
21 would say between maybe 15 to 20 hours.

22 Q. And sorry if I'm misremembering,  
23 but you said other than meeting with counsel,  
24 you also reviewed documents. Is that right?

25 A. I reviewed my own report and the

1 documents cited in the report.

2 Q. All of the documents cited in  
3 your report or any particular?

4 A. I just reviewed --

5 MS. ZORNBERG: Objection to form.

6 You can answer.

7 A. I reviewed the documents that I  
8 felt would be useful for my analysis.

9 Q. Did you review anything else?

10 A. I focused on reviewing my report.

11 Q. Did you speak with anyone other  
12 than the counsel that you mentioned in  
13 preparing for your deposition?

14 A. I have not.

15 Q. Okay. Now I'm going to ask  
16 Mr. Sylvester to please hand you a copy of  
17 your report which we had premarked as Exhibit  
18 YY-1.

19 A. Thank you.

20 Q. I'm going to ask you to take a  
21 look at the document in the binder that was  
22 just handed to you and tell me if you  
23 recognize it.

24 (Exhibit YY-1, Expert report of  
25 Professor Yesha Yadav, marked for

1 identification, as of this date.)

2 A. (Document review.)

3 MS. STEWART: And for the counsel  
4 who are participating by Zoom, I'm going  
5 to ask our paralegal Stella not to  
6 display the documents on Zoom just  
7 because, when that happens, I can't see  
8 Professor Yadav. So we will e-mail you  
9 the exhibits instead.

10 A. I recognize my report, yes.

11 Q. And so it is your expert report  
12 in this matter?

13 A. This is my expert report in the  
14 matter.

15 Q. And if you look at the page  
16 following page 71, is that your signature?

17 A. That is my signature, yes.

18 Q. When did you finalize this  
19 report?

20 A. This report was finalized on  
21 October the 4th, 2021.

22 Q. Have you finished all the work  
23 that you were assigned to do in this case?

24 A. I believe so. For the moment,  
25 yes.

1 Q. Are you planning to submit a  
2 supplemental report in this case?

3 A. Not that I know of, no.

4 Q. And in the pocket of the binder  
5 that has your report, there should be an  
6 errata sheet that's dated January 28, 2022.

7 Do you see that?

8 A. I do, yes.

9 Q. Is that your signature on the  
10 errata sheet?

11 A. It is, yes.

12 Q. Did you prepare this errata  
13 sheet?

14 A. I did, yes.

15 Q. Other than the information on  
16 this errata sheet, is there any inaccuracy  
17 that you're aware of in your report that you  
18 would like to correct here today?

19 A. Not that I know of, no.

20 Q. Since you signed this report,  
21 have you become aware of anything that has  
22 affected or altered the opinions that are set  
23 forth in the report?

24 A. I have not, no.

25 Q. Who wrote this report?



1 A. I did.

2 Q. Did anyone help you draft the  
3 report?

4 MS. ZORNBERG: You can answer  
5 without disclosing communications with  
6 counsel.

7 THE WITNESS: Sure.

8 A. I wrote this report. I received  
9 comments from counsel. In addition I  
10 requested counsel to help me with various  
11 research in relation to the preparation of  
12 this report. But I held the pen. This is my  
13 opinion and conclusions.

14 Q. Other than asking counsel for  
15 comments on the report, did you ask anyone  
16 else for comments on the report?

17 A. I did not, no.

18 Q. Did counsel draft any portion of  
19 the report?

20 MS. ZORNBERG: Objection.

21 MS. STEWART: I'm sorry, what was  
22 your answer?

23 MS. ZORNBERG: I'm going to  
24 direct the witness not to answer to the  
25 extent that the witness has already --

1 on grounds that it's prohibited by  
2 Rule 26 and you're calling for attorney  
3 work product. The witness has already  
4 said that she received comments.

5 MS. STEWART: So you're not going  
6 to let her answer a yes or no question  
7 as to whether counsel drafted any  
8 portion of the report?

9 MS. ZORNBERG: I'm not, no. I  
10 think that's -- you're calling for  
11 privileged information. I'll certainly  
12 permit questions about, you know, if you  
13 want to ask questions about what she did  
14 with comments that she received from  
15 counsel.

16 MS. STEWART: Okay.

17 BY MS. STEWART:

18 Q. Are you going to follow counsel's  
19 instructions not to answer that question,  
20 Professor?

21 A. I am, yes.

22 Q. With respect to the comments that  
23 you received from counsel, did you incorporate  
24 those into the final version of the report?

25 MS. ZORNBERG: You can answer.

1           A.     I reflected on the comments, I  
2     considered the comments, I incorporated the  
3     comments that I was comfortable with in my own  
4     language and with my own interpretation and  
5     thinking.

6           Q.     And you said that you asked  
7     counsel to undertake various research for you  
8     in connection with the report. Is that right?

9           A.     That's right, yes.

10          Q.     What research did you ask counsel  
11     to undertake?

12                 MS. ZORNBERG: You can answer.

13          A.     The research that I asked counsel  
14     to undertake mainly related to helping locate  
15     information in relation to the location of the  
16     exchanges set out in Table A.

17          Q.     And what specifically did you ask  
18     counsel to do?

19          A.     In general --

20                 MS. ZORNBERG: Again, again, just  
21     as an instruction, I'll allow you to  
22     answer. But just focus on what the task  
23     was that you wanted to perform and not  
24     get into the specifics of communications  
25     with counsel.

1           A.     In general, I asked counsel to  
2     help me locate information in relation to the  
3     various aspects of the location of the  
4     different exchanges in Table A.

5           Q.     What steps are you aware that  
6     counsel took in order to conduct this  
7     research?

8           A.     I believe that counsel consulted  
9     with various databases and sources to provide  
10    the information.

11          Q.     What databases did counsel  
12    consult?

13          A.     I believe that counsel consulted  
14    databases including CipherTrace, S&P  
15    Intelligence, as well as reputable news  
16    sources.

17          Q.     And you mentioned, in addition to  
18    databases, sources. Any other sources that  
19    you're aware of that counsel consulted?

20          A.     I believe the --

21                 MS. ZORNBERG: Object to form.

22                 You can answer.

23          A.     I believe the focus here was on  
24    the CipherTrace and S&P databases, as well as  
25    reputable news sources that are cited in this

1 report.

2 Q. And when you refer to counsel  
3 undertaking this research, just to be clear,  
4 who are you referring to?

5 A. I'm referring to counsel for the  
6 defendants.

7 Q. Were you involved in this  
8 research process?

9 A. I was constantly involved as part  
10 of the conversations surrounding the research,  
11 yes.

12 Q. How were you involved?

13 MS. ZORNBERG: I'm just going to  
14 give the instruction not to disclose  
15 your communications with counsel. I  
16 think these questions are approaching  
17 the line, especially in light of the  
18 witness' answers so far.

19 But if you want to -- if you want  
20 to answer by specifically providing  
21 information on what you did as part of  
22 your research, that's fine.

23 A. I received information. I  
24 reviewed information. I incorporated the  
25 insights and information that I wished to

1 include in the report as part of my analysis.

2 Q. What, if anything, did you do to  
3 check the accuracy of the research that  
4 counsel performed?

5 A. I went through the footnotes, I  
6 checked the sources, made sure I was  
7 comfortable with the databases that were being  
8 consulted, and carefully read through the  
9 documents provided to me.

10 Q. Did you check each and every  
11 source?

12 A. I attempted to check each and  
13 every source, yes.

14 Q. Were there some that you were not  
15 successful in checking?

16 A. Not that I can recall, sitting  
17 here today.

18 Q. And did you carefully read  
19 through all of the documents provided to you?

20 MS. ZORNBERG: Objection to form.

21 A. I have --

22 Q. Well, just to be clear, I thought  
23 that your previous answer was that you  
24 carefully reviewed the documents. If that's  
25 not what you said, I apologize.

1 But did you review all the  
2 documents provided to you?

3 MS. ZORNBERG: Objection. Asked  
4 and answered.

5 You can answer.

6 A. I've gone through all the  
7 documents provided to me as part of the -- as  
8 part of the footnotes.

9 Q. What, if anything, did you do to  
10 check the thoroughness of the research that  
11 counsel performed?

12 MS. ZORNBERG: Object to form.

13 You can answer.

14 A. I did my own research in relation  
15 to the -- in relation to the matters detailed  
16 in the report. I went through counsel's  
17 documents that were sent to me and made sure I  
18 was comfortable.

19 Q. When you say that you did your  
20 own research, what are you referring to?

21 A. Referring to my own research and  
22 experience in relation to the matters being  
23 dealt with in the report, as well as ensuring  
24 that I was comfortable with the databases that  
25 were consulted as part of this research.

1 Q. Did you do any research in  
2 connection with the footnotes that you're  
3 referring to independent of the research that  
4 counsel performed?

5 A. I did research  
6 independent -- independently. That is  
7 referenced throughout my report. My  
8 independent research was certainly a part of  
9 my process in preparing this report.

10 Q. What did you do to make sure that  
11 you were comfortable with the databases that  
12 counsel was using for its research?

13 A. I had heard of the databases  
14 before. Certainly in one case, I had used  
15 that database myself, or reports from that  
16 database myself in relation to S&P. And I  
17 made sure that I was comfortable with  
18 CipherTrace, and I was very comfortable. It  
19 was a firm that I had heard of before.

20 Q. Taking a look at Exhibit A to  
21 your report, if you can turn to that, please.  
22 Are you there, Professor?

23 A. I am. I am here.

24 Q. Is Exhibit A -- I'm sorry. Does  
25 Exhibit A to your report include your CV?



1           A.     It does, yes.

2           Q.     Sitting here today, are you aware  
3 of any inaccuracies in your CV as presented in  
4 Exhibit A?

5           A.     There are no inaccuracies in the  
6 CV. However, it does -- it does need updating  
7 to reflect various conferences that I've been  
8 attending and presentations that I've been  
9 giving over the course of the last year as  
10 well as early this year.

11                     Including, for example, several  
12 presentations in relation to the regulation of  
13 cryptocurrency exchanges that I gave towards  
14 the latter half of 2021, as well as talks that  
15 I've given this year, including a talk last  
16 week in relation to the insolvency of  
17 cryptocurrency exchanges.

18                     And I'm happy to talk more about  
19 these conferences and talks that I've been  
20 giving that are not reflected in this current  
21 draft of the CV.

22           Q.     Okay. Thank you. Does the  
23 education section of your CV accurately list  
24 the degrees that you earned?

25           A.     Yes, it does.

1 Q. Do you hold any professional  
2 licenses?

3 A. Yes, I am qualified to practice  
4 as a solicitor in England and Wales in the UK.

5 Q. Have you held any other  
6 professional licenses in the past?

7 A. I don't believe so, no.

8 Q. Have you ever been the subject of  
9 a disciplinary action related to your  
10 professional activity?

11 A. I have not, no.

12 Q. And you've been a professor at  
13 Vanderbilt Law School since 2006. Is that  
14 right?

15 A. No, I've been a professor at  
16 Vanderbilt Law School since 2011.

17 Q. Okay. Are you currently tenured?

18 A. I am, yes.

19 Q. When did you become tenured?

20 A. I believe I became tenured in  
21 2016. I should know that better, but I think  
22 it was 2016.

23 Q. Have you testified as an expert  
24 witness before?

25 A. I have not.

1 Q. Have you submitted an expert  
2 report before?

3 A. I have not.

4 Q. Have you been retained as an  
5 expert witness before?

6 A. I have not.

7 Q. When did you first hear of  
8 Ripple?

9 A. I first came across Ripple as  
10 part of my general work into financial  
11 markets. I can't recall exactly when, but I  
12 came across Ripple as part of my everyday  
13 research work.

14 Q. And when did you first hear of  
15 XRP?

16 A. Again, I came across XRP as part  
17 of my normal research into financial markets.  
18 Again, I can't recall at what time and when.

19 Q. And just so the record is clear,  
20 when I said "Ripple," I'm referring to Ripple  
21 Labs. Is that right?

22 MS. ZORNBERG: Object to form.

23 A. I'm sorry, could you --

24 Q. When I asked you questions about  
25 Ripple, I was referring to Ripple Labs. Were

1 your answers also referring to Ripple Labs?

2 A. Yes. Ripple Labs.

3 Q. And just so the record is clear,  
4 what is XRP?

5 A. XRP is a token that is a part of  
6 the XRP ledger that is -- that is a --  
7 produced by the XRP ledger.

8 Q. And what is the XRP ledger?

9 A. The XRP ledger is a ledger that  
10 is providing validation in relation to  
11 transactions in XRP as well as other  
12 currencies that are part of -- that are a part  
13 of the ledger.

14 Q. Prior to your retention as an  
15 expert in this matter, what did you know about  
16 Ripple?

17 A. The knowledge that I had about  
18 Ripple was a fairly general knowledge in  
19 relation to the role of Ripple as a payment  
20 services facilitator.

21 Q. And how did you gain this  
22 knowledge about Ripple prior to your retention  
23 for this case?

24 A. It was part of conversations I  
25 had with academics as well as a part of the

1 general research ecosystem that I work in in  
2 relation to Fintech.

3 Q. And prior to your retention as an  
4 expert witness, what did you know about XRP?

5 A. What I knew about XRP related to  
6 its role as a cryptocurrency that facilitated  
7 international payment transactions.

8 Q. And how did you learn this  
9 information about XRP?

10 MS. ZORNBERG: Object to form.

11 A. Again, I can't say exactly. I  
12 had various conversations with academics as  
13 well as part of the general Fintech system  
14 that I am researching in.

15 Q. Have you ever met Chris Larsen?

16 A. I have not.

17 Q. Have you ever heard Chris Larsen  
18 speak?

19 A. No, I don't believe I have.

20 Q. Have you ever met Brad  
21 Garlinghouse?

22 A. I have not.

23 Q. Have you ever heard  
24 Mr. Garlinghouse speak?

25 A. I don't believe I have.

1 Q. Were you a speaker at the DC  
2 Fintech Week virtual experience in October  
3 2021?

4 A. I was, yes.

5 Q. Do you recall whether  
6 Mr. Garlinghouse was also a speaker at that  
7 conference?

8 A. I believe he was in the program.

9 Q. But you don't believe that you  
10 heard him speak?

11 A. No, I was not able to be there  
12 for his session.

13 Q. And the same question with  
14 respect to that conference in October of 2020.  
15 Were you a speaker at that conference in  
16 October 2020?

17 A. At which conference, sorry?

18 Q. At the same -- the DC week  
19 virtual experience?

20 MS. ZORNBERG: Objection. And  
21 just to note, unless I misheard, I  
22 thought you previously said the date was  
23 October 2021. And now you're saying  
24 October 2020.

25 Can you just clarify the year

1           that you're addressing?

2           Q.     Sure. I'm asking about both  
3           years. So I think my initial question was  
4           about October 2021.

5                     And now I want to ask the same  
6           question about whether you also spoke at the  
7           same conference the year before in  
8           October 2020.

9           A.     I believe I did.

10          Q.     And do you recall if  
11          Mr. Garlinghouse was a speaker at that  
12          conference in October 2020?

13          A.     I really can't recall. I did not  
14          attend his session, if he would have been in  
15          the program.

16          Q.     Prior to your retention as an  
17          expert, did you have any relationship with any  
18          Ripple board member?

19          A.     I -- I'm not sure if he is a  
20          board member. I do know a professor who I  
21          believe may be affiliated, potentially. But  
22          I'm not sure.

23          Q.     And who is the professor you're  
24          referring to?

25          A.     Michael Barr.

1 Q. Prior to your retention as an  
2 expert, did you have any relationship with any  
3 Ripple executive?

4 A. No.

5 Q. Are you on the advisory board for  
6 Leaf Global Fintech?

7 A. Am I? I am not sure. It's --  
8 one of the my students was a person who was  
9 directing that. I asked him that -- not to be  
10 on the board. So I don't believe I am.

11 Q. Do you have any connection with  
12 Leaf Global Fintech?

13 A. All -- I just -- I know Nat  
14 Robinson, who I believe started it. But  
15 beyond that, no.

16 Q. Before your retention in this  
17 case, did you have any meetings or  
18 conversations with anyone affiliated with  
19 Ripple?

20 A. Affiliated in what sense?

21 MS. ZORNBERG: Yeah, object to  
22 form of that question.

23 Q. Anyone who was an employee,  
24 executive, board member, shareholder, or  
25 otherwise affiliated with Ripple?



1 MS. ZORNBERG: Objection.

2 Q. I believe you can answer but --

3 MS. STEWART: Lisa, you can  
4 correct me.

5 MS. ZORNBERG: Objection noted.

6 You can answer if you understand  
7 the question.

8 A. I'm not sure I understand the  
9 question. It's a very broad question. I'm  
10 not sure who is affiliated with Ripple  
11 exactly. The only person I know who may be  
12 potentially at some point is Michael Barr, who  
13 is a colleague of mine at Michigan University.

14 Q. Do you own any XRP?

15 A. I do not.

16 Q. Have you ever owned XRP?

17 A. I have not.

18 Q. Do you expect to receive any  
19 compensation in XRP in this case?

20 A. I do not.

21 Q. Do you own other  
22 cryptocurrencies?

23 A. I do not.

24 Q. Have you ever?

25 A. I have not.

1 MS. STEWART: Mark, can we hand  
2 out Exhibit YY-10.

3 A. Thank you very much.

4 (Exhibit YY-10, "Fintech and the  
5 Innovation Trilemma" by Yesha Yadav and  
6 Chris Bummer, marked for identification,  
7 as of this date.)

8 Q. Now, professor, take however long  
9 you need to examine YY-10. And I'm going to  
10 ask you if you recognize it.

11 A. (Document review.)

12 Yes, it's my article with  
13 Professor Chris Brummer.

14 Q. And the title of it is "Fintech  
15 and the Innovation Trilemma." Is that right?

16 A. That's right, yeah.

17 Q. Did you discuss digital assets in  
18 this article?

19 A. I believe digital assets are  
20 referenced in this article, yes.

21 Q. Did you discuss XRP in this  
22 article?

23 A. It is very briefly referenced in  
24 the first page, I believe.

25 Q. And that's the page that is

1       numbered on top 237. Is that right?

2               A.       That's right.

3               Q.       And that reference is to Ripple's  
4       XRP. Is that right?

5               A.       It is, yes.

6               Q.       Why did you reference "Ripple's  
7       XRP" as opposed to just "XRP"?

8               A.       It was a sloppy use of wording on  
9       my part and my coauthor's part. We recognized  
10      the separation; however, it was just a  
11      colloquial and sloppy usage.

12              Q.       And if you look at page 277 of  
13      the article, the fourth line down, do you see  
14      another reference to Ripple's XRP?

15              A.       Yes.

16              Q.       And why did you use this term  
17      "Ripple's XRP" here?

18              A.       Again, it was sloppy, sloppiness  
19      on our part.

20              Q.       And when you say "sloppy," what  
21      do you mean?

22              A.       We should have been more careful  
23      in referencing XRP as a separate  
24      cryptocurrency distinct from Ripple Labs.

25              Q.       Have you ever written a

1 publication critiquing any aspect of the US  
2 regulatory regime?

3 MS. ZORNBERG: Objection.

4 A. Many, I believe. It's -- I'm not  
5 very sure, the question is very broad as to  
6 the definition of "critique." But I certainly  
7 write publications on the various aspects of  
8 US regulation in different context.

9 Q. And are some of these  
10 publications critical of the US regulatory  
11 regime?

12 MS. ZORNBERG: Objection to form.

13 A. I'm not really sure what you mean  
14 about "critical," about the regulatory regime.

15 Q. What is it that you don't  
16 understand about that?

17 A. It's just very --

18 MS. ZORNBERG: Object to form.

19 A. It's very broad. The definition  
20 of "critique" is not necessarily a  
21 particularly accurate description. It  
22 critiques certainly some aspects of it. But  
23 the idea here is to improve and enhance the  
24 framework that is currently in place in  
25 different context.

1 Q. When you say "the idea here,"  
2 what are you referring to?

3 A. My goal in my research.

4 Q. If the word "critique" is not an  
5 appropriate word, how would you describe your  
6 research as it applies to the US regulatory  
7 regime?

8 MS. ZORNBERG: Object to form.

9 A. I suppose "critique" can be used.  
10 The word is really to try and examine  
11 innovations that are currently underway in the  
12 marketplace, and to think about ways in which  
13 our current regulatory regime fits the  
14 innovations that are developing in the market  
15 today.

16 Q. And is it your view in general  
17 that the corrupt regulatory regime does not  
18 fit the innovations in the market today?

19 MS. ZORNBERG: Object to form.

20 A. That's very broad. I'm sorry.  
21 It's a very broad question.

22 Q. Okay. So tell me what your view  
23 is.

24 MS. ZORNBERG: Object to form.

25 View of what?

1 Q. You started talking about the  
2 goals of your research. Right? Correct?

3 A. I can --

4 MS. ZORNBERG: Object to form.

5 Put a question.

6 Q. You were referring to the goals  
7 of your research with respect to innovations  
8 and the US regulatory regime. Correct?

9 MS. ZORNBERG: Object to form.

10 A. Yes, I'm happy to go through my  
11 papers with you and to discuss particular  
12 aspects of my thesis in relation to what would  
13 substantiate the overall framework that I  
14 have.

15 So, for example, in relation to  
16 my research in market microstructure, I  
17 examined innovations in the ways in which our  
18 trading systems have evolved to incorporate  
19 high-speed traders, high-speed communication  
20 technologies, and then to look at aspects of  
21 our regulatory system that perhaps are less  
22 well adapted than they should be to these  
23 innovations in the marketplace.

24 So, for example, in "The Failure  
25 of Liability in Modern Markets," which was

1 published in Virginia Law Review, I detail  
2 aspects of our liability structure, for  
3 example, in relation to negligence, in  
4 relation to intent, in relation to strict  
5 liability, that do not necessarily fit within  
6 a paradigm where we have extremely high-speed  
7 traders in an interconnected marketplace.

8 What I argue in that paper is  
9 that the lack of a proper fit of the liability  
10 structure to a modern market structure can  
11 create costs for different participants in the  
12 market, as well as for the structural  
13 integrity of the marketplace as a whole.

14 In addition, looking at why  
15 the -- looking at inefficiencies in the  
16 algorithmic trading market, I have written a  
17 paper in the Vanderbilt Law Review on how  
18 algorithmic trading undermines efficiency in  
19 capital markets.

20 Again, that paper examines  
21 innovations in market structure; notably  
22 high-speed trading, to think about ways in  
23 which the disclosure paradigm that we have  
24 doesn't exactly fit in a market in which time  
25 horizons tend to be pretty short term in

1 nature, and to try to think of ways in which  
2 we might incorporate a more long-term vision  
3 into incorporating fundamental information  
4 into our disclosure regimes.

5 Similarly, in the oversight  
6 failure in securities markets, I examine  
7 innovations in relation to platforms and  
8 platform design.

9 So here I look at competition in  
10 the marketplace to bring in insights about  
11 dark pools, particularly as they're  
12 colloquially known, alternative trading  
13 systems, and to think about ways in which  
14 exchanges and dark pools can exercise  
15 oversight across the marketplace as a whole  
16 that is innovating rapidly to include  
17 competition and innovation in platform design.

18 In addition, more recently, I've  
19 been working on projects in relation to the US  
20 treasury markets, US treasury market  
21 microstructure, which has seen tremendous  
22 innovation over the last ten years, and where  
23 regulation has not kept pace at all to meet  
24 the structure of this marketplace.

25 There I have written two papers,



1 one is my own and one is coauthored, that  
2 examine the ways in which US treasury market  
3 microstructure, as well as the Ripple market  
4 microstructure and their regulation, do not  
5 fit together given the evolving paradigms  
6 within our marketplace today.

7 In the broken bond market, again,  
8 I examine the ways in which our regulation is  
9 not -- is insufficient to provide a way for  
10 the bond market to offer efficiency in the  
11 marketplace.

12 And, again, this paper provides  
13 ways in which to think about -- think about  
14 innovations within private governance that we  
15 could bring in that could help make the bond  
16 market a more amenable one for efficiency.

17 So, you know, thinking through  
18 this, sort of, line of projects, I have also  
19 papers on Fintech and the Innovation Trilemma,  
20 which you already mentioned, as well as one  
21 looking at international Fintech that examines  
22 the challenges that regulators face when  
23 dealing with Fintech Innovations.

24 What we do in that paper is that  
25 we look at the ways in which Fintech is

1 different from past iterations of financial  
2 innovation. We examine the use of algorithms.  
3 We examine the use of big data. We examine  
4 the entry of smaller nontraditional firms into  
5 the financial ecosystem, and think about the  
6 ways in which that poses special and new  
7 challenges for regulators.

8 In addition, I have a few papers,  
9 as I've referenced in my CV, in relation to  
10 cryptocurrency exchanges. And here, I think  
11 about ways or I'm proposing to think about  
12 ways that cryptocurrency exchanges are  
13 evolving and to help make their evolution as  
14 something that can be a positive for the  
15 regulatory oversight of the market as a whole.

16 So it's very hard for me to  
17 provide a, sort of -- you know, without going  
18 through individual papers to provide a, sort  
19 of, overarching description, as it were.

20 But my goal here, as you can see,  
21 is to think about innovations in the financial  
22 marketplace and to think about ways in which  
23 our regulatory paradigms that we rely on  
24 currently may not be a great fit.

25 Q. Professor, how would you describe

1 your area of expertise?

2 A. I would describe my area of  
3 expertise as market microstructure and  
4 innovation.

5 MS. STEWART: Can we go off the  
6 record, please.

7 A. I would also add --

8 MS. ZORNBERG: Wait, wait, wait,  
9 hold on.

10 Are we off or are we on?

11 MS. STEWART: Can we go off,  
12 please.

13 MS. ZORNBERG: Was there  
14 something that you needed to finish to  
15 answer the last question?

16 A. Yes, I wanted to add financial  
17 markets -- financial markets and their  
18 regulation to my area of expertise as well.

19 MS. STEWART: Okay. Thank you.  
20 That's helpful.

21 Now can we go off the record.

22 MS. ZORNBERG: Yes.

23 THE VIDEOGRAPHER: The time is  
24 10:07 a.m. This concludes Media 1. Off  
25 the record.

1 (Recess taken from 10:07 a.m. to  
2 10:25 a.m.)

3 THE VIDEOGRAPHER: The time now  
4 is 10:25 a.m. This begins Media 2. On  
5 the record.

6 BY MS. STEWART:

7 Q. Professor Yadav, before we went  
8 off the record, we were talking about your  
9 area of expertise. Do you recall that?

10 A. I do, yes.

11 Q. Does your area of expertise  
12 include Fintech?

13 A. It does, yes.

14 Q. And just so the record is clear,  
15 what is Fintech?

16 A. There is no standard definition  
17 of Fintech. Broadly speaking, it refers to  
18 the use of digital technologies in the area of  
19 financial markets.

20 In my article, I define, it  
21 alongside my coauthor, as entailing the use of  
22 algorithms, big data, as well as including  
23 smaller, less traditional players in the  
24 financial marketplace.

25 Q. And what is your expertise with

1       respect to Fintech?

2                       MS. ZORNBERG: Object to form.

3               A.       So I have a great deal of  
4       expertise in relation to the role of new  
5       technologies that are entering the financial  
6       marketplace.

7                       And that has come from my  
8       personal professional experience that grew out  
9       of my time in legal practice that examined  
10      innovations in financial market design, at  
11      that time focusing on financial markets'  
12      contracts, financial markets' engineering,  
13      looking, for example, at derivatives  
14      contracts, at innovations in banking, and in  
15      payment technologies.

16                      And working through my research  
17      in relation to the expertise that I have today  
18      in relation to various aspects of Fintech,  
19      including cryptocurrencies, cryptocurrency  
20      exchanges, looking at also various types of  
21      online advising in relation to financial  
22      products, investment advice, thinking broadly  
23      in relation to blockchains, looking at the  
24      aspect of financial markets products that are  
25      entering the marketplace such as online

1       lending that are important in the market  
2       today.

3               So that is that is, in a  
4       nutshell, some of the expertise that is  
5       encapsulated in the word "Fintech."

6               Q.     You mentioned in your last answer  
7       cryptocurrency exchanges. Do you consider  
8       yourself an expert with respect to the  
9       functioning of cryptocurrency exchanges?

10              A.     I do consider myself to be  
11      knowledgeable and expert in the area of  
12      cryptocurrency exchanges.

13              Q.     And can you expand on how you're  
14      knowledgeable and expert in that area?

15              A.     Sure. The expertise that I have  
16      in the area of cryptocurrency exchanges has  
17      developed out of a career that has focused  
18      intensively on market structure, market  
19      structure platforms, platform design,  
20      clearing, and settlement.

21                     I began this expertise in my a  
22      career at Clifford Chance where I specialized  
23      as a lawyer that worked in market structure,  
24      in exchange design, in clearing, settlement,  
25      and risk management.

1                   At that time, I worked heavily in  
2                   relation to advising various aspect -- on  
3                   various aspects of exchange design, clearing,  
4                   and settlement and risk management.

5                   In addition, as part of this  
6                   overall expertise into market structure and  
7                   platforms, I worked as a key person, a key --  
8                   one of the two key lawyers that advised the  
9                   European payments council.

10                  That was a council that was a,  
11                  sort of, Pan -- Pan-European effort to create  
12                  a harmonized payments environment for the  
13                  European economic area and Switzerland.

14                  In that capacity, I was one of  
15                  the key drafters of the rules that undergirded  
16                  various payment schemes that included various  
17                  innovative forms of payments.

18                  And I worked as a key resource  
19                  person that provided the rulemaking for those  
20                  schemes, as well as engaged heavily with  
21                  respect to the technical and operational  
22                  standards that were driving those payments  
23                  schemes.

24                  Further to that work, I have  
25                  worked at the World Bank on various aspects of

1 cross-border finance. That is important in  
2 the area of cryptocurrency exchanges as well.

3 I have worked in -- in various  
4 aspects of looking at firm design, looking at  
5 insolvency aspects, looking at the  
6 cross-border flow of transactions and data,  
7 also as part of my World Bank work into the  
8 study and implementation of international  
9 cross-border standards.

10 Following my time in research, I  
11 have worked extremely intensively looking at  
12 aspects of exchanges, clearing and settlement,  
13 looking at innovations in exchange technology,  
14 as I discussed with you as part of my earlier  
15 answer, looking at high-frequency trading  
16 platforms, for example, looking at dark pools  
17 as I noted before.

18 And so the work in  
19 cryptocurrencies that I am doing today is very  
20 much a natural extension of that expertise and  
21 knowledge and research and background that  
22 have developed throughout my career in legal  
23 practice, in policy, as well as today as part  
24 of my research.

25 In addition, I should mention



1       that I am constantly in conversation with  
2       policymakers, with thinkers, with other  
3       academics, in relation to various aspects of  
4       exchange design, thinking about aspects of  
5       market innovation, and certainly building --  
6       building a platform, a foundation for  
7       developing expertise in relation to  
8       cryptocurrencies and cryptocurrency exchanges.

9               Q.       Which policymakers are you  
10       constantly in conversations with with respect  
11       to exchange design?

12              A.       So I have had conversations  
13       certainly as part of my work with the CFTC. I  
14       was a member -- I've been a member since 2018  
15       of the technology advisory committee. That  
16       committee is currently, I believe it's waiting  
17       for a commission sponsorship at present, so  
18       it's not presently active.

19                     But that was a committee in which  
20       the conversations on exchange design, platform  
21       design, market design, clearing, and  
22       settlement were ongoing really on a very, very  
23       regular basis.

24                     In addition, I have also had  
25       conversations with the SEC in relation to

1 aspects of treasury market structure and  
2 platforms.

3 I have had conversations with  
4 respect to European policymakers, the EU, the  
5 EU commission. I have spoken to them about  
6 aspects of treasury market platforms and  
7 treasury market risks.

8 And so, you know, this is very  
9 much a part of my work to engage in  
10 conversations with policymakers, with leading  
11 thinkers in order to be able to forward my  
12 ideas for reform.

13 Q. Who at the SEC have you had  
14 conversations with with respect to treasury  
15 market structure and platform?

16 A. I had a conversation with Gary  
17 Gensler's office, with his chief of staff, I  
18 believe.

19 Q. And when was this conversation?

20 A. This conversation was, I would  
21 say, just prior to Thanksgiving, if I recall  
22 correctly.

23 Q. Was it a phone conversation?

24 MS. ZORNBERG: Excuse me. Can  
25 you repeat that. I didn't hear it.

1 Q. Was is it a phone conversation?

2 A. It was a conversation over Zoom,  
3 I think. It was a conversation on Zoom.

4 Q. Okay.

5 A. Or WebEx or one of them, yeah.

6 Q. Before your retention as an  
7 expert in this matter, were you aware that XRP  
8 was traded on cryptocurrency exchanges?

9 A. I was generally aware. I was  
10 generally aware, I think.

11 Q. Now, professor, I want to go  
12 through your report. So if you can get that  
13 binder that has Exhibit YY-1 back in front of  
14 you, please.

15 Do you have your report in front  
16 of you?

17 A. I do, yes.

18 Q. Okay. Taking a look at paragraph  
19 2, sort of, the middle of the paragraph where  
20 you speak about your research, including  
21 Fintech and cryptocurrencies.

22 Do you see that?

23 A. Yes, I do.

24 Q. I think you've spoken a little  
25 bit about this in general, but I just want to

1 make sure we have it in the record.

2 Can you explain what research  
3 you've conducted with respect to  
4 cryptocurrency?

5 A. Yes.

6 MS. ZORNBERG: Object to form.

7 A. Could you be a little bit more  
8 specific about what you're looking for here?

9 Q. Sure. I would like to understand  
10 better the research that you're referring to  
11 in this paragraph as it relates to  
12 cryptocurrencies.

13 A. Sure.

14 MS. ZORNBERG: Objection. I'm  
15 sorry. Can you -- are you talking about  
16 a specific part of the paragraph?

17 MS. STEWART: Yeah. We're -- I'm  
18 asking, Lisa, about this sentence that  
19 begins with "This research spans equity  
20 markets," and ends with, "and Fintech  
21 including cryptocurrencies."

22 So I just want to understand the  
23 portion that refers to cryptocurrencies  
24 and the research that the professor has  
25 conducted with respect to

1           cryptocurrencies. I'm not sure what's  
2           unclear about that.

3           MS. ZORNBERG: Thank you.

4           A.       The research that I'm currently  
5           undertaking on cryptocurrencies spans at  
6           present, I believe, four projects. So I will  
7           speak on each of them in turn.

8                    So with respect to cryptocurrency  
9           exchanges, I'm currently working on an article  
10          that examines the ability of cryptocurrency  
11          exchanges to perform the role of  
12          self-regulatory organizations as traditional  
13          exchanges currently do under the Securities  
14          and Exchange Act.

15                   So what my article seeks to do is  
16          examine the pros and the cons, the rationales,  
17          the theoretical payoffs that might come from  
18          cryptocurrency exchanges, exercising private  
19          oversight and discipline of the marketplace as  
20          traditional exchanges currently do.

21                   What this paper seeks to argue is  
22          that cryptocurrency exchanges on the positive  
23          side can bring a great deal of expertise, of  
24          industry experience, and also disciplinary  
25          power arising from their very important,

1 indeed, central role within the cryptocurrency  
2 ecosystem.

3           However, the paper also points to  
4 potential drawbacks of cryptocurrency  
5 exchanges performing this oversight role. For  
6 example, it details various potential for  
7 conflicts of interest that may arise where  
8 cryptocurrency exchanges that provide  
9 oftentimes a variety of products to their  
10 users are exercising discipline over those  
11 that they are currently in business with in a  
12 very deep way.

13           However, these are not concerns  
14 that are particularly new to the  
15 cryptocurrency marketplace. They have been  
16 dealt with.

17           Also, in the context of  
18 traditional exchanges like the New York Stock  
19 Exchange and NASDAQ, there is extensive  
20 literature, for example, on the conflicts of  
21 interest that may apply in the case of the  
22 NASDAQ and the New York Stock Exchange  
23 exercising discipline over the folks that they  
24 supervise.

25           And so what this paper goes on to

1 do is to propose and to think about potential  
2 ways in which to make cryptocurrency exchanges  
3 positive actors that can exercise discipline  
4 and oversight and bring safety and integrity  
5 to the marketplace as a whole, and provides a  
6 series of ideas that can -- that might work to  
7 enhance that going forward. So that is one  
8 paper here.

9 In addition, I would -- I'm  
10 looking at the application of international  
11 standards as promulgated by the committee on  
12 payment and settlement systems, the Basel  
13 committee, looking at IOSCO, and seeing how  
14 well these standards might apply in the  
15 context of clearing and settlement exchanges,  
16 as well as also the clearing and settlement  
17 mechanisms that these exchanges deployed.

18 So in particular, what that  
19 research will seek to examine is the ability  
20 of clearing and settlement standards, for  
21 example, to apply in the context of  
22 cryptocurrency exchanges that internalize much  
23 of the role of clearing and settlement within  
24 their firm.

25 As you know in the traditional

1 context -- and this is detailed in this report  
2 as well -- traditional exchanges tend to rely  
3 on clearinghouses to perform -- and custodians  
4 to perform a variety of risk management  
5 functions.

6 In the context of clearing --  
7 central clearing in the context of  
8 cryptocurrency exchanges on the other hand,  
9 many of these functions are internalized  
10 generally by the cryptocurrency exchanges  
11 themselves.

12 And what this paper and research  
13 seeks to look at is whether the international  
14 standards that we have existing in place for  
15 cryptocurrency risk management for -- sorry.  
16 I take that back.

17 The existing standards we have in  
18 place for traditional service providers can  
19 apply with equal force to cryptocurrency  
20 clearing and settlement mechanisms. And I  
21 argue, as I will argue in this paper, there  
22 are some issues to think about that are  
23 different and interesting.

24 In particular, the role of  
25 storage and private keys is something to think



1 about that is new to the cryptocurrency  
2 marketplace. How to safeguard those keys, how  
3 to think about those keys, that's something  
4 that is particularly important.

5 Data management, risk management,  
6 collateral, cryptocurrency exchanges, and how  
7 they should calibrate their levels of capital,  
8 for example, to safeguard and maintain  
9 credential safety for the marketplace as a  
10 whole. So that is one project that is also  
11 underway.

12 In addition, I have a couple of  
13 projects that are looking at CBDCs. That's a  
14 slightly different take here. I am looking at  
15 Central Bank digital currencies, and  
16 specifically on the role of privacy in the  
17 context of Central Bank digital currencies.

18 That will be a coauthored  
19 project, and that will examine how  
20 programmable Central Bank digital currencies  
21 operate within a privacy framework that we  
22 have today, and how to potentially enhance the  
23 privacy safeguards that we will have  
24 potentially in the context of a CBDC.

25 Finally, a project that I am --

1       that I am planning to do that I am currently  
2       researching the material for looks at how to  
3       think about code in the context of a Central  
4       Bank digital currency.

5               In particular, when we do have a  
6       Central Bank digital currency that is  
7       promulgated by our government, how should the  
8       code underlying that currency be regulated?  
9       What is the difference between a Central Bank  
10      digital currency and the digital mechanisms  
11      for payments that we deploy today?

12             If our government is providing a  
13      programmable digital currency as might be  
14      proposed, in that context, how should the  
15      underlying code for that currency be thought  
16      about?

17             What kind of safeguards should be  
18      put in? What kind of potential fragilities  
19      exist within a market space? For example, in  
20      relation to cyber risks where much of our  
21      monetary system is subject to an underlying  
22      code.

23             So that gives you some flavor of  
24      the current projects that I'm doing. And just  
25      last week I was speaking to federal judges

1 from the fifth circuit bankruptcy -- from the  
2 fifth circuit.

3 And I was discussing a potential  
4 project in relation to the insolvency of  
5 cryptocurrency exchanges and what kind of  
6 procedures that might have to be put in place  
7 to deal with the resolution of an exchange  
8 where assets like cold storage of keys, for  
9 example, may be very difficult to locate, take  
10 possession of, and distribute within the  
11 communities that judges are used to dealing  
12 with. So, you know, that hopefully gives you  
13 some idea of the current research that is  
14 underway.

15 BY MS. STEWART:

16 Q. Thank you. That's helpful. Was  
17 any of this current research that you spoke  
18 about in your last answer underway at the time  
19 you were retained as an expert in this case?

20 A. I had been working on a paper in  
21 relation to the cryptocurrencies as SROs work.  
22 In addition, I had had several conversations  
23 as well as planned out my projects with  
24 respect to Central Bank digital currencies.

25 Q. And that paper that you referred

1 to with respect to cryptocurrencies -- crypto  
2 exchanges as SROs, do you know when that paper  
3 will be published?

4 A. As an academic, I can't give you  
5 a clear answer on that. I am working on it at  
6 present.

7 Q. So in that same paragraph in your  
8 report, paragraph 2, toward the end, you  
9 state:

10 "My work also engages with  
11 international developments in market  
12 design to explore how foreign  
13 jurisdictions organize their trading  
14 markets, oversee innovation," et cetera.

15 Do you see that sentence?

16 A. I do, yes.

17 Q. What work are you referring to in  
18 that sentence?

19 A. So, for example, I am -- I have  
20 been a financial regulatory lawyer throughout  
21 my career, essentially, in international  
22 financial market standards.

23 That began at Clifford Chance  
24 where I engaged very, very frequently with  
25 international standards, for example, in

1 relation to banking, regulation in the Basel  
2 standards, as well as numerous other  
3 standards, for example, in relation to  
4 clearing and settlement systems.

5 I was advising heavily at that  
6 time in relation to these standards. And this  
7 work obviously became much more directly  
8 involved in financial standard setting from  
9 the policy side when I joined the World Bank.

10 At the World Bank, much of my  
11 work at the bank was focused on the  
12 implementation of the Financial Stability  
13 Board's international standards, notably in  
14 relation to insolvency and creditor rights.

15 But as detailed in the CV, the  
16 engagement at the bank also included thinking  
17 about and discussing and engaging with the  
18 other standards that the financial stability  
19 board has promulgated.

20 So this was really the work that  
21 I have grown up in. This is the work that I  
22 have deep expertise in, in relation to the --  
23 in relation to the crafting and implementation  
24 and operationalizing of global international  
25 standards within domestic spaces.

1                   In terms of my research work,  
2           this work has been reflected in a number of  
3           papers as well as in my policy work. So, for  
4           example, in the extraterritorial regulation of  
5           clearinghouses, I explore the international  
6           regulation of clearinghouses, how divergent  
7           standards post Dodd-Frank have been dealt with  
8           in the context of clearinghouses.

9                   I have a paper in the Vanderbilt  
10          Journal of Transnational -- in the Vanderbilt  
11          Transnational Law Journal that speaks to the  
12          international regulation of Fintech in the  
13          context of our global financial stability  
14          board standards.

15                   In addition, I have engaged with  
16          policy work that -- that is directly concerned  
17          with the implementation of the G20's  
18          Pittsburgh agenda into financial market  
19          systems, and that was with the Atlanta council  
20          where I focused on chapters in relation to  
21          derivatives and clearinghouses.

22                   And in addition, obviously, I  
23          have worked with the -- I have been an  
24          honorary advisor to the Indian Financial  
25          Services Law Reform Commission, where I was

1       advising on the implementation of  
2       international financial regulatory standards  
3       into the domestic framework for the Indian  
4       financial market and for their proposed  
5       reforms that were underway at that time.

6               In addition, this international  
7       standard setting work that you referenced is  
8       something that has come up also in the context  
9       of my policy work with the CFTC.

10              There in meetings with the CFTC,  
11       I have discussed aspects of international  
12       financial standards in the context of  
13       discussions that were underway at the  
14       technology advisory committee meetings that  
15       were ongoing at that time.

16              Q.     Turning now to paragraph 3 of  
17       your report, and I want to look at the last  
18       sentence of that paragraph where you say, sort  
19       of, starting in the middle of the sentence:

20                    "My research has focused on how  
21       effectively international standards can  
22       apply in this area and the implications  
23       of divergent jurisdictional approaches  
24       to the supervision of highly mobile and  
25       geographically dispersed cross-border

1 technologies (e.g., cryptocurrencies)."

2 Do you see that?

3 A. I do, yes.

4 Q. Am I understanding correctly  
5 that, based on the example you provide in that  
6 sentence, that you believe that  
7 cryptocurrencies are highly mobile and  
8 geographically dispersed cross-border  
9 technologies?

10 A. Cryptocurrencies can be mobile  
11 and geographically dispersed technologies.

12 Q. And as you use it in your report,  
13 what does the term "highly mobile" mean?

14 A. Cryptocurrencies can be traded on  
15 a cross-border basis. They can be traded by  
16 people who are moving between jurisdictions.  
17 They can be traded on various blockchains that  
18 are global in nature and whose nodes are  
19 global in nature.

20 Q. And as you use it in your report,  
21 what does "geographically dispersed" mean?

22 A. "Geographically dispersed" means  
23 not confined necessarily to one country.

24 Q. And as you use it in your report,  
25 what does "cross-border" mean?



1           A.     Again, not confined to one  
2     country but going between different countries.

3           Q.     Turning to paragraph 4 of your  
4     report, in the middle of the paragraph, you  
5     say:

6                     "My focus lies in determining  
7     whether unique aspects about the design  
8     and structure of cryptocurrency  
9     exchanges will impact their capacity to  
10    deliver robust oversight of the  
11    marketplace and users."

12                  Do you see that?

13          A.     I do, yes.

14          Q.     What "unique aspect" are you  
15    referring to in that sentence?

16          A.     So, for example, one unique  
17    aspect of cryptocurrency design, exchange  
18    design, is the fact that they tend to engage  
19    in their own clearing and settlement and  
20    custody of the assets being traded.

21                  That is different and divergent  
22    from current practices that traditional  
23    exchanges deploy, and that has been referenced  
24    in my report as well.

25                  So current traditional exchanges

1       tend to rely on specialized clearinghouses,  
2       for example, like Depository Trust and  
3       Clearing Corporation or CME. The Chicago CME  
4       clearing, Chicago Mercantile Exchange  
5       Clearing, ICE clearing as well, they rely on  
6       specialist clearinghouses to provide clearing  
7       services as well as custody services for  
8       assets.

9               Now, looking at cryptocurrency  
10       exchanges by contrast, they tend to clear  
11       in-house, meaning that they tend to -- they  
12       tend to modify the books and records of their  
13       exchange itself and modify user records to  
14       reflect the trading and the gains of different  
15       users on the exchange using an internal -- an  
16       internal system of clearing -- pardon me, of  
17       clearing in this regard.

18              That has several implications for  
19       the ability of cryptocurrency exchanges to  
20       deliver private oversight. Most notably, in  
21       my paper, I argue that it can be a real  
22       incentive for cryptocurrency exchanges to do a  
23       good job in delivering cryptocurrency exchange  
24       oversight.

25              And the reason for that is that

1       cryptocurrency exchanges are more centralized  
2       than traditional marketplaces are, because  
3       they are centralizing and internalizing this  
4       clearing and settlement function.

5               So to just give you one example  
6       that is a unique aspect of cryptocurrency  
7       exchange design that is different from  
8       traditional exchanges.

9               Nevertheless, as I've detailed  
10       throughout this paper, opinion, as well as  
11       discussed in my research paper, cryptocurrency  
12       exchanges also harness a lot of similarities  
13       with traditional exchanges like the New York  
14       Stock Exchange, NASDAQ, CME, and others,  
15       meaning that we really have to think deeply  
16       about distinguishing features of  
17       cryptocurrency exchanges to think about  
18       potential ways in which they may be subject to  
19       certain risks that are different from the  
20       traditional risks that are -- that they're  
21       subject to common to other types of exchanges  
22       and marketplaces.

23              Q.       Okay. Turning to paragraph 5 of  
24       your report, and looking at the last sentence  
25       where you say:

1 "For example, in discussing  
2 cryptocurrencies, I seek to provide  
3 students with an overview of the  
4 computational principles that are  
5 utilized in the creation of  
6 cryptocurrencies like Bitcoin (e.g., to  
7 explain the need for mining within its  
8 decentralized blockchain)."

9 Do you see that?

10 A. I do, yes.

11 Q. And when you refer in this  
12 sentence to "decentralized blockchain," what  
13 do you mean by that?

14 A. I refer to traditional  
15 blockchains in the context of Bitcoin and  
16 Ethereum in particular. Those are the ones  
17 that I focus on in my course.

18 Q. And what does the term  
19 "decentralization" mean as applied to  
20 blockchains?

21 A. So just in a general level, how I  
22 teach it really references the use of multiple  
23 different nodes within -- multiple different  
24 nodes within the blockchain that don't  
25 necessarily know each other.

1 Q. Are you offering an opinion in  
2 this case about whether or not the bitcoin  
3 blockchain is decentralized?

4 A. I am not.

5 Q. Do you have an opinion on whether  
6 or not the bitcoin blockchain is  
7 decentralized?

8 A. I do not.

9 Q. Are you offering an opinion about  
10 whether or not the XRP ledger is  
11 decentralized?

12 A. I am not.

13 Q. Do you have an opinion about  
14 whether or not the XRP ledger is  
15 decentralized?

16 A. I do not.

17 Q. Turning to paragraph 9 of your  
18 report, you say:

19 "For example, in "The Broken Bond  
20 Market" (with Professor Jonathan  
21 Brogaard), I studied over-the-counter  
22 bond market microstructure to develop an  
23 understanding of why bond markets appear  
24 to lack attributes like liquidity and  
25 transparency."

1 Do you see that?

2 A. I do, yes.

3 Q. What is "liquidity" as you use it  
4 in your report?

5 A. As I use it in my report or as I  
6 use it in this paper?

7 Q. Well, as you use it in your  
8 reference to this paper in your report.

9 A. Ah, okay. The liquidity that I'm  
10 referencing in the broken bond market refers  
11 to the ability of bonds to be able to trade in  
12 a smooth manner where the trading is cheap,  
13 where the trading is -- where there's  
14 plentiful ability of market makers to enter  
15 and exit and provide opportunities for  
16 trading, and for the trading not to impact the  
17 prices when investors potentially undertake a  
18 large order.

19 So the liquidity that is detailed  
20 and discussed in this paper is referencing the  
21 inability of the bond market to create a  
22 marketplace where investors can enter and exit  
23 the bond market with ease, do so cheaply, and  
24 do so in a way where their actions do not  
25 necessarily impact prices in the market.

1 I should add that one of the  
2 aspects that is important here is also the  
3 ability of prices to be informative. So that  
4 is a corollary of the liquidity that is  
5 discussed in this paper.

6 Q. When you say "that is a corollary  
7 of the liquidity discussed in this paper," can  
8 you explain to me what you mean by that?

9 A. Certainly. What that means is  
10 that the liquidity would encourage a broad  
11 swath of traders to enter the market, would  
12 afford informed, uniformed, other traders to  
13 be part of the market. This is discussed as  
14 part of my work in this opinion as well.

15 And it offers a way for  
16 that -- the information that is contained in  
17 that trading to then be reflected in the  
18 prices at which the assets are being traded.

19 Q. And as you use it in your report  
20 with respect to the paper that you're  
21 referring to in paragraph 9, what does the  
22 term "transparency" mean?

23 A. Part of the transparency that is  
24 discussed here is in relation to pretrade  
25 transparency in the bond market.

1                   One of the unique features of our  
2                   bond market today, which is surprising, is  
3                   that it lacks, for the most part, pretrade  
4                   transparency, which means that the  
5                   infrastructure for trading in the market does  
6                   not advertise systematically the prices at  
7                   which the bonds are being offered by the  
8                   different dealers.

9                   Dealers have a lot of discretion  
10                  in the prices that they quote in the  
11                  over-the-counter market for bond trading, and  
12                  what that means, essentially, is that there is  
13                  a lack of pretrade transparency in the bond  
14                  market that implies that investors entering  
15                  the market do not always know the prices at  
16                  which they are likely to execute the  
17                  transactions they are looking to get into.

18                 Q.       Are liquidity and transparency  
19                  important in cryptocurrency markets?

20                 MS. ZORNBERG:   Object to form.

21                 A.       That is a broad question.  
22                  Liquidity and transparency are aspects that  
23                  are arguably quite contentious, even in the  
24                  traditional market.

25                 So in the context of the



1 traditional market, for example, transparency  
2 is something that is not always provided by  
3 the market, sometimes deliberately not  
4 provided by the market.

5 So, for example, when one looks  
6 at transparency, there is a lack of  
7 transparency even in the equity market, which  
8 is supposedly one of the most transparent  
9 markets in our system today.

10 If one takes a look at dark  
11 pools, for example, which are a part of our  
12 equity market structure trading system, there  
13 is a lack of pretrade transparency even on  
14 those dark pools.

15 However, policy considers some of  
16 this lack of transparency to be desirable in  
17 order to afford investors a choice about how  
18 they wish to execute their trades.

19 In addition, as we just  
20 discussed, the treasury market lacks  
21 transparency on multiple different measures,  
22 and oftentimes that is by design, in order to  
23 prevent potential systemic damage arising from  
24 the trading of treasury.

25 So in asking about cryptocurrency

1 market, it's a very, very difficult question.  
2 There is a lack of empirical study about the  
3 trading structure in this market that could  
4 give credible responses about some of the  
5 aspects of transparency and liquidity that you  
6 were discussing.

7 Q. As part of your work for the CFTC  
8 technology advisory committee that you  
9 referenced today, did you participate in any  
10 discussions regarding Ripple or XRP?

11 A. Not that I can recall, no.

12 Q. As part of your work on that  
13 committee, did you conduct any research or  
14 analysis of Ripple or XRP?

15 A. Not that I can recall.

16 Q. Looking at paragraph 18 of your  
17 report, you say: "I am being compensated at  
18 my ordinary hourly rate of \$800 per hour."

19 Do you see that?

20 A. I do, yes.

21 Q. What do you mean by "ordinary  
22 hourly rate"?

23 A. Just the normal rate.

24 Q. Okay. Have you charged that rate  
25 for other engagements?

1 A. I have not, no.

2 Q. So what makes it ordinary?

3 MS. ZORNBERG: Objection. Object  
4 to form.

5 A. It's just that -- it's just the  
6 normal rate for me.

7 Q. Have you charged a different rate  
8 for other engagements?

9 A. I have not had other engagements.

10 Q. Turning now to paragraph 19 of  
11 your report, you say:

12 "I have been asked by counsel for  
13 Ripple to offer an opinion on how offers  
14 to buy and sell, and trades of,  
15 cryptocurrencies are made on  
16 cryptocurrency exchanges, the location  
17 of those offers and trades, and the  
18 location of various cryptocurrency  
19 exchanges."

20 Do you see that?

21 A. I do, yes.

22 Q. Is this an accurate description  
23 of the scope of your assignment in this  
24 matter?

25 A. Yes, it is.

1 Q. As you use the terms in this  
2 sentence and in your report, what are "offers  
3 to buy and sell cryptocurrencies made on  
4 cryptocurrency exchanges"?

5 A. I'm not sure -- I don't  
6 understand the question.

7 Q. Can you explain to me what you  
8 mean when you say "offers to buy and sell  
9 cryptocurrencies on cryptocurrency exchanges"?

10 A. What I generally mean by that are  
11 offers that are submitted into cryptocurrency  
12 exchanges in order to buy and sell  
13 cryptocurrencies on that exchange that are  
14 then matched by the exchange and made final on  
15 those exchanges.

16 Q. And as you use it in this  
17 sentence we just read in paragraph 19 and  
18 throughout your report, what are "trades of  
19 cryptocurrencies made on cryptocurrency  
20 exchanges"?

21 A. "Trades" references transactions  
22 that are consummated. In other words, once an  
23 offer to trade, meaning an offer to buy or  
24 sell a cryptocurrency, is matched by the  
25 exchange in accordance with its rules and

1 processes, that then becomes a consummated  
2 transaction, in other words, a trade.

3 Q. As you use the term in your  
4 report, does "offer" refer to a trade order?

5 A. An "offer" refers to an offer to  
6 buy or sell a cryptocurrency.

7 Q. So as you use it in your report,  
8 an "offer" does not refer to a trade order?

9 A. I don't know what you mean by  
10 "trade order."

11 Q. You don't understand what the  
12 term "trade order" means generally?

13 MS. ZORNBERG: Objection.  
14 You can answer.

15 A. An order to trade? Yes. "Trade  
16 order," that's not a term I'm -- that comes up  
17 very often.

18 Q. What is an order to trade?

19 A. Meaning an order to buy or sell a  
20 cryptocurrency on an exchange that is made in  
21 accordance with the exchange's specific rules  
22 and processes for submitting an order into  
23 that exchange.

24 Q. So as you just defined the term  
25 "order of trade," is that what you're

1       referring to when you use the word "offer" in  
2       your report?

3             A.       That's really broad. The -- you  
4       know, I'd have to go through my whole report  
5       for various uses here. Certainly in the  
6       scope, the order that I'm referring is the  
7       order to buy and sell a cryptocurrency.

8             Q.       As you use it in paragraph 19,  
9       would it be accurate to say that "the offer to  
10      buy and sell a cryptocurrency" refers to an  
11      order of trade to buy or sell a  
12      cryptocurrency?

13            A.       Refers to an order to buy and  
14      sell a cryptocurrency on an exchange made in  
15      accordance with the rules and processes of  
16      that exchange.

17            Q.       Is your opinion in this case  
18      limited to offers and trades of  
19      cryptocurrencies on cryptocurrency exchanges?

20                   MS. ZORNBERG: Object to form.

21                   You can answer.

22            A.       Yes, it is.

23            Q.       In your opinion, is it possible  
24      for an offer for a cryptocurrency on an  
25      exchange to occur at a different place than

1 the trade for that cryptocurrency?

2 A. Could you repeat the question,  
3 please.

4 Q. In your opinion, is it possible  
5 for an offer for a cryptocurrency on an  
6 exchange to occur at a different place than  
7 the trade for that cryptocurrency?

8 A. No. In my opinion, an offer that  
9 is made to trade a cryptocurrency, in other  
10 words, an offer that is made to buy or sell a  
11 cryptocurrency is made on that exchange in  
12 accordance with the rules and processes of  
13 that exchange.

14 It is then matched by that  
15 exchange in accordance with its rules and  
16 processes, and it becomes final on that  
17 exchange in accordance with its rules and  
18 processes.

19 Q. So would you agree that an offer  
20 for a cryptocurrency on an exchange is  
21 transmitted to the exchange from the place the  
22 person making the offer is located?

23 MS. ZORNBERG: Object to form.

24 A. No. The exchange receives the  
25 order in accordance with its own order

1 submission mechanisms. How that is  
2 transmitted is not particularly relevant or  
3 germane or always known to the exchange.

4 Q. Putting aside whether it's  
5 relevant or germane or known to the exchange,  
6 is it fair to say that an offer for  
7 cryptocurrency is transmitted to the exchange  
8 from the place that the person making that  
9 offer is located at the time he or she makes  
10 that offer?

11 MS. ZORNBERG: Object to form.

12 A. It's very broad. The offer to  
13 buy or sell a cryptocurrency is made in  
14 accordance with the exchange's own order  
15 submission system.

16 Q. So you can't answer my question  
17 about whether an offer is transmitted from the  
18 place of the person transmitting the offer is  
19 located?

20 A. The order takes on a form only  
21 under the rules and processes of the exchange  
22 itself. In other words, an order becomes an  
23 order only when it enters the submission  
24 system that the exchange deploys in order to  
25 vet incoming instructions, to take those



1 instructions, to make them into viable orders  
2 to buy and sell a cryptocurrency. That order  
3 only becomes an order in accordance with the  
4 rules and processes of the exchange itself.

5 Q. Looking at paragraph 20 of your  
6 report, you say:

7 "I also requested, reviewed, and  
8 considered additional materials,  
9 information, and documents."

10 Do you see that sentence?

11 A. I do, yeah.

12 Q. Is all of the material that you  
13 requested, reviewed, and considered reflected  
14 either in Exhibit B to your report or in the  
15 footnotes to your report?

16 A. Yes. Although, as you can see,  
17 I've also relied on my, sort of, general  
18 academic knowledge as well as my own  
19 professional experience and judgment.

20 Q. Who did you request materials  
21 from?

22 MS. ZORNBERG: Objection. Asked  
23 and answered.

24 You can answer again but without  
25 disclosing the substance of

1           communications with counsel.

2           A.     I requested material from  
3     counsel.

4           Q.     Anyone other than counsel?

5           A.     No.

6           Q.     Without getting into the  
7     specifics, did counsel supply any facts that  
8     you considered in forming your opinions?

9           A.     No.

10          Q.     Did counsel supply any data that  
11     you considered in forming your opinion?

12                 MS. ZORNBERG: Object to form.

13          A.     The only thing I received from  
14     counsel was in relation to the Table A  
15     exchanges and that's it.

16          Q.     Did counsel supply any  
17     assumptions that you relied on in forming your  
18     opinions?

19          A.     No, they did not.

20          Q.     So I want to turn now to Exhibit  
21     B of your report.

22                 MS. ZORNBERG: I don't know,  
23     Ms. Stewart, if -- we're coming up on  
24     another hour. Just at some point, I'd  
25     be interested in taking a five-minute

1 break.

2 MS. STEWART: Sure. Now is fine.

3 THE VIDEOGRAPHER: The time now  
4 is 11:14 a.m. This concludes Media 2.  
5 Off the record.

6 (Recess taken from 11:14 a.m. to  
7 11:40 a.m.)

8 THE VIDEOGRAPHER: The time now  
9 is 11:40 a.m. This begins Media 3. On  
10 the record.

11 EXAMINATION BY

12 MR. SYLVESTER:

13 Q. Professor, you testified earlier  
14 today that you were generally aware that XRP  
15 was traded on digital asset platforms prior to  
16 your retention as an expert witness in this  
17 case. Correct?

18 A. That's correct.

19 Q. Okay. Again, prior to your  
20 retention as an expert witness, what, if  
21 anything, was your understanding about any  
22 link between XRP's role in facilitating  
23 international payment transactions and its  
24 trading on digital asset platforms?

25 A. I didn't have any particular

1 knowledge in that regard.

2 Q. Did you know whether the trading  
3 and the facilitation of international payment  
4 transactions were linked in any way?

5 A. I'm sorry, could you repeat the  
6 question.

7 Q. Sure. Did you know whether XRP's  
8 trading on digit asset trading platforms and  
9 its use in facilitating international payment  
10 transactions were linked in any way?

11 A. No, I --

12 MS. ZORNBERG: Object to form.

13 A. I had no real knowledge in that  
14 regard.

15 Q. Okay. Can we turn to Table A of  
16 your report, please.

17 A. Sure.

18 Q. It's on page 59. Earlier today  
19 we discussed that you asked counsel to do  
20 research into certain digital asset trading  
21 platforms. Is that correct?

22 A. I asked counsel to help me do  
23 research on the exchanges set out in Table A.

24 Q. Okay. And are the results of  
25 counsel's research reflected in Table A?

1 MS. ZORNBERG: Objection.

2 First of all, I think it's -- I  
3 think you're asking about -- I'm  
4 going --

5 Professor Yadav, you can answer  
6 without disclosing conversations with  
7 counsel.

8 I also just object to the form.

9 A. Counsel helped me do research.

10 The research that is reflected in Table A  
11 reflects counsel's help as well as, obviously,  
12 my research and my review and consideration of  
13 the work provided to me by counsel.

14 Q. After receiving the research that  
15 counsel conducted related to what is presently  
16 displayed in Table A, what changes, if any,  
17 did you make to that information that you  
18 received from counsel?

19 MS. ZORNBERG: Objection.

20 Assumes facts not in evidence. Lack of  
21 foundation.

22 Q. You can answer if you can.

23 A. Could you repeat the question.

24 MR. SYLVESTER: Could you read  
25 her that back, madam court reporter.

1 (Record read by the certified  
2 stenographer as follows:

3 "QUESTION: After receiving the  
4 research that counsel conducted related  
5 to what is presently displayed in Table  
6 A, what changes, if any, did you make to  
7 that information that you received from  
8 counsel?")

9 MS. ZORNBERG: Same objection.

10 You can answer.

11 A. It's very hard to recall specific  
12 changes here.

13 Q. Sitting here today, can you  
14 recall whether you made any changes?

15 A. I would imagine I did, yes.  
16 Sitting here today, I would imagine so.

17 Q. To make sure I understand your  
18 answer, drawing a distinction between having a  
19 recollection and assuming you might have, do  
20 you have a recollection that you made changes?

21 A. I have a recollection that I made  
22 changes.

23 Q. Okay.

24 A. I can't say which ones.

25 Q. Let's take a look at Exhibit B to

1 your report.

2 With respect to the Bates-stamped  
3 materials beginning on page 3, did you request  
4 any of these documents from counsel?

5 A. I'm sorry, which materials are  
6 you referring to?

7 Q. There's a subheading on page 3 of  
8 Exhibit B that's entitled "Bates-stamped  
9 materials."

10 Do you see that?

11 A. "Bates-stamped materials"?

12 Q. Yes. So my question was whether  
13 you requested from counsel any of the  
14 documents that are listed under the subheading  
15 "Bates-stamped materials."

16 A. I requested "Terms of Use"  
17 certainly, yes.

18 Q. How about the documents ending  
19 with the Bates-stamped digits and prior to the  
20 digits RFA that are listed on page 6?

21 A. I'm sorry. I don't --

22 MS. ZORNBERG: Object to form.

23 A. I'm so sorry. I can't find the  
24 material you're referencing on page 6.

25 Q. So do you see on the top of page

1 6, there's a number of bullets?

2 A. Yes.

3 Q. Okay. And do you see how the --  
4 my understanding is that after each bullet is  
5 a reference to a document by Bates stamp. Is  
6 that correct?

7 MS. ZORNBERG: Object to form.

8 Q. Do you need me to clarify?

9 A. Yes, please. Because I'm not  
10 sure I'm looking at the same thing.

11 Q. I'm on Exhibit B, "Materials  
12 Considered and Relied Upon," and page 6 of  
13 Exhibit B.

14 A. I'm on page 6.

15 Q. Okay. And at the top of page 6,  
16 are you looking at a series of approximately  
17 ten bullets?

18 A. 11.

19 Q. Okay. And do each of those  
20 bullets end with a digit?

21 A. They do.

22 Q. And at the prior -- strike that.  
23 Prior to the digits, do you see  
24 the letters RFA for each of those bullets?

25 A. I do.



1 Q. Okay. Do you understand each of  
2 those bullets to be a reference to a document?

3 A. I do.

4 Q. Okay. Did you request the  
5 documents referenced by those bullets at the  
6 top of page 6?

7 A. I really --

8 MS. ZORNBERG: Objection.

9 A. I can't recall. I'm sorry.

10 Q. Did you review each of the  
11 documents that are listed in Exhibit B?

12 A. As far as I can recall, I  
13 reviewed the documents listed in Exhibit B.

14 Q. Turning to page 8 of your Exhibit  
15 B, do you see where it says "Statutes and  
16 Regulations"?

17 A. Yes, I do.

18 Q. And under Statutes and  
19 Regulations, there is one statute and one  
20 regulation listed. Do you see that?

21 A. Yes, I do.

22 Q. How did those -- strike that.

23 How did that statute and that  
24 regulation inform your opinions in this case?

25 A. This was, I believe, a general

1 reference to the role played by traditional  
2 exchanges as overseers of marketplaces in the  
3 report.

4 Q. Did you consider Section 5 of the  
5 Securities Act of 1933 as part of your  
6 opinion?

7 A. I did not. I'm not here to give  
8 a legal opinion. I'm here as a market  
9 structure expert.

10 Q. Are you offering any opinion  
11 regarding whether or not defendants violated  
12 Section 5 as part of the conduct at issue in  
13 this matter?

14 A. I am not.

15 Q. Did you consider any case law as  
16 part of your opinion?

17 A. I don't believe I did.

18 Q. Are you familiar with the United  
19 States Supreme Court's United States versus  
20 Morrison decision?

21 A. I'm not here as a legal expert.  
22 I am here as a expert in market structure and  
23 would prefer to talk about market structure.

24 Q. Be that as it may, are you  
25 familiar with that decision?

1           A.     I am, yes.

2           Q.     Are you offering an opinion on  
3 whether the supreme court's holding in United  
4 States versus Morrison applies to the conduct  
5 at issue in this case?

6           A.     I'm not offering an opinion.

7           Q.     Okay. Does the opinion in United  
8 States versus Morrison inform your opinion at  
9 all in this case?

10           MS. ZORNBERG: Objection.

11           A.     No, it does not.

12           Q.     Are you offering an opinion as to  
13 whether the supreme court's holding in United  
14 States versus Morrison extends to Section 5 of  
15 the Securities Act?

16           A.     I'm not offering that opinion.

17           Q.     Are you offering any opinion on  
18 the efficiency of the XRP market?

19           A.     No.

20           MS. ZORNBERG: Object to form.

21           A.     No.

22           Q.     Do you understand the question  
23 that I just asked?

24           A.     I believe so.

25           Q.     Okay. Let's turn to paragraph 32

1 of your report, please. That's on page 17.

2 The second sentence says:

3 "To operationalize trading,  
4 cryptocurrency exchanges utilize key  
5 conventions that have long been relied  
6 on by traditional venues to enable order  
7 submission, matching, trade execution,  
8 and information dissemination."

9 Do you see that?

10 MS. ZORNBERG: Mark, if you could  
11 just slow down a little in your  
12 questioning, I'd appreciate it.

13 MR. SYLVESTER: Sure.

14 A. I'm sorry. Which paragraph are  
15 you referring to?

16 Q. It's paragraph 32 and I just read  
17 into the record the second sentence.

18 A. Paragraph 32. Okay. Sorry.

19 Q. My question is: Which key  
20 conventions are you referring to in that  
21 sentence?

22 A. As described in detail in the  
23 report, there are a number. For example, in  
24 relation to order submission, order matching,  
25 the kind of central limit order book

1 convention that is deployed in cryptocurrency  
2 exchanges to match transactions and conclude  
3 them and finalize them, for example.

4 Q. How did you determine that crypto  
5 exchanges utilized the key conventions you  
6 just listed?

7 A. This was based off of my own  
8 research as well as through the review of the  
9 terms of service of the exchanges, 24 of the  
10 exchanges set out in Table A.

11 Q. When you say your "own research,"  
12 are you referring to research you conducted in  
13 preparing your expert opinion or different  
14 research?

15 A. My general research into market  
16 structure as well as the general research I do  
17 into cryptocurrency markets as part of my  
18 work.

19 Q. Is the research that you just  
20 described research that you conducted separate  
21 from forming your opinion in this case?

22 A. The research that I have relied  
23 on is set out in the footnotes to this  
24 opinion.

25 Q. Turning to paragraph 33, about

1 midway through the paragraph, you write:

2 "Instead, the exchange's 'floor'  
3 is more accurately seen as a function of  
4 its internal computerized matching  
5 engines."

6 Do you see that?

7 A. I do, yes.

8 Q. Why is it -- strike that.

9 What properties of a trading  
10 floor are now reflected with respect to  
11 cryptocurrency exchanges in internalized  
12 computerized matching engines?

13 MS. ZORNBERG: Object to form.

14 A. This paragraph references  
15 traditional financial markets, as in  
16 traditional financial exchanges and not  
17 necessarily crypto exchanges.

18 However, the "floor," as it's  
19 referenced here, means the order submission,  
20 order matching, and finalizing is done in an  
21 electronic and dematerialized way.

22 Q. And is the description of the  
23 floor that you just gave with respect to  
24 traditional exchanges also true of  
25 cryptocurrency exchanges?

1           A.     As set out in my opinion,  
2     cryptocurrency exchanges deeply borrow the  
3     order submission, matching, finalizing  
4     conventions from traditional marketplaces,  
5     yes.

6           Q.     What is an internal computerized  
7     matching engine?

8           A.     An internal computerized matching  
9     engine references the matching protocols used  
10    by the exchange that take incoming orders and  
11    match them in accordance with preset rules to  
12    finalize a trade on the exchange.

13          Q.     Can you explain what you mean by  
14    the word "protocols"?

15          A.     A protocol references the  
16    algorithms, essentially, that are programmed  
17    to deploy a certain matching convention. For  
18    example, many central limit order books that  
19    matching engines use, use a price-time  
20    priority convention, which is referenced and  
21    detailed in the report.

22          Q.     When you say "algorithms," are  
23    you referencing a computer software?

24                 MS. ZORNBERG: Object to form.

25          A.     It's a broad question. I'm not

1 an computer expert. Based off my own  
2 knowledge and research into the area, what I'm  
3 referencing are essentially preprogrammed  
4 computerized sequences that reflect a certain  
5 protocol to match incoming orders.

6 Q. I guess what I'm getting at is:  
7 This matching is done by a computer, not by a  
8 person receiving the order. Is that fair?

9 A. In electronic exchanges, the  
10 matching is done automatically by algorithms  
11 that receive the orders.

12 Q. Computerized algorithms?

13 A. Algorithms are computerized, yes.

14 Q. The very last sentence of  
15 paragraph 33, you state:

16 "In this way, the 'floor' or  
17 'pit' is now very much electronic and  
18 essentially dematerialized."

19 Do you see that?

20 A. I do, yes.

21 Q. What does "essentially  
22 dematerialized" mean?

23 A. Means it's essentially  
24 electronic.

25 Q. Going back to an internal



1 computerized matching engine, where is an  
2 exchange's computerized matching engine  
3 typically located?

4 A. Depends on the exchange.

5 Q. Can you give me one example?

6 A. It's very hard to describe  
7 exactly and answer the question exactly as you  
8 state it. The matching engines of an exchange  
9 reflect a number of its roles and processes  
10 which can't necessarily be confined to a  
11 computer.

12 Q. Can you say more about how they  
13 can't be confined to a computer?

14 A. For example, when you have the  
15 central limit order book of an exchange, it  
16 reflects the various rules and processes that  
17 an exchange puts in place to make sure that  
18 that central limit order book has actual  
19 meaning. In other words, when trades come in,  
20 they become binding.

21 Q. And in your view, are those  
22 various rules and processes in a different  
23 location than the internal computerized  
24 matching engine?

25 MS. ZORNBERG: Object to form.

1                   You can answer.

2                   A.       Those rules and processes are a  
3       function of the exchange itself, wherever that  
4       exchange is located.

5                   Q.       Are the rules and processes  
6       themselves computer programs?

7                   A.       Not necessarily, no.

8                   Q.       Okay. So I want to go back to  
9       where an exchange's matching engine is  
10      located.

11                   In your view, is -- does that  
12      matching take place on the exchange's servers?

13                   A.       Part of it may -- part of it will  
14      take place -- there'll be a server involved  
15      somewhere. However, the matching process is  
16      much more than an interaction on a server.

17                   It reflects the rules and  
18      processes that give that order form, that give  
19      that matching actual content, which means that  
20      that bargain becomes binding and the exchange  
21      moves forward to enforce that binding bargain  
22      in accordance with its rules and processes.

23                   Q.       Okay. So part of the matching  
24      takes place on a server. Is that right?

25                   A.       I'm not a computer expert. I'm

1 not here to provide a expert -- expertise in  
2 relation to computer science. Some part of  
3 that mechanical aspect of the matching may  
4 take place on a server somewhere.

5 Q. The mechanical aspect is exactly  
6 what I'm getting at, and you're free to draw  
7 any lines around your expert opinion. But I  
8 want to tease out what your opinions are about  
9 that. So --

10 MS. BUNTING: Objection.

11 Q. So is the -- what part of the  
12 matching process takes place on the server?

13 A. Again, I'm --

14 MS. ZORNBERG: Objection.

15 Just -- objection. Asked and answered.

16 You can answer again.

17 A. I would dispute the contention  
18 that the matching that takes place is anything  
19 other than the interaction of one byte,  
20 b-y-t-e, as it were, with another.

21 The actual matching, as it were,  
22 is undertaken in accordance with the  
23 exchange's preset rules, the central limit  
24 order book, as well as its system of  
25 governance that gives that matching form and

1 binding quality.

2 Q. Does that interaction between two  
3 bytes take place in any particular geographic  
4 location, in your view?

5 MS. ZORNBERG: Object to the  
6 form.

7 A. I have really no response to  
8 that. I don't know.

9 Q. Is that interaction of bytes that  
10 you just described necessary in order to  
11 complete a trade on a cryptocurrency exchange?

12 A. It is necessary but not  
13 sufficient.

14 Q. What else is needed?

15 A. What else -- as detailed in the  
16 report and as set out in my prior answer, what  
17 is needed here is the rules and processes of  
18 an exchange that ensure that matching has  
19 formed, that ensure that the matching follows  
20 a certain convention such as a price-time  
21 priority model, that the exchange then honors  
22 that bargain and forces that bargain as  
23 between the parties concerned.

24 Q. Geographically, where are the  
25 rules and processes of an exchange located?

1 A. On the exchange.

2 Q. When you say "on the exchange,"  
3 can you be more specific?

4 MS. ZORNBERG: Objection.

5 A. In my opinion, those rules and  
6 processes are located where the exchange is  
7 located.

8 Q. And when we're discussing rules  
9 and processes, are we thinking about a paper  
10 document, are we thinking about a computer  
11 program? Can you tell me how the rules and  
12 processes are embodied in the world?

13 MS. ZORNBERG: Objection.

14 A. The way I understand it, those  
15 rules and processes are embodied as part of  
16 the exchange's institution and its governance  
17 processes, its internal governance, its rule  
18 book that sets out the rules for parties to  
19 follow.

20 And that ensures those rules  
21 become binding in accordance with the party's  
22 agreement to those rules, which includes the  
23 order submission, order binding, and order  
24 finalization processes.

25 Q. Is that rule book a material,

1 physical rule book, like, a physical book? Or  
2 is it something else?

3 A. That's very broad. It depends on  
4 the exchange.

5 Q. Sitting here today, do you know  
6 of any exchanges where the rule book takes the  
7 form of an actual physical book?

8 A. I really can't speak to every  
9 particular exchange and how they document  
10 their rule book. The way in which that rule  
11 book is documented can vary.

12 Q. Understanding that, I'm just  
13 asking if you can think of any example within  
14 your knowledge where the rule book that you  
15 referenced in your earlier testimony takes the  
16 form of an actual physical book.

17 A. I'm sure there's a physical book  
18 for most exchanges. For example, the CME, as  
19 detailed here, has a rule book. That rule  
20 book is very thick, deep. You can find it  
21 online. And I imagine the CME keeps a hard  
22 copy for those members that need it.

23 Q. Now, focusing just on  
24 cryptocurrency exchanges, are you aware of any  
25 cryptocurrency exchanges where the rule book

1       that you referenced in your earlier testimony  
2       is also actually a physical book?

3           A.     You know, cryptocurrency  
4       exchanges, as set out in this report,  
5       stipulate various terms and conditions with  
6       their members, which are highlighted here,  
7       that require consent by those trading on the  
8       exchange to consent to the rules of the  
9       exchange.

10                If that's done in paper form,  
11       perhaps that's the case. I don't know.

12           Q.     And sitting here today, you're  
13       not sure one way or the other whether those  
14       rule books that you just described are or are  
15       not in paper form. Is that right?

16                MS. ZORNBERG: Object to form.

17           A.     I really don't understand the  
18       thrust of the question. In other words, it's  
19       perfectly possible to print a document and put  
20       it in paper form.

21           Q.     Right. I'm trying to understand  
22       in your view where physically in the world all  
23       components of a trade take place. And one --

24                MS. ZORNBERG: Objection. Sorry.

25           Q.     -- one of the items you listed

1       that's necessary for completion of a trade is  
2       a rule book. Is that right?

3               MS. ZORNBERG: Object to form.

4               A. One of them, yes.

5               Q. And so the reason why I'm asking  
6       is -- is it in physical form is because if it  
7       was in physical form, we could determine its  
8       physical location in the world. Right?

9               MS. ZORNBERG: Objection.

10              A. Perhaps, yeah.

11              Q. So are you aware of  
12       cryptocurrency exchanges keeping a rule book  
13       in a physical form?

14              A. I imagine they might.

15              Q. Setting aside whether they might,  
16       are you aware that they do?

17              MS. ZORNBERG: Object to form.

18              A. I really can't speak to whether  
19       they do or not. I've not examined the -- I've  
20       not -- gone into a cryptocurrency exchange to  
21       examine whether they keep their paper rule  
22       book or not.

23              Q. Once a trade has happened on a  
24       cryptocurrency exchange, is it recorded  
25       somewhere?



1 A. Yes.

2 Q. Where?

3 A. On the internal books and records  
4 of the exchange.

5 Q. Where are those located for  
6 cryptocurrency exchanges?

7 A. In my opinion, they are located  
8 at the exchange.

9 Q. Are the internal books and  
10 records of the -- of cryptocurrency exchanges  
11 kept in paper format typically?

12 A. I don't know. I imagine there's  
13 a digital and paper record potentially.

14 Q. Setting aside what you imagine  
15 and just focusing on what you know for sure,  
16 do cryptocurrency exchanges keep their books  
17 and records on which they record trades in  
18 physical paper format?

19 MS. ZORNBERG: Object to form.

20 A. I would imagine it would be very  
21 useful for cryptocurrency exchanges to keep  
22 books and records in paper form.

23 Q. And I just want to follow up  
24 because you've used the word "imagine" twice  
25 now. And I appreciate your answer, but I want

1 to just --

2 A. Sure.

3 Q. -- carve out what you imagine and  
4 focus just on what you know.

5 So do you know one way or the  
6 other whether cryptocurrency exchanges keep  
7 the records of completed trades in paper form?

8 MS. BUNTING: Objection.

9 A. I think for exchanges it is  
10 extremely advisable, like it is for  
11 traditional exchanges, to keep books and  
12 records in paper form. And some --

13 Q. Go ahead. I'm sorry. Please  
14 finish.

15 A. No, that's it.

16 Q. So you've said it's advisable,  
17 but that doesn't tell me whether or not they  
18 actually do it.

19 So could you let me know whether  
20 or not you know whether cryptocurrency  
21 exchanges keep their records of trades in  
22 paper form?

23 MS. ZORNBERG: Object to form.

24 Asked and answered.

25 You can answer.

1           A.     For example, in the case of  
2     traditional exchanges, rules pertaining to  
3     that exchange itself require the keeping of  
4     paper records in order to maintain the  
5     integrity of paper records. And that's set  
6     out in my report.

7                     I would imagine that  
8     cryptocurrency exchanges may be subject or  
9     would think it would be advisable to do a  
10    similar thing.

11           Q.     Are you aware of any such rules  
12    governing cryptocurrency exchanges?

13                     MS. BUNTING: Objection.

14           A.     As I sit here today, I'm not  
15    aware of any rules, however there certainly  
16    may be, as the regulatory rules here are  
17    developing.

18           Q.     And setting aside what any rules  
19    governing cryptocurrency exchanges might  
20    require, are you aware of any cryptocurrency  
21    exchanges that keep their trading records in  
22    paper form?

23                     MS. ZORNBERG: Object to form.

24           A.     In my opinion, it would be  
25    important for cryptocurrency exchanges to keep

1 records in paper form, owing to potential  
2 disruptions, damage, that may occur to digital  
3 formats.

4 Q. Professor, with all due respect,  
5 I understand your opinion that it would be  
6 important for them to do so. But I'm trying  
7 to focus on what it is that you know as to  
8 what they actually do.

9 So do you know one way or the  
10 other whether cryptocurrency exchanges keep  
11 their trading records in paper form?

12 MS. ZORNBERG: Objection. Asked  
13 and answered.  
14 You can answer.

15 A. I can't speak to every  
16 cryptocurrency exchange as to how they keep  
17 their books and records.

18 Q. Are you aware of any  
19 cryptocurrency exchange that keeps its records  
20 in paper form?

21 A. I would be shocked if there  
22 wasn't one.

23 Q. Sitting here today, are you aware  
24 of any?

25 A. I'm not aware of one. But again,

1       like I said, I would be shocked if there  
2       wasn't one or many, in fact.

3               Q.       If a cryptocurrency exchange did  
4       not keep their trading records in paper form,  
5       how do they keep them?

6               MS. ZORNBERG:   Objection.

7               A.       Presumably, they would keep them  
8       in some kind of digital storage.

9               Q.       And where would that digital --  
10       strike that.

11               Where is that digital storage  
12       located?

13               MS. ZORNBERG:   Objection.   Lack  
14       of foundation.

15               A.       I have no idea.

16               Q.       Okay.   Let's turn to paragraph  
17       37, please.   The second sentence of paragraph  
18       37 says:

19               "Here, there is significant  
20       convergence on the key principles among  
21       exchanges."

22               Do you see that?

23               A.       I do.

24               Q.       Okay.   Can you tell me what you  
25       mean by "significant convergence"?

1           A.     What I mean by that is that there  
2     is significant commonality in the practice of  
3     the fact that when orders match, they become  
4     final.

5           Q.     Significant commonality between  
6     what and what?

7           A.     Between traditional marketplaces  
8     and the -- the fact that exchanges essentially  
9     cue to the principle that when orders match,  
10    they become final.

11          Q.     Are you aware of any traditional  
12    financial exchanges where a buyer or a  
13    seller's order becomes binding as soon as the  
14    order is placed but before it is matched?

15               MS. ZORNBERG: Object to form.

16               You can answer.

17          A.     I'm sorry, are you asking -- can  
18    you repeat that question, please.

19          Q.     Of course. Are you aware of any  
20    traditional financial exchanges where an order  
21    becomes binding as soon as the order is placed  
22    but before it is matched?

23               MS. ZORNBERG: Same objection.

24          A.     Not that I can think of.

25          Q.     Are you aware of any

1 cryptocurrency exchanges where an order  
2 becomes binding as soon as the order is placed  
3 but before it is matched?

4 A. No.

5 Q. Let's look at paragraph 41,  
6 please. The second sentence states:

7 "Orders may be submitted from  
8 around the world, while still executing  
9 within the order books of an exchange  
10 and within its home jurisdiction."

11 Do you see that?

12 A. Yes, I do.

13 Q. Okay. Where is an exchange's  
14 order book located?

15 A. In my opinion, an exchange's  
16 order book is located at the exchange.

17 Q. When you say "in your opinion,  
18 the order book is located at the exchange" --  
19 strike that.

20 Is the order book that's being  
21 referenced -- strike that.

22 Is the order book that you  
23 reference in paragraph 41 a physical book?

24 A. The -- it may be. Order books  
25 tend to be digital in electronic markets.

1           Q.     Are you aware of any  
2     cryptocurrency exchange whose order book is a  
3     physical book?

4           A.     Not that I can think of.

5           Q.     You testified order books tend to  
6     be digital in electronic markets. Is that  
7     right?

8           MS. ZORNBERG: Objection. Asked  
9     and answered.

10          Q.     Is that correct?

11          A.     Yes.

12          Q.     Where are digital order books  
13     kept?

14          A.     Again, that's a very broad  
15     question.

16          Q.     If a record book is digital,  
17     where in the world does it exist?

18          A.     In my opinion, the --

19          MS. BUNTING: Objection.

20          A.     Sorry. In my book -- in my  
21     opinion, that order book exists at the  
22     exchange.

23          Q.     What does the -- where are the  
24     digital records of an order book maintained  
25     physically?



1 MS. ZORNBERG: Objection.

2 MS. BUNTING: Objection.

3 A. The digital order book of the  
4 exchange references the orders that are coming  
5 into the exchange and going into its central  
6 limit order book.

7 That is a function of what the  
8 exchange does and is determined, as before, by  
9 the various rules and processes of the  
10 exchange that ensure those order books have  
11 form and that protocols applied to those order  
12 books to match the orders as they come in.

13 Q. And as a practical matter, is the  
14 process that you just described executed by a  
15 computer program?

16 MS. ZORNBERG: Objection.

17 A. Some part of it.

18 Q. Which part is not?

19 MS. ZORNBERG: Objection.

20 A. As detailed in this opinion as  
21 well as in our answers in our conversation  
22 already, that matching process has multiple  
23 parts to it. Orders match mechanically. That  
24 matching has form and content based on the  
25 governance and rules and processes of that

1 exchange.

2 Q. When you say "orders match  
3 mechanically," is that a reference to orders  
4 matching through a computer program?

5 A. Some part of it will match, the  
6 b-y-t-e will match on a computer at some point  
7 at some level, yes.

8 Q. Can you describe to me what  
9 portions of the order book are not executed by  
10 a computer program?

11 MS. ZORNBERG: Object to form.

12 A. Sure. The order book exists to  
13 collect the orders, match those orders, make  
14 them final. Then the exchange has to enforce  
15 that bargain.

16 In some cases, that enforcement  
17 takes place using actual human beings that are  
18 responsible for verifying the orders, making  
19 sure that the order book has integrity in real  
20 time, as well as finally, potentially, dealing  
21 with any disputes that may arise with respect  
22 to any orders that are concluded.

23 Q. You say in some cases human  
24 beings are involved. Is that typical?

25 MS. ZORNBERG: Object to form.

1           A.     Human beings are involved even in  
2     the highly digital matching process because  
3     human beings have to check the constant  
4     integrity of the programs that are running.  
5     Where there's a problem, human beings have to  
6     get involved to fix that problem.

7           Q.     Is the exchange's digital order  
8     book located on a server or elsewhere?

9           MS. ZORNBERG:   Object to form.

10          A.     Again, some part of it may be,  
11     but that order book has a far larger and more  
12     institutional existence than the simple  
13     mechanical matching of one byte with another.

14          Q.     Is the institutional existence  
15     that you just referenced -- strike that.

16                 Can you tell me what you mean by  
17     "institutional existence"?

18          A.     The institutional existence that  
19     I referenced means the fact that the exchange  
20     has to develop a protocol for ensuring the  
21     order book has real form, for ensuring that  
22     binding bargains are enforced, for dealing  
23     with any problems that may arise, either in  
24     the context of a digital order book operating  
25     in real time, or in the context of potential

1 disputes that may arise in relation to  
2 concluded orders.

3 Q. Is the word "protocol," as you  
4 just used it, a reference to a computer  
5 program?

6 MS. ZORNBERG: Object to form.  
7 And I don't think her last answer used  
8 the word "protocol."

9 CERTIFIED STENOGRAPHER: Yes, it  
10 did. It didn't translate properly.

11 A. It doesn't have to. I mean, a  
12 computerized -- it doesn't have to be  
13 computerized. A protocol may be written  
14 outside of the computer and then potentially  
15 instrumentalized through a computer.

16 But a protocol is a general word  
17 referencing a set of conventions in relation  
18 to a particular exchange practice.

19 Q. Are all trades on cryptocurrency  
20 exchanges instrumentalized, at least in some  
21 part, through a computer program?

22 A. At some point, a computer may be  
23 involved. A computer -- certainly a computer  
24 is involved. However, the order matching,  
25 order submission, order conclusion, the

1 governance, making sure that disputes are  
2 dealt with, that is all a part of the larger  
3 institutional existence of the exchange. And  
4 no order can exist outside of it.

5 Q. The portion that takes place via  
6 a computer program, where in the world,  
7 geographically, does that take place?

8 MS. ZORNBERG: Objection.

9 A. I have no idea.

10 Q. Is it your view that locating  
11 computer servers around the world facilitates  
12 rapid trading?

13 A. It does facilitate rapid trading.  
14 It can facilitate rapid trading.

15 Q. In what way does locating  
16 computer servers around the world facilitate  
17 rapid trading?

18 A. For any number of reasons. I'm  
19 not a computer expert. So ...

20 Q. In that case, what's the basis  
21 for your belief that computer servers --  
22 strike that.

23 What's the basis for your belief  
24 that locating computer servers around the  
25 world facilitate rapid trading?

1           A.     I know a lot about the topic  
2     based off my own research, in general, into  
3     high frequency markets.

4           Q.     So if I understand your  
5     testimony, you understand that that statement  
6     is true. But from a mechanical perspective,  
7     you're not sure why. Is that fair?

8           A.     I mean, it helps to ease  
9     communication between jurisdictions.

10          Q.     Why is that?

11          A.     It reduces the physical distance  
12     that communication has to travel.

13          Q.     So if the physical distance  
14     between two servers is shorter, in general,  
15     the communication between those servers is  
16     faster. Is that right?

17                 MS. ZORNBERG: Object to form.

18          A.     Again, I'm not a computer expert.  
19     But just based off my own knowledge and  
20     research, that tends to be the case.

21          Q.     Do any cryptocurrency exchanges  
22     that are based outside the United States have  
23     computer servers located in the United States?

24          A.     I have no idea.

25          Q.     Is it the case that the closer

1 one is physically to an exchange's server, the  
2 faster one can obtain price information and  
3 place trade orders?

4 MS. ZORNBERG: Objection.

5 Outside the scope.

6 A. It depends.

7 Q. What does it depend on?

8 A. It depends on any number of  
9 things. For example, even if you place a  
10 server closer to that of the exchange, it may  
11 not necessarily get that information faster,  
12 because you may not pay for a faster service.

13 Q. In your experience, do  
14 professional traders typically want to be  
15 located close to servers to obtain an  
16 advantage of speed of execution?

17 MS. ZORNBERG: Objection.

18 A. It depends on the trader.

19 Q. Is it typical within the  
20 professional trading industry for traders to  
21 want to be located close to servers for speed  
22 reasons?

23 MS. ZORNBERG: Objection.

24 A. It depends on the trader.

25 Q. And why do you say "it depends on

1 the trader"?

2 A. Some traders pursue strategies  
3 that depend on speed. Others don't.

4 Q. That's a very fair point. If the  
5 trader is concerned -- strike that.

6 If a trader is pursuing a  
7 strategy that depends on speed, is it typical  
8 for that trader to want to be physically  
9 located closer to a server?

10 MS. ZORNBERG: Object to form.

11 A. They may want to do that.

12 Q. Is it typical?

13 MS. ZORNBERG: Objection.

14 A. It is typical if their strategy  
15 is focused purely on speed to try and do that.  
16 Nevertheless, there are many contingencies  
17 that can still apply.

18 MS. ZORNBERG: Just, we're almost  
19 at 12:30. Just, I think, whenever you  
20 finish this line, maybe we can break.

21 MR. SYLVESTER: That sounds good.  
22 I think I have, like, a couple more  
23 questions.

24 MS. ZORNBERG: Okay.

25 Q. If a trader is typically



1 focused -- strike that.

2 If a trader's strategy is  
3 typically focused on speed of transaction, why  
4 is it that that trader might want to be  
5 located closer to a server?

6 A. Whose server? Sorry.

7 Q. The exchange's server.

8 MS. ZORNBERG: Object to form.

9 A. In general, a trader that is  
10 pursuing a speed-based strategy may want to  
11 co-locate alongside the servers of an exchange  
12 in order to try and get data faster and to be  
13 able to send orders quicker into the order  
14 submission system.

15 Q. Can you explain what you mean by  
16 "co-locate"?

17 A. Locate next to -- locate their  
18 servers next to the servers of the exchange.

19 MR. SYLVESTER: Okay. I think  
20 that's a good place to stop. Let's go  
21 off the record.

22 THE VIDEOGRAPHER: The time now  
23 is 12:28 p.m. This concludes Media 3.  
24 Off the record.

25 (Recess taken from 12:28 p.m. to

1 12:45 p.m.)

2 THE VIDEOGRAPHER: The time now  
3 is 12:45 p.m. This begins Media 4. On  
4 the record.

5 BY MR. SYLVESTER:

6 Q. Professor, why would co-locating  
7 a trader's server next to the servers of an  
8 exchange allow the trader to send his order  
9 quicker into the order submission system?

10 A. In general, co-location helps  
11 reduce the time it takes to send an order by  
12 reducing the distance that has to be traveled.

13 Q. When you reference distance in  
14 your answer, do you mean the distance between  
15 the trader's servers and the exchange's  
16 servers?

17 A. I did, yes.

18 Q. Okay. Let's go back to paragraph  
19 41, please. Professor, at the end of 41, do  
20 you see a discussion of the London Stock  
21 Exchange?

22 A. I do, yes.

23 Q. Where are the London Stock  
24 Exchange's order books?

25 A. In my opinion, in London.

1           Q.     What is the basis for your  
2     opinion that the London Stock Exchange's order  
3     books are in London?

4           A.     In my mind, in my opinion, the  
5     exchange's order books reflect the exchange's  
6     institutionalized processes for determining  
7     how orders match, what happens when they  
8     match, and for ensuring that the order becomes  
9     final and is enforced.

10                 That system for doing so is  
11     located at the exchange, in this case, in the  
12     London Stock Exchange, where the stock  
13     exchange operates its central limit order  
14     book, orders go into that central limit order  
15     book, are finalized in accordance with the  
16     rules and processes of the London Stock  
17     Exchange, and enforced under the rules of the  
18     London Stock Exchange, as governed by the laws  
19     of England and Wales.

20           Q.     Is the London Stock Exchange's  
21     central limit order book a physical book?

22           A.     Some part of it might be.

23           Q.     Is any part of it not a physical  
24     book?

25           A.     The central limit order book

1 references the system whereby orders are  
2 collected, they're matched in accordance with  
3 a certain convention, they become binding and  
4 final based on that matching, and that central  
5 limit order book is then enforced by the  
6 exchange.

7 Q. Is any of what you just -- strike  
8 that.

9 Does any of what you just  
10 described take place via a computer program?

11 A. Some part of it will take place  
12 using a computer at some point.

13 Q. And for the portion of what you  
14 described that takes place via computer, is  
15 the data processed by that computer program  
16 located on the London Stock Exchange's  
17 servers?

18 MS. ZORNBERG: Object to form.

19 A. I would imagine so somewhere.

20 Q. You cite in Footnote --  
21 Footnote 73 and 75 the London Stock  
22 Exchange's -- "A Guide to London Stock  
23 Exchange Trading Service For Equity  
24 Securities."

25 Do you see that?

1           A.       I do.

2           Q.       Does the guide referenced in  
3       those footnotes say that orders are matched in  
4       London?

5           A.       I can't recall.

6           Q.       The second to last sentence of  
7       paragraph 41 reads:

8                       "Nevertheless, even with these  
9       operations, including in the United  
10       States, it is clear that market  
11       participants understand the London Stock  
12       Exchange to be located in London, United  
13       Kingdom."

14               Can you tell me what the basis is  
15       for your statement that it is clear that the  
16       market participants understand that the LSE is  
17       located in London?

18           A.       Yes, it's a common understanding  
19       that the London Stock Exchange is located in  
20       London. A part of that process involves  
21       market participants having to become a part of  
22       the London Stock Exchange in some form in  
23       order to be able to trade on it.

24           Q.       So in order for a trader to trade  
25       in the London Stock Exchange, that trader has

1 to become a part of the London Stock Exchange  
2 in some way?

3 A. Has to be connected to the London  
4 Stock Exchange in some way, yes.

5 Q. Can you explain what you mean by  
6 "connected" in that context?

7 A. So, for example, you may have to  
8 use a particular broker that is a member of  
9 the London Stock Exchange in order to be able  
10 to trade.

11 Q. Are there any cryptocurrency  
12 exchanges that have similar requirements?

13 MS. ZORNBERG: Object to form.

14 A. Cryptocurrency -- cryptocurrency  
15 exchanges, as detailed in the report, require,  
16 for the most part, in the terms of service  
17 that I have reviewed, to have users download a  
18 particular wallet that is particular to that  
19 exchange itself.

20 Q. Is the -- strike that.

21 Is your answer the only  
22 similarity you can think of between the London  
23 Stock Exchange's requirement that a specific  
24 broker has to be affiliated with the exchange  
25 to trade on the exchange and cryptocurrency

1 exchanges?

2 MS. ZORNBERG: Objection.

3 Q. You can answer.

4 A. It's --

5 MS. ZORNBERG: Okay. You can  
6 answer.

7 A. I'm sorry, could you repeat the  
8 question.

9 Q. Can you tell me what it means to  
10 be a member of the London Stock Exchange?

11 A. Sure. To be a member of the  
12 London Stock Exchange means that you have  
13 certain rights and privileges in order to be  
14 able to trade on the London Stock Exchange,  
15 and members subscribe for that privilege.

16 Q. How is it that one becomes a  
17 member of the London Stock Exchange?

18 A. It's been a long time since I  
19 read those rules. There's a process.

20 Q. Is anyone required to be a member  
21 of a cryptocurrency exchange to trade on that  
22 exchange?

23 A. Crypto- --

24 MS. ZORNBERG: Object to form.

25 A. Cryptocurrency exchanges require

1       their users, in general and as detailed in  
2       this report, to submit to terms of service  
3       that require them to provide various  
4       representations as to who they are, get a  
5       wallet that is particular to that exchange,  
6       and ensure that they abide by the rules of the  
7       exchange including with respect to the trading  
8       process.

9               Q.       Does taking the steps that you  
10       just described make a trader a member of a  
11       particular cryptocurrency exchange?

12              A.       As far as I understand it, the  
13       concept of membership is different in the  
14       context of a cryptocurrency exchange. I don't  
15       believe they follow that same member-based  
16       structure that more traditional exchanges like  
17       the New York Stock Exchange and the London  
18       Stock Exchange follow.

19              Q.       Returning to your statement about  
20       "it is clear that market participants  
21       understand that the LSE is located in London,"  
22       did you speak to any market participants about  
23       that topic?

24              A.       Based on my own research and  
25       understanding, the fact that I was a lawyer in



1 London, the London Stock Exchange, for all  
2 intents and purposes, it would be absurd to  
3 think otherwise.

4 Q. I appreciate that. But did you  
5 speak to any market participants on the topic  
6 of their understanding of where the London  
7 Stock Exchange is located?

8 A. I haven't. It's such a basic  
9 question, it would be weird to ask.

10 Q. The next sentence, the concluding  
11 sentence of paragraph 41 says:

12 "As such, offers to buy and sell  
13 on the London Stock Exchange are made in  
14 London once they enter its order books,  
15 and trades become final there once  
16 offers match on its platform in  
17 accordance with the Exchange's rules and  
18 procedures."

19 Do you see that?

20 A. I do, yes.

21 Q. Is where the London Stock  
22 Exchange's offers to buy and sell match  
23 influenced, in your view, by where market  
24 participants understand the London Stock  
25 Exchange to be located?

1 MS. ZORNBERG: Object to form.

2 A. Could you repeat the question.

3 Q. Sure. What is the relevance, if  
4 at all, to market participants' understanding  
5 of where the London Stock Exchange is located  
6 to where the London Stock Exchange's orders  
7 match?

8 A. It's all part of the exchange.  
9 It's all part of where the exchange -- the  
10 institutional existence of the exchange.

11 Q. So in your view, a market  
12 participant's understanding of where an  
13 exchange is located has some relevance to the  
14 question of where its orders to buy and sell  
15 are matched?

16 A. Likely so.

17 Q. Can you explain the relevance?

18 A. The order submission process that  
19 the customer thinks they're entering into,  
20 they believe that it's happening in London.

21 If you take a look at the terms  
22 of service of the London Stock Exchange, in  
23 other words, its rule book, it sets out  
24 dispute resolution processes, for example,  
25 that need to be followed that consistently

1 reference the laws of England and Wales and  
2 obviously the London Stock Exchange in London.

3 And so the fact that investors  
4 are engaging in a direct way with the London  
5 Stock Exchange with all of the paraphernalia  
6 that references the London Stock Exchange as  
7 being in London, I think that's -- influences  
8 their judgment and certainly the -- that's  
9 a -- shows what they -- how they understand  
10 the order submission process there to  
11 function.

12 Q. In your view, is it obvious that  
13 the London Stock Exchange is located in  
14 London?

15 A. To me? Yes.

16 Q. Why is that?

17 A. For many reasons. The first is  
18 historical. The London Stock Exchange has  
19 centuries-deep roots in London. It is  
20 governed by the laws of England and Wales. It  
21 is governed by a rule book that has organized  
22 this marketplace for a very long time.

23 The London Stock Exchange also  
24 offers a particular set of products that  
25 reflect the fact that it is based in the

1 United Kingdom, and therefore, at a location  
2 which is in the middle of the US, Europe, and  
3 Asia.

4 And so the fact of being in  
5 London is, in fact, very important for the  
6 London Stock Exchange to actually have the  
7 kind of products that it offers to the rest of  
8 the global trading community.

9 Q. There are a number of  
10 cryptocurrency exchanges. Correct?

11 A. Yes.

12 MS. ZORNBERG: Object to form.

13 Q. What's the oldest?

14 A. Cryptocurrency exchanges?

15 Q. Yes.

16 A. Well, are you asking is it still  
17 in existence or not?

18 Q. No, I apologize. Of all the  
19 cryptocurrency exchanges that exist, which is  
20 the oldest?

21 A. I'm not sure if it still exists  
22 in some form, but my understanding is that the  
23 first real big exchange was the Mt. Gox  
24 exchange, which subsequently imploded.

25 Q. When was the Mt. Gox exchange

1       founded?

2               A.       I believe it was  
3       around -- early -- maybe 2013-'14.

4               Q.       Excluding Mt. Gox, what's the  
5       second oldest cryptocurrency exchange?

6               MS. ZORNBERG:  Objection.  
7       Outside scope.

8               A.       There -- you know, it's hard for  
9       me to say.

10              Q.       Because you don't know?

11              MS. ZORNBERG:  Objection.

12              Q.       Just for clarity.

13              A.       I don't know exactly which  
14       exchange was the second to come into existence  
15       after Mt. Gox.

16              Q.       Sure.  Paragraph 42, the last  
17       sentence reflects your view that it's:

18                     "Clear that market participants  
19       understand that the Chicago Mercantile  
20       Exchange is located in Chicago" and the  
21       Tokyo Stock Exchange is located in  
22       Tokyo.

23                     Do you see that?

24              A.       I do, yes.

25              Q.       Did you speak to any market

1 participants on the topic of their belief as  
2 to where either of those exchanges are  
3 located?

4 A. I did not.

5 Q. Okay. Did you review any  
6 literature regarding market participants'  
7 belief as to whether -- where either of those  
8 exchanges were located?

9 A. I don't know what you mean by  
10 "literature."

11 Q. I would include within literature  
12 any papers, articles, media.

13 MS. ZORNBERG: I'm going to  
14 object to form.

15 You can answer.

16 A. It's -- you know, there is a  
17 lengthy literature in relation to the history  
18 of the Chicago Mercantile Exchange, some of it  
19 which is referenced here, that speaks to the  
20 centrality of Chicago as the reason why the  
21 Chicago Mercantile Exchange came into being  
22 for the reasons it came into being.

23 There's an extensive literature  
24 detailing the importance of Chicago as one of  
25 the key players in the commodities

1 marketplace.

2 And so I imagine that is an  
3 important structural connection point between  
4 the minds of market participants and the  
5 trade -- trading hub itself.

6 The fact that Chicago is so  
7 essential to the economic history of the US,  
8 and in particular, the economic history of the  
9 commodities trading marketplace.

10 Q. Did any of the literature that  
11 you just described discuss the specific point  
12 of market participants' understanding of the  
13 location of the Chicago Mercantile Exchange?

14 MS. ZORNBERG: Object to form.

15 A. I don't actually know what that  
16 question really means.

17 I mean, I think the historical  
18 record in some of the articles speaks to folks  
19 meeting in Chicago in the earliest days to try  
20 and create a grain market, for example. So I  
21 don't know if that counts.

22 Q. Where are the Chicago Mercantile  
23 Exchange's order books located?

24 A. In Chicago.

25 Q. How do you know that?

1           A.     Well, the Chicago Mercantile  
2     Exchange is the Chicago Mercantile Exchange.  
3     Going back to my earlier answers, there's an  
4     institutional existence for the order book  
5     that encompasses the rule book of the exchange  
6     that encompasses the fact that the exchange  
7     has a presence in Chicago, the governance  
8     processes of the Chicago Mercantile Exchange,  
9     its rules and processes that give effect to  
10    the order book.

11           Q.     Where does the Chicago Mercantile  
12    Exchange match its orders?

13           A.     The matching process, as detailed  
14    in my earlier answers, references the  
15    mechanical matching process that may exist on  
16    a b-y-t-e, byte-to-byte level as well as the  
17    larger rules and processes that give that  
18    matching form, that ensure that orders that  
19    match become a trade that is binding and that  
20    ensure the enforceability of that bargaining.

21           Q.     At the byte level, where  
22    do -- where does the Chicago Mercantile  
23    Exchange match its orders?

24                   MS. ZORNBERG: Objection.

25           A.     Depends on orders. It's hard to



1 say.

2 Q. When you say "it depends on  
3 orders," can you say what it depends on?

4 A. I mean, the Chicago Mercantile  
5 Exchange may have computers anywhere. I'm not  
6 sure.

7 Q. Globally?

8 A. Presumably.

9 Q. When you say "presumably," why  
10 presumably?

11 A. I don't know the exact location,  
12 if it's various operations around the world.

13 Q. When you say "presumably," do you  
14 suggest that it's probably the case that they  
15 have global servers?

16 MS. BUNTING: Objection.

17 A. I would be extremely shocked if  
18 they didn't have -- well, they -- I believe  
19 they will have servers at locations around the  
20 globe.

21 Q. Okay. Where is the Tokyo Stock  
22 Exchange's order books located?

23 A. I'm guessing in Tokyo, given my  
24 earlier answers that the Tokyo Stock Exchange,  
25 like the Chicago Mercantile Exchange,

1 encompasses an institutional presence that  
2 ensures that orders matching are matched,  
3 become final trades, and are enforced as  
4 bargains by the Tokyo Stock Exchange.

5 Q. Where does the Tokyo Stock  
6 Exchange match its orders?

7 A. The Tokyo Stock Exchange's  
8 matching includes the, b-y-t-e, byte-to-byte  
9 matching that may exist, as well as ensuring  
10 that the matching process, which is  
11 mechanical, has actual meaning in accordance  
12 with the rules and conventions of the central  
13 limit order book and the governance processes  
14 of the Chicago -- of the Tokyo Stock Exchange.

15 Q. Focusing just on the byte-to-byte  
16 matching process, where does the Tokyo Stock  
17 Exchange match its orders?

18 MS. ZORNBERG: Objection.

19 MS. BUNTING: Objection.

20 A. I don't know.

21 Q. Are you offering any opinion in  
22 this case that XRP is a currency?

23 A. I am not.

24 Q. Are you offering any opinion in  
25 this case as to whether or not XRP has the

1 attributes of a currency?

2 A. I am not.

3 Q. Let's look at the last sentence  
4 of paragraph 49, please. You write:

5 "The XRP cryptocurrency, for  
6 example, has been used as a digital  
7 settlement asset to overcome the speed  
8 and costly frictions entailed in making  
9 cross-border payments between different  
10 currencies."

11 Do you see that?

12 A. I'm sorry, I must be on the wrong  
13 page.

14 Q. I'm on page -- I'm starting at  
15 the bottom of page 26.

16 A. (Document review.)

17 Yes.

18 Q. What is your basis for that  
19 statement?

20 A. I've cited a source at source 86  
21 as an example --

22 Q. Sorry. Is there any other basis  
23 for the statement that I just read aloud other  
24 than the source cited in Note 86?

25 A. Based off my general background

1 understanding.

2 Q. What is that general background  
3 understanding?

4 A. That XRP offers a settlement --  
5 payment settlement asset for international  
6 payments.

7 Q. And remind me how you learned  
8 that.

9 MS. ZORNBERG: Object to form.

10 A. It's part of my general research  
11 into the marketplace.

12 Q. Prior to your retention in this  
13 case?

14 A. Yes.

15 Q. When you say "the marketplace" in  
16 that answer, what marketplace?

17 A. The financial markets.

18 Q. And how was it that you came  
19 across XRP's use as a -- strike that.

20 How is it that you came across  
21 the use of XRP in making cross-border payments  
22 in your research into the financial markets?

23 A. I can't recall exactly. However,  
24 I imagine -- I think it may have been as part  
25 of conversations I have with academics,

1 discussions at conferences, for example, in  
2 relation to innovations in payments  
3 technology.

4 Q. Is cross-border payments  
5 something that you study?

6 A. Cross-border payments has been an  
7 area in which I developed extensive expertise  
8 and practice and as part of my overall  
9 research.

10 Q. Are you aware of any disruptions  
11 or halts on the XRP ledger?

12 A. None specifically at present.

13 Q. Let's look at paragraph 59,  
14 please. That is on page 32. The third  
15 sentence in that paragraph is:

16 "Many cryptocurrency exchanges,  
17 including several on which I understand  
18 XRP to have been transacted,  
19 contractually stipulate  
20 rules-of-the-road for order submission,  
21 matching, trade execution, and  
22 settlement that are consistent with this  
23 understanding."

24 And I believe "this  
25 understanding" refers to the previous sentence

1 where you say:

2 "Market participants understand  
3 that their trades will be executed and  
4 then immediately settled within the  
5 confines of the exchange."

6 Is that correct?

7 A. Are you on page 32?

8 Q. I am.

9 A. Okay.

10 Q. Paragraph 59.

11 MS. ZORNBERG: Object to form.

12 Are you just asking her if that's  
13 correctly -- you read it correctly?

14 MR. SYLVESTER: No. I'm asking  
15 whether or not the phrase "this  
16 understanding" referenced the  
17 understanding of market participants  
18 described in the previous sentence.

19 A. (Document review.)

20 I'm sorry. What's the question?

21 Q. Do you see the reference in the  
22 third sentence of paragraph 59, at the end,  
23 "this understanding"?

24 A. Third sentence of paragraph 59.

25 Are you referring to "market participants"

1 understand that their trades will be executed  
2 and then immediately settled"?

3 Q. That's what I'm asking, is  
4 whether or not this phrase "this  
5 understanding" used in the third sentence is  
6 referring back to your description of market  
7 participants' understanding in the second  
8 sentence of the paragraph.

9 A. I believe it's referencing market  
10 participants' understanding that their trades  
11 will be executed and then settled within the  
12 exchange.

13 Q. Okay. So you say that many  
14 cryptocurrency exchanges, including several on  
15 which you understand XRP to have been  
16 contracted -- transacted, have contractual  
17 rules of the road that reflects the  
18 understanding that trades will be executed and  
19 then immediately settled within the confines  
20 of the exchange. Is that right?

21 MS. ZORNBERG: Object to form.

22 You can answer.

23 A. Right.

24 Q. Let me ask a better question.

25 You say many -- the third

1 sentence seems to be about the  
2 rules of the road for many cryptocurrency  
3 exchanges.

4 I'm trying to get at: What is it  
5 that they contain?

6 A. Okay.

7 Q. In your third sentence, what are  
8 you describing?

9 A. That's a broad question. The  
10 rules of the road for cryptocurrency exchanges  
11 are set out in the terms of service that are  
12 discussed in this report.

13 I reviewed 24 of them for  
14 exchanges set out in Table A, and many of  
15 those terms of service set out the processes  
16 that exchanges use for order submission, what  
17 makes orders binding, for dispute resolution,  
18 for ensuring that users comply with a certain  
19 standard of behavior when they're on the  
20 exchange, as well as rules with respect to how  
21 they maintain their solvency on the exchange,  
22 for example.

23 Q. Are there any rules of the road  
24 that you reviewed that do not include any of  
25 the information you just described?



1 MS. ZORNBERG: Object to form.

2 A. There may be a couple of -- there  
3 may have been -- there were, rather, I should  
4 say, some terms of service that were much more  
5 basic than others.

6 Q. When you say they were "much more  
7 basic," does that mean they did not include  
8 the information that you just described?

9 A. They may have included some of  
10 it, but the detail was varied in the depth  
11 depending on the terms of service.

12 Q. Were there any rules of the road  
13 that you read that did not set forth what  
14 makes an order binding?

15 MS. ZORNBERG: Object to form.

16 A. You know, I think there may have  
17 been one user agreement or a couple user  
18 agreements that perhaps weren't as clear on  
19 that. But in general, the user agreements  
20 were very categorical about the fact that  
21 orders become binding when they are matched by  
22 the exchange, partially-filled orders become  
23 binding to the part that is filled when  
24 matched by the exchange.

25 Q. Which were those one or two that

1       you just described?

2               A.       I can't exactly recall. I'd have  
3       to go through the user agreements to fish them  
4       out.

5               Q.       Is there anywhere in your report  
6       that reflects that those one or two do not set  
7       forth information about what makes orders  
8       binding on those exchanges?

9               A.       In the report, I focus on the  
10       general. I did -- may -- I don't think I  
11       noted the one or two that did not include that  
12       information specifically.

13              Q.       Okay. The third to last sentence  
14       in paragraph 59 says:

15                     "As with traditional exchanges  
16       that enter into contracts with users,  
17       thereby creating a unique trading  
18       environment, cryptocurrency exchanges  
19       tend to similarly establish a core set  
20       of rules and standards for their  
21       particular market."

22                     Do you see that?

23              A.       I'm so sorry, which paragraph?

24              Q.       59 again.

25              A.       Sorry.

1 Q. It's okay.

2 A. (Document review.)

3 Yes.

4 Q. Are there any exchange rules that  
5 you reviewed that do not set forth the core  
6 set of rules and standards that you describe  
7 in that sentence?

8 MS. ZORNBERG: Objection.

9 A. Again, referencing back to my  
10 previous answer, there were some  
11 exchange -- there were a couple of exchanges,  
12 some user agreements that were much more basic  
13 than others. Yeah.

14 Q. For the exchanges with user  
15 agreements that were much more basic than  
16 others, as you describe it, was XRP traded on  
17 those exchanges?

18 MS. ZORNBERG: Objection to form.

19 A. I believe so. I can't say for  
20 sure.

21 Q. Is it your understanding that all  
22 of the -- strike that.

23 Is it your understanding that XRP  
24 was traded on all the exchanges that are  
25 listed in your Table A?

1           A.     I believe so.

2           Q.     Did you confirm that in any way  
3 before putting Table A in your report?

4           A.     I think I did -- I did -- I think  
5 I did confirm it.

6           Q.     How did you do that?

7           A.     Discuss broadly with counsel.

8           Q.     And did you personally review all  
9 of the user agreements for each of the  
10 exchanges on which XRP traded?

11          A.     I did not review -- with respect  
12 to the exchanges listed in Table A, I reviewed  
13 all of the user agreements minus that of  
14 Bitlish.

15          Q.     Why didn't you review Bitlish?

16          A.     It was not available.

17          Q.     Is it your understanding that  
18 Table A contains all of the cryptocurrency  
19 exchanges on which XRP has ever been traded?

20          A.     I have no idea. Sorry. I  
21 don't --

22          Q.     Let's go to paragraph 63 on the  
23 next page, page 33.

24          A.     Yup.

25          Q.     The first sentence says:

1 "Based on my review of their user  
2 agreements, exchanges mostly use a  
3 trading model that closely resembles a  
4 central order book that matches buy and  
5 sell orders in accordance with a set  
6 matching algorithm."

7 Do you see that?

8 A. I do.

9 Q. I'm focusing just in on the word  
10 "mostly." Which are the exchanges that do not  
11 use a trading model that closely resembles a  
12 central order book, as you describe in  
13 paragraph 63?

14 A. The reason I use the word  
15 "mostly" there is because, as I said, some  
16 user agreements are much more basic and don't  
17 provide a detail description of their order  
18 matching system.

19 I will say that the central limit  
20 order book is the dominant form that has  
21 appeared in the user agreements.

22 Q. Of the user agreements that you  
23 reviewed, how many of them don't provide that  
24 detailed description of their order matching  
25 system?

1           A.     I would have to go through them  
2     all to fish out the ones that are more basic  
3     and don't stipulate exactly what their order  
4     matching mechanisms look like.

5           Q.     For the ones that don't stipulate  
6     exactly what their order matching mechanisms  
7     look like, do you know how those exchanges  
8     match their orders?

9           MS. ZORNBERG: Object to form.

10          A.     I do not, no.

11          Q.     The next sentence says -- of  
12     paragraph 63 -- says:

13                 "Offers to buy or sell are made  
14     on the exchange and appear on the  
15     central order book within the confines  
16     of the exchange."

17                 Do you see that?

18          A.     That's right.

19          Q.     Can you tell me what you mean by  
20     the phrase "within the confines of the  
21     exchange"?

22          A.     What I mean by that phrase is  
23     within the order submission ecosystem of that  
24     exchange that sets up an order submission  
25     system, order matching system, and then the

1 clearing and settlement system for regulating  
2 the accounts of the different users.

3 Q. Is the order submission ecosystem  
4 consistent -- strike that.

5 Does the order submission  
6 ecosystem consist of an order submission  
7 system, an order matching system, and a  
8 clearing and settlement system?

9 MS. ZORNBERG: Object to form.

10 A. Going back to my earlier answers,  
11 the order matching system, the central limit  
12 order book, consists of the order matching,  
13 the binding quality that comes about when  
14 orders match, the rules and processes that  
15 ensure that binding bargain is then recognized  
16 and enforced by the exchange.

17 Q. Is what you just described in  
18 your answer what you would consider to be the  
19 order submission ecosystem?

20 A. Broadly, yes.

21 Q. Okay. Let's go to paragraph 64,  
22 the first sentence. It says:

23 "Orders, once matched, then  
24 become automatically binding in the  
25 exchange's trading system."

1 Do you see that?

2 A. I do, yes.

3 Q. Is that always true?

4 MS. ZORNBERG: Object to form.

5 A. In general, it is by far, by far,  
6 the prevailing convention across exchanges,  
7 traditional and cryptocurrency exchanges, that  
8 orders, once matched, immediately become  
9 binding in the exchange's trading system.

10 Q. Focusing just on cryptocurrency  
11 exchanges, what are the exceptions?

12 A. Going back to my earlier answer,  
13 there were some terms of service that were  
14 more basic, and so I cannot give a conclusive  
15 answer with respect to those exchanges.

16 Q. The first complete sentence of  
17 paragraph 64 that appears on page 34 begins:

18 "The terms of service of most of  
19 the exchanges that I reviewed refer to  
20 specific in-house order matching systems  
21 that result in orders becoming binding  
22 as soon as a sell and buy order match."

23 Do you see that?

24 A. I do, yes.

25 Q. Were there any terms of service



1       that you read where that statement was not  
2       true?

3               A.       Which part of it was not true?

4               Q.       Did you review any terms of  
5       service where the in-house order matching  
6       systems did not result in orders becoming  
7       binding as soon as a sell and buy order  
8       matched?

9               A.       You know, as I sit here today and  
10      think back to the terms of service I reviewed,  
11      where they mention order submission, whenever  
12      they do mention it, that mention states that  
13      whenever orders match, they become binding.

14              Q.       Near the end of paragraph 64,  
15      second to last sentence says:

16                      "Once offers entering the  
17                      exchange are matched by the exchange and  
18                      become final, reversal can occur only on  
19                      narrow grounds (as described below) and  
20                      per my review of several user  
21                      agreements, only at the discretion of  
22                      the exchange."

23                      Do you see that?

24              A.       I do, yes.

25              Q.       Which are the "several user

1       agreements" you're referring to?

2               A.       I can give you some examples.

3               Q.       Sure. Go ahead.

4               A.       So, for example, when one looks  
5       at the Coinbase exchange, Coinbase Singapore  
6       sets out in its terms of service that trades  
7       may be reversed by the exchange only on  
8       extremely narrow grounds, like a clearly  
9       erroneous trade.

10              Similarly, if one looks at  
11       BitMax, as I recall, trades may be reversed  
12       for clearly erroneous transactions that take  
13       place on an exchange but, again, only at the  
14       absolute discretion of the exchange itself.

15              Q.       Were there any user agreements  
16       you reviewed where reversal was not only at  
17       the discretion of the exchange?

18              A.       There was only one where the user  
19       could ask for help in helping reverse a trade,  
20       but ultimately it would be up to the exchange,  
21       as far as I can recall, to ensure that  
22       reversal would happen.

23              That one exception, I cannot  
24       remember exactly which one that was, had the  
25       exchange offering to work with the market

1 participants.

2                   However, it is a very fundamental  
3 principle in exchange design that trades are  
4 final as soon as they become binding on  
5 exchanges and that where reversals happen,  
6 these happen on extremely narrow grounds and  
7 only at the discretion of the exchange itself.

8           Q.     When you say "it's a principle of  
9 exchange design," do you mean traditional  
10 exchanges or crypto exchanges or both?

11           A.     Let me start at the broadest  
12 level. It is a fundamental principle of  
13 exchange design that orders, when they match,  
14 become final and binding on the exchange.

15                   That is critical, as detailed in  
16 this report, because without that finality,  
17 market participants cannot rely on their  
18 bargain and cannot then take on any kind of  
19 reliance on that bargain.

20                   And that principle is applied by  
21 traditional exchanges, as cited here in this  
22 report, as well as by cryptocurrency  
23 exchanges, for the most part, as I detail in  
24 this report.

25           Q.     Did you review all of the user

1 agreements that are cited in your Appendix B?

2 MS. ZORNBERG: Objection. Asked  
3 and answered.

4 You can answer again.

5 A. I reviewed all of the user  
6 agreements for Table A exchanges minus  
7 Bitlish.

8 Q. Let's turn to the first sentence  
9 of paragraph 65 on page 34. You write:

10 "Per many of the terms of service  
11 that I reviewed, cryptocurrency  
12 exchanges appear to use the common order  
13 matching conventions seen in traditional  
14 financial exchanges to create binding  
15 finality for offers entering an exchange  
16 once they match on the exchange in  
17 accordance with exchange rules."

18 Do you see that?

19 A. I do, yes.

20 Q. Can you tell me what you mean by  
21 the phrase "appear to use"?

22 A. Yes, it's the fact that I'm  
23 looking at the user agreements, and based off  
24 the user agreements, that's what I understand  
25 those order matching conventions to be.

1 Q. The first sentence of paragraph

2 66 on page 35. Do you see that? It says:

3 "This order matching process and  
4 the finality of trades is further  
5 corroborated by industry participants'  
6 understanding of how trades are executed  
7 on cryptocurrency exchanges."

8 Do you see that?

9 A. I do, yes.

10 Q. What's your basis for your  
11 knowledge of what industry participants'  
12 understanding is of how trades are executed on  
13 cryptocurrency exchanges?

14 A. For example, as stated in the  
15 report, I relied on the testimony of  
16 Mr. Cristian Gil for his understanding as a  
17 longtime market participant in the  
18 cryptocurrency industry.

19 Q. Is there any other basis for your  
20 knowledge other than Mr. Gil's testimony?

21 A. The user agreements that are  
22 being signed by the customers of  
23 cryptocurrency exchanges presumably would  
24 match and create an understanding on their  
25 part as to what they expect the exchange to

1 deliver for them.

2 In addition, cryptocurrency  
3 exchanges, as detailed in this report, are  
4 conducting very high trade volumes. Without  
5 those trade volumes having -- without trades  
6 being binding, those volumes would be -- users  
7 would not be attracted to those exchanges if  
8 they did not -- if they could not rely on the  
9 finality of their trades.

10 Q. Do you have any basis to believe  
11 that traders on cryptocurrency exchanges  
12 actually read the user agreements of those  
13 exchanges?

14 MS. ZORNBERG: Object to form.

15 A. I'm sorry. I don't really  
16 understand the question.

17 Q. I understood your last answer to  
18 be based, in part, on traders' review of  
19 cryptocurrency exchanges' user agreements.

20 So my question is whether or not  
21 you have any -- strike that.

22 Do you have any basis to believe  
23 that traders on cryptocurrency exchanges  
24 actually read those user agreements of those  
25 exchanges?

1           A.     I mean, I can't say for sure. I  
2     can't speak to every trader everywhere.  
3     However, the user agreements certainly  
4     stipulate some very clear requirements that  
5     are demanded of users.

6                     For example, in many of the user  
7     agreements I reviewed here, it demands that a  
8     user get a wallet that is particular to that  
9     exchange, that that user then fill that wallet  
10    with a certain amount of value.

11                    So I would imagine that user  
12    agreements would have to -- users would have  
13    to reflect and think and read that agreement  
14    in order to know what to do when they -- when  
15    they naturalize themselves on a cryptocurrency  
16    exchange.

17           Q.     Do you have any basis to believe  
18    that a trader on a cryptocurrency exchange  
19    would read the entire user agreement of that  
20    exchange?

21                   MS. ZORNBERG: Objection.

22           A.     I really can't speak to every  
23    trader everywhere. It would be certainly in  
24    the trader's interest to read those user  
25    agreements because it sets out the obligations

1 of traders.

2 In addition, the user agreements  
3 also sets out the kind of conduct that is  
4 expected of traders and the punishment that  
5 may arise if that conduct is not observed.

6 Moreover, these user agreements  
7 are, for the most part, clearly written  
8 generally. They're not particularly long  
9 generally.

10 And so they do appear to be  
11 amenable to being easily read by folks using  
12 the exchange.

13 Q. Are you expressing an opinion  
14 here that traders on cryptocurrency exchanges  
15 actually do read those exchanges' user  
16 agreements?

17 A. I'm not expressing that opinion.

18 Q. Okay. Paragraph 68 on page 37.  
19 Near the bottom of the paragraph, you  
20 reference trading on Bittrex.

21 Do you see that?

22 A. Which part? I'm sorry.

23 Q. Say, the bottom half of paragraph  
24 68 discusses Bittrex?

25 A. Okay.



1 Q. And you reference that Bittrex  
2 offers customers both on-chain and off-chain  
3 settlement options. Is that correct?

4 A. Yes.

5 Q. Okay. Was XRP traded on Bittrex?

6 A. I believe so.

7 Q. Do you know whether any of the  
8 XRP traded on Bittrex was traded using  
9 on-chain settlement?

10 A. I don't know.

11 Q. Turning to page -- the next page,  
12 page 38 and paragraph 69. The first sentence  
13 is:

14 "The fact that transactions are  
15 executed instantaneously and are final  
16 following matching is supported by the  
17 understanding of market participants."

18 Do you see that?

19 A. I do.

20 Q. And right after that sentence,  
21 you again cite Mr. Gil's testimony.

22 Do you see that?

23 A. I do.

24 Q. Do you have any basis for your  
25 conclusion about the understanding of market

1 participants other than Mr. Gil's testimony?

2 A. Going back to my earlier answer,  
3 it is a core and fundamental principle of  
4 exchange design that transactions become final  
5 as soon as they're matched. Without that,  
6 transaction functions would be extremely  
7 diminished in quality.

8 Q. And focusing just on market  
9 participants' understanding of that principle,  
10 do you have any basis, other than Mr. Gil's  
11 testimony, for your belief that market  
12 participants understand that?

13 MS. ZORNBERG: Objection. Asked  
14 and answered.

15 You can answer again.

16 A. Again, it is a core principle of  
17 exchange design that transactions become final  
18 once they're matched and become binding.

19 As noted earlier, that is set out  
20 in many user agreements and reflected in the  
21 fact that users are assenting to these user  
22 agreements.

23 Q. I'm sorry, I didn't hear that  
24 word. Users are what?

25 A. Assenting.

1           Q.     When you say "assenting," can you  
2 tell me what --

3           A.     Agreeing to.

4           Q.     How do users reflect their  
5 agreement -- their -- with the user  
6 agreements?

7           A.     I'm sorry?

8           Q.     How, if at all, do users --  
9 strike that.

10                   How, if at all, do traders on  
11 cryptocurrency exchanges reflect their  
12 agreement with user agreements?

13                   MS. ZORNBERG: Object to form.

14           A.     It's my understanding that a user  
15 agreement has to be completed by a user before  
16 they're able to access exchange services on a  
17 cryptocurrency exchange.

18           Q.     Did you read the entirety of  
19 Mr. Gil's deposition testimony?

20           A.     I did.

21           Q.     Did Mr. Gil speak to the physical  
22 location of matching agents on cryptocurrency  
23 exchanges?

24                   MS. ZORNBERG: Objection.

25           A.     I can't recall. I'm sorry.

1 MR. SYLVESTER: I think this is  
2 probably a good time for a break if that  
3 works for you.

4 MS. ZORNBERG: Of course.

5 MR. SYLVESTER: Okay. Let's go  
6 off the record.

7 THE VIDEOGRAPHER: The time now  
8 is 1:38 p.m. This concludes Media 4.  
9 Off the record.

10 (Lunch recess taken from  
11 1:38 p.m. to 2:27 p.m.)

12 (Continued on the next page.)

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1 A F T E R N O O N S E S S I O N

2 - - -

3 (Time noted: 2:27 p.m.)

4 - - -

5 THE VIDEOGRAPHER: The time now  
6 is 2:27. This begins Media 5. On the  
7 record.

8  
9 Y E S H A Y A D A V, resumed and testified

10 further as follows:

11 CONTINUED EXAMINATION

12 BY MR. SYLVESTER:

13 Q. Professor, can we look at  
14 paragraph 71 of your report on page 39. The  
15 first sentence of paragraph 71 says:

16 "I have been asked to provide an  
17 opinion on whether offers to buy and  
18 sell cryptocurrencies like XRP, trading  
19 on an exchange, take place on the  
20 exchange itself or elsewhere."

21 My first question is: Is your  
22 opinion limited to offers to buy and sell XRP  
23 on an exchange?

24 MS. ZORNBERG: Objection. Asked  
25 and answered.

1                   You can answer.

2                   A.     My opinion is limited to offers  
3     to buy and sell cryptocurrencies trading on an  
4     exchange.

5                   Q.     The last portion of that sentence  
6     says "take place on the exchange itself or  
7     elsewhere."

8                   Do you see that?

9                   A.     I do.

10                  Q.     When you say "elsewhere," what do  
11     you mean by that? Where else could offers or  
12     trades on an exchange happen?

13                  MS. ZORNBERG: Object to form.

14                  A.     Perhaps they might happen off  
15     exchange.

16                  Q.     When you say "off exchange," can  
17     you explain what you mean by that?

18                  A.     It can reference any number of  
19     different market structure possibilities.

20                  Q.     Can you give me an example?

21                  A.     For example, over-the-counter  
22     bilateral trades happen off exchange.

23                  Q.     Okay. The next sentence says:

24                         "Based on my research and  
25     experience, I conclude that offers to

1           buy and sell cryptocurrencies take place  
2           on an exchange and become binding trades  
3           as soon as they are matched within the  
4           books and records of the exchange in  
5           accordance with the rules of the  
6           exchange."

7                   Do you see that?

8           A.     Yes.

9           Q.     On what research is that  
10          conclusion based?

11          A.     That is based on my general body  
12          of research, my work experience in  
13          professional practice, as well as specific  
14          research material that I reference in this  
15          report.

16          Q.     Okay. Is there a distinction  
17          between research and experience in that  
18          sentence?

19          A.     For example, I have had  
20          professional experience during which time I  
21          was involved, as part of legal practice, in  
22          advising on matters relating to exchanges,  
23          clearinghouses, and other market  
24          infrastructure providers.

25          Q.     Is any of the experience that you

1 just discussed related to cryptocurrency  
2 exchanges?

3 A. That experience happened in  
4 the -- at a time when cryptocurrency exchanges  
5 weren't around.

6 Q. Do you have any professional  
7 experience relevant to -- strike that.

8 Do you have any professional  
9 experience related to cryptocurrency exchanges  
10 that's encompassed within your reference to  
11 experience in paragraph 71?

12 A. So the --

13 MS. ZORNBERG: Object to form.

14 You can answer.

15 THE WITNESS: Sorry.

16 A. So the experience that I have in  
17 professional practice included frequently  
18 advising on and studying matters relating to  
19 exchange design, transactions, payment  
20 finality, and so forth.

21 In addition, the work that I was  
22 doing as part of practice, as detailed in the  
23 CV, also looked at payment services providers  
24 and innovation in payment services.

25 Work in relation to



1 cryptocurrencies and cryptocurrency exchanges  
2 is a very natural extension of the work that I  
3 did in professional practice. That was  
4 examining issues of exchange design, order  
5 submission, settlement, finality, and risk  
6 management.

7 As noted in this report, many  
8 practices that are deployed by cryptocurrency  
9 exchanges borrow heavily from existing  
10 paradigms in traditional market design.

11 And that work I did extensively  
12 throughout practice in my legal practice as  
13 well as studied it as part of my research  
14 thoroughly over this last decade.

15 Q. Just focusing on your legal  
16 practice, did any of that touch on matters  
17 related to cryptocurrency exchanges?

18 MS. ZORNBERG: Object to form.

19 A. That was at the time prior to  
20 when cryptocurrencies were around, if one  
21 takes Satoshi Nakamoto's 2008 paper as  
22 potentially an origin point.

23 However, the experience that I  
24 gleaned as part of that professional practice  
25 provides a very natural foundation for

1 studying and analyzing the operations of  
2 cryptocurrency exchanges.

3 Q. I think I follow what you're  
4 saying, but I just want to make sure I  
5 understand.

6 So none of your professional  
7 experience had to do with cryptocurrency  
8 exchanges, but it -- your professional  
9 experience nevertheless informs your view in  
10 the report?

11 A. It --

12 MS. ZORNBERG: Object to --  
13 object to form.

14 Q. Is that fair?

15 A. My professional experience  
16 informs my research and understanding of  
17 cryptocurrency exchanges.

18 In addition, I would highlight my  
19 policy experience that I've engaged in over  
20 the last -- over a period of years, for  
21 example, in relation to work with the CFTC,  
22 where there has been discussion and  
23 examination of various cryptocurrency-related  
24 technologies.

25 Q. Other than your policy work, what

1 professional experience do you have strictly  
2 related to cryptocurrency exchanges?

3 MS. ZORNBERG: I have a standing  
4 objection to the word "professional,"  
5 because I don't know if you mean law  
6 firm or something broader.

7 Q. Do you have an understanding of  
8 what I mean by "professional experience"?

9 A. My teaching and research  
10 experience, if that -- I mean, I consider that  
11 to be my professional experience as well.

12 And in that regard, in addition  
13 to my practice work at Clifford Chance, which  
14 provided a very granular understanding of  
15 exchange design, I was advising very  
16 frequently various market participants in  
17 relation to issues pertaining to exchanges,  
18 clearinghouses, finality, risk management, on  
19 a cross-border basis.

20 I worked extensively, as noted  
21 earlier, with the European Payments Council in  
22 relation to developing rules and processes for  
23 payment services on a Pan-European level.  
24 Those -- that scheme, that governance  
25 structure is still there today.

1                   My professional experience in the  
2           academic context includes extensive teaching.  
3           I have taught -- I have taught  
4           cryptocurrencies as part of my courses in  
5           relation to financial markets innovation.  
6           Currently I'm teaching a seminar on  
7           cryptocurrencies that is focused exclusively  
8           on cryptocurrencies.

9                   In addition, of course, I'm  
10          researching cryptocurrencies extensively as  
11          part of my research agenda.

12                  Q.       When you were in private  
13          practice, were any of your clients  
14          cryptocurrency exchanges?

15                  A.       When I was in private practice?  
16          At what time? When were you -- which practice  
17          are you referring to?

18                  Q.       It doesn't matter for the scope  
19          of my question. Any time you were in private  
20          practice, were any of your clients  
21          cryptocurrency exchanges?

22                       MS. ZORNBERG: Object to form.

23                  A.       So when I was in private practice  
24          in Clifford Chance in London, it would have  
25          been impossible to have clients relating to

1 cryptocurrency exchanges, as that technology  
2 did not exist as I understand it.

3           However, I did have, as noted,  
4 plenty of clients that related to various  
5 aspects of different exchange functions.  
6 So -- and including clearing and settlement  
7 systems, and obviously in relation to payment  
8 systems as well.

9           Q.     Okay. But you've never had a  
10 client that actually was a cryptocurrency  
11 exchange?

12           MS. ZORNBERG: Objection. Asked  
13 and answered.

14           A.     No, I haven't.

15           Q.     Okay. The last sentence of  
16 paragraph 71 says:

17           "Therefore, both offers and  
18 trades occur on the exchange and at the  
19 geographic location of the exchange."

20           Do you see that?

21           A.     I do.

22           Q.     Okay. What do you mean by "the  
23 geographic location of the exchange"?

24           A.     I mean where the exchange is  
25 located.

1           Q.     How does one make the  
2     determination where an exchange is located?

3           A.     In my opinion, I set out four  
4     indicia that I considered to be the core  
5     indicia for determining the location of a  
6     cryptocurrency exchange.

7           Q.     Did you create those core  
8     indicia?

9           A.     I did.

10          Q.     Do you believe that those core  
11     indicia are generally accepted in your field  
12     as authoritative on determining the location  
13     of a cryptocurrency exchange?

14          A.     This is a new issue. The  
15     criteria that I set out reflects what I  
16     consider to be an informed understanding of  
17     what I would imagine researchers in my field  
18     would consider to be eminently reasonable and  
19     correct as a way of identifying four core  
20     criteria that would be dispositive in  
21     determining the location of a cryptocurrency  
22     exchange.

23          Q.     Do you know one way or another  
24     whether researchers in your field do consider  
25     your criteria to be eminently reasonable and

1 correct?

2 MS. ZORNBERG: Object to form.

3 A. I've put forward these indicia in  
4 this opinion. It's a new area. I have made  
5 an attempt to put out four core indicia that I  
6 consider to be very logical, very reasonable,  
7 well-founded, that would govern and provide a  
8 credible understanding of where an exchange is  
9 located.

10 This is a new issue. I believe  
11 if researchers in my field were to have a look  
12 and consider this opinion, I imagine that they  
13 would be very supportive of the reasoning and  
14 the logic that is put forward in this opinion  
15 with respect to these indicia.

16 Q. Did you consult with any of the  
17 researchers in your field when forming your  
18 indicia?

19 A. I did not. However, I have  
20 relied on my extensive professional  
21 experience, including legal practice, legal  
22 research, and teaching as well in the area of  
23 cross-border payments and cross-border  
24 banking, to determine what I consider to be  
25 four core indicia for determining the location

1 of a cryptocurrency exchange.

2 Q. To your knowledge, are any of the  
3 researchers in your field aware of the four  
4 indicia that you've selected to determine the  
5 location of a cryptocurrency exchange?

6 MS. ZORNBERG: Object to form.

7 A. I do not believe so. This  
8 opinion is confidential as far as I  
9 understand.

10 Q. Have you ever read any academic  
11 literature setting forth the four criteria  
12 that you selected for determining the location  
13 of a cryptocurrency exchange?

14 A. I have not but this is a new  
15 issue. And my opinion provides an attempt to  
16 set out four core indicia that I feel  
17 is -- that I feel are logical, reasonable, and  
18 well founded.

19 Q. Is it fair to say that because  
20 this issue is so new, your four indicia could  
21 not possibly be generally accepted in your  
22 field yet?

23 MS. ZORNBERG: Object to form.

24 A. I disagree. I feel that the  
25 indicia that I provided here is based on



1 extensive professional experience that comes  
2 from a very close interaction with the  
3 exchange industry, advising on issues with  
4 respect to the cross-border migration of  
5 value, capital, cash securities, assets  
6 elsewhere, and dealing with where the location  
7 of transactions may be and firms in that  
8 context.

9 Furthermore, at the World Bank, I  
10 was involved extensively in relation to  
11 thinking about issues pertaining to  
12 international insolvencies, thinking about  
13 where assets might be located, where  
14 jurisdiction might be established, for the  
15 purposes of international insolvencies.

16 As far as my research is  
17 concerned, I have worked extensively on issues  
18 relating to cross-border finance,  
19 international standard setting in that regard.

20 And so the indicia that I provide  
21 here is based on an understanding of what four  
22 core factors would be that would be supported  
23 by that research and experience.

24 And so I believe that researchers  
25 in my field would be supportive of the

1 conclusions I draw here.

2 Q. But there's no way to know for  
3 sure because they're not aware of your  
4 conclusions that you draw here. Correct?

5 MS. ZORNBERG: Objection. Asked  
6 and answered.

7 A. I don't believe the opinion's  
8 been seen. I believe it's a confidential  
9 opinion.

10 Q. Okay. Can we go back to the end  
11 of paragraph 33 which is on page 18. Can you  
12 explain to me -- strike that.

13 Professor, do you see at the end  
14 of paragraph 33 where you write:

15 "In this way, the 'floor' or  
16 'pit' is now very much electronic and  
17 essentially dematerialized."

18 Do you see that?

19 A. (Document review.)

20 Yes.

21 Q. Can you reconcile for me your  
22 view that the trading function of an exchange  
23 is essentially dematerialized with your  
24 conclusion that an exchange has a geographical  
25 location, as reflected at the end of paragraph

1 71?

2 MS. ZORNBERG: Object to form.

3 You can answer.

4 A. The opinion sets out four  
5 criteria that are indicative of the location  
6 of an exchange. Those four criteria provide  
7 an understanding of what the institutional  
8 existence of an exchange is. They provide and  
9 link to the governance, the processes, the  
10 rules of an exchange.

11 And so that is very much  
12 consistent with the fact that an exchange runs  
13 a electronic trading operation.

14 Q. And the electronic trading  
15 operation is the part that's dematerialized in  
16 your view. Is that correct?

17 A. The electronic trading operation,  
18 parts of it may be very physical. They may  
19 involve bricks and mortar, computers at the  
20 exchange.

21 Q. Servers? Sorry.

22 A. So they may involve physical  
23 aspects. "Dematerialized" refers to the fact  
24 of electronic trading.

25 Q. And just to follow up, that

1 electronic trading operation would also  
2 involve servers, too. Correct?

3 A. Coming back to my earlier answer,  
4 a part of that operation, the matching of one  
5 byte with another, b-y-t-e, with another, at  
6 some point would likely involve the operation  
7 of some server.

8 However, that trade process is  
9 much bigger and deeper than the simple  
10 mechanical matching of one byte, b-y-t-e, with  
11 another.

12 Q. Is a trade final when -- strike  
13 that.

14 Is a trade final upon the simple  
15 mechanical matching of one byte with another  
16 if the one byte on the one side is an offer to  
17 buy and the other byte on the other side is an  
18 offer to sell?

19 A. When trades match, they becoming  
20 binding in accordance with the rules and  
21 processes of an exchange.

22 Q. And I'm asking about when -- what  
23 moment in time. So when the offer to buy byte  
24 and the offer to sell byte meet somewhere, is  
25 that the moment in which the trade is

1 finalized?

2 MS. BUNTING: Objection.

3 MS. ZORNBERG: Object to form.

4 Q. You can answer.

5 A. So that matches. However, that  
6 also has to be recognized as matched by the  
7 exchange. So the exchange has to validate  
8 that matching.

9 It's not simply the case that one  
10 electron interacts with another electron in  
11 space. The exchange has to give it form. And  
12 the exchange has to validate that interaction  
13 with its own rules and processes to determine  
14 whether that electron matching was done in a  
15 valid way in accordance with the exchange's  
16 rules and processes.

17 Q. So it's your view that the trade  
18 is finalized at some moment in time past the  
19 matching of the offer to buy byte and the  
20 offer to sell byte?

21 MS. ZORNBERG: Objection.

22 A. The point I'm making is  
23 conceptual. The conceptual point I'm making  
24 here is that the electron matching of one  
25 electron with another isn't sufficient.

1                   The exchange has to be present in  
2           its rules and processes to validate that  
3           matching is providing a binding trade on the  
4           platform of the exchange.

5                   Q.       Okay. Let me pose a  
6           hypothetical. If I'm sitting at my computer  
7           and I enter a keystroke in which I offer to  
8           buy on a cryptocurrency exchange, in your  
9           view, is the trade final?

10                   MS. BUNTING: Objection.

11                   A.       No.

12                   Q.       Okay. What needs to happen next?

13                   A.       So once you've submitted an order  
14           to buy, where has that -- where have you  
15           submitted that order?

16                   Q.       Let's say Binance.

17                             (Stenographer clarification.)

18                   A.       So once you've submitted that  
19           order into the -- Binance's order submission  
20           system, that order has to then -- that  
21           instruction, rather, has then to be turned  
22           into an order.

23                             So the instruction that you gave  
24           into the Binance order submission system then  
25           has to be digested by that order submission

1 system, vetted, validated, and then it enters  
2 the matching engine of Binance, whereupon it  
3 may match with another corresponding offer.  
4 And as and when that happens, a trade becomes  
5 final.

6 Q. When after the matching of my  
7 offer to buy with the offer to sell does the  
8 trade become final?

9 A. Ideally, that process should  
10 happen as soon as possible afterwards.

11 Q. Let me ask a better question.  
12 What has to happen after my offer  
13 to buy and the other person's offer to sell  
14 match in order for the trade to become final?

15 A. As soon as it matches, the  
16 exchange determines that it's final. But that  
17 matching process is set up in such a way that  
18 the orders that are coming into the exchange  
19 are vetted and validated as orders recognized  
20 by the exchange's order submission system.  
21 Once that's done, those orders match and they  
22 become final.

23 Q. So if the exchange's rules are  
24 such that the trade becomes final on matching,  
25 then the moment in time it becomes final is

1       when my offer to buy meets the other person's  
2       offer to sell?

3               A.       As soon as possible afterwards.

4               Q.       Okay. Turning back to paragraph  
5       71, you use the word "offer" in the -- strike  
6       that.

7                       You use the word "offer"  
8       throughout paragraph 71.

9                       In that paragraph, are you  
10      offering any opinion on the meaning of the  
11      term "offer" under the Securities Act of 1933?

12              A.       I am not.

13              Q.       Okay. And when you use the word  
14      "offer," are you intending to use it  
15      co-extensively with the meaning of the word  
16      "offer" under the Securities Act of 1933?

17                      MS. ZORNBERG: Objection. Asked  
18      and answered.

19                      Are you specific to paragraph 71  
20      still?

21                      MR. SYLVESTER: Yes.

22              A.       I am not.

23              Q.       Okay. Is there any place in your  
24      report where you use the word "offer" and you  
25      intend it to be co-extensive with the meaning



1 of the term "offer" in the Securities Act of  
2 1933?

3 A. I do not.

4 Q. Okay. Is it your opinion that in  
5 the case of each unit of XRP offered by  
6 defendants, defendant's offer was limited to  
7 the entry of a buy-or-sell order on a  
8 cryptocurrency exchange?

9 MS. ZORNBERG: Objection.

10 A. I'm sorry. Can you repeat the  
11 question.

12 Q. Sure. Is it your opinion that in  
13 the case of each unit of XRP offered by  
14 defendants, defendants' offer was limited to  
15 the entry of a buy-or-sell order on a  
16 cryptocurrency exchange?

17 MS. ZORNBERG: Objection.

18 A. My opinion here --

19 MS. ZORNBERG: Outside the scope.

20 THE WITNESS: Sorry.

21 A. My opinion here relates to the  
22 question about how offers to buy and sell  
23 cryptocurrencies in exchange are made and  
24 become final and where the exchange is then  
25 located.

1 Q. As part of your work on your --  
2 strike that.

3 As part of forming your expert  
4 opinion, did you consider the geographic  
5 location where orders to buy or sell XRP were  
6 placed?

7 MS. ZORNBERG: Object to form.

8 A. I'm sorry, could you repeat the  
9 question.

10 Q. Sure. As part of your work  
11 forming your opinion, did you consider the  
12 geographic location where orders to buy or  
13 sell XRP were placed?

14 MS. ZORNBERG: Object to form.

15 A. In forming my opinion, I  
16 considered the microstructural processes for  
17 submitting orders to an exchange in order to  
18 determine how these microstructural processes  
19 operate to make the offer to buy and sell a  
20 cryptocurrency final on a cryptocurrency  
21 exchange.

22 Q. Can you define "microstructural  
23 processes" as you just used it in your answer?

24 A. Sure. There's no defined term as  
25 such with respect to microstructure; however,

1 broadly speaking, this refers to the detailed  
2 processes, operational processes by which  
3 trades happen and value moves within an  
4 exchange.

5 Q. As part of forming your opinions  
6 set forth in your report, did you consider  
7 where the -- a person submitting an offer to  
8 buy or sell on an exchange was physically  
9 located?

10 A. What I considered in my opinion  
11 was how offers to buy and sell a  
12 cryptocurrency are made in order for these  
13 offers to be valid orders on an exchange that  
14 become binding on that exchange.

15 As part of that process, I  
16 detailed the order submission processes that  
17 allow orders to be made and become valid and  
18 binding for trades to take place on an  
19 exchange.

20 Q. In your view and in your opinion,  
21 is there any relevance to where an individual  
22 trader is located in the world when he or she  
23 places an order on an exchange?

24 A. What do you mean by "place an  
25 order"?

1 Q. Let's go back to my example.

2 Let's go back to the hypothetical. I'm going  
3 to place an order on Binance. Two  
4 hypotheticals. In one, I'm sitting here in  
5 New York City. Another one, I'm sitting in  
6 London.

7 Does the difference between my  
8 physical location in placing an offer to buy  
9 on Binance have any relevance whatsoever to  
10 your opinion about where an order takes place?

11 A. No.

12 MS. ZORNBERG: Objection -- I'm  
13 going to object to the form, although  
14 the witness answered.

15 Q. And as part of forming your  
16 opinions in this case, did you consider the  
17 geographic location that title passed in  
18 transactions involving the purchase or sale of  
19 XRP?

20 MS. ZORNBERG: Object to form.

21 A. Could you repeat the question.

22 Q. Sure. In forming your opinions  
23 in this case, did you consider the geographic  
24 location that title passed in transactions  
25 involving the purchase or sale of XRP?

1 MS. ZORNBERG: Same objection.

2 A. The purchase and sale of XRP. In  
3 what context are you discussing this?

4 Q. The purchase of XRP on  
5 cryptocurrency exchanges.

6 A. Could you repeat the question  
7 again.

8 Q. Sure.

9 MS. BUNTING: Could you slow it  
10 down a bit, Mark. It's just a bit fast.

11 MR. SYLVESTER: Sure.

12 Q. In forming your opinions in this  
13 case, did you consider the geographic location  
14 that title passed in transactions involving  
15 the purchase or sale of XRP on cryptocurrency  
16 exchanges?

17 A. My --

18 MS. ZORNBERG: Objection.

19 A. -- opinion, I looked at how  
20 offers to buy and sell cryptocurrencies are  
21 made on an exchange, how they become final in  
22 the exchange, final and binding on the  
23 exchange, and where the exchange is located.

24 Q. Is it of any relevance to your  
25 opinion where title is passed in a sale on a

1 cryptocurrency exchange?

2 MS. ZORNBERG: Objection.

3 A. Could you repeat the question  
4 again.

5 Q. Sure. Is it of any relevance to  
6 your opinion where title is passed for any  
7 given sale on a cryptocurrency exchange?

8 A. No.

9 Q. Okay. Is it -- was it of any  
10 relevance to your expert opinion the  
11 geographic location in which payment was  
12 exchanged for any transaction that occurred on  
13 a cryptocurrency exchange?

14 MS. ZORNBERG: Object to form.

15 A. So in looking at the question of  
16 how offers to buy and sell cryptocurrencies  
17 are made on an exchange and become binding on  
18 the exchange and its location, I -- it's not  
19 relevant to my opinion regarding payment.

20 Q. Was it of any relevance to your  
21 opinion -- strike that.

22 Was the geographic location of  
23 any contracts for the purchase or sale of a  
24 digital asset of any relevance to your opinion  
25 in this case?

1           A.     I'm not sure what you mean by  
2     that.

3           Q.     Under the user agreements you  
4     reviewed, at some point, a trader on a  
5     cryptocurrency exchange becomes bound  
6     to -- strike that.

7                     Is there a point in a  
8     cryptocurrency transaction in which a trader  
9     becomes bound to -- becomes bound to his offer  
10    to buy or sell?

11                    MS. ZORNBERG: On an exchange?

12                    MR. SYLVESTER: On an exchange.

13           A.     Well, yes. When the orders to  
14     buy and sell match, that transaction becomes  
15     binding on the participants that submit that  
16     order.

17           Q.     Was where the orders to buy and  
18     sell match of any relevance to you in  
19     determining where a cryptocurrency exchange  
20     was located for purposes of your opinion?

21                    MS. ZORNBERG: Object to form.

22           A.     In my opinion, orders to buy and  
23     sell are matched by the exchange and on the  
24     exchange. And so they happen at the location  
25     of the exchange, as set out in this opinion.

1           Q.     In your opinion, is it possible  
2     for parties to trade on an exchange and become  
3     bound to the transaction at two separate times  
4     or locations?

5           A.     In my opinion, parties become  
6     bound to the transaction once orders to buy  
7     and sell the cryptocurrency are made on the  
8     exchange and made binding by the exchange in  
9     accordance with its rules and processes and at  
10    the geographic location of the exchange.

11          Q.     Did any of the user agreements  
12    that you reviewed in connection with your work  
13    on this case expressly state where trades of  
14    digital assets occur?

15          A.     I'm not sure what you mean by  
16    that.

17          Q.     Did any of the user agreements  
18    that you reviewed in this case state, "The  
19    trades on this exchange occur in," and then  
20    name a jurisdiction?

21          A.     Many of the user agreements that  
22    I reviewed, most of them, had some kind of  
23    governing law provision attached to it. And  
24    that governing law provision would govern  
25    presumably whatever rule book and terms of



1 services apply to the parties that are  
2 transacting on the exchange.

3 Q. I'm asking something a little  
4 narrower, though, just about your review of  
5 the words that are in the user agreements.

6 Did any of those user agreements  
7 expressly state, "The trades on our exchange  
8 take place in X jurisdiction"?

9 A. I can't recall.

10 Q. If you had seen those words or  
11 language similar to that in a user agreement,  
12 do you think you would have put that in your  
13 report?

14 MS. ZORNBERG: Objection.

15 A. Yes.

16 Q. Why?

17 A. May be a consideration to think  
18 about.

19 Q. Let's look at paragraph 77,  
20 please. I'm looking at the bottom of -- the  
21 portion of 77 that's on page 42, starting with  
22 "In other words, parties do not generally  
23 know."

24 Do you see where I am? It's the  
25 last, say, five lines of paragraph 77 on page

1 42.

2 A. (Document review.)

3 Okay.

4 Q. You write:

5 "In other words, parties do not  
6 generally know in advance with whom they  
7 are trading. They cannot submit an  
8 offer with the express aim of trading  
9 with a specific party on the other side.  
10 It seems extremely unlikely that  
11 cryptocurrency exchanges would depart  
12 from this model."

13 Do you see that?

14 A. Yes.

15 Q. Do you know one way or another  
16 whether or not cryptocurrency exchanges  
17 actually do depart from this model?

18 A. Whether they do?

19 Q. Mm-hmm.

20 MS. ZORNBERG: Object to form.

21 A. Candidly, it would be unthinkable  
22 and possibly create a venue that is rife with  
23 manipulation if they did. So in my mind, any  
24 exchange that did would be a completely  
25 disreputable exchange.

1           Q.     Be that as it may, sitting here  
2     today, do you know whether or not any  
3     cryptocurrency exchanges actually do depart  
4     from this model?

5           A.     I can't say for sure. I would be  
6     shocked if they did. In the user agreements  
7     that I looked at, there were at least two,  
8     DigiFinex and BitMax, whose language made  
9     clear that trading in these spaces is  
10    anonymous.

11                   It is a absolutely cardinal rule  
12    of traditional marketplaces, modern electronic  
13    marketplaces, that pretrade anonymity be  
14    sacrosanct.

15                   Given how deeply cryptocurrency  
16    exchanges borrow from traditional rules and  
17    processes of traditional exchanges, and  
18    particularly given how important this  
19    principle is, especially arguably in the  
20    context of cryptocurrencies, I would be truly  
21    shocked if an exchange, cryptocurrency  
22    exchange, did not have pretrade anonymity as  
23    part of its offering.

24           Q.     Understood. But do you know one  
25    way or the other?

1 MS. ZORNBERG: Objection.

2 A. With respect to BitMEX, with  
3 respect to DigiFinex, their rules of service  
4 certainly suggest that transactions are  
5 safeguarding pretrade anonymity.

6 Furthermore, the order submission  
7 processes that are described in the user  
8 agreements that I've reviewed for most of the  
9 exchanges in Table A certainly seem to suggest  
10 that trading there is anonymous.

11 For example, the user -- the  
12 order submission paragraphs do not require  
13 that one specifies a particular party to  
14 transact with. They simply refer to the  
15 placing of a buying and selling order into the  
16 order -- into the order submission system.

17 Q. Let's go to paragraph 83, please.  
18 My question is: Is the question of the point  
19 at which an offer to trade made on an exchange  
20 becomes binding controlled by the contractual  
21 provisions of an exchange's user agreement?

22 A. I'm so sorry. I was just reading  
23 that paragraph.

24 Q. Sure. Did you want to continue?

25 I --

1           A.     If you can give me just two  
2 seconds.

3           Q.     Of course. Go ahead.

4           A.     Thank you.

5                     (Document review.)

6           Q.     So may question was: Is the  
7 question of the point at which an offer to  
8 trade made on an exchange becomes binding  
9 controlled by the contractual provisions of  
10 the user agreement of that exchange?

11          A.     Those are -- those user  
12 agreements stipulate the rules of the road as  
13 between the exchange and the user. The  
14 exchange establishes its order submission,  
15 matching, and finality procedures, and users  
16 agree to be subject to those submission,  
17 matching, and finality procedures.

18          Q.     So is it fair to say that those  
19 user agreements govern the question of when an  
20 offer to trade made on an exchange becomes  
21 binding?

22          A.     They govern the bargain reached  
23 between the exchange and the user to determine  
24 when orders to buy and sell a cryptocurrency  
25 become binding and final on the exchange.

1 Q. Is there anything outside of the  
2 user agreement that is relevant to the  
3 question of when an offer to trade on an  
4 exchange becomes binding?

5 MS. ZORNBERG: Object to form.

6 A. I'm not sure what you mean.

7 Q. We can move on. Looking at the  
8 last two sentences of paragraph 83, you write:

9 "As per my review of various user  
10 agreements, these rules establish, inter  
11 alia, processes and procedures relating  
12 to dispute resolution, governing law,  
13 place of domicile, and incorporation.  
14 In doing so, they also work to tie an  
15 exchange more formally to a geographic  
16 locale as a matter of its operation and,  
17 arguably, also in the expectations of  
18 those that use the venue."

19 Can you explain how the processes  
20 and procedures relating to dispute resolution,  
21 governing law, place of domicile, and  
22 incorporation work to tie an exchange more  
23 formally to a geographic locale as a matter of  
24 its operation?

25 A. So here the terms of service

1 often include a governing law, as set out in  
2 Table A, for the different exchanges. That  
3 governing law can determine any number of  
4 important issues, for example, in relation to  
5 asset distribution, potentially, upon an  
6 exchange's insolvency, for example.

7 And so in so doing, the terms of  
8 service and the procedures that establish  
9 where governing law -- what governing law  
10 applies to that will tie the geographic  
11 location of the exchange more closely to the  
12 exchange's terms of service and its terms of  
13 operation.

14 Q. In the last sentence of paragraph  
15 83, can you explain what you mean by the  
16 phrase "as a matter of its operation"?

17 A. Yes. What I mean in general is  
18 the -- as a part of its institutional  
19 existence.

20 Q. Is there a particular operational  
21 component to its institutional existence that  
22 you're referencing in the last sentence of  
23 paragraph 83?

24 A. What I mean here is that these  
25 user agreements tie the general workings and

1 institutional existence of an exchange more  
2 closely to its geographic location.

3 Q. In your view, does the  
4 understanding of market participants affect  
5 the actual geographic location where trading  
6 platforms match trades?

7 MS. ZORNBERG: Objection. Asked  
8 and answered.

9 You can answer.

10 A. So as set out in Table A, and as  
11 detailed in this opinion, I set out four core  
12 indicia that I believe are credible and  
13 informative in providing an analysis of where  
14 an exchange is located.

15 And one of these criteria  
16 includes the assessment of reasonable market  
17 participants as to where they think an  
18 exchange is located.

19 Q. And does your opinion -- strike  
20 that.

21 Are you offering an opinion on  
22 what reasonable market participants believe as  
23 to the locations of all of the exchanges  
24 listed in your Table A?

25 A. I'm not.



1           Q.     To take, for example, Bitlish,  
2     which appears to be incorporated in the United  
3     Kingdom -- I'm looking at page 61.

4                     Do you see that?

5           A.     Yes.

6           Q.     If, for some strange reason,  
7     everyone who traded on Bitlish thought that  
8     Bitlish was located in the United States,  
9     would that have any bearing on where Bitlish  
10    was actually located?

11          A.     So the four criteria that I set  
12    out here provide a guidepost for determining  
13    the location of an exchange and in determining  
14    whether we can exclude or include the US as a  
15    place where these exchanges may be located.

16                     If one of these criteria were to  
17    refer to the US as a possible location, that  
18    would be a part of thinking about whether the  
19    US could be excluded as a possible location or  
20    included.

21          Q.     So if your average trader thought  
22    Bitlish was located in the United States,  
23    would you then have included Bitlish within  
24    the four that have some indicia of US contact?

25          A.     If market participants believed

1       that Bitlish was located in the United States,  
2       then I could not exclude Bitlish as an  
3       exchange that wasn't located in the United  
4       States. In other words, that would be part of  
5       the four exchanges that have indicia of  
6       location in the US.

7               Q.     Okay. And for all of the  
8       exchanges that are listed in your Table A  
9       what, if anything, did you do to determine  
10      what actual market participants believe as to  
11      where these exchanges are located?

12             A.     In terms of trying to determine  
13      or trying to gauge the perception of market  
14      participants, I looked at credible news  
15      sources to get a sense of where the general  
16      perception of location is likely to be.

17             Q.     What credible news sources did  
18      you review?

19             A.     They are set out here in the  
20      footnotes.

21             Q.     How did you locate these news  
22      sources?

23             A.     I --

24             Q.     Strike that. Actually, I want to  
25      clarify. When you say they're set out here in

1 the footnotes, are you referring to the  
2 footnotes that appear under Table A?

3 A. That's right.

4 Q. Okay. Let me re-ask the  
5 question.

6 How did you locate the news  
7 sources listed on the footnotes under Table A?

8 A. Asked counsel for assistance in  
9 helping collect reputable news articles that  
10 would reference particular exchanges set out  
11 in Table A.

12 I reviewed and checked and went  
13 through these articles to determine if they  
14 provided a credible gauge in my opinion, and  
15 then I -- these were included as part of Table  
16 A's indicia as to the perception of market  
17 participants with respect to each exchange.

18 Q. What instructions, if any, did  
19 you give counsel on how to locate materials  
20 that supplied you with the views of market  
21 participants as to where cryptocurrency  
22 exchanges are located?

23 MS. ZORNBERG: Hold on just a  
24 minute. I just want to consult on a  
25 privilege question.

1 MR. SYLVESTER: Yes, of course.

2 Let's go off the record while you guys  
3 consult, please.

4 THE VIDEOGRAPHER: The time is  
5 3:16 p.m. This concludes Media 5. Off  
6 the record.

7 (Recess taken from 3:16 p.m. to  
8 3:25 p.m.)

9 THE VIDEOGRAPHER: The time now  
10 is 3:25 p.m. This begins Media 6. On  
11 the record.

12 MS. ZORNBERG: Okay. Thank you.  
13 So Mr. Sylvester, we took a short break  
14 in response to your last question  
15 because of concerns so I could consult  
16 with cocounsel about issues that touch  
17 on privilege.

18 And I would just like to make a  
19 proffer to see if it helps us move  
20 forward. If not, we'll take it question  
21 by question, of course.

22 But the proffer is that there was  
23 dialogue by Professor Yadav with counsel  
24 in relation to selecting sources that  
25 she wished to use for her report.

1           Professor Yadav made the  
2           determinations ultimately after viewing  
3           materials about which sources she would  
4           use, and she's testified to her process  
5           for that.

6           The concern touching on privilege  
7           and attorney work product is that the  
8           nature of the dialogue was -- it's  
9           intertwined in a way that I think makes  
10          it difficult for her to answer the  
11          questions -- your question more  
12          specifically without getting into  
13          communications with counsel.

14          So first, let me just ask  
15          Professor Yadav if what I've said in  
16          terms of the proffer about dialogue with  
17          counsel is accurate to your knowledge?

18          THE WITNESS: To my knowledge,  
19          yes.

20          MS. ZORNBERG: So that's the  
21          proffer. I don't know if that helps  
22          you, there was testimony this morning  
23          under questioning by Ms. Stewart about  
24          her process so we can -- beyond that, we  
25          can take it one by one if you'd like.

1 MR. SYLVESTER: That sounds good.  
2 And just for the record, I'm only  
3 concerned with any instructions that the  
4 professor gave to anyone, counsel or  
5 otherwise, performing work on her behalf  
6 to prepare her opinions in this report.  
7 I'm not interested in work product  
8 flowing from counsel to Professor Yadav.  
9 Understanding --

10 MS. ZORNBERG: Yeah.

11 MR. SYLVESTER: I think what  
12 you're saying is that it might be hard  
13 to separate the two.

14 MS. ZORNBERG: That's the issue.

15 MR. SYLVESTER: But maybe I can  
16 ask you the question and see if it's  
17 possible for you to answer, strictly  
18 your instructions to counsel, that  
19 direction.

20 Which I think we both agree it  
21 can't be work product.

22 MS. ZORNBERG: Well, I'm not sure  
23 that it can't be work product. Let me  
24 make the proffer a little bit more  
25 specific. I'll ask professor Yadav to

1 confirm so you understand the nature.

2 MR. SYLVESTER: Okay.

3 MS. ZORNBERG: If the instruction  
4 was a request for the research  
5 assistants to identify and pull together  
6 articles from reputable sources, and  
7 then the dialogue with counsel that  
8 followed was a dialogue surrounding  
9 sources in relation to her request for  
10 assistance, we don't think it's  
11 appropriate for her to get into the back  
12 and forth of that dialogue.

13 And ultimately what came out of  
14 it was a set of materials that she  
15 reviewed to decide what to include or  
16 not include in her report.

17 Professor Yadav, is that a fair  
18 statement?

19 THE WITNESS: That's fair.

20 MR. SYLVESTER: Okay. What I'm  
21 struggling with is just, you know, if  
22 she had asked a research assistant  
23 instead of counsel, then I'd have a  
24 perfect view of exactly the methodology  
25 she conducted that's baked into Table A.

1           And if she asked counsel instead  
2           of a research assistant, it seems like  
3           there's little bit of a black box as to  
4           the methodology. That's, sort of, what  
5           I'm hearing.

6           MS. ZORNBERG: I disagree with  
7           that in the sense that she has  
8           already -- Professor Yadav has already  
9           testified that she sought assistance of  
10          counsel in locating media, public media  
11          sources on the exchanges in Table A.

12          There's been a proffer that  
13          Professor Yadav has confirmed that she  
14          had a dialogue with counsel in relation  
15          to her specific request that they assist  
16          in pulling sources. She's provided  
17          testimony that counsel did, in fact,  
18          pull together a set of materials to give  
19          her for consideration and review.

20          She's testified about her process  
21          of reviewing them. She's testified that  
22          she included it in her report the ones  
23          she found to be credible, and the report  
24          extensively identifies each one of those  
25          media articles.



1 MR. SYLVESTER: Okay. I hear  
2 you. I'm not sure that quite addresses  
3 my concerns. But I think I have a  
4 couple questions that I'll ask and just  
5 see if you're able to answer them.

6 MR. SOLOMON: Hey Mark, if I can  
7 just say it in a slightly different way,  
8 maybe it will help. Probably saying the  
9 same thing.

10 But, you know, she -- if she  
11 relies on facts or assumptions that she  
12 used to form her opinions about that,  
13 that's fair game and you can ask about  
14 that. You can ask about assumptions,  
15 you can ask about facts. Those are not  
16 privileged.

17 But other than facts or  
18 assumptions that she considered or  
19 relied on, we believe that  
20 communications with counsel are  
21 privileged. And those communications  
22 could be compromised by her explaining  
23 to you direction, express direction she  
24 gave to lawyers for Mr. Garlinghouse,  
25 Mr. Larsen, or Ripple in connection with

1 preparation of her report.

2 Now, you're fine asking her  
3 obviously, you know, did you rely on  
4 this? Why would you rely on it? Why  
5 did you think that was credible?

6 But we're just trying to avoid a  
7 situation where she's telling you what  
8 she told lawyers. That would be what we  
9 believe to be privileged communications,  
10 outside of facts and assumptions that  
11 she used in connection with her report.

12 That's our position. And I think  
13 we're going to stick to that position.  
14 So --

15 MR. SYLVESTER: I understand. I  
16 think the use of lawyers in this  
17 particular instance seems to insulate  
18 some questioning from our perspective on  
19 her methodology. That's my view. But  
20 we can take it a couple at a time.

21 MS. ZORNBERG: We'll disagree on  
22 that but ...

23 MR. SYLVESTER: Okay.

24 BY MR. SYLVESTER:

25 Q. So let me ask you this: If it's

1 possible to just isolate instructions you gave  
2 counsel, perhaps at the beginning of the  
3 process, what instructions, if any, did you  
4 give to counsel on how to locate materials  
5 that supplied you with views of market  
6 participants as to where a cryptocurrency  
7 exchange was located?

8 MS. ZORNBERG: Okay. So

9 Professor Yadav, I'm going to instruct  
10 you to answer that question only if you  
11 can do so in a way that is not  
12 intertwined with substantive dialogue  
13 and communications with counsel. In  
14 other words, a back and forth.

15 A. At the very broadest level, I  
16 requested assistance in identifying  
17 information on various exchanges in Table A  
18 from reputable news sources.

19 Q. Did you identify for counsel what  
20 news sources you believed to be reputable?

21 MS. ZORNBERG: Hold it. You can  
22 answer that -- again, I think the  
23 instruction is that you can answer that  
24 if there's a clear yes or no, or  
25 something that you can say that does not

1           involve a dialogue between you and  
2           counsel, sort of a back-and-forth  
3           discussion.

4           A.     Would you repeat the question,  
5           please.

6                     MR. SYLVESTER:   Madam court  
7           reporter, would you mind reading that  
8           back, please.

9                     (Record read by the certified  
10          stenographer as follows:

11                    "QUESTION:   "Did you identify for  
12          counsel what news sources you believed  
13          to be reputable?"

14           A.     On a general level, yes.

15           Q.     How did you determine that the  
16          sources in your report are reputable news  
17          sources on the topic of what market  
18          participants believe as to where  
19          cryptocurrency exchanges are located?

20           A.     So the methodology I used there  
21          was based on my professional judgment, my  
22          research into cryptocurrency markets  
23          generally, my general reading and interest in  
24          this market to consider and identify sources  
25          that I believe to be credible and that are

1       doing well-sourced, thoughtful, nuanced  
2       reporting on how cryptocurrency exchanges  
3       operate and how users interact with these  
4       exchanges.

5               Q.       What criteria did you apply when  
6       determining whether or not a particular news  
7       source was credible?

8               MS. ZORNBERG:   Object to form.

9               A.       So in general, I relied on my own  
10       experience with that news source, reading  
11       about cryptocurrency exchanges in general as  
12       part of my research -- as part of my research,  
13       as part of my teaching.

14               This judgment as to which news  
15       sources I believe to be credible came from  
16       that reading and my experience with absorbing  
17       news from particular sources that I considered  
18       to be especially thoughtful, well resourced,  
19       well sourced, and that appear to be well  
20       connected with the overall conversation in  
21       relation to the cryptocurrency ecosystem.

22               Q.       Were there any sources that you  
23       were presented with that you rejected as  
24       unreliable?

25               A.       I can't recall specifically.

1 Q. Okay. Of the exchanges whose  
2 user agreements you reviewed, are there any  
3 other than Bittrex that use on-chain  
4 settlement?

5 A. I think there may have been one  
6 that uses on-chain settlement, one other one.  
7 I can't exactly remember which one. But if I  
8 can recall, there was one that offers either  
9 the option for on-chain or does settlement  
10 on-chain.

11 Q. Do you know whether -- one way or  
12 the other whether XRP was traded on the  
13 exchange you just described?

14 A. I'm sorry. I have no idea. I  
15 don't know.

16 Q. There are certain user agreements  
17 that you reviewed that provided that, after  
18 the offer and bid are matched, the trade  
19 becomes irreversible. Is that right?

20 A. I'm sorry, could you repeat the  
21 question?

22 Q. Sure.

23 A. Thank you.

24 Q. There are certain user agreements  
25 you reviewed that provide that, after the

1 offer and bid are matched, the trade becomes  
2 irreversible. Is that right?

3 A. That's correct.

4 Q. Were there any user agreements  
5 you reviewed that were in conflict with that  
6 position?

7 A. What the user agreement said, for  
8 the most part, where information existed,  
9 referring to our conversation earlier, where  
10 orders for buying and selling a cryptocurrency  
11 match, the trade becomes final.

12 In certain very, very limited  
13 circumstances, trades may be reversed by the  
14 exchange, in case of a clearly erroneous  
15 transaction, for example, and this provision  
16 was included, for example, in the case of the  
17 Coinbase user agreement, Coinbase Singapore,  
18 as well as the BitMax Singapore user  
19 agreement --

20 Q. Were --

21 A. -- for example.

22 Q. Sorry.

23 Were there any user agreements  
24 that you reviewed that did not specify when  
25 the trade became irreversible?

1 MS. ZORNBERG: Objection.

2 A. Returning to our earlier  
3 discussion, there were some user agreements  
4 that were very basic and did not fully specify  
5 the process involved.

6 Where the process was specified  
7 and mentioned order handling, as far as I can  
8 recall, it was very categorical in stating  
9 that, as soon as orders to buy and sell a  
10 cryptocurrency match, a trade becomes final  
11 and binding and, as far as the customers are  
12 concerned, entirely irreversible.

13 Q. When you say "there were some  
14 user agreements that did not fully specify the  
15 process involved," does that mean that there  
16 were some user agreements that did not  
17 expressly set forth when a trade becomes  
18 irreversible?

19 MS. ZORNBERG: Objection. Asked  
20 and answered.

21 Q. You can answer.

22 A. Okay. As detailed in my earlier  
23 response, there were some user agreements that  
24 were very basic and did not fully specify the  
25 order handling, submission, and finality



1 provisions.

2 Q. Let's look at paragraph 92,  
3 please, on page 50. The sentence I'm looking,  
4 it's mid -- it's, sort of, towards the end of  
5 the paragraph:

6 "As acknowledged by certain user  
7 agreements (e.g., Korbit) transactions  
8 on these exchanges are therefore  
9 never/infrequently published to the  
10 cryptocurrency blockchains."

11 Do you see that?

12 A. (Document review.)

13 That's right, thank you.

14 Q. My question is: Other than  
15 Korbit, did you review any other user  
16 agreements that stated that the transactions  
17 on the exchange would not be published to  
18 cryptocurrency blockchains?

19 A. It was implied in a number of the  
20 user agreements I reviewed. In particular,  
21 the user agreements stated that the  
22 transaction would settle immediately.

23 This was the case, for example,  
24 in the CoinOne exchange service that's  
25 referenced here, in the case of Binance, in

1 the case of Coinbase user agreement, that  
2 the -- for example, that the transaction would  
3 settle immediately upon being matched, and  
4 what this implied was that the clearing and  
5 settlement happened immediately following the  
6 transaction becoming final rather than having  
7 any interaction with an underlying blockchain.

8 Q. What's the -- strike that.

9 How is it that you conclude  
10 that -- strike that.

11 Is there ever a point at which a  
12 cryptocurrency trade on, say, Coinbase is  
13 recorded on the blockchain?

14 MS. ZORNBERG: Object to form.

15 A. As far as I can tell by Coinbase  
16 itself, the settlement happens in-house.  
17 Where interaction with an underlying  
18 blockchain may happen is when a customer  
19 transfers their holdings to an address on an  
20 underlying blockchain.

21 A couple of the user agreements  
22 explicitly allow for this and mention the fact  
23 that they will charge a user for any fees that  
24 arise in relation to a transaction to an  
25 underlying blockchain to transfer value out

1 from an exchange wallet into a wallet on the  
2 underlying blockchain.

3 Q. At the -- let's turn to paragraph  
4 98, please. That's page 53. You  
5 write -- this is the last sentence:

6 "By becoming final and binding  
7 within an exchange and not requiring  
8 settlement on a blockchain, it is my  
9 opinion that transactions become binding  
10 in the geographic location of the  
11 exchange upon which the trades are  
12 made."

13 My question is: What is the  
14 relevance to not requiring settlement on a  
15 blockchain to your opinion set forth that I  
16 just read?

17 A. I'm sorry, what was your  
18 question?

19 Q. What is the relevance of the fact  
20 that settlement on the blockchain is not  
21 required to your opinion set forth in the last  
22 sentence of paragraph 98?

23 A. What I mean here is that the  
24 transactions become valid and binding as soon  
25 as the orders are matched and clearing and

1 settlement takes place by the exchange on the  
2 exchange, and therefore, the location of the  
3 exchange.

4 Q. If the trade required settlement  
5 on a blockchain, how would that affect your  
6 opinion about where the trade took place, if  
7 it would?

8 A. It wouldn't. The trade becomes  
9 binding and valid as soon as orders are  
10 matched on the exchange.

11 Q. Okay. Let's move on to --

12 THE WITNESS: Is it possible to  
13 take a break?

14 MR. SYLVESTER: Do you want to  
15 take a break?

16 THE WITNESS: Would that be okay?

17 MR. SYLVESTER: Sure.

18 Absolutely. Let's go off the record.

19 THE VIDEOGRAPHER: The time now  
20 is 3:43 p.m. This concludes Media 6.  
21 Off the record.

22 (Recess taken from 3:43 p.m. to  
23 4:04 p.m.)

24 THE VIDEOGRAPHER: The time is  
25 4:04 p.m. This begins Media 7. On the

1 record.

2 BY MR. SYLVESTER:

3 Q. Professor, let's turn to  
4 paragraph 99 of your report. That's on page  
5 54. The second sentence starts:

6 "I conclude that for all but four  
7 of the exchanges listed in Table A,  
8 there is no indication that offers are  
9 made on the exchanges in the US or that  
10 trades on these exchanges become final  
11 in the US."

12 Do you see that?

13 A. (Document review.)

14 Okay.

15 Q. Can you please describe the facts  
16 that, in your view, support that conclusion?

17 A. In Table A I set out four indicia  
18 of location that I believe provide a credible  
19 and informative account of where that exchange  
20 is located, and based on those four indicia, I  
21 can exclude or include a particular exchange  
22 from whether or not it is situated in or  
23 outside the United States.

24 Q. Do you see the next sentence:

25 "While a small handful of the

1 exchanges" -- actually, strike that.

2 Are all the facts that underlie  
3 your opinion that I just read in  
4 paragraph 99 set forth in Table A?

5 MS. ZORNBERG: Objection.

6 A. The -- Table A sets out the  
7 application of the four indicia to the  
8 exchanges listed in Table A.

9 Q. And in the application of your  
10 indicia, you concluded that certain facts were  
11 relevant in forming your opinion. Is that  
12 right?

13 A. I concluded that certain indicia,  
14 the four indicia I mentioned, were the indicia  
15 that I looked for in determining the location  
16 of the different exchanges.

17 Q. And you applied those indicia to  
18 each of the exchanges in your Table A. Right?

19 A. Yes.

20 Q. Okay. And the facts that are  
21 relevant to the indicia that you applied to  
22 the 24 exchanges are set forth in Table A.  
23 Correct?

24 MS. ZORNBERG: Objection.

25 A. Table A --

1 Q. Go ahead.

2 A. Table A sets out references that  
3 speak to where -- to what these indicia are  
4 with respect to each of the exchanges listed  
5 in Table A.

6 Q. Okay. Let's look at Table A.  
7 Let's just start on page 59, please.

8 Do you see the first row on Table  
9 A says "Binance"?

10 A. Yes.

11 Q. Okay. Are there any other facts  
12 about Binance that are relevant to your  
13 conclusions set forth in paragraph 99 that are  
14 not listed in Table A?

15 A. Table A identifies and lists the  
16 four key indicia that I conclude are essential  
17 for establishing the location of a  
18 cryptocurrency exchange. Table A, with  
19 respect to Binance, sets out how these four  
20 indicia applied in the case of Binance.

21 MS. ZORNBERG: I have a request  
22 to go off the record just for a moment.

23 MR. SYLVESTER: Sure. Let's go  
24 off the record.

25 MS. ZORNBERG: Okay.

1 THE VIDEOGRAPHER: The time is  
2 4:09 p.m. This concludes Media 7. Off  
3 the record.

4 (Recess taken from 4:09 p.m. to  
5 4:10 p.m.)

6 THE VIDEOGRAPHER: The time is  
7 4:10 p.m. This begins Media 8. On the  
8 record.

9 A. I'd like to correct something I  
10 said.

11 By MR. SYLVESTER:

12 Q. Please do.

13 A. Which is that Table A lists three  
14 of the indicia that I discussed. In addition,  
15 I also include observation of where regulators  
16 believe an exchange is located. And that  
17 information is not contained with respect to  
18 the actual Table A references here.

19 Q. Okay. Maybe you can help me with  
20 this. The Table A has six columns. Do you  
21 see that?

22 A. That's right.

23 Q. And one column -- the first  
24 column is "Exchange." Do you see that?

25 Can you explain which columns



1 correspond with which indicia?

2 A. Yes. "Place of  
3 Incorporation/Domicile," "Place of Business,"  
4 "Registered Office," that is one indicia. The  
5 "Location That is Referenced in the Terms of  
6 Service and Governing Laws," that is a second  
7 indicia. The perception of market, reasonable  
8 market participants, that is a third indicia  
9 as set out in the "Notable Items in Public  
10 Sources and Media."

11 Q. Why did you call the final column  
12 "Notable Items in Public Sources and Media"?

13 A. It references the perception of  
14 market participants in relation to where the  
15 exchanges are believed to be located.

16 Q. Yes. So why not call it the  
17 "Perception of Market Participants." Why call  
18 it "Notable Items in Public Sources and  
19 Media"?

20 MS. ZORNBERG: Object to form.

21 A. The reason I did that was because  
22 I looked at the credible media sources in  
23 order to identify and gauge what reasonable  
24 market participants believe -- where they  
25 believe an exchange to be located.

1           Q.     I think I'm asking a much more  
2     basic question, which is why did you select  
3     the words "Notable Items in Public Sources and  
4     Media" for your chart?

5           MS. ZORNBERG:  Objection.  Asked  
6     and answered.

7           A.     The fourth indicia also was in  
8     relation to the regulators' perception.

9           Q.     So the fourth column -- sorry --  
10    the sixth column in Table A combines both --

11          MS. ZORNBERG:  Object.  There's a  
12    misunderstanding going on.

13          MR. SYLVESTER:  Okay.

14          MS. ZORNBERG:  I don't think the  
15    witness thought -- realized there was a  
16    question pending, your last question.  
17    So she had moved on to talk about where  
18    the fourth indicia is reflected.

19          MR. SYLVESTER:  I see.

20          Q.     I see.  Okay.  Let me go back to  
21    my original question, which I understand  
22    your -- Ripple's counsel believes it is asked  
23    and answered, but I don't think I've gotten an  
24    answer.

25                 I just want to know why is it

1       that you labeled the column "Notable Items in  
2       Public Sources and Media"? Why select those  
3       words?

4             A.       I selected those words because  
5       that's where I got the information.

6             Q.       Okay. But sitting here today,  
7       you're explaining that, in fact, that column  
8       represents sources of information that are  
9       relevant to the criteria of what, in your  
10      view, market participants believed as to the  
11      location of these exchanges?

12            A.       That's how I gauged information  
13      regarding the perception of market  
14      participants and where they believed an  
15      exchange to be located.

16            Q.       Okay. Let's flip back to  
17      paragraph 99, please. About midway through  
18      the paragraph, you write:

19                    "Given the possible presence of a  
20                   foreign arm on which a trade may have  
21                   occurred, it is not determinable in the  
22                   abstract whether, for any particular  
23                   trade, the transaction became final  
24                   within the US or outside the US through  
25                   a unit located in a foreign

1 jurisdiction."

2 My question is just: What does  
3 the term "foreign arm" mean as used in that  
4 sentence?

5 A. (Document review.)

6 An arm that is not a US arm.

7 Q. What does the word "arm" mean in  
8 your answer?

9 A. An affiliate, a unit -- an  
10 affiliate or unit of the exchange.

11 Q. Did you determine for all 24  
12 exchanges whether or not there was a US  
13 affiliate or unit associated with each of  
14 those exchanges?

15 A. I looked at the list of exchanges  
16 I received from counsel.

17 Q. Okay. After you received that  
18 list, did you take any steps to determine  
19 whether or not, for any of the exchanges  
20 listed in Table A, all of -- any of the  
21 exchanges had a US affiliate or unit?

22 A. I relied on the exchanges that I  
23 received from counsel as set out in Table A.

24 Q. I understand that but I just want  
25 to -- I want to see if, once you received the

1 information from counsel that's in Table A,  
2 whether you took any additional steps.

3 So once you received that  
4 information, did you take any steps to  
5 determine that any of the exchanges listed in  
6 Table A did or did not have a US affiliate or  
7 unit?

8 A. My reliance here was in relation  
9 to the exchanges set out in Table A. I did  
10 not go through each and every exchange to  
11 determine whether they were US units.

12 Q. Okay. Sitting here today and  
13 excluding Bittrex, Poloniex, Coinbase, and  
14 Kraken, do any of the remaining exchanges  
15 listed in Table A have a US affiliate or unit?

16 MS. ZORNBERG: Object to the  
17 form.

18 A. I did not do specific research  
19 with respect to each and every exchange listed  
20 in Table A. I did not -- based on my own  
21 general understanding, for example, Binance  
22 has a US affiliate.

23 Q. Okay. Does bitbank?

24 A. I can't say specifically.

25 Q. Is that because you don't know?

1 A. I can't recall.

2 MS. ZORNBERG: Objection.

3 A. I don't know.

4 Q. Does Bitfinex have a US  
5 affiliate?

6 A. I believe it does.

7 Q. Does BitForex have a US  
8 affiliate?

9 A. I don't know.

10 Q. Does Bithumb have a US affiliate?

11 A. I don't know.

12 Q. Does Bitlish have a US affiliate?

13 A. I don't know.

14 Q. Does BitMart have a US affiliate?

15 A. Does which one?

16 Q. BitMart?

17 A. I don't know.

18 Q. Does Bitmax have a US affiliate?

19 A. I believe it does.

20 Q. Does Bittrue have a US affiliate?

21 A. I don't know.

22 Q. Does Bitstamp have a US  
23 affiliate?

24 A. Bitstamp, I believe it does.

25 Q. Does Bittrex have a US affiliate?

1 A. Yes.

2 Q. Does BW have a US affiliate?

3 A. I don't know.

4 Q. If you'd like, I'm reading from  
5 page 62 of your report. It's not just --

6 A. Okay.

7 Q. You're free to follow along.

8 Does CoinBene, B-e-n-e, have a US  
9 affiliate?

10 A. I don't know.

11 Q. Does CoinOne have a US affiliate?

12 A. I don't know.

13 Q. Does DigiFinex have a US  
14 affiliate?

15 A. I don't know.

16 Q. Does HitBTC have a US affiliate?

17 A. I don't know.

18 Q. Does Huobi Global have a US  
19 affiliate?

20 A. I believe it may have had one.

21 Q. In what time period?

22 A. Around summer 2018 for a period  
23 of time.

24 Q. Does Korbit have a US affiliate?

25 A. I don't know.

1           Q.     There's no way I'm going to be  
2     able to pronounce this. Does the company  
3     that's doing business as OKEx have a US  
4     affiliate?

5           A.     I don't know.

6           Q.     Does Upbit have a US affiliate?

7           A.     I don't know.

8           Q.     Does ZB have a US affiliate?

9           A.     I don't know.

10          Q.     Does ZBG have a US affiliate?

11          A.     I don't know.

12          Q.     For all of the exchanges that you  
13     are not aware whether or not they have a US  
14     affiliate, how can you be sure that the trades  
15     of digital assets on those exchanges did not  
16     take place in the United States?

17                 MS. ZORNBERG: Object to form.

18          A.     I looked at the exchanges  
19     provided to me in Table A and applied the  
20     indicia to those exchanges in Table A.

21          Q.     Okay. Let me ask you a different  
22     question: Did you take any steps -- strike  
23     that.

24                 For the exchanges that we just  
25     discussed where you're not sure whether or not



1       they have a US affiliate, sitting here today,  
2       can you -- can you definitively say that  
3       trades taking place on those exchanges did not  
4       take place in the United States?

5                   MS. ZORNBERG: Object to form.

6           A.     My opinion was to look at the  
7       exchanges set out in Table A and to determine  
8       how trades become final, binding -- and  
9       binding on exchanges and cryptocurrency  
10      exchanges and where those trades then become  
11      final. That was the scope of my opinion.

12          Q.     Let me return to your opinion to  
13      paragraph 99. About midway through the  
14      paragraph, you write:

15                   "Given the possible presence of a  
16      foreign arm on which a trade may have  
17      occurred, it is not determinable in the  
18      abstract whether, for any particular  
19      trade, the transaction became final  
20      within the US or outside the US through  
21      a unit located in a foreign  
22      jurisdiction."

23                   Do you see that?

24          A.     Yes.

25          Q.     Does that sentence that I just

1 read describe Bittrex, Poloniex, Coinbase, and  
2 Kraken?

3 A. It references the fact that  
4 Bittrex, Poloniex, Coinbase, and Kraken may  
5 have had foreign affiliates through which  
6 transactions could have occurred.

7 Q. Okay. And is it in your view --  
8 strike that.

9 Is it your opinion that you're  
10 unable to conclude that trades on Bittrex,  
11 Poloniex, Coinbase, and Kraken occurred in the  
12 US because of the existence of a foreign  
13 affiliate of those four entities?

14 A. I wasn't providing a particular  
15 opinion here. I was merely suggesting for the  
16 sake of, you know, completeness that one may  
17 want to look at the particular facts on the  
18 ground.

19 The opinion I provide is in  
20 relation to Table A, and applying those four  
21 indicia to the exchanges listed on Table A,  
22 and then identifying, based on those indicia,  
23 which exchanges can be included within the --  
24 as US exchanges and which are excluded as US  
25 exchanges.

1           Q.     So in light of that, why was it  
2     not important for you to determine whether or  
3     not any of the remaining 20 exchanges on  
4     Table A had a US affiliate?

5           A.     The reason I made this  
6     observation for the sake of completeness is  
7     because I had reviewed Mr. Gil's deposition,  
8     which mentioned the fact that he transacted on  
9     platforms that he believed were located  
10    offshore.

11                     In addition, with respect to  
12    Coinbase, I had Coinbase Singapore's terms of  
13    service. And so, again, for the sake of  
14    completeness, I mentioned the fact that one  
15    may want to consider looking at where the  
16    actual trades take place, given what was said  
17    by Mr. Gil in his deposition and given the  
18    fact that my materials included Coinbase  
19    Singapore's terms of service.

20           Q.     When you say "where the actual  
21    trades take place" in your answer just now,  
22    what is it that you mean?

23           A.     If the trades became -- it  
24    became -- if the orders were submitted to and  
25    became final on the foreign arm of an exchange

1 affiliated with Coinbase, Bittrex, Kraken, or  
2 Poloniex.

3 Q. If an exchange became -- strike  
4 that.

5 If a trade became final on the US  
6 affiliate arm of an otherwise foreign  
7 exchange, would that make that trade, in your  
8 view, occurring in the United States?

9 A. If the indicia points to that  
10 exchange as being a US exchange and the trades  
11 become final on that exchange, that trade  
12 becomes final in the geographic location of  
13 the exchange, which, as the indicia would  
14 point out, would include the US.

15 Q. Okay. So let me pose a  
16 hypothetical that, as far as I know -- well,  
17 strike that.

18 Let me pose a hypothetical.  
19 Let's talk about Bitlish again. That's on  
20 page 61 of your report.

21 Let's assume -- I'm not saying  
22 this is true. I'm just saying let's assume as  
23 a hypothetical that Bitlish has a US  
24 affiliate.

25 Are you with me so far?

1           A.     I'm with you so far.

2           Q.     Okay.  If a particular trade  
3           takes place on the US affiliate of Bitlish, in  
4           your view, would that trade have taken place  
5           within the United States?

6           A.     Applying those indicia to the  
7           platform that is a US affiliate of Bitlish, if  
8           those indicia point to a US location, then the  
9           US could not be excluded as a geographic  
10          location where the transaction becomes final.

11          Q.     So my question is:  Why wasn't it  
12          of relevance for you to determine whether many  
13          of these exchanges listed in Table A had a US  
14          affiliate in order to reach your opinion?

15          A.     My opinion was simply to identify  
16          for -- identify the indicia to determine the  
17          location of the exchange, not to pinpoint any  
18          particular location where trades become final.  
19          I applied my indicia to the exchanges given to  
20          me in Table A, and that was my -- that was the  
21          scope of my opinion.

22          Q.     So Table A does not reflect your  
23          opinion as to where any particular trade  
24          became final.  Is that fair?

25          A.     What my opinion -- what my

1 opinion here does is apply the indicia to  
2 determine whether or not these indicia can  
3 exclude or include the US as a possible  
4 geographic location for a cryptocurrency  
5 exchange listed in Table A.

6 Q. Okay. Let me pose another  
7 hypothetical. Let's say I have made a trade  
8 on Bitlish. Do you have enough information,  
9 based on the application of your criteria, to  
10 say where that trade was finalized?

11 A. It's not my opinion to give a  
12 particular location. But applying my indicia  
13 to the current Bitlish indicia here, it would  
14 indicate that all the indicia would point to  
15 the UK.

16 Q. Okay. Could you conclusively  
17 determine that that trade happened in the UK?

18 A. My opinion is simply to look --  
19 describe how orders are made on cryptocurrency  
20 exchanges and become final on cryptocurrency  
21 exchanges, provide the indicia for determining  
22 location, not to specify a particular location  
23 with respect to any one exchange.

24 Q. Is it also true that your opinion  
25 is -- does not include specifying a particular

1 location with respect to any one particular  
2 trade?

3 A. No, it does not.

4 Q. Okay. Let's move to paragraph  
5 101, please. That's on page 55.

6 You write in the first full  
7 sentence:

8 "In determining where offers are  
9 made and where transactions match and  
10 become final, pinpointing the exact  
11 geographic location of cryptocurrency  
12 exchanges poses logistical and  
13 analytical challenges."

14 Do you see that?

15 A. I'm sorry, which paragraph are we  
16 on?

17 Q. We're on 101 and it's the top of  
18 page 55. It's the first full sentence on the  
19 top of page 55.

20 A. (Document review.)

21 Q. My question is: What are the  
22 logistical and analytical challenges that you  
23 reference in paragraph 101?

24 A. The logistical and analytical  
25 challenges here point to the fact that

1 cryptocurrency exchanges are, relatively  
2 speaking, newer to the marketplace. Some of  
3 them may be smaller exchanges.

4 That may be largely -- the  
5 smaller exchanges that are -- that include  
6 people located in different jurisdictions, so  
7 on and so forth. So it's difficult to  
8 pinpoint with precise -- with precision  
9 exactly where the cryptocurrency exchange is  
10 located.

11 Q. Okay. Let's move on to paragraph  
12 102. The first sentence says:

13 "The mobile, digital nature of  
14 cryptocurrency exchanges arguably  
15 exacerbates the challenge of ascribing  
16 particular weight to various potential  
17 indicia of location (e.g., location of  
18 employees, servers, cold key storage) as  
19 providing definitive 'proof' of the  
20 location of the exchange on which trades  
21 are made final."

22 Do you see that?

23 A. (Document review.)

24 Yes.

25 Q. Focusing just on location of



1 employees, servers, and cold key storage, in  
2 forming your opinions in this case, did you  
3 consider whether or not to ascribe any weight  
4 to those items as indicia of location of  
5 cryptocurrency exchanges?

6 A. I gave it thought. I reflected  
7 on it. And then I determined that I could not  
8 credibly put any weight on these factors as  
9 indicators of location.

10 Q. Why is that?

11 A. With respect to which factor?

12 Q. Let's take servers.

13 A. With respect to servers, servers  
14 are located around the world with respect to  
15 exchanges and the firms that use them. As  
16 seen in Mr. Gil's testimony, for example, his  
17 firm locates servers throughout the world.

18 Servers are really not  
19 informative at all with respect to the  
20 location of where an exchange might be or a  
21 firm might be located, given the fact that  
22 they proliferate globally in order to enable  
23 global trading to take place.

24 Q. Is it true that the exchanges  
25 that are listed in Table A have servers that

1 proliferate globally?

2 A. I couldn't say with respect to  
3 the exchanges specifically. But as a general  
4 principle, it is commonplace for firms, for  
5 exchanges to enable global trading to happen  
6 to facilitate that process to locate servers  
7 around the globe.

8 As such, I consider that to be  
9 completely uninformative as to where the  
10 exchange is actually located.

11 Q. Did you take any steps to  
12 determine where the servers of the exchanges  
13 listed in Table A -- strike that.

14 Did you take any steps to  
15 determine, with respect to the exchanges in  
16 Table A, where those exchanges' servers were  
17 located?

18 A. Based on my research and  
19 experience, based on my understanding of  
20 market structure and trading, I conclude  
21 strongly that servers in today's modern  
22 digital global electronic marketplace really  
23 have no significance whatsoever in providing  
24 definitive and credible indicia of where an  
25 exchange or firm is located.

1           Q.     Is it fair to say, then, that you  
2     did not take any steps to locate where those  
3     exchanges' servers were because you did not  
4     think that their location had any relevance?

5           A.     I reflected on the question about  
6     servers. I thought hard about it. I applied  
7     my professional experience, research,  
8     judgment, and concluded strongly that, in  
9     today's economy and financial marketplace,  
10    servers are too ubiquitous to be able to  
11    provide any credible signal as to the location  
12    of an exchange or firm.

13          Q.     And this question is just focused  
14    on your methodology that you applied in  
15    preparing your opinion. So I just want to ask  
16    you to limit your answer to steps that you  
17    took or did not take.

18                 Did you take any steps to  
19    determine where the exchanges on Exhibit A  
20    have servers?

21          A.     No.

22          Q.     Let's go back to our Bitlish  
23    example. If everything that you wrote about  
24    Bitlish in Table A remained the same --

25          A.     Yeah.

1           Q.     -- this is hypothetical -- but  
2     all of its servers were in the United States,  
3     would that affect your opinion at all?

4           A.     It would not.

5           Q.     Okay. If you had wanted to  
6     determine where the exchanges on your Table A  
7     had their servers, is that something that you  
8     could have figured out?

9           MS. ZORNBERG: Objection.

10          A.     I think it would have been very  
11     difficult to figure out simply because I  
12     believe that servers are so widespread that  
13     pinpointing exact servers with respect to  
14     firms or platforms or exchanges is just very  
15     difficult logistically in today's marketplace.

16          Q.     If -- understanding you didn't  
17     want to do it, if you had wanted to do it,  
18     what steps would you have taken?

19          MS. BUNTING: Objection.

20          MS. ZORNBERG: Objection.

21          A.     I think it's a tough question. I  
22     think I would have researched the issue. I  
23     would have conducted searches as to where  
24     servers might be located. I would have to  
25     really think about that question as to how I

1 would have approached it exactly.

2 It's a tough question. I think  
3 it's ultimately one doomed to failure, given  
4 the incredible proliferation of servers across  
5 the globe today.

6 Q. Is it your view that it would be  
7 doomed to failure because the information is  
8 not publicly available?

9 MS. ZORNBERG: Objection.

10 A. That's part of it potentially.  
11 In addition, it's hard to identify. Certain  
12 servers may not even operate. They may be  
13 broken. They may not work. They may be old.  
14 Any number of reasons.

15 Q. Okay. I want to turn to your  
16 process of selecting the four criteria that  
17 you applied.

18 A. Yeah.

19 Q. Walk me through what steps you  
20 took to select those four criteria, please.

21 A. The steps I took here really  
22 brought to bear the professional experience  
23 and judgment that I have developed in my  
24 career in legal practice as part of my work at  
25 the World Bank, as part of my research into

1 market microstructure and international  
2 financial regulation.

3 Bringing that process to bear, I  
4 have thought very carefully during my years in  
5 practice as well as in my research about where  
6 transactions become final, where firms are  
7 located for the purposes of their  
8 transactions, their home state, for the  
9 purposes of liability, for the purposes of  
10 various jurisdictional issues that, when  
11 attached to them, have thought of those issues  
12 throughout my career and practice at Clifford  
13 Chance, World Bank, as well as in my research.

14 And I brought that judgment to  
15 bear in identifying four key credible,  
16 informative signals that would provide a real  
17 indication of where cryptocurrency exchanges  
18 could be located, given the difficulties of  
19 doing so.

20 Q. Prior to your engagement in this  
21 case, had you ever considered the question of  
22 where trades on cryptocurrency exchanges were  
23 located?

24 A. I have often. Throughout my  
25 years in practice, it was very normal to give

1 thought to various aspects of jurisdiction; as  
2 to where transactions are happening, where  
3 firms are located, where settlement finality  
4 may be taking place in order to determine  
5 particular risk management or governance that  
6 may be applicable. That was extremely  
7 frequent as a part of my practice.

8 At the World Bank, I was  
9 frequently engaged in discussions, thinking  
10 about, researching questions as to  
11 international insolvency, which oftentimes  
12 engages questions about location, in order to  
13 determine aspects such as the center of main  
14 interests applicable to a particular firm or  
15 transaction.

16 In my research, I am teaching as  
17 well as researching questions about  
18 international financial institutions. In the  
19 case of my teaching, I've delivered lectures,  
20 thought about aspects of location,  
21 particularly as it pertains to where financial  
22 institutions develop subsidiaries or branches,  
23 what difference does that make in terms of how  
24 transactions are finalized and liability  
25 arises with respect to the those firms and

1 institutions.

2 And so I applied that knowledge  
3 to the novel question of where cryptocurrency  
4 exchanges finalize their trades. To me, it  
5 represented an extremely natural and logical  
6 extension of my past work.

7 And I used that substance and  
8 analysis to apply, in this case, to developing  
9 the four indicia that I identify here.

10 Q. I'd like to focus very narrowly  
11 on the question of where trades on  
12 cryptocurrency exchanges are finalized.

13 Prior to your engagement in this  
14 case, had you ever considered the question of  
15 where trades on cryptocurrency exchanges were  
16 finalized?

17 MS. ZORNBERG: Objection. Asked  
18 and answered.

19 A. I reject your premise in the  
20 sense that you are creating a deep distinction  
21 between the finalization of trades on  
22 cryptocurrency exchanges relative to  
23 traditional exchanges.

24 As detailed throughout my report,  
25 cryptocurrency exchanges borrow methodology



1 for finalizing trades very, very deeply, in  
2 fact, from traditional exchanges.

3 So all of the questions that I  
4 have just discussed, all the material I just  
5 discussed in my previous answer I feel is  
6 incredibly applicable and relevant to thinking  
7 about the question of cryptocurrency exchanges  
8 precisely because cryptocurrency exchanges  
9 rely so heavily on their methodologies, on  
10 traditional exchanges, and how they establish  
11 their trading systems.

12 Q. Okay. Focusing narrowly on the  
13 question of where trades on cryptocurrency  
14 exchanges are finalized, had you ever written  
15 any publication whatsoever on that narrow  
16 topic prior to this report?

17 A. No.

18 Q. Okay. Again, prior to your  
19 engagement in this case, have you ever made  
20 any kind of public statement about where  
21 trades on cryptocurrency exchanges are  
22 finalized?

23 A. I don't believe so. Then again,  
24 it's a novel question, so I'm not surprised  
25 about that.

1           Q.     Okay. Are there any indicia of  
2     location, other than the ones we've already  
3     discussed, that you considered including  
4     within your test but ultimately decided not to  
5     include?

6           MS. ZORNBERG: Objection. Asked  
7     and answered.

8           You can answer again.

9           A.     So, for example, as detailed in  
10    102, paragraph, I considered aspects like the  
11    location of employees, servers, cold key  
12    storage, for example. And I rejected these  
13    indicia as being essentially noise that is  
14    uninformative as to the location of an  
15    exchange.

16          Q.     Other than location of employees,  
17    servers, and cold key storage, were there  
18    additional indicia that you had considered  
19    including in your methodology but ultimately  
20    rejected?

21          A.     I think there would have been. I  
22    can't exactly recall, as I sit here today,  
23    exactly which ones.

24          Q.     In your view, is the geographic  
25    location of servers that house a

1 cryptocurrency exchange's matching engine  
2 relevant at all to determining where a trade  
3 on that exchange is finalized?

4 MS. BUNTING: Objection.

5 MS. ZORNBERG: Object to form.

6 A. So there are two aspects to your  
7 question that I disagree with on their  
8 fundamental premise; firstly, that servers are  
9 important in respect of establishing location  
10 as discussed. I do not believe they are at  
11 all for the reasons that we just discussed.

12 In addition, as previously  
13 discussed throughout, I do not believe that  
14 matching engines can be distilled to a  
15 location on a server.

16 As discussed, matching engines  
17 comprise the rules and processes of an  
18 exchange, the governance of an exchange, and  
19 are far bigger, far more deeply embedded  
20 within an exchange's institutional presence  
21 than the simple mechanical matching of one  
22 byte, b-y-t-e, with another on some server  
23 somewhere.

24 Q. Have you reviewed any other  
25 expert reports in this case? Other than your

1 own. That's what I mean by "other."

2 A. I reviewed the rebuttal report of  
3 Mr. Dewey.

4 Q. Any others?

5 A. No.

6 Q. Other than any testimony that may  
7 be listed in your materials considered, have  
8 you reviewed any deposition testimony  
9 transcripts in this case?

10 A. I have not.

11 Q. Okay. The very end of paragraph  
12 102, page 55, you mentioned, among other  
13 things, that Bitstamp has servers in Ireland  
14 and Germany.

15 Do you see that?

16 A. (Document review.)

17 Yes.

18 Q. How did you determine that  
19 Bitstamp has servers in Ireland and Germany?

20 A. I believe it was in one of the  
21 materials that I've reviewed with respect to  
22 Bitstamp.

23 Q. One of the materials cited in  
24 your report. Is that right?

25 A. That's right.

1 Q. Okay. Let's move to paragraph  
2 104 on page 56, please. The first sentence  
3 says:

4 "These indicia might not all be  
5 applicable for every exchange or even  
6 knowable for every exchange."

7 Do you see that?

8 A. (Document review.)

9 Yes.

10 Q. Did it concern you at all in  
11 forming your opinion that the indicia you  
12 selected did not always -- weren't always  
13 knowable for every exchange?

14 MS. ZORNBERG: Object to form.

15 You can answer.

16 A. It did not bother me at all.

17 Q. Why is that?

18 A. This is a new industry. It is to  
19 be expected that certain information at  
20 present may not exist or be knowable.

21 In my opinion, the methodology I  
22 establish is sound and provides a real world,  
23 concrete, logical, reasonable understanding of  
24 location. The fact that not every exchange  
25 has every indicia, that doesn't -- to me, that

1 doesn't seem like a problem at all.

2 Q. Prior to forming your opinions  
3 set forth in your report, had you ever applied  
4 this for the four indicia to determine the  
5 location of trading on any particular  
6 cryptocurrency exchange?

7 A. As I stated in my previous  
8 responses, I addressed the question of  
9 location on cryptocurrency exchanges in this  
10 opinion as part of forming this opinion.

11 This is a brand-new question,  
12 essentially, in the literature, as far as I'm  
13 aware. I have taken steps in this opinion to  
14 bring my professional judgment, experience,  
15 and research to establishing these four  
16 indicia. And I believe I do so in a way that  
17 others in my field would consider to be  
18 extremely credible.

19 So this is -- this is my attempt  
20 to set out four key indicia that I believe  
21 credibly speak to the location of a  
22 cryptocurrency exchange. This is the first  
23 time I'm doing it.

24 Q. You testified, among other  
25 things, that this is a brand-new question,

1       essentially, in the literature, as far as  
2       you're aware.

3               Does that mean it's fair to say  
4       there's not really a literature that addresses  
5       the issue of where a trade on a cryptocurrency  
6       exchange takes place?

7               A.     I'll be very clear, this  
8       literature and answering this question  
9       intertwines deeply with existing practices,  
10      with respect to existing literature, with  
11      respect to international standards, in  
12      relation to the location of exchanges,  
13      transactions, and firms.

14              There is extensive discussion,  
15      literature, thinking around the question of  
16      where international firms establish  
17      themselves, questions of liability, questions  
18      of locating where particular assets might be  
19      located. There is a deep literature,  
20      thinking, and practice surrounding those  
21      questions.

22              That literature, practice, and  
23      experience is very relevant to determining the  
24      question of how cryptocurrency exchanges  
25      should be analyzed.

1                   And I've sought to bring that  
2       research and expertise in the traditional  
3       marketplace with respect to international  
4       standards, with respect to market practice, to  
5       the determination of what four indicia should  
6       be applied here, to determining the location  
7       of cryptocurrency exchanges.

8               Q.     Are there any academic articles  
9       you're aware of that address the specific  
10      question of where a trade on a cryptocurrency  
11      exchange takes place?

12            A.     In my opinion, based on the best  
13      of my belief, I don't believe there is.

14            Q.     Moving to paragraph 105, please,  
15      the first two sentences say:

16                    "These indicia are important for  
17                   a variety of reasons. They provide  
18                   concrete attributes that are possible to  
19                   identify for the large majority of  
20                   exchanges with a degree of certainty."

21                   Do you see that?

22            A.     (Document review.)

23                   Yes.

24            Q.     My question is: Were you able to  
25      achieve a greater degree of certainty with



1       respect to some of your indicia versus other  
2       indicia?

3                   MS. ZORNBERG: Object to form.

4               A.     I'm not really sure what you  
5       mean.

6               Q.     Let me provide an example. Like,  
7       were you able to be more certain about where a  
8       cryptocurrency exchange was incorporated  
9       versus market participants' perception of  
10      where it was located?

11              A.     It really depends on the  
12      exchange.

13              Q.     Were there instances in which  
14      your level of certainty varied among indicia  
15      with respect to a single exchange?

16                   MS. ZORNBERG: Object to form.

17              A.     Take one example. Binance has  
18      the potential for different places of  
19      incorporation and domicile. It's difficult to  
20      establish. However, the terms of service make  
21      clear that arbitrations are to be undertaken  
22      in Hong Kong.

23                   So it's very clear to read the  
24      terms of service and establish choice of venue  
25      for disputes. However, establishing the place

1 of incorporation and domicile is more  
2 difficult.

3 Q. Are you offering any opinion as  
4 to where the books and records of any  
5 particular exchange listed on your Table A are  
6 located?

7 A. I'm not.

8 Q. Okay. Are you offering any  
9 opinion that any of the exchanges listed on  
10 your Table A are subject to the recordkeeping  
11 demands that you describe in paragraph 105?

12 MS. ZORNBERG: Object to form.

13 A. Are you talking about a  
14 particular exchange? I'm not sure I fully  
15 appreciate and understand the question.

16 Q. Fair enough. Let's break it  
17 down. You discuss in paragraph 105, in your  
18 words, "strict recordkeeping demands on  
19 regulated entities."

20 Do you see that?

21 MS. ZORNBERG: What page are you  
22 on?

23 MR. SYLVESTER: Sorry. The very  
24 bottom of 56, or almost the very bottom.

25 A. (Document review.)

1 Q. Do you see that?

2 A. I do.

3 Q. Okay. So my question is whether  
4 or not you're offering any opinion as to  
5 whether or not any of the exchanges that are  
6 listed in your Table A are subject to any of  
7 the strict recordkeeping demands that you  
8 reference in paragraph 105.

9 A. What I'm saying here is that the  
10 indicia identified in Table A includes the  
11 place of incorporation domicile, place of  
12 business, registered office, governing laws.

13 The governing laws, with respect  
14 to a particular exchange, may subject the  
15 exchange to particular recordkeeping  
16 requirements. That is commonplace with  
17 respect to the regulation of exchanges in  
18 traditional markets.

19 So it is certainly very  
20 reasonable to imagine that a governing law  
21 with respect to a particular exchange is -- as  
22 identified as part of the indicia, would  
23 establish the same with respect to some of the  
24 exchanges established in Table A.

25 Q. But sitting here today, are you

1       aware of any such recordkeeping demands that  
2       are applicable to any of the exchanges that  
3       you list in Table A?

4                   MS. ZORNBERG: Object to form.

5           A.       I haven't researched the  
6       different laws of the different countries  
7       listed here in the terms of service.

8           Q.       So is it fair to say that you're  
9       not sure one way or the other whether the  
10      exchanges listed in Table A are subject to  
11      recordkeeping demands?

12                  MS. ZORNBERG: Objection.

13          A.       As I sit here today, I can't make  
14      that determination.

15          Q.       In a case where an exchange may  
16      conduct most of its business in a different  
17      jurisdiction from its registered domicile, in  
18      your view, is its registered domicile still  
19      relevant to the analysis of where a trade on  
20      that exchange takes place?

21          A.       Yes.

22                  MS. ZORNBERG: Objection.

23          Q.       Why is that?

24          A.       Yes, the place of incorporation  
25      and domicile may determine the corporate forum

1       that the particular exchange inhabits. It may  
2       determine the potential rules that apply in  
3       the event that exchange becomes insolvent.

4               It may have certain applicability  
5       as to the particular rules that govern the  
6       internal recordkeeping of the exchange, as I  
7       set out in this report as part of my thinking  
8       here.

9               So even though the place of  
10       business may be in a different jurisdiction,  
11       it's perfectly under- -- it's perfectly  
12       reasonable to think that an exchange may still  
13       be subject to various obligations, demands  
14       with respect to the corporate forum that it  
15       has and that is registered in its place of  
16       incorporation and domicile.

17              Q.     Did you take any steps to  
18       determine -- strike that.

19               For the exchanges that are listed  
20       in your Table A, did you take any steps to  
21       determine as part of your analysis whether  
22       these exchanges conducted most of their  
23       business in a place other than their domicile?

24              A.     Table A sets out information that  
25       I've gathered as referenced here. That sets

1 out what I believe to be the place of business  
2 with respect to the different exchanges listed  
3 in Table A, and as derived from information  
4 that is referenced in Table A.

5 Q. Can you --

6 A. And footnotes.

7 Q. I'm sorry. Can you define for me  
8 what "domicile" means as used in your Table A?

9 A. For me, "domicile" essentially  
10 means the place where the exchange may be  
11 registered, essentially the home base where  
12 the exchange has been incorporated and is  
13 based.

14 Q. Is there any difference in your  
15 mind between place of incorporation and  
16 domicile?

17 A. I can't say for sure. Different  
18 countries may apply different jurisdictional  
19 criteria to what they consider to be  
20 incorporation versus how they consider an  
21 exchange to be naturalized within their  
22 particular jurisdiction.

23 Q. For each of the exchanges listed  
24 on Exhibit A, for the column that says "Place  
25 of Incorporation/Domicile," do you know

1       whether the entry reflects the place of  
2       incorporation or the domicile or both?

3               A.       I would have to go through the  
4       footnotes to the different exchanges to be  
5       able to answer your question. I mean, the  
6       information that I have here is set out in the  
7       footnotes. To be able to make an attempt at  
8       answering it, I would need to go through the  
9       different footnotes.

10              Q.       But prior to today, you went  
11       through the sources and the footnotes and made  
12       the determination that each of these had the  
13       place of incorporation or domicile reflected  
14       in Table A. Is that right?

15              A.       That's right.

16              Q.       Can we go to paragraph 103 on  
17       page 56. I'd like to ask a question about  
18       your third criteria which reads:

19                      "Third, in what country do market  
20       participants and the public believe the  
21       exchange does business?"

22                      Do you see that?

23              A.       (Document review.)

24              Q.       What is the relevance of what the  
25       public believes as to where a cryptocurrency

1 exchange is located as distinct from market  
2 participants?

3 A. The --

4 MS. ZORNBERG: Object to form.

5 You can answer.

6 A. Indicia here references the view  
7 of reasonable market participants, including  
8 members of the public, obviously, as to what  
9 they considered to be the location of an  
10 exchange. I believe that's very important  
11 because it goes directly to the business of  
12 what an exchange does, which is try to attract  
13 traders to the platform to transact in  
14 cryptocurrencies.

15 Q. In concluding for purposes of  
16 application of your indicia what market  
17 participants believe as to the geographic  
18 locations of an exchange, I believe you've  
19 testified that you relied on your review of  
20 the user agreements, and you also relied on  
21 the sources that are cited in the footnotes  
22 beneath your Table A.

23 Are there any other sources that  
24 inform that application of that criteria?

25 MS. ZORNBERG: Objection. Asked



1           and answered.

2           You can answer again.

3           A.     Those are the main sources of  
4     information that I relied on with respect to  
5     this indicia.

6           Q.     Your fourth indicia is what  
7     regulators believe with respect to the  
8     location of an exchange. Is that correct?

9           A.     That's correct.

10          Q.     Why is that relevant to the  
11     question of the geographic location of where a  
12     trade occurs?

13          A.     It's extremely relevant in my  
14     opinion. It reflects what informed regulators  
15     believe the regulation -- the location of an  
16     exchange to be. In my mind, that is extremely  
17     important because international regulators  
18     tend to be informed.

19                 Furthermore, they are subject to  
20     and apply international standards as  
21     promulgated by IOSCO in relation to  
22     cooperation between regulators to address  
23     issues of mutual concern.

24                 In that regard, steps taken by  
25     regulators pursuant to IOSCO standards reflect

1 formal procedures that regulators are subject  
2 to under these different standards, providing  
3 an indication of what informed regulators are  
4 doing, affirmative steps they are taking,  
5 recognizing the jurisdiction of another  
6 country, another location with respect to the  
7 firm whose location they are -- with respect  
8 to the firm that they are seeking information  
9 about.

10 Q. In preparing your opinions, did  
11 you speak with anyone from any of the  
12 exchanges listed in Table A?

13 A. No, I did not.

14 Q. In preparing your opinion, did  
15 you speak to any traders who have traded on  
16 the exchanges listed in Table A?

17 A. No, I did not.

18 Q. Turning to paragraph 104 again,  
19 the second sentence says:

20 "Not every factor is necessary,  
21 and no factor is sufficient, to  
22 understand the location of the  
23 exchanges."

24 Do you see that?

25 A. (Document review.)

1 Yes.

2 Q. Is it fair to say that that  
3 sentence, at least in part, describes the  
4 application of your methodology as set forth  
5 in your report?

6 MS. ZORNBERG: Objection to form.

7 You can answer.

8 A. That sentence describes the  
9 application of the methodology to the  
10 exchanges in Table A.

11 Q. How did you reach your opinion  
12 for purposes of the application of your  
13 methodology that not every factor is necessary  
14 and no factor is sufficient?

15 A. I set out in my opinion what the  
16 indicia do is establish a constellation of  
17 informative factors that help in providing a  
18 guidepost as to where the location of an  
19 exchange is.

20 And what that does for the  
21 purposes of my opinion is allow that exchange  
22 to either be included or excluded as an  
23 exchange that is located within the United  
24 States.

25 Q. Are there any factors in your

1 methodology that are necessary to draw a  
2 conclusion as to where a trade -- sorry --  
3 strike that.

4 Are there any factors in your  
5 methodology to conclude -- that are necessary  
6 to conclude where a cryptocurrency exchange is  
7 located?

8 A. My methodology sets out four  
9 indicia. It doesn't give particular weight to  
10 any specific one of those indicia. What it  
11 does is to set out four credible, informative,  
12 reasoned criteria that provide a set of  
13 factors to consider when trying to establish  
14 the location of a cryptocurrency exchange.

15 Q. Is it fair to say that none --  
16 there's no one factor that's more important  
17 than others under your methodology?

18 A. My methodology sets out the four  
19 factors. It does not choose one particular  
20 indicia as being particularly dispositive over  
21 and above the others.

22 Q. Understanding no one is  
23 dispositive, are there any that are more  
24 important than the others?

25 A. It sets out four factors to guide

1 regulators, provides a framework. It does not  
2 stipulate as to what weight should be given to  
3 each of these different factors.

4 Q. Do you think that someone could  
5 apply your four factors to the same set of  
6 exchanges and come up with a different  
7 conclusion about where the exchange is  
8 located?

9 MS. ZORNBERG: Objection.

10 A. My opinion here is not to provide  
11 particular locations for the different  
12 exchanges in Table A. My -- the scope of my  
13 opinion is to set out the four indicia and to  
14 decide on that basis whether they're indicia  
15 that can include or exclude the US as a  
16 possible location of the different exchanges  
17 in Table A.

18 MR. SYLVESTER: Can we take a  
19 brief break, please.

20 MS. ZORNBERG: Yes.

21 THE VIDEOGRAPHER: The time is  
22 5:11 p.m. This concludes Media 8. Off  
23 the record.

24 (Recess taken from 5:11 p.m. to  
25 5:32 p.m.)

1 THE VIDEOGRAPHER: The time now  
2 is 5:32. This begins Media 9. On the  
3 record.

4 BY MR. SYLVESTER:

5 Q. Professor, let's turn back to  
6 paragraph 102 on page 55, please.

7 Why was it that you decided to  
8 exclude from your indicia of location,  
9 location of employees?

10 A. So the reason why I rejected that  
11 indicia as being an informative one was  
12 because employees could be located anywhere,  
13 particularly given what we know today about  
14 remote work. People are working from  
15 everywhere.

16 And so to me -- or could  
17 potentially be working from any location --  
18 and so to me, that did not feature as a  
19 reliable indicator of location.

20 Q. If all of the management of a  
21 specific cryptocurrency exchange were located  
22 in one place, would that change your opinion  
23 as to that factor's relevance?

24 A. It would not.

25 Q. Why was it that you decided to

1 include cold key storage as a possible indicia  
2 of location of cryptocurrency exchange?

3 (Discussion off the record.)

4 A. The reason I excluded cold key  
5 storage was because cold keys are essentially  
6 the passwords to the user accounts at the  
7 exchanges. They are incredibly portable and  
8 they could be essentially anywhere.

9 They could be carried in  
10 someone's pocket. They could be moved to any  
11 locale. So to me, that was a completely  
12 unreliable indicator of the location of an  
13 exchange.

14 Q. I want to pose for you another  
15 hypothetical, going back to Bitlish. What if  
16 100 percent of the traders trading on Bitlish  
17 were trading from the US?

18 Would that affect your opinion at  
19 all as to the location of Bitlish?

20 A. My indicia here set out the four  
21 criteria. Where the traders are located that  
22 are trading into Bitlish, that is not relevant  
23 as a part of my criteria.

24 Q. I believe that you testified  
25 earlier that you were aware that Binance has a

1 US affiliate. Is that right?

2 A. Based on my general knowledge in  
3 this area, as well as, I believe, a couple of  
4 sources that may be in the report, yes.

5 Q. Is the existence of a US  
6 affiliate for Binance an indication that some  
7 offers or trades on Binance may have become  
8 final in the United States?

9 A. I'm sorry. Could you repeat the  
10 question.

11 Q. Sure. Is the existence of a US  
12 affiliate for Binance an indication that some  
13 offers or trades on Binance may have become  
14 final in the United States?

15 A. I'm not sure I understand. Why  
16 would that be an indication as to why that  
17 would happen?

18 Q. I believe that if you return to  
19 paragraph 99, you'll recall we discussed  
20 earlier your opinion that, because certain  
21 exchanges have a foreign arm, it is not  
22 determinable in the abstract whether for any  
23 particular trade the transaction became final  
24 within the United States.

25 Do you remember that?



1           A.       That's right.

2           Q.       Okay. So I'm just trying to flip  
3       that analogy the other way. So since Binance  
4       has a US affiliate, is it possible that some  
5       of the trades on Binance became final in the  
6       United States?

7           A.       So I think my methodology here  
8       you may be slightly misunderstanding in how  
9       you're presenting it. The four indicia here  
10      provide a guide as to the location of a  
11      particular cryptocurrency exchange.

12                 I applied these four indicia, the  
13      25 exchanges, to determine whether one can  
14      exclude the US as a possible location where  
15      these exchanges may be based.

16                 I made the observation here based  
17      on my reading of the Gil deposition as well as  
18      my possession of and my review of the Coinbase  
19      Singapore terms that, for completeness, it may  
20      be worth looking at the potential for trades  
21      to have occurred through the foreign  
22      affiliates of Coinbase, Kraken, Bittrex, and  
23      Poloniex.

24                 With respect to that observation,  
25      the second part, one could apply my indicia to

1 the foreign affiliates of Kraken, Poloniex,  
2 Bittrex, and Coinbase to establish where they  
3 may likely be located and whether they may be  
4 including or excluding the US as an indicia.

5 So my methodology does not  
6 require looking at the different affiliates.  
7 What it's doing is identifying four core  
8 indicia, applying them to the exchanges in  
9 Table A as a way to include or exclude the US  
10 as a possible place where indicia may point to  
11 as a location for an exchange.

12 Q. Okay. So since Binance has a  
13 United States arm, how is it that you're able  
14 to exclude the US as a possible location for  
15 Binance?

16 A. I looked at the exchanges in  
17 Table A. I applied my indicia to those  
18 exchanges in Table A. Binance US was not  
19 on -- one of the exchanges on Table A.

20 Q. How did you determine which  
21 exchanges to include in Table A?

22 MS. ZORNBERG: Object to form.

23 A. I received those specific  
24 exchanges from counsel.

25 Q. Do you have any understanding of

1 the significance, if any, of this set of 24  
2 exchanges reflected in Table A?

3 A. I believe --

4 MS. ZORNBERG: I will say, you  
5 can answer without disclosing  
6 communications with counsel.

7 A. My understanding is that there  
8 may have been trades of XRP on the exchanges  
9 listed in Table A.

10 Q. If one of the exchanges on your  
11 Table A had a US parent company, would that be  
12 any indication of -- that some offers or  
13 trades on that exchange may have become final  
14 in the United States?

15 A. No. The exchange is as set out  
16 in Table A.

17 MS. ZORNBERG: Hold on, the audio  
18 is echoing. It stopped but it was -- we  
19 were getting feedback. Everything the  
20 witness said was being -- spitting back  
21 out.

22 Coming from your --

23 Q. Do you want to say something  
24 again, Professor?

25 A. I'm so sorry. I think I lost

1 my--

2 Q. That's fine. I just -- I think  
3 we're good.

4 MS. ZORNBERG: Okay. It stopped.

5 THE VIDEOGRAPHER: Somebody might  
6 have unmuted themselves on Zoom.

7 Q. Let me repeat the question if  
8 that's okay.

9 A. Thank you.

10 Q. If one of the exchanges on Table  
11 A had a US parent company, would that be any  
12 indication that some of the offers or trades  
13 on that exchange may become final in the  
14 United States?

15 A. What my report does is set out  
16 the four indicia that point to the location of  
17 a cryptocurrency exchange looking at aspects  
18 such as registered office, domicile, place of  
19 business, to determine whether that indicia  
20 points to the US or otherwise as a possible  
21 location.

22 The parent as a separate legal  
23 entity has no bearing on the application of  
24 these indicia to the actual exchange itself.  
25 The indicia could be applied to the parent to

1 determine where its possible location could  
2 be.

3 But with respect to the exchanges  
4 set out in Table A as well as more generally  
5 with respect to the methodology, it sets out  
6 four criteria that help point to the location  
7 of a cryptocurrency exchange, where trades  
8 become final on that exchange. And that's  
9 really what the methodology is doing here.

10 Q. Do you know one way or the other  
11 whether defendants employed market makers to  
12 sell XRP?

13 MS. ZORNBERG: Objection.

14 A. I really have no idea.

15 Q. Okay.

16 A. I don't know.

17 Q. Did you as part of your  
18 analysis -- strike that.

19 You cite Mr. Gil's testimony at  
20 various places in your report. Correct?

21 A. I do, yes.

22 Q. Do you know what firm Mr. Gil is  
23 affiliated with?

24 A. I believe he's affiliated with  
25 GSR.

1 Q. And do you know what, if any,  
2 relationship GSR has with Ripple?

3 A. My understanding based on  
4 Mr. Gil's deposition is that he was an  
5 execution agent.

6 Q. When you say "execution agent,"  
7 will you tell me what you mean by that?

8 A. I believe he --

9 MS. ZORNBERG: Objection.

10 THE WITNESS: Sorry.

11 MS. ZORNBERG: You can answer.

12 A. I believe he helped facilitate  
13 trades for the defendants.

14 Q. Okay. XRP trades. Is that  
15 right?

16 A. I --

17 MS. ZORNBERG: Object to form.

18 A. I'm not sure. I believe -- I  
19 believe so based on my recollection of the  
20 deposition.

21 Q. Okay. Have you reviewed the  
22 terms of service of any agreements that GSR  
23 may have signed with any cryptocurrency  
24 exchange?

25 A. I have reviewed the terms of

1 service as set out in my report. I have not  
2 reviewed any terms of service specific to GSR.

3 Q. Other than GSR, are you aware of  
4 any other market makers the defendants  
5 employed to sell XRP?

6 MS. ZORNBERG: Objection. Lack  
7 of foundation.

8 Q. Go ahead.

9 A. No.

10 Q. As part of your work in forming  
11 your opinions, did you analyze which exchanges  
12 accepted US customers?

13 A. No.

14 Q. As part of your work in forming  
15 your opinion, did you analyze which, if any,  
16 exchanges affirmatively blocked US customers  
17 from trading on their exchanges?

18 A. Could you repeat the question.

19 Q. Sure. As part of your work in  
20 forming your opinion, did you assess whether  
21 any of the exchanges listed in your Table A  
22 took any steps to block US customers from  
23 trading on those exchanges?

24 A. In forming my opinion, I did not  
25 look at that as a factor relevant to forming

1 my opinion about where trades become final and  
2 where exchanges are located.

3 Q. And you're not opining on where  
4 any particular trade became final as part of  
5 your opinion, are you?

6 A. I'm not.

7 Q. Could we turn to page -- sorry --  
8 paragraph 113, page 70 of your report.

9 A. I'm sorry, I missed that.

10 Q. Fair enough. Paragraph 113, page  
11 70.

12 A. Thank you very much.

13 Q. I'll direct you to the second  
14 sentence where you say:

15 "First, I am aware that certain  
16 of the exchanges listed in Table A,  
17 including those that I do not believe  
18 finalize trades in the US, have had  
19 contact with or submitted license  
20 applications to certain US regulators."

21 Do you see that?

22 A. (Document review.)

23 Q. My first question is: Are you  
24 aware of any instances of the exchanges listed  
25 in Table A submitting license applications



1 other than those that are cited in

2 Footnote 287?

3 A. Other than that -- other than  
4 those cited in the footnotes, I'm not aware of  
5 other exchanges listed in Table A submitting  
6 applications.

7 Q. And then one sentence later, you  
8 say:

9 "Importantly, to the best of my  
10 understanding, these interactions with  
11 regulators do not constitute evidence  
12 that these exchanges were finalizing  
13 trades in the US."

14 Do you see that?

15 A. (Document review.)

16 Yes.

17 Q. What is your understanding  
18 described in that sentence based upon?

19 A. It's based upon my general  
20 knowledge of the marketplace and what the  
21 purposes of licensure tends to be.

22 The purposes of licensure with  
23 respect to FinCEN registration, for example,  
24 based on my general research and  
25 understanding, is not necessarily related to

1 any meaning to finalize trades. It can be  
2 done for any number of reasons that have  
3 nothing to do with that.

4 Q. Other than the money services  
5 business registrant search -- strike that.

6 Are you aware of any of the  
7 exchanges listed in Table A applying for any  
8 kind of license with any US regulator other  
9 than money services business license?

10 A. I'm not aware.

11 Q. Okay. Going back to 113, the  
12 next sentence, you say:

13 "Rather, a more plausible account  
14 is that these exchanges were trying to  
15 get permission to engage in some  
16 exchange business in the US (e.g.,  
17 through registration with FinCEN as a  
18 money services business."

19 Why is that more plausible in  
20 your view than the conclusion that an exchange  
21 was seeking a license from a US regulator  
22 because it finalizes trades in the US?

23 A. The purposes of registering with  
24 FinCEN, as far as I understand it, is to gain  
25 permission to be able to conduct potential

1 payments related money services business, or  
2 sometimes defensively as a way to avoid  
3 inadvertently being caught in US money  
4 laundering and terrorist financing  
5 regulations, or as a potential aspirational  
6 matter where the exchange may be looking for  
7 some future presence in the US.

8 Q. How did you come to the  
9 understanding of the purposes that you just  
10 listed?

11 A. Based on my general research and  
12 knowledge in this area.

13 Q. Were you aware of those purposes  
14 prior to your engagement in this case?

15 A. I was aware of FinCEN, what  
16 FinCEN does as part of my general knowledge in  
17 the financial markets and regulatory sphere.

18 Q. In forming your opinion in this  
19 case, did you consider the definition of  
20 "exchange" under the US securities laws?

21 MS. ZORNBERG: Objection.

22 A. No, I did not.

23 Q. Do you have any understanding of  
24 the factors that the SEC uses in determining  
25 whether an exchange has to register with the

1 commission?

2 A. I'm not here to give a legal  
3 opinion or to look at legal factors.

4 Q. Understanding that, I'm just  
5 asking you for your understanding. Do you  
6 have an understanding of the factors that the  
7 SEC uses in determining whether an exchange  
8 has to register with the commission?

9 A. Again, without -- with the caveat  
10 that I'm not giving a legal opinion but a  
11 market structure opinion, I'm aware.

12 Q. Does the commission focus on the  
13 physical location that orders are matched on  
14 the exchange in making that determination?

15 MS. ZORNBERG: Objection. Calls  
16 for a legal conclusion.

17 A. I'm not here to give a legal  
18 opinion.

19 Q. Understanding that, I'm just  
20 asking about the facts that are or are not in  
21 your head.

22 MS. ZORNBERG: Yeah, but it's so  
23 far outside of scope that it's not  
24 proper.

25 MR. SYLVESTER: I'm not sure

1           that -- I mean, are you instructing her  
2           not to answer? It doesn't sound  
3           privileged to me. I'm asking just  
4           whether she knows or she doesn't know.

5           MS. ZORNBERG: Please note my  
6           objection.

7           MR. SYLVESTER: Fair enough.

8           MS. ZORNBERG: Improper line of  
9           questioning.

10          MR. SYLVESTER: Okay.

11         BY MR. SYLVESTER:

12                 Q.     Does the commission focus on the  
13                 physical location that orders are matched on  
14                 an exchange in order to determine whether an  
15                 exchange has to register with the commission?

16                 MS. ZORNBERG: Objection.

17                 A.     Again, with the caveat that I'm  
18                 not giving a legal opinion, I would have to go  
19                 ahead and consult the statute book and the  
20                 application of the statutes. So that question  
21                 is a complicated question.

22                 Q.     Do you know, sitting here today,  
23                 whether, in determining whether an exchange  
24                 has to register with the commission, the  
25                 commission looks at whether any component of

1 the exchange is used by US investors?

2 MS. ZORNBERG: Objection.

3 A. I'm not here to give a legal  
4 opinion. With that caveat, again, I'd have to  
5 go and do research.

6 Q. Again, just asking your  
7 understanding, do you know whether or not the  
8 commission looks at whether any component of  
9 an exchange is located in the US in  
10 determining whether or not that exchange has  
11 to register with the commission?

12 MS. ZORNBERG: Objection.

13 A. With the caveat I'm not giving a  
14 legal opinion, that's a question for which I  
15 would have to go and do research.

16 Q. Let's look at the last sentence  
17 of paragraph 113, please. That's on the top  
18 of page 71. It says:

19 "Thus, absent other specific  
20 indicia, and based on the approach  
21 outlined in this section, I would  
22 continue to conclude that trades on the  
23 exchanges in Table A other than Bittrex,  
24 Poloniex, Coinbase, and Kraken would not  
25 have occurred in the US."

1                   My question is just, what are the  
2                   other specific indicia that might affect your  
3                   opinion as set forth at the end of paragraph  
4                   113?

5                   A.       (Document review.)

6                   So what that sentence refers to  
7                   is the fact that there are no indicia with  
8                   respect to the 25 exchanges, other than the  
9                   four mentioned here, that point to the US as a  
10                  plausible location for the exchanges mentioned  
11                  outside of the four mentioned here.

12                  Q.       Let's look at your final  
13                  paragraph, paragraph 114. Second sentence,  
14                  you write:

15                         "Based on my research, it is my  
16                         understanding that many cryptocurrency  
17                         exchanges tend to avoid becoming located  
18                         in the US and falling within the purview  
19                         of US regulators."

20                  What's the basis for that  
21                  statement?

22                  A.       (Document review.)

23                  The basis for that statement is  
24                  my general research and understanding of the  
25                  marketplace.

1           Q.     Is that research and  
2     understanding of the marketplace that is  
3     specific to the preparation of this report, or  
4     something that predated your report?

5           A.     Predated.

6           Q.     Why is it, if you have an  
7     understanding, that many cryptocurrency  
8     exchanges tend to avoid becoming located in  
9     the US and falling within the purview of US  
10    regulators?

11          A.     Speculating, hypothetically. I  
12    can't speak to the exchanges themselves.  
13    Based on what I've read, I think it's a  
14    general fear of being caught potentially  
15    within regulation inadvertently. That appears  
16    to be the driving reason.

17          Q.     When you say regulation, what is  
18    it that you're referring to?

19          A.     Potentially being caught within  
20    the purview of US regulation.

21          Q.     The last two sentences of 114  
22    say:

23                   "Within this environment, it  
24    makes sense that most of the exchanges  
25    noted above would locate themselves in



1           jurisdictions outside of the US and  
2           would seek to avoid falling within US  
3           territorial borders. To the extent they  
4           do so, it is likely to be an accidental  
5           and inadvertent mistake or by way of  
6           minor, inconsequential physical presence  
7           that does not affect the location of the  
8           underlying exchange or where trades on  
9           the exchange become final."

10           Do you see that?

11           A.     Yes.

12           Q.     What is your basis for concluding  
13           that "to the extent they do so, it is likely  
14           to be an accidental and inadvertent mistake or  
15           by way of minor, inconsequential physical  
16           presence"?

17           A.     Based on my general research and  
18           understanding, as cited to the source here,  
19           the, for example, the website about how to  
20           build a cryptocurrency exchange, it is  
21           generally, as noted here, a sentiment that  
22           exchanges try and avoid falling within US  
23           regulation, within the jurisdiction of the US,  
24           and therefore, it is likely that if they do  
25           so, it would be accidental.

1 Q. What is an example of an  
2 accidental or inadvertent mistake that could  
3 have that consequence?

4 A. Hard to speculate. They may --  
5 it's hard to speculate.

6 Q. What did you have in mind when  
7 you wrote that phrase?

8 A. For example, potentially they  
9 establish a presence here of some description.

10 Q. Same question. What's an example  
11 of a minor, inconsequential physical presence?

12 A. For example, a post box or a  
13 registered office.

14 Q. In your view would a post office  
15 box or a registered office be relevant to the  
16 geographic location of the exchange?

17 A. The four indicia do not mention  
18 offices, post boxes, and so, no.

19 Q. Did anyone assist you in  
20 generating the four indicia that you apply in  
21 this report?

22 A. This was my work.

23 Q. Be that as it may, did anyone  
24 assist you in generating the four indicia that  
25 you apply in your report?

1           A.     What do you mean --

2                   MS. ZORNBERG:  Objection.

3                   THE WITNESS:  Sorry.

4           A.     I don't know what you mean by  
5     "assist" me.

6           Q.     Did you receive input from anyone  
7     as to what four indicia you should select as  
8     your methodology in your report?

9           A.     No, these were my indicia based  
10    on my research, my experience, and expertise.

11                   MR. SYLVESTER:  Okay.  I don't  
12    have any further questions at this time.

13                   Do you have redirect?

14                   MS. ZORNBERG:  Let me just  
15    consult with counsel.

16                   MR. SYLVESTER:  Sure.

17                   (Continued on the next page.)

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1 THE VIDEOGRAPHER: The time is  
2 6:00 p.m. This concludes Media 9.

3 The time is 6:01 p.m. This  
4 continues Media 9. Still on the record.

5 MS. ZORNBERG: Nothing further on  
6 behalf of the defendants.

7 MR. SYLVESTER: Wonderful.

8 Professor, thank you very much  
9 for your time today.

10 THE WITNESS: Thank you very much  
11 for your time today. I really  
12 appreciate it.

13 MR. SYLVESTER: Off the record.  
14 Okay.

15 (Discussion off the record.)

16 THE VIDEOGRAPHER: The time is  
17 6:02 p.m. This concludes Media 9 of 9.  
18 Off the record.

19 (Time noted: 6:02 p.m.)

20 - - -  
21  
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23  
24  
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## 1 CERTIFICATE OF WITNESS

2  
3  
4 I, YESHA YADAV, do hereby declare under  
5 penalty of perjury that I have read the entire  
6 foregoing transcript of my deposition testimony,  
7 or the same has been read to me, and certify that  
8 it is a true, correct and complete transcript of  
9 my testimony given on February 11, 2022, save and  
10 except for changes and/or corrections, if any, as  
11 indicated by me on the attached Errata Sheet, with  
12 the understanding that I offer these changes and/or  
13 corrections as if still under oath.

14 \_\_\_\_\_ I have made corrections to my deposition.

15 \_\_\_\_\_ I have NOT made any changes to my deposition.

16  
17 Signed: \_\_\_\_\_  
YESHA YADAV

18  
19 Dated this \_\_\_\_\_ day of \_\_\_\_\_ of 20\_\_\_\_.

## C E R T I F I C A T E

STATE OF NEW YORK )

: ss.

COUNTY OF NASSAU )

I, PATRICIA A. BIDONDE, a Notary  
Public within and for the State of New  
York, do hereby certify:

That YESHA YADAV, the witness  
whose deposition is hereinbefore set  
forth, was duly sworn by me, and that  
such deposition is a true record of the  
testimony given by the witness.

I further certify that I am not  
related to any of the parties to this  
action by blood or marriage, and that I  
am in no way interested in the outcome  
of this matter.

IN WITNESS WHEREOF, I have  
hereunto set my hand this day, February  
11, 2022.

---

PATRICIA A. BIDONDE  
Stenographer  
Registered Professional Reporter  
Realtime Certified Reporter



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E R R A T A (Continued)

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_____	_____
Date	Yesha Yadav



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# Exhibit 20

**UNITED STATES DISTRICT COURT  
SOUTHERN DISTRICT OF NEW YORK**

SECURITIES AND EXCHANGE  
COMMISSION,

Plaintiff,

v.

RIPPLE LABS INC., BRADLEY  
GARLINGHOUSE, and CHRISTIAN A.  
LARSEN,

Defendants.

Case No. 20 Civ. 10832 (AT) (SN)

**Expert Report of Professor Yesha Yadav**

October 4, 2021

*Designated Highly Confidential*

*Pursuant to the Protective Order Filed March 9, 2021*

## **I. Qualifications and Experience**

1. I am a Professor of Law and Associate Dean and Robert Belton Director for Diversity, Equity and Community at Vanderbilt Law School. I also serve as the Faculty Co-director of the Law School's Masters-in-Law (LL.M.) Program. At Vanderbilt Law School, I have taught courses covering securities regulation, corporate bankruptcy, market structure, financial markets, and financial innovation where I focus on digital financial technologies categorized under the rubric of "fintech," or financial technology. A copy of my curriculum vitae, including a list of all the publications I have authored in the previous ten years, is attached as **Exhibit A**. I have not testified as an expert at trial or by deposition in the previous four years.

2. My research, consistently published in the leading law journals, examines the regulation of market structure, credit risk, financial innovation, and financial system stability. This research agenda necessitates an interdisciplinary and real-world lens through which to understand the systems and processes underlying securities market trading; the design of exchanges, domestic and international; alternative trading platforms; financial risk management; and technological innovation. This research spans equity markets, derivatives (exchange-traded and over-the-counter), corporate bond and U.S. Treasury markets, and fintech including cryptocurrencies. I have developed a particular specialty in market microstructure and the dynamics of securities market trading, clearing and settlement. This discipline broadly describes the nuts-and-bolts processes and systems that enable securities trading to take place in markets like equities, derivatives, or Treasuries; and how markets operationally produce informative prices for efficient capital allocation and safeguard their trading systems from fragility and disruption. As reflected in my research, this discipline sits at the intersection of literature in financial economics, policymaking, industry practice, and regulation. My work also engages with international developments in market design to explore how foreign jurisdictions organize their trading markets; oversee innovation; and contend with frictions and opportunities created by cross-border flows of capital, traders, investors, and information.

3. I have a dedicated research focus as well as specific teaching interests in the areas of fintech, cryptocurrencies and distributed ledger technologies (DLT) (or blockchains) that reflect particular expertise cultivated over my academic career. In researching

*Fintech and the Innovation Trilemma* (co-authored with Prof. Chris Brummer), published in the *Georgetown Law Journal*, and selected for reprinting in the *Corporate Practice Commentator*, I explored in-depth the workings of technologies underlying modern-day fintech – exemplified, *inter alia*, by cryptocurrencies and blockchains – and the challenges these create for conventional regulatory paradigms.<sup>1</sup> As evidenced throughout this work, the task of theorizing on how fintech differs from past eras of innovation and why that matters for regulation required me to engage deeply with the technology being developed at the frontiers of fintech, including within the context of crypto-markets and blockchains. Given the global nature of fintech – as highlighted by the international use and trading of cryptocurrencies – I have extended this research to examine the cross-border regulation of fintech and approaches to fintech regulation in foreign jurisdictions. As a lawyer that specialized in working in international financial standards prior to joining academia, my research has focused on how effectively international standards can apply in this area and the implications of divergent jurisdictional approaches to the supervision of highly mobile and geographically dispersed cross-border technologies (*e.g.*, cryptocurrencies).<sup>2</sup>

4. I am working on several projects that examine the regulation of cryptocurrencies and blockchains. First, I am presently working on a project analyzing cryptocurrency exchanges and their capacity to deliver private oversight in the marketplace akin to traditional exchanges that carry the designation of self-regulatory organizations (SRO). My focus lies in determining whether unique aspects about the design and structure of cryptocurrency exchanges will impact their capacity to deliver robust oversight of their marketplace and users. In a separate project, I am researching the application of international regulatory standards on market infrastructure (*e.g.*, in relation to capital standards and risk management) to cryptocurrency exchanges. I am also pursuing two pieces of study on regulatory issues in relation to central bank digital currencies.

5. As noted above, I have taught seminars at Vanderbilt Law School focused on financial technology that necessarily included instruction on cryptocurrencies and the role of

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<sup>1</sup> Chris Brummer & Yesha Yadav, *Fintech and the Innovation Trilemma*, 107 GEO. L. J. 235 (2019).

<sup>2</sup> Yesha Yadav, *Fintech and International Financial Regulation*, 53 VAND. J. TRANSNAT'L L. 1109 (2020).

blockchains. My teaching philosophy for this seminar lies in ensuring that law students understand the fundamentals of the underlying technologies as much as they engage with their risks and regulation. For example, in discussing cryptocurrencies, I seek to provide students with an overview of the computational principles that are utilized in the creation of cryptocurrencies like Bitcoin (*e.g.*, to explain the need for mining within its decentralized blockchain).

6. In relation to more traditional market structure, my academic work has focused on several key areas to develop an account of how financial innovation impacts fundamental concepts in securities and financial regulation. A brief overview of this ongoing research and key areas of focus are described below.

7. First, a key focus of my research has been on the impact of innovative high-speed automation in trading and market design covering the stock market and the market for U.S. Treasuries. This body of work highlights ways in which algorithmic trading impacts the production of efficient information flows and prices in U.S. securities markets, as well as various risks that are generated in markets that are reliant on high-speed trading for liquidity. It also details how regulation and industry incentives have led stock exchanges to reshape their trading systems to accommodate this technological shift. As part of my research, I endeavor to understand the real-world operation of trading market microstructure and the detailed processes and systems that exchanges build to enable trading. In *Insider Trading and Market Structure*, for example, I focused on the technological developments in communication and order submission systems that exchanges have developed to facilitate high-speed automated trading.<sup>3</sup> This work has involved researching the detailed logistics involved in data capture by traders, order submission, matching, and price-updating to determine whether high-speed traders enjoy special advantages in trading relative to those that transact from spaces that are not co-located with those of an exchange. In researching *How Algorithmic Trading Undermines Efficiency in Capital Markets*, I studied the ways in which high speed traders use creative order choice and order submission techniques to operationalize a variety of trading strategies.<sup>4</sup> The goal of this

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<sup>3</sup> Yesha Yadav, *Insider Trading and Market Structure*, 63 UCLA L. REV. 968 (2016).

<sup>4</sup> Yesha Yadav, *How Algorithmic Trading Undermines Efficiency in Capital Markets*, 68 VAND. L. REV. 1607 (2015).



work was to develop an account of how high-speed trading affects the quality of price formation with a view to connecting these shifts to regulation that relies on securities prices as a monitoring lever for market participants and regulators. For *The Failure of Liability in Modern Markets*, I studied markets more broadly from a structural standpoint to examine interconnections between exchanges and platforms across asset classes, opining that high-speed trading upends conventional ways of thinking about the liability standards that underpin market regulation (e.g., negligence, strict liability and intent).<sup>5</sup> Relatedly, in my article, *The Failed Regulation of U.S. Treasury Markets*, I have focused on the microstructure of the U.S. Treasury market to detail the impact of recent shifts towards automated trading technologies that have resulted in novel and unexamined risks being faced by the world's preeminent risk-free market and to explain why current regulatory approaches are insufficient in light of these risks. For this area of work, I closely study the microstructure of trading in U.S. Treasuries as well as issues in relation to clearing and settlement of U.S. Treasuries.<sup>6</sup>

8. Second, my academic work focuses on the significance of exchanges, trading platforms and clearinghouses as critical actors in private industry self-governance. It details the amplified importance assumed by providers of financial markets infrastructure in offering oversight of technologically innovative, transactionally complex markets. As part of this research, I study innovations such as alternative equity trading platforms or disintermediating financial technologies (e.g., blockchains) to analyze the ways in which creativity in platform design can affect the delivery of oversight and risk management in financial markets. In *Oversight Failure in Securities Markets*, for example, I researched, *inter alia*, how traders transact across multiple platforms – exchanges as well as alternative trading venues – to execute trading strategies.<sup>7</sup> I speak to traders to gain insight into their trading mechanisms, the risks they face and their lived experience of trade execution quality – and also engage with exchange providers. These conversations facilitate discussions of costs entailed in trade execution to help nurture thinking about structural, technological solutions. From early in my academic career and following on from my professional work as a lawyer with expertise in

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<sup>5</sup> Yesha Yadav, *The Failure of Liability in Modern Markets*, 102 VA. L. REV. 1031 (2016).

<sup>6</sup> Yesha Yadav, *The Failed Regulation of U.S. Treasury Markets*, 121 COLUM. L. REV. 1173 (2021); Pradeep Yadav & Yesha Yadav, *Fragile Financial Regulation*, VAND. L. RSCH. PAPER NO. 20-46 (2021).

<sup>7</sup> Yesha Yadav, *Oversight Failure in Securities Markets*, 104 CORNELL L. REV. 101 (2019).

financial markets infrastructure, I have also studied clearinghouses and how they settle transactions. As clearinghouses have taken on greater significance in risk management of complex derivatives globally following the 2008 financial crisis, I have examined how effectively they might perform this role to safeguard themselves and the financial system from transactional and counterparty risks.

9. Third, my research explores the impact of financial innovation – and in some cases, the lack thereof – on market quality and investor protection. Most recently, I have worked extensively on the microstructure of U.S. Treasury and U.S. corporate bond markets to describe the systematic risks and economic costs they create for everyday investors and for the effectiveness of these markets as conduits of capital. For example, in *The Broken Bond Market* (with Prof. Jonathan Brogaard), I studied over-the-counter bond market microstructure to develop an understanding of why bond markets appear to lack important attributes like liquidity and transparency.<sup>8</sup> This work has involved exploring trade execution mechanisms in over-the-counter markets to develop an account of why these are falling short in producing important efficiencies for trading.

10. Finally, because capital is global and mobile, my research also focuses on comparative analysis of these issues across foreign jurisdictions, building on my professional background in cross-border work as a regulatory lawyer at Clifford Chance LLP and at the World Bank. It studies the approaches adopted by foreign regulators and international standard-setting bodies to regulate innovation, risk-taking and the governance of financial institutions, noting jurisdictional divergences in supervisory strategies and examining their implications for understanding how international firms and technologies operate, the ease of geographic migration and the challenges these create for domestic regulators.

11. My research has been cited in judicial decisions by the U.S. Supreme Court, the U.S. Court of Appeals for the District of Columbia Circuit, and the U.S. Court of Appeals for the Sixth Circuit.<sup>9</sup> It has been referenced by securities regulators and policymakers

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<sup>8</sup> Jonathan Brogaard & Yesha Yadav, *The Broken Bond Market*, Working Paper (2021).

<sup>9</sup> *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 220 (2014) (citing Yesha Yadav, *The Problematic Case of Clearinghouses in Complex Markets*, 101 GEO. L. J. 387, 406–12 (2013), for the proposition that

in the U.S. and abroad. Additionally, my work has been covered by the business media, including by the Wall Street Journal, Bloomberg News, the Financial Times, and the Economist. I have been invited to present my research to regulators and policymakers in the U.S. as well as internationally. As an academic specializing in U.S. and comparative financial regulation, I have delivered research talks at leading universities in the U.S., Europe, Asia, South America, and Australia. Finally, my research has been recognized institutionally. At Vanderbilt University, I was selected to receive a Chancellor Faculty Fellowship for 2019-2021, reflecting the institution's commitment to recognizing outstanding, recently-tenured faculty. I also serve on the board of editors for the Capital Markets Law Journal and the International Economic Law Journal (both, Oxford University Press).

12. My academic interests reflect my professional background and areas of specialization. Prior to joining academia, I worked as a lawyer in the London and Paris offices of Clifford Chance LLP, a leading international law firm, specializing in financial regulation and derivatives. As part of this practice group, I developed a particular focus on issues affecting financial market infrastructure providers like exchanges and clearinghouses. This work entailed building an understanding of the detailed processes underlying risk management of such institutions, often with a cross-border perspective.

13. Additionally, I was one of the two main financial regulatory lawyers assigned to advise the European Payments Council (EPC) in the development of a harmonized and standardized transactional environment for euro payments across the European Economic Area (EEA) and Switzerland - an initiative known as the Single Euro Payments Area (SEPA). In this capacity, I worked extensively with the EPC as a key resource person to draft the rules governing SEPA payment schemes, advise on technical standards and risk management for various kinds of payments and work with industry and European Union (EU) regulators to implement this initiative. In bringing together a fragmented system of domestic payment

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clearinghouses are a building block of the modern economy); *Coburn v. Evercore Trust Co.*, 844 F.3d 965, 969 (D.C. Cir. 2016) (quoting Yesha Yadav, *How Algorithmic Trading Undermines Efficiency in Capital Markets*, 68 VAND. L. REV. 1607, 1632 (2015), for an explanation of efficient capital market theory in the context of algorithmic trading); see also *Saumer v. Cliffs Nat. Res. Inc.*, 853 F.3d 855, 859 (6th Cir. 2017) (same).

schemes within a harmonized and integrated payments environment, SEPA is now a critical part of the financial ecosystem in the EEA, Switzerland, and the United Kingdom.<sup>10</sup>

14. In 2008, I joined the World Bank as legal counsel in the Legal Vice Presidency. My work at the World Bank further developed my interest and specialization in market regulation and risk management. At the World Bank, I worked as part of a small team of specialist lawyers focused on assessing the regulatory systems of World Bank client countries with a particular emphasis on studying and opining on the effectiveness of domestic insolvency, restructuring and credit risk management regimes. In addition, the team advised more broadly on issues concerning the health of domestic financial markets as measured against the standards expounded by the Financial Stability Board.<sup>11</sup> This work was international and comparative in nature and was designed to analyze the workings of domestic regulatory environments within the larger context of transnational best practices, standards, and benchmarks. While working at the World Bank, I also served as the Acting Research Director for the Committee on Capital Markets Regulation, a leading think tank on issues relating to financial regulation and policy reform.

15. Since joining academia, I have engaged actively with policymakers and industry participants, both domestically and internationally, on matters concerning financial innovation, market structure, and the impact of emerging digital technologies on regulatory standards. I was a member of the Atlantic Council's Task Force examining the diverging implementation of financial regulatory standards between the U.S. and the E.U. after the 2008 Financial Crisis and focusing on reform efforts in the area of derivatives and clearinghouses.<sup>12</sup> I was selected to serve as an Honorary Advisor to India's Financial Services Law Reform Commission as part of India's wide-ranging overhaul of its domestic regulatory system following the 2008 Financial Crisis.

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<sup>10</sup> See European Commission, *Single Euro Payments Area (SEPA)*, [https://ec.europa.eu/info/business-economy-euro/banking-and-finance/consumer-finance-and-payments/payment-services/single-euro-payments-area-sepa\\_en](https://ec.europa.eu/info/business-economy-euro/banking-and-finance/consumer-finance-and-payments/payment-services/single-euro-payments-area-sepa_en).

<sup>11</sup> Financial Stability Board, *Key Standards for Sound Financial Systems*, [https://www.fsb.org/work-of-the-fsb/about-the-compendium-of-standards/key\\_standards/](https://www.fsb.org/work-of-the-fsb/about-the-compendium-of-standards/key_standards/).

<sup>12</sup> Chris Brummer, Atlantic Council, *The Danger of Divergence: Transatlantic Financial Reform & the G20 Agenda* (Dec. 2013), 29–48.

16. Since 2018, I have been a member of the Commodity Futures Trading Commission's (CFTC) Technology Advisory Committee (TAC). As part of this role, I have participated in the TAC's subcommittees on Distributed Ledger Technology (DLT) (blockchain) and Algorithmic Trading and acted as the recent co-chair of the DLT subcommittee. In recent years, the DLT subcommittee and the TAC have examined issues in relation to the potential deployment of blockchain-based technologies for payment and settlement in derivatives markets with a view to informing the CFTC about the opportunities and challenges these present.<sup>13</sup> Reflecting my interest in exchange oversight, I sit as a member of the Hearings Panel of the Nasdaq as part of its panel of outside experts examining breaches of listing rules. At Vanderbilt Law School, I am a part of a small interdisciplinary group of Vanderbilt University scholars working to develop a research-based prediction market for measures relating to climate.

17. I hold a MA(Hons)(First Class) in Modern Languages and Law from the University of Cambridge and a Masters-in-Law from Harvard Law School. While at Harvard Law School, I served as a researcher for the Committee on Capital Markets Regulation as part of its efforts to produce a detailed report into the 2008 Financial Crisis.

18. I am being compensated at my ordinary hourly rate of \$800 per hour. No part of my opinion is based in any way on my compensation, and my compensation is not dependent on the outcome of this matter or the substance of the opinions that I render.

## **II. Scope of Assignment, Materials Relied Upon and Summary**

19. I have been retained by Debevoise & Plimpton LLP and Kellogg, Hansen, Todd, Figel & Frederick P.L.L.C., on behalf of Ripple Labs Inc., ("Ripple"), as well as by Paul, Weiss, Rifkind, Wharton & Garrison LLP, on behalf of Christian Larsen, and Cleary Gottlieb Steen & Hamilton LLP, on behalf of Bradley Garlinghouse. I have been asked by counsel for Ripple to offer an opinion on how offers to buy and sell, and trades of, cryptocurrencies are

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<sup>13</sup> E.g., Commodity Futures Trading Commission, *CFTC's Technology Advisory Committee to Meet on October 3, 2019*, <https://www.cftc.gov/PressRoom/Events/opaeventtac100319>.

made on cryptocurrency exchanges, the location of those offers and trades, and the location of various cryptocurrency exchanges.

20. In forming my opinions, I reviewed academic literature and relied on my own experience. I also requested, reviewed, and considered additional materials, information, and documents in order to form the opinions I express in this report. A list of the materials I considered in forming my opinions is attached hereto as **Exhibit B**. In addition, to the extent not reflected in Exhibit B, I considered and relied on material that is reflected in the footnotes in this report.

21. All opinions expressed herein are mine alone.

22. This report is organized as follows. Sections III & IV provide background on the core functions of traditional exchanges, cryptocurrency exchanges, and blockchains and set out key facts, principles and research that ground my conclusions. In Section V, I conclude that offers to buy and sell of cryptocurrencies that are posted to an exchange, once matched on the exchange in accordance with exchange rules, become final and binding on the exchange as soon as they are matched by the exchange in accordance with exchange rules. Therefore, as soon as offers to buy and sell cryptocurrencies are posted on and matched by an exchange in accordance with its rules, I conclude that they become final and binding transactions at the geographical location where the exchange is based. Section VI examines settlement procedures for cryptocurrency transactions to conclude that cryptocurrency transactions become final and binding as soon as the exchange matches buy and sell orders in accordance with its rules. To give effect to this binding transaction and move value between exchange users, it is common industry practice for exchanges to settle transactions on the books of the exchange itself by adjusting the respective balances of user accounts. In any event, because transactions become binding as soon as orders are matched on and by the exchange, finality does not depend on publication on a blockchain. In fact, owing to the proliferation of in-house settlement, an unknown and substantial number of exchange-traded cryptocurrency transactions are never recorded on blockchains. Section VII examines the location of the exchanges listed in Table A and concludes that most of the exchanges listed in Table A lack any significant indicia showing that offers on these exchanges are made in the United States, or that trades being matched on

these exchanges become final and binding in the United States, or that those exchanges could be properly considered to be domestic exchanges. Further, while four exchanges may have indicia suggesting a connection to the United States, determinations about where particular offers were made and where trades became final and binding in their context must be undertaken on a case-by-case basis, as trading may have occurred through a foreign arm of each of these four exchanges and therefore outside of the United States.

23. My opinions are based on the information available to me as of the date of this report. Should additional relevant documents or information be made available to me, I may adjust or supplement my opinions as appropriate.

### III. Background on the Role and Function of Exchanges

24. Cryptocurrency exchanges have many structural features in common with traditional commodities or stock exchanges.<sup>14</sup> Their growth in recent years has been rapid and economically significant, with trillions of dollars' worth of trades moving through their venues on a monthly basis. Consider Binance – the world's largest cryptocurrency exchange by trading volume. In May 2021, it reportedly hosted around \$1.5 trillion worth of spot trades,<sup>15</sup> seeing around \$20-\$30 billion in daily trading volume.<sup>16</sup> These figures represented a gain of 63% from April 2021.<sup>17</sup> This substantial trading volume reflects, in part, the fruits of a tried-and-tested approach to platform design, likely evidencing familiarity among market participants to the experience and transactional practices of traditional exchanges, such as those used to trade commodities.

25. To situate the role and function of cryptocurrency exchanges specifically, it is helpful to outline the economic role and function of exchanges generally. Below, I set out

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<sup>14</sup> Cong et al., *Crypto Wash Trading*, Working Paper, 3 (Jul. 2021).

<sup>15</sup> Lyllah Ledesma, *Binance Extended Crypto Exchange Dominance During May Trading Frenzy*, COINDESK, Jun. 7, 2021.

<sup>16</sup> Jen Wiczner, *The World's Largest Crypto Exchange Keeps Losing CEOs*, NEW YORK MAGAZINE, Aug. 17, 2021. Spot trades refer to trades in the actual coins and tokens, rather than to any derivatives that may reference the coins and tokens. It is worth noting that Binance and other exchanges also transact in derivatives written on popular crypto-assets.

<sup>17</sup> Ledesma, *supra* note 15.



an introduction to traditional exchange design, highlighting key aspects of its usefulness for anchoring markets in claims and for establishing the operational mechanisms of trading.

*A Brief Introduction to Exchange Design and Trading Mechanics*

26. Exchanges constitute an essential pillar of the economy.<sup>18</sup> In the absence of exchanges, capital faces costly frictions to move from one party to another and risk can become hard to manage.<sup>19</sup> Those wishing to trade must independently find one another, perform due diligence on and negotiate with their counterparty, make a deal, and then finally send payment to receive the agreed-upon assets.<sup>20</sup> Such systematic costs can diminish or eliminate the incentives of those looking to enter the market. Those that do should rationally charge more for their participation or anticipate receiving less capital than they might otherwise receive to reflect in-built costs.<sup>21</sup> These kinds of frictions can result in market participants facing information gaps, lacking confidence in a deal's integrity, and becoming forced to take extra care to reduce the risk that counterparties fail to honor their end of the bargain.<sup>22</sup>

27. Exchanges have a storied history, including in the U.S., arising out of private efforts to reduce these and other frictions entailed in bilateral trading. For example, to respond to vibrant interest among farmers looking to sell their grain, others looking to buy it – and with speculators in the middle – the Chicago Board of Trade came into being in 1848. It became a recognizably formal exchange in the 1860s, setting rules governing such matters as standardized contracts, grain inspections, margin, delivery, and acceptable trader conduct.<sup>23</sup>

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<sup>18</sup> Stavros Gadinis & Howell E. Jackson, *Markets as Regulators: A Survey*, 80 S. CAL L. REV. 1239, 1242 (2007).

<sup>19</sup> For example, risks may be mitigated by entering into derivatives contracts to hedge exposures. A farmer expecting a harvest can enter into a future/forward contract to sell their grain at a specific price at a particular time in the future, ensuring that they can receive a set price for their goods. On the other side, a consumer of grain agrees to purchase the contract, ensuring a floor to the price they pay for the goods. In this way, both parties can reduce their economic risk of commodity price fluctuations.

<sup>20</sup> Yesha Yadav, *Oversight Failure in Securities Markets*, 104 CORNELL L. REV. 101, 113–16 (2019).

<sup>21</sup> See, e.g., Aswath Damodaran, *Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2021 Edition*, 11–14 (2013).

<sup>22</sup> Craig Pirrong, *A Theory of Financial Exchange Organization*, 43 U. CHI. J. L. & ECON. 437, 439–40 (2000).

<sup>23</sup> Commodity Futures Trading Commission, *US Futures Trading and Regulation Before the Creation of the CFTC*, [https://www.cftc.gov/About/HistoryoftheCFTC/history\\_precftc.html](https://www.cftc.gov/About/HistoryoftheCFTC/history_precftc.html); Jeffrey C. Williams, *The Origin of Futures Markets*, 56 AGRIC. HIST. 306 (1982).



Over time, other Boards of Trade and commodities exchanges emerged across the country, facilitated and linked by easier communication and travel between major cities.<sup>24</sup> With various Boards of Trade and commodity exchanges convening participants and creating rules-of-the-road, commodity and other futures markets expanded in their reach and sophistication.<sup>25</sup> In the context of stock exchanges, brokers have come together since the earliest days of the Republic to standardize and systematize the trading process. In signing the famous Buttonwood Agreement in 1792 – originating the New York Stock Exchange (NYSE) – 24 stockbrokers contractually bound themselves to a set of multilateral rules designed to enable cheaper and more predictable trading between them.<sup>26</sup> By bringing interested parties together to transact in accordance with group norms, exchanges have reflected the aim of reducing search costs, easing the process of coming to agreement, mitigating the risks of contract default and building confidence about the integrity of the marketplace by applying centrally-governed rules and standards.<sup>27</sup>

28. Crucially, when performing effectively, exchanges can create a virtuous cycle that yields a multitude of economic benefits. By increasing confidence among market participants and responding to economic needs and preferences (e.g., to hedge risk or invest capital for future returns), exchanges can generate positive “network effects.”<sup>28</sup> In other words, smooth trading encourages more and more participants, which in turn reduces transaction costs and builds even more momentum for others to join the market. Such network effects have real power in financial markets.<sup>29</sup> Notably, their presence enhances the “liquidity” of the exchange. That is, in ever greater numbers, market participants can transact with increasing ease, more cheaply and avoid causing sudden price crashes and spikes if trading parties cannot be found.<sup>30</sup> With large groups wishing to trade, exchanges can attract engaged market makers – professional

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<sup>24</sup> Commodity and Futures Trading Commission, *supra* note 23; Williams, *supra* note 23.

<sup>25</sup> Williams, *supra* note 23.

<sup>26</sup> Olivia Waxman, *How a Financial Panic Helped Launch the New York Stock Exchange*, TIME (May, 17, 2017); Paul G. Mahoney, *Exchange as Regulator*, 83 VA. L. REV. 1453, 1459–60 (1997).

<sup>27</sup> Mahoney, *supra* note 26, 1460–62.

<sup>28</sup> See, e.g., Haim Mendelson, *Consolidation, Fragmentation and Market Performance*, 22 J. FIN. QUAN. A. 189 (1987).

<sup>29</sup> For discussion see, e.g., Ananth Madhavan, *Market Microstructure: A Survey*, 3 J. FIN. MKTS. 205, 226–27 (2000).

<sup>30</sup> *Id.*

traders that stand ready to use their own supply of cash and tradeable assets to lubricate the flow of transactions, assuring investors that a counterparty is always available even when investors might not find others to transact with them.<sup>31</sup> With deep liquidity, those that wish to buy or hedge risk at a particular moment can do so, making the most of any private information that they may have.<sup>32</sup> Alternatively, others can sell at their chosen time, releasing cash and exiting risk to reflect their preference. By allowing such fluid transfers of risk, economic benefits can redound widely where those best placed to bear the risk calibrate a precise price for their services, while those that need the market for capital or risk protection can access it seamlessly. Additionally, speculators can enter and exit the market, contributing liquidity and providing information.

29. Network effects and resilient liquidity can also contribute to building efficient, informative prices. By encouraging participants to the marketplace, exchanges can attract a lively mix of informed, lesser informed and uninformed actors whose combined interactions can produce insightful prices.<sup>33</sup> It is a cornerstone of finance theory that trading markets offer efficiencies where the prices they create quickly reflect publicly available information.<sup>34</sup> The ability to gather a diverse mix of participants, possessing varying levels of information and expertise, can help to mobilize the process of making markets efficient, pooling reserves of information and extracting a price from an interactive trading environment. That is, knowledgeable actors will place offers and engage in trades that reflect the general trajectory of a contract's likely performance, leading prices to eventually move as others follow their lead and converge upon a value that best approximates the worth of the contract's future cash flows at a given point in time. To be sure, theory recognizes that this process is not perfect. Participants can behave irrationally, for example.<sup>35</sup> They may overweight certain pieces of key

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<sup>31</sup> Lawrence R. Glosten, *Insider Trading, Liquidity and the Role of the Monopolist Specialist*, 62 J. BUS. 211 (1989).

<sup>32</sup> Lawrence R. Glosten & Paul R. Milgrom, *Bid, Ask and Transaction Prices in a Specialist Market with Heterogeneously Informed Traders*, 14 J. FIN. ECON. 71 (1985).

<sup>33</sup> Ronald J. Gilson & Reinier H. Kraakman, *The Mechanisms of Market Efficiency*, 70 VA. L. REV. 549 (1984).

<sup>34</sup> Eugene F. Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, 25 J. FIN. 383, 383 (1970); Gilson & Kraakman, *supra* note 33.

<sup>35</sup> See generally, Lawrence H. Summers, *Does the Stock Market Rationally Reflect Fundamental Values?*, 41 J. FIN. 591 (1986).

information and underweight others, showcasing various biases that muddy the clarity of prices. Nevertheless, it is broadly accepted that busy, liquid markets can help achieve informative prices.<sup>36</sup> By revealing the state of a contract's value through an easily understood measure, liquid exchange-based markets provide an essential tool – prices – through which to understand dematerialized claims (*e.g.*, futures contracts, swaps, shares or bonds) that can lack any inherent worth, or would otherwise be difficult to value.<sup>37</sup>

30. Importantly, from their very beginnings, exchanges have set the rules and industry practices that organize how transacting parties interact with one another on the venue.<sup>38</sup> Those wishing to enjoy the economic services of an exchange would first have to agree to abide by these rules.<sup>39</sup> In the case of commodities exchanges, for example, Boards of Trade established standardized terms that govern contract sales between trading parties.<sup>40</sup> Similarly, members forming the NYSE crafted common terms for solving differences about finality of transactions and what to do if a party defaulted.<sup>41</sup> This focus on standardization continues to this day, and means that parties can transact in accordance with a pre-accepted set of terms that are common to all deals – no matter the quantity of the assets being traded, their type or quality (*e.g.*, a certain kind of wheat), the method of payment, delivery specifications, settlement mechanisms, future maturity dates, etc. – as managed by a centralized authority (the exchange). By creating a shared set of terms, exchange rules establish market expectations regarding what trade is executed on the exchange, in what form, how trading takes place, when trades become binding on the venue, who can trade on the exchange, how traders must behave, what resources they must possess, how they should protect the market from their default, and what kind of discipline the exchange can assert to safeguard market integrity. Standardization thus builds

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<sup>36</sup> Ronald J. Gilson & Reinier Kraakman, *Market Efficiency after the Financial Crisis: It's Still a Matter of Information Costs*, COLUM. L. ECON., Working Paper No. 470 (2014).

<sup>37</sup> Gilson & Kraakman, *supra* note 33; James Dow et al., *Incentives for Information Production in Markets where Prices Affect Real Investment*, 15 J. EUR. ECON. ASS'N 877 (2017).

<sup>38</sup> Commodity Futures Trading Commission, *supra* note 23.

<sup>39</sup> Mahoney, *supra* note 26, 1459–61.

<sup>40</sup> Commodity Futures Trading Commission, *supra* note 23.

<sup>41</sup> Mahoney, *supra* note 26, 1459–61.

certainty and stability, and encourages liquidity.<sup>42</sup> It shapes how traders interact with one another and within the larger marketplace.<sup>43</sup>

31. Additionally, in the U.S., regulation requires exchanges to act as self-regulatory organizations (SROs) and to ensure the enforcement of securities laws and industry standards on their venue.<sup>44</sup> As detailed below, modern financial exchanges generally mandate compliance by members with a detailed rulebook that governs, *inter alia*, trading, transaction finality, settlement, and exchange discipline.<sup>45</sup> By seeking to create standards and certainty through their rulebooks, exchanges can achieve two critical goals. First, they help individual actors transact on terms that are well-known in advance, reducing the cognitive and logistical burdens of evaluating deals and processing risk. This brings positive payoffs by helping to generate network effects, informed trading, and price efficiencies. Second, exchange rulemaking can organize the experience of the market by shaping how its participants expect to trade and the environment in which this trading occurs. With exchange rules creating expectations about the ease of trading, finality, speed, cost and integrity, participants can have greater confidence about structuring their own economic interactions in reliance on the exchange's promise and capacity to perform. As a result, farmers can have confidence that they will receive \$1000 dollars for their wheat in three months' time after purchasing a futures contract on these terms on the exchange. Expecting this \$1000, they can enter their own contracts to purchase seeds or machinery. They will also make provision to harvest the wheat in time and to warehouse and deliver it to the exchange at the conclusion of three months. Importantly, unrelated third parties, too, gain a reliance interest in the exchange's workings. For example, sellers of the seed and machinery will depend on the farmer's business, as will those operating the warehouse and delivery transport. And if the farmers and their counterparties have a dispute about the terms of their transactions, the exchange can serve as a centralized authority to enforce its rules.

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<sup>42</sup> See generally, Jonathan Brogaard & Yesha Yadav, *The Broken Bond Market*, Working Paper (2021).

<sup>43</sup> Mahoney, *supra* note 26, 1459–61.

<sup>44</sup> Yadav, *supra* note 20, 1818–26; see also Exchange Act § 6(a), 15 U.S.C. § 78f(b) (2000); Roberta Karmel, *Should Securities Industry Self-Regulatory Organizations Be Considered Government Agencies*, 14 STAN. J. L. BUS. & FIN. (2008).

<sup>45</sup> See, e.g., Chicago Mercantile Exchange, *CME Rulebook*, <https://www.cmegroup.com/rulebook/CME/>.

*Key Aspects of the Microstructure of Exchange Trading*

32. In addition to possessing features in common with traditional exchanges, cryptocurrency platforms also share many microstructural similarities. To operationalize trading, cryptocurrency exchanges utilize key conventions that have long been relied on by traditional venues to enable order submission, matching, trade execution and information dissemination. A full description of exchange microstructure is outside the scope of this opinion. However, below, I briefly describe some key processes by which traditional financial exchanges connect buyers and sellers as part of a fluid trading environment.

33. Traditional financial exchanges today are largely automated and electronic.<sup>46</sup> This means that the popular image of bustling trading pits has been replaced by a present-day reality where computerized processes guide virtually all aspects of trading. Order submission, matching, trade execution and settlement are thus completed by trading algorithms – broadly defined as pre-programmed computerized instructions that encode a set of actions in relation to the trading process.<sup>47</sup> Viewing exchanges in terms of simple brick-and-mortar entities is thus mostly obsolete. Instead, the exchange’s “floor” is more accurately seen as a function of its internal computerized matching engines. When a person wishes to make an order to buy or sell on an exchange, automated algorithms can receive exchange data, process it, attach a value to the input, put a price to an electronic order and then submit the order into the exchange’s order submission system. The orders to buy and sell are automatically processed by and executed through the matching engine of the exchange. The exchange then updates the

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<sup>46</sup> Alain Chaboud et al., *Rise of the Machines: Algorithmic Trading in the Foreign Exchange Market*, INT’L FIN. DISCUSSION PAPERS, No. 980 (July 5, 2013). While trading is mostly electronic, the NYSE, for example, maintains a small floor trading presence to backstop trading operations particularly when markets open and close. For discussion on the impact of floor trading on the NYSE, see Jonathan Brogaard et al., *Does Floor Trading Matter?* Working Paper (Jan. 2021). In the derivatives markets, the Chicago Mercantile Exchange closed its floor trading facilities in response to the COVID-19 pandemic and took the decision to shut it down permanently in May 2021, while maintaining discrete floor trading within certain product categories. CME Group, *Update on Trading at CME Group*, <https://www.cmegroup.com/company/information.html>.

<sup>47</sup> Yadav, *supra* note 4, **Error! Bookmark not defined.**, 1617–30; John Bates, *Algorithmic Trading and High Frequency Trading: Experiences and Thoughts on Regulatory Requirements*, Tech. Advisory Comm., U.S. Commodity Futures Trading Comm’n, Technological Trading in the Markets 27 (2010), [http://www.cftc.gov/ucm/groups/public/@newsroom/documents/file/tac\\_071410\\_binder.pdf](http://www.cftc.gov/ucm/groups/public/@newsroom/documents/file/tac_071410_binder.pdf) (“An algorithm is ‘a sequence of steps to achieve a goal’---and the general case of algorithmic trading is ‘using a computer to automate a trading strategy.’”).

internal books and records that it maintains to reflect the outcomes of the executed trade.<sup>48</sup> This is all done without real-time human intervention and at speeds and data quantities that are excessive for human beings to achieve.<sup>49</sup> In this way, the “floor” or “pit” is now very much electronic and essentially dematerialized.<sup>50</sup>

34. Exchanges generally stipulate precise rules and processes in relation to the order submission and matching process that they use. Each exchange’s rules set out the specific steps that the exchange requires to be met for orders to be valid and active in the matching engine. Otherwise, trades cannot occur. For example, the CME stipulates that all trading must occur on or through its trading facilities and in compliance with its rulebook to be acceptable.<sup>51</sup> Irrespective of how an order is submitted – using one trading firm’s electronic interface or another’s – it must be routed through the CME Globex trading platform and matched using CME Globex matching algorithms.<sup>52</sup> The CME also internally vets each order to ensure that it conforms with its standards. As an illustration, the CME sets price bands on incoming orders. A limit order that quotes a price that is far too distant from the best price currently on the exchange is automatically rejected. These and other checks are designed by the exchange to occur in milliseconds. They generally show an exchange-specific process that determines which orders are permitted to enter as live orders in its matching engine.<sup>53</sup>

35. Broadly speaking, most traditional financial exchanges use matching engines that rely on a “central limit order book” (CLOB) model. In a central order book, the exchange matches buy and sell orders in accordance with pre-specified matching rules. The most common such rule is the “price/time priority rule” which states that orders that are the most competitive in price – so, the highest price in the case of a buy order, or the lowest price in

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<sup>48</sup> CME Group, Rulebook: Data Submitted to the Exchange (535), <https://www.cmegroup.com/content/dam/cmegroup/rulebook/CBOT/I/5.pdf>.

<sup>49</sup> Yadav, *supra* note 3, 992–1001.

<sup>50</sup> *Id.*

<sup>51</sup> CME Group, Rulebook: Trading Practices, Trading Confined to Exchange Facilities (520), <https://www.cmegroup.com/content/dam/cmegroup/rulebook/CME/I/5/5.pdf>.

<sup>52</sup> CME Group, *Things to Know Before Trading CME Group Futures: Submitting a Futures Order*, <https://www.cmegroup.com/education/courses/things-to-know-before-trading-cme-futures/submitting-a-futures-order.html>.

<sup>53</sup> *Id.* See also CME Group, *Things to Know Before Trading CME Group Futures: What Happens When You Submit an Order*, <https://www.cmegroup.com/education/courses/things-to-know-before-trading-cme-futures/what-happens-when-you-submit-an-order.html>.

the case of a sell order – are first in the queue to be matched. Where multiple orders are entered with the same top price, then the order that is the first to arrive gets the highest priority for execution.<sup>54</sup> Within this basic CLOB model, different exchanges can vary in how they calibrate their matching algorithms. For example, the NYSE, deploys a “parity/priority” model. Here, the NYSE’s matching algorithm first rewards orders posting the best price and then allocates any remaining shares to other orders that also match the price.<sup>55</sup> Others, like the CBOE’s foreign exchange trading platform establishes matching rules that seek to reward the faster liquidity providers.<sup>56</sup>

36. Exchanges generally have firm-specific rules in relation to order-types and fees, creating a unique ecosystem of rules and trading practices for their markets. Broadly, the two main types of orders that exchanges use are limit orders and market orders. Limit orders refer to orders that seek to execute a trade at a specific price or better. A person trying to buy an asset at \$20 would place a limit order for \$20 and get the deal if the price of the asset is trading at \$20 or lower. In the case of a sale, a seller submitting a limit order to sell the asset at \$20 would want to make a deal if the price of the asset is at \$20 or higher.<sup>57</sup> Market orders, by contrast, are those that wish to trade straight away no matter what the price of the asset may be. They provide immediate execution but create the risk that the trader pays a high price or receives a low price.<sup>58</sup> Nevertheless, exchanges can also offer an array of bespoke and firm-specific order types that can offer sophisticated traders a complex menu of options around which to design their trading.<sup>59</sup> They also stipulate particular fee schedules to reflect a trader’s

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<sup>54</sup> See, e.g., CME Group, *How CME Group Ag Markets Operate*, <https://www.cmegroup.com/education/articles-and-reports/overview-what-makes-ags-markets-work.html>.

<sup>55</sup> New York Stock Exchange, *Explaining Parity/Priority*, <https://www.nyse.com/article/parity-priority-explainer>.

<sup>56</sup> Hayley McDowell, *CBOE Launches Central Limit Order Book*, THE TRADE, Jun. 20, 2020, <https://www.thetradenews.com/cboe-launches-fx-central-limit-order-book/>.

<sup>57</sup> Securities and Exchange Commission, *Types of Orders*, <https://www.investor.gov/introduction-investing/investing-basics/how-stock-markets-work/types-orders>.

<sup>58</sup> *Id.*

<sup>59</sup> See, e.g., New York Stock Exchange, *Trading Information: Order Types*, <https://www.nyse.com/markets/nyse-arca/trading-info#equities-order-types>; Investors Exchange, *Order Types*, <https://iextrading.com/trading/order-types/>.



various preferences and order types, as well as their own firm's efforts to attract volume to the venue (*e.g.*, through specific fees that reward those that produce liquidity).<sup>60</sup>

37. Importantly, exchange rules clearly set out the conditions that determine when orders become binding and cannot be modified, canceled, or reversed by a trader. Here, there is significant convergence on the key principles among exchanges. A buyer or seller's order becomes binding as soon as it is matched with another that results in the order being filled in accordance with the exchange's matching algorithms. At this point, once matching occurs, both the buyer and seller are bound and cannot modify, cancel, or reverse their respective orders. For example, the CME states that all or any part of a bid or offer is subject to immediate acceptance and that the price at which it is accepted becomes the final, execution price for the trade.<sup>61</sup> In the explanatory language used by the CME, as soon as an order matches, the trader gets a confirmation that they are a holder of a new futures contract in their trading account.<sup>62</sup>

38. Executed trades may be reversed by the exchange in only rare cases – on narrow, specific grounds.<sup>63</sup> On this matter, the CME, acting through its Global Command Center (GCC), retains for itself the “absolute and sole discretion” to adjust prices and reverse trades in the event of disruptive malfunctions to the electronic trading system and for other system defects. Its decisions are final. In addition to the CME taking action on its own initiative, a user can also request the CME to review the trade, and has eight minutes to do so following its execution.<sup>64</sup> This authority is part of a broad power held by the GCC to take any action that it

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<sup>60</sup> NYSE Arca Equities, *Fees and Charges*, Sept. 30, 2021, [https://www.nyse.com/publicdocs/nyse/markets/nyse-arca/NYSE\\_Arca\\_Marketplace\\_Fees.pdf](https://www.nyse.com/publicdocs/nyse/markets/nyse-arca/NYSE_Arca_Marketplace_Fees.pdf); Stanislav Dolgoplov, *The Maker-Taker Pricing Model and Its Impact on the Securities Market Structure: A Can of Worms for Securities Fraud?* 8 VA. L. BUS. REV. 231 (2014).

<sup>61</sup> CME Group, *Rulebook: Acceptance of Bids and Offers* (522), <https://www.cmegroup.com/content/dam/cmegroup/rulebook/CME/I/5/5.pdf>.

<sup>62</sup> CME Group, *What Happens When You Submit an Order*, <https://www.cmegroup.com/education/courses/things-to-know-before-trading-cme-futures/what-happens-when-you-submit-an-order.html>.

<sup>63</sup> CME Group, *Rulebook: Acceptance of Bids and Offers* (522), <https://www.cmegroup.com/content/dam/cmegroup/rulebook/CME/I/5/5.pdf>.

<sup>64</sup> CME Group, *Rulebook: Trade Cancellations and Price Adjustments* (588), <https://www.cmegroup.com/content/dam/cmegroup/rulebook/CME/I/5/5.pdf> (detailing the various processes involved in reversing a trade, or in adjusting prices, including steps parties can take to deal with any losses that may arise). In Rules 588A and 588B, the Rulebook notes that trade cancellations and price adjustments can help to preserve market integrity and mitigate negative effects where a defective trading system causes trades



considers necessary to maintain the integrity of CME Group markets, such as to stop trading or prevent customers from accessing the platform.<sup>65</sup> To further exemplify the expansive power of the exchange in the context of maintaining finality, the NYSE ARCA platform allows traders 30 minutes after execution to submit a request to review the trade on the grounds that this trade was “clearly erroneous.”<sup>66</sup> The exchange will then review it and make a determination if it is “clearly erroneous” according to established guidelines and factors, and if so, the exchange has discretion to cancel the trade. Following this period of review, the trade is considered as being binding on the parties at its execution price.<sup>67</sup>

39. It is understandable that exchanges seek to provide clear, categorical rules about when contracts become binding on their venues. As detailed above, significant economic relationships depend on the ability of an exchange to foster contractual certainty between parties. Consider again the case of the farmer looking to sell their wheat in three months’ time. Once the farmer’s sell order is matched with a corresponding buy order, this order becomes

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to be executed at prices that are inconsistent with prevailing market conditions. Such events might arise for any number of reasons. For example, disruption might arise where a defective electronic trading system produces a sudden *flash* event that causes prices to suddenly surge or plummet, out-of-step with real information about the asset but as a direct result of malfunctioning electronic trading systems. When reviewing whether to adjust or cancel trades, an application can be made by a user, or by the CME may act on its own. In other words, under Rule 588B, a user that considers their trade to have been executed during such disrupted conditions may seek redress by application to the CME.

<sup>65</sup> CME Group, *Rulebook: Global Command Center* (579), <https://www.cmegroup.com/content/dam/cmegroup/rulebook/CME/1/5/5.pdf>.

<sup>66</sup> This might happen, for example, where traders enter a “fat finger” trade and conclude it at a reference price that is well in excess of what it should be. The NYSE sets out the grounds that qualify a trade as being within the categorization of “clearly erroneous.” In 2010, the Securities and Exchange Commission approved measures put forward by exchanges to institute circuit breakers to counter the negative effects of sudden price surges/drops in the market prices of traded assets as well as provisions clarifying the price deviations that would justify an exchange reversing a trade. These measures were instituted in response to the May 2010 *Flash Crash* when the Dow Jones Index lost almost 1000 points in minutes, wiping out around one trillion dollars in value, before rebounding quickly. This turbulence prompted review by exchanges and regulators of procedures to control such swings and to reverse trades or adjust prices in their aftermath. Securities and Exchange Commission, *SEC Approves Rules Expanding Stock-by-Stock Circuit Breakers and Clarifying Process for Breaking Erroneous Trades* (Sept. 10, 2010), <https://www.sec.gov/news/press/2010/2010-167.htm>. On the flash crash, see, e.g., Andrei A. Kirilenko et al., *The Flash Crash: High-Frequency Trading in an Electronic Market*, 72 J. FIN. 967 (2017).

<sup>67</sup> NYSE ARCA, *Rules: Rule 7.9-E & Rule 7.9-10*, [https://nysearcaguide.srorules.com/rules/document?treeNodeId=csh-da-filter!WKUS-TAL-DOCS-PHC-%7B57E4C5DB-A9B6-48EB-964A-3E2CA5EDB8C6%7D--WKUS\\_TAL\\_18878%23teid-504](https://nysearcaguide.srorules.com/rules/document?treeNodeId=csh-da-filter!WKUS-TAL-DOCS-PHC-%7B57E4C5DB-A9B6-48EB-964A-3E2CA5EDB8C6%7D--WKUS_TAL_18878%23teid-504).

binding.<sup>68</sup> In an alternative reality, if such an order were instead to be contingent even after matching or face a long lag before its irrevocability could be established, then the buyer could decide to renege on the bargain upon finding a cheaper deal. Or the farmer might cancel the deal if the price of wheat suddenly increases. Such a situation would be undesirable economically and from the perspective of fostering a vibrant market. Where parties can renege easily or have the option to do so after matching, concerns about a market's reliability and integrity return, forcing parties to worry, pay more to protect themselves or consider not participating in the market at all.

40. It is well recognized that national exchanges, traditional as well as those trading cryptocurrencies, often exert international reach.<sup>69</sup> However, even though they host and conduct extensive business on a cross-border basis, they remain subject to a domestic home base and regulatory system.<sup>70</sup> As recognized by the International Organization of Securities Commissions (IOSCO), despite deepening globalization, “market oversight remains a local affair, with national or provincial-level regulators implementing legislation passed by their jurisdictions’ legislatures.”<sup>71</sup>

41. An internationalized business model means that exchanges frequently attract a global customer base on their platforms.<sup>72</sup> Orders may be submitted from around the world, while still executing within the order books of an exchange and within its home jurisdiction. And exchanges may locate offices or computer servers in various locations around the world to facilitate rapid trading and other efficiencies. In the case of the London Stock Exchange, for example, all incoming orders – from around the world – match within the LSE’s order books that are governed by the rules of the London Stock Exchange and subject to the

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<sup>68</sup> For example, it would become binding in accordance with CME rules. CME Group, *Rulebook: Acceptance of Bids and Offers* (522), <https://www.cmegroup.com/content/dam/cmegroup/rulebook/CME/1/5/5.pdf>.

<sup>69</sup> See, e.g., Tech. Comm. of the International Organization of Securities Commissions (IOSCO), *Principles Regarding Cross-Border Supervisory Cooperation* (May 2010), 3–4.

<sup>70</sup> *Id.*

<sup>71</sup> *Id.*

<sup>72</sup> London Stock Exchange, *International Order Book*, <https://www.londonstockexchange.com/trade/equity-trading/international-order-book?lang=en>.

laws of England and Wales.<sup>73</sup> To operationalize cross-border trading, exchanges have invested in connecting their home markets through communications infrastructure that facilitates order submission from the jurisdiction where one exchange is located to a platform situated in a different country and subject to the laws of a different legal system. Similarly, an exchange located in one jurisdiction may place a satellite office in another jurisdiction to represent its interests. The London Stock Exchange, for example, has a network of local offices in cities around the world.<sup>74</sup> Nevertheless, even with these operations, including in the United States, it is clear that market participants understand the London Stock Exchange to be located in London, United Kingdom. As such, offers to buy and sell on the London Stock Exchange are made in London once they enter its order books and trades become final there once offers match on its platform in accordance with the Exchange's rules and procedures.<sup>75</sup>

42. Consider another example. To facilitate trading in Japanese Yen-denominated Tokyo Stock Price Index (TOPIX) futures on the CME, the CME, and the Japan Exchange Group (including the Tokyo Stock Exchange) launched the JPX-Chicago Co-Location Direct. This service seeks to create high-speed connections for traders between data centers for the Tokyo Stock Exchange and the CME to encourage liquidity from both markets to animate trading in TOPIX futures.<sup>76</sup> Even with this infrastructure connecting Chicago and Tokyo, it is clear that market participants understand the Chicago Mercantile Exchange to be located in Chicago, Illinois, United States, and the Tokyo Stock Exchange to be situated in Tokyo, Japan.

43. In sum, domestic exchanges in international markets can have operations around the world to facilitate cross-border trading. As exemplified above, the London Stock Exchange, the CME and the Tokyo Stock Exchange – despite their international connections –

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<sup>73</sup> London Stock Exchange, *A Guide to London Stock Exchange Trading Service for Equity Securities*, 3 (Mar. 2015).

<sup>74</sup> London Stock Exchange, *Contact: Our Global Office*, <https://www.londonstockexchange.com/contact>.

<sup>75</sup> London Stock Exchange, *A Guide to London Stock Exchange Trading Service for Equity Securities*, 3 (Dec. 2015).

<sup>76</sup> Japan Exchange Group, *Introduction of "JPX-Chicago Co-Location Direct" As a New Arrownet-Global Service*, News Release, Oct. 19, 2017, <https://www.jpx.co.jp/english/corporate/news/news-releases/0060/20171019-01.html>; Finextra, *Colt to Provide Direct Connectivity for Japan Exchange Group to Chicago*, Oct. 19, 2017, <https://www.finextra.com/pressarticle/71259/colt-to-provide-direct-connectivity-for-japan-exchange-group-to-chicago>.

are recognizably located in and around London, Chicago, and Tokyo, representing major economic hubs for their home countries and overseen under their respective governing laws.<sup>77</sup>

44. The development of cryptocurrency exchanges therefore comes in the wake of the growth and proliferation of traditional exchanges that have, over centuries, innovated to convene sophisticated markets that operate under a system of public and private rules, enable capital transfers in milliseconds, host traders from around the world and maintain profitability. As discussed further below, cryptocurrency exchanges tend to borrow noticeably from the model of traditional exchanges in important ways. For example, they operate centralized, electronic marketplaces that use central limit order books and they secure binding agreements on the exchange as soon as buy and sell orders match in accordance with exchange rules.

*Risk Management, Clearing, and Settlement after Contract Execution*

45. Most traditional exchanges in financial markets rely on outside clearinghouses to clear and settle trades. On this matter, cryptocurrency exchanges appear to diverge from the settlement model adopted by traditional exchanges. While mainstream financial exchanges look to outside clearinghouses, cryptocurrency exchanges tend to settle their trades in-house. In the vast majority of cases, this happens soon after contract execution on the exchange is completed, using internal ledgers, rather than blockchains, in a process referred to as “off-chain” settlement.<sup>78</sup> As detailed more fully below, during off-chain settlement, the exchange simply debits one user’s account and credits another’s to reflect the outcome of a deal. Because the exchange is frequently also acting as the custodian of digital assets belonging to customers, it can settle trades without the need to contact an outside actor like a clearinghouse

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<sup>77</sup> CME Group, *CME Group Rules and Regulation Overview*, <https://www.cmegroup.com/education/courses/market-regulation/overview/cme-group-rules-and-regulation-overview.html> (noting the primary jurisdiction of the CFTC); London Stock Exchange, *Rules of the London Stock Exchange: Rule Book*, 3, <https://docs.londonstockexchange.com/sites/default/files/documents/rules-of-the-london-stock-exchange-effective-1-january-2021.pdf> (noting that it is subject to the governing law of England and Wales); Japan Exchange Group, *Rules: Tokyo Stock Exchange*, <https://www.jpx.co.jp/english/rules-participants/rules/regulations/index.html> (detailing the system of self-regulation and applicable legislation).

<sup>78</sup> See, e.g., Tom Casteleyn, *Cryptocurrencies: The New Market Structure*, Bank of New York Mellon, May 2019, <https://www.bnymellon.com/latam/en/insights/all-insights/cryptocurrencies-the-new-market-structure.html> (noting that the “vast majority” of transactions are conducted “off-chain.”).

or custodian.<sup>79</sup> It also does not need to engage blockchains to validate user identities, transfer value and publish transaction data.

46. By comparison, in traditional markets, clearinghouses are critical to ensuring that contract bargains concluded on exchanges are honored.<sup>80</sup> Once a contract becomes binding on the exchange, it is then cleared and settled. The clearing and settlement process, effectively, ensures that the terms of the contract are performed even if a party breaches down the line – such that the farmer always gets the money for selling their wheat, and the counterparty receives the wheat even if the farmer fails to deliver it. Clearinghouses do this by creating a structure whereby they “novate” each leg of the bargain to their own institution. In other words, the clearinghouse becomes the buyer to the seller and the seller to buyer. In this way, the clearinghouse intercedes to remove the risk that a lesser counterparty fails to perform. Even if the farmer’s harvest fails, the clearinghouse promises to the buyer that it (the clearinghouse) will find the wheat to deliver, even if it costs the clearinghouse a great deal of money. Similarly, the clearinghouse promises to pay the farmer for their wheat even in cases where the buyer becomes insolvent before they can send payment. By guaranteeing performance, clearinghouses provide enormous reassurance to the marketplace that financial contracts made final and binding on exchanges are robust to default risks.

47. This traditional clearinghouse model diverges from the internal off-chain based cryptocurrency exchange settlement process. Despite this divergence, however, both methods work to recognize and implement a bargain reached on an exchange and made binding in accordance with the exchange’s matching algorithms.

48. In summary, traditional exchanges have, for centuries, provided forums to convene market participants to transact with one another in accordance with a set of agreed-upon rules. Now largely electronic and automated, financial exchanges reflect a tried-and-tested model for actively transacting in claims, and for producing multiple ancillary benefits like

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<sup>79</sup> For a summary of custody services in financial markets, see The Clearing House, *The Custody Services of Banks* (Jul. 2016), [https://www.davispolk.com/sites/default/files/20160728\\_tch\\_white\\_paper\\_the\\_custody\\_services\\_of\\_banks.pdf](https://www.davispolk.com/sites/default/files/20160728_tch_white_paper_the_custody_services_of_banks.pdf).

<sup>80</sup> See, e.g., Yesha Yadav, *The Problematic Case of Clearinghouses in Complex Markets*, 101 GEO. L. J. 387 (2013).

liquidity, efficient prices, and external market monitoring. Exchanges each stipulate detailed microstructural rules and processes to govern such trading logistics as order types, submission, matching and execution. When one order matches with another on the exchange in accordance with its internal rules and matching algorithms, this trade becomes final and binding. To honor the significance and terms of this bargain, the traditional market looks to clearinghouses and various third-party custodians and payment services providers to ensure performance of the contract through the transfer of cash and assets between parties.

#### IV. Background on Cryptocurrencies, Blockchains and Cryptocurrency Exchanges

49. Cryptocurrencies have, in short order, attracted sizable valuations and global capital. While subject to fluctuation, it is estimated that the market capitalization of all cryptocurrencies exceeded \$1.5 trillion as of February 2021.<sup>81</sup> In the first quarter of 2020, global trading volume in cryptocurrencies reached around \$8.8 trillion.<sup>82</sup> As described in my research, this worldwide excitement about fintech, including and perhaps most especially about cryptocurrencies, reflects a trend toward highly digitized (rather than bricks-and-mortar) finance that does not depend on conventional intermediaries like banks.<sup>83</sup> In some cases, this preference reflects a particular philosophical worldview, emerging out of the collapse of financial markets in 2008, that seeks to deemphasize traditional intermediaries and the role of the state in overseeing finance.<sup>84</sup> In others, or alongside, it highlights a motivation to embrace digital solutions where traditional intermediaries, such as banks and other payment service providers, have been costly or less successful in meeting economic needs.<sup>85</sup> The XRP cryptocurrency, for

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<sup>81</sup> Cong et al., *supra* note 14.

<sup>82</sup> *Id.*

<sup>83</sup> Brummer & Yadav, *supra* note 1; Yadav, *supra* note 2.

<sup>84</sup> Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System* (2008).

<sup>85</sup> See, e.g., Santiago Pérez and Caitlin Ostroff, *El Salvador Becomes First Country to Adopt Bitcoin as National Currency*, WALL ST. J., Sept. 7, 2021; Charlotte Principato, *Banking the Unbanked Requires Raising Trust and Awareness. For the Underbanked, Better Service Means Payments Innovation*, MORNING CONSULT, Aug. 17, 2021; On trading in crypto by younger people, see, e.g., Qing Chan et al., *An Inside Look into Cryptocurrency Exchanges*, Working Paper (Dec. 9, 2020).

example, has been used as a digital settlement asset to overcome the speed and costly frictions entailed in making cross-border payments between different currencies.<sup>86</sup>

*An Outline of Blockchains and Cryptocurrencies*

50. A blockchain – often referred to as a distributed ledger – constitutes the record of transactions for a cryptocurrency.<sup>87</sup> To understand how that record is built and maintained, it is helpful to briefly describe what blockchains are designed to achieve computationally. Public blockchains operate as a decentralized network of digital nodes governed by a shared protocol – or code. Decentralization means that, rather than be operated and backstopped by a single trusted institution – like an exchange – the blockchain is designed to function independently and without reliance on a central authority.<sup>88</sup> The first task of a blockchain is to validate information for a transaction – such as a payment where cryptocurrency moves from one user to another. To do this, the decentralized network of nodes checks the information it receives from a user to determine, *inter alia*, their digital identity, whether they have funds in their account, whether these funds validly exist (*e.g.*, they do not represent an attempt to spend the same funds twice) and the identity of the payee. Because of the absence of a central player, the nodes on the blockchain must validate this data by some form of consensus – that is, they come to agreement jointly (the code of the particular blockchain specifies how consensus is reached and how many nodes need to agree). Once the transaction information is validated, it becomes part of the blockchain’s ledger. Usually, the network picks up multiple potential transactions that must be validated and organizes them into blocks for the nodes to validate together – thus giving distributed ledger technology its nomenclature of being a blockchain.<sup>89</sup>

51. The second task of the blockchain is to maintain a record of information about all the transactions that have occurred on its network as part of its public ledger. On the Bitcoin blockchain, for example, a transaction is generally accepted to be final after six

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<sup>86</sup> See, *e.g.*, Garrick Hileman & Michael Rauchs, *Global Cryptocurrency Benchmarking Study*, CAMBRIDGE CTR. FOR ALTERNATIVE FIN., 15 (2017).

<sup>87</sup> *Id.* at 13–14.

<sup>88</sup> Lin William Cong & Zhiguo He, *Blockchain Disruption & Smart Contracts*, 32 REV. FIN. STUDIES 1754 (2018).

<sup>89</sup> Mike Orcutt, *How Secure Is Bitcoin Really*, MIT TECH. REV., Apr. 25, 2018.



subsequent blocks have been added to the chain containing that transaction, after which point it is highly unlikely that sufficient computing power could be devoted to a different chain that did not contain the transaction.<sup>90</sup> The process thus offers several advantages to its users, including: (i) transparency by allowing the entire ledger to be examined; and (ii) immutability and irreversibility of the transaction record. These attributes are essential for building trust, accountability and certainty within a community that lacks any centralized actor that can offer these assurances.

52. The third task of the blockchain network is to protect its integrity. This is generally achieved in two ways. For a start, networks rely on encryption to engineer user and transaction privacy. Encryption must be strong enough throughout to prevent determined actors from breaking the code and uncovering underlying information in the blocks as well as about the users.<sup>91</sup> In addition, the network has to guard against bad actors, including within the network itself, that may behave maliciously to disrupt its process. In the case of Bitcoin, for example, this task is achieved through “mining” – where nodes are incentivized to solve computational problems by receiving some of the native Bitcoin tokens as a prize. Miners can also earn transaction fees that may be appended by users to each transaction and that encourage a miner to pick up the transaction for the block.<sup>92</sup> Those that solve the puzzle propose the block for validation. This process is supposed to motivate good behavior by participating nodes.<sup>93</sup> As a decentralized, encrypted system, blockchains lack a central point for failure.<sup>94</sup> If some of the nodes shut down, the blockchain should, in theory, keep operating. They should be resistant to undue control by a central authority.<sup>95</sup> Encryption ought to also prevent theft of information and maintain user privacy.<sup>96</sup>

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<sup>90</sup> Andrey Didovskiy, *Blockchain’s Flavors of Finality*, MEDIUM, Feb. 3, 2021.

<sup>91</sup> Orcutt, *supra* note 89.

<sup>92</sup> Easley et al., *From Mining to Markets: The Evolution of Bitcoin Transaction Fees*, 134 J. FIN. ECON. 91 (2019).

<sup>93</sup> Nakamoto, *supra* note 84, at 4.

<sup>94</sup> Nic Carter & Linda Jeng, *DeFi Protocol Risks: The Paradox of DeFi*, REGTECH, SUPTECH AND BEYOND: INNOVATION AND TECH. FIN. SERV. (FORTHCOMING), 5 (Jun. 2021).

<sup>95</sup> *Id.*

<sup>96</sup> Orcutt, *supra* note 89.



53. When transacting on decentralized blockchains, participants operate with various degrees of pseudonymity. They are identifiable by their public key on the ledger. Each public key links to a private key that is known only to the user. Private keys constitute the password that unlocks value for the user within the ledger and makes it available for use.

54. Certain blockchains can suffer from several sources of disruption and fragility that create uncertainty about the resilience of the blockchain and the up-to-date reliability of the information appearing on the ledger. First, some transactions do not make it into the ledger because they are not picked up by a proposing node. This might happen if high levels of traffic into the blockchain slow it down and result in transactions being left unprocessed. The Bitcoin blockchain, for example, has experienced this problem. Uncertainty about uptake, especially during busy periods, can motivate users to attach optional transaction fees (like tips) to their instructions in a bid to encourage a self-interested node to include a fee-carrying transaction in its proposed block.<sup>97</sup> Conversely, users that do not include fees may feel less certain about whether their transaction makes it into a block. While transactions may be more likely to be picked up in quieter periods, high traffic can lead to expensive transaction costs where users attach fees to their instructions as well as to the possibility that transactions – both fee-carrying and not – are excluded from inclusion into a block.<sup>98</sup> In May 2020, it was reported that Bitcoin’s pool of unprocessed transactions reached 77.58 million bytes.<sup>99</sup> The Ethereum blockchain has suffered well-documented slowdowns owing to its general popularity as a platform for supporting various kinds of crypto-projects. During such periods, users can be charged higher transaction fees.<sup>100</sup>

55. Second, blockchains may be vulnerable to outages. This might happen if the network fails owing to excessive volume, or it may arise where the blockchain experiences some other adverse event that results in a shutdown. In September 2021, the Solana blockchain experienced a 17-hour outage caused by a denial-of-service attack that overwhelmed its

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<sup>97</sup> Easley, *supra* note 92.

<sup>98</sup> *Id.*

<sup>99</sup> Zack Voell, *Bitcoin Miners Usually Create 6 Blocks per Hour. They Just Banged Out 16*, COINDESK, May 1, 2020.

<sup>100</sup> Carter & Jeng, *supra* note 94, 4–5.

validators and precluded them from reaching consensus on the state of the ledger.<sup>101</sup> Notably, Bitcoin suffered two major rollbacks in 2010 and 2013 where blocks were unrecorded, or the transactions reversed. It was reported that around 15 hours of transactions were lost during these two failures.<sup>102</sup>

56. Third, permissionless and decentralized blockchains can become victims of malicious events like hacks or collusive attacks. Famously, in 2016, the Ethereum blockchain was forced to “reset” itself following a hack on an application that used its blockchain, which led to the theft of a significant quantity of ether. Ethereum’s leadership used a “hard fork” to reverse the hack and reset users’ balances.<sup>103</sup> In another attack, the Verge blockchain experienced an attack by its validators in 2021 that resulted in 200 days of data being eliminated and transactions being removed from the ledger.<sup>104</sup>

#### *An Overview of Cryptocurrency Exchanges and their Market Structure*

57. Cryptocurrency exchanges permit users to buy and sell various cryptocurrencies and other digital tokens as well as to engage in a variety of strategies and transactions relating to crypto assets (e.g., derivatives, mining, yield farming).<sup>105</sup> In contrast to the emphasis on blockchain decentralization, most cryptocurrency exchanges work as centralized institutions.<sup>106</sup> Recent years have witnessed a dramatic rise in the volume of exchange trading in cryptocurrencies, confirming that exchanges represent some of the most profitable actors within this ecosystem.<sup>107</sup>

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<sup>101</sup> *Network Outage Initial Overview: Incident on Sept. 14, 2021*, SOLANA, Sept. 20, 2021, <https://solana.com/news/9-14-network-outage-initial-overview>.

<sup>102</sup> Carter & Jeng, *supra* note 94.

<sup>103</sup> *Id.* at 14–15.

<sup>104</sup> *Id.*

<sup>105</sup> See Kyle Soska et al., *Towards Understanding Cryptocurrency Derivatives: A Case Study of BitMEX*, Working Paper (2021). On the practice of yield-farming, or lending cryptocurrencies in return for interest, fees and other gains, see Olga Kharif, *What’s ‘Yield Farming’? (And How Do You Grow Crypto?)*, WASH. POST, Sept. 9, 2021.

<sup>106</sup> Kristin N. Johnson, *Decentralized Finance: Regulating Cryptocurrency Exchanges*, 62 WM. & MARY L. REV. 1911 (2021).

<sup>107</sup> Cong et al., *supra* note 14; Soska et al., *supra* note 1055; see also Deposition Transcript of Cristian Gil (“Gil Dep. Tr.”), 129:2–4, Aug. 11, 2021 (“I believe 2017 was when this whole thing was the first kind of big explosion in activity.”).

58. Cryptocurrency exchanges resemble traditional financial exchanges in important ways. There are several reasons that may explain these similarities. Perhaps most persuasive is that cryptocurrency exchanges seek to accomplish similar goals to two-hundred-year-old exchanges – starting with the objective of being able to host a vibrant market in claims.<sup>108</sup> Even if their origins are historic, modern financial exchanges are now highly automated, technologically sophisticated venues, boasting turnover in milliseconds or less, information efficiencies and capabilities of moving hundreds of billions in transaction volumes daily. Rather than spend time and effort to reinvent new ways of trading, relying on effective, existing models and their trading processes may represent a sound way for cryptocurrency exchanges to avoid large start-up costs. This would allow cryptocurrency exchanges to purchase working technologies, hardware, and software, for such processes as order submission and matching, trade verification, fraud-detection, data analysis and gathering as well as to promote the exchanges to users that are familiar to existing financial platforms.<sup>109</sup> In addition, prominent cryptocurrency exchanges have often been built by founders and include senior management with a pedigree in more traditional finance.<sup>110</sup> Traditional financial firms, like high-speed traders, are now also increasingly attracted to participate in cryptocurrency exchanges in various capacities, for example as market makers.<sup>111</sup> This cross-fertilization between traditional and cryptocurrency markets can offer pathways to import features of structural scaffolding seen in more traditional platforms to cryptocurrency exchanges.

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<sup>108</sup> See, e.g., *About Coinbase*, COINBASE, <https://www.coinbase.com/about>; *Mission*, FTX US, <https://about.ftx.us/>; *About Us*, BITTREX US, <https://bittrex.zendesk.com/hc/en-us/articles/115003684411>.

<sup>109</sup> For example, BitStamp notes that it uses the TRADExpress Trading System provided by Nasdaq (formerly, Cinober). Bitstamp describes this system as a “fully developed, modular, multi-asset and multi-market trading platform for high- volume trading venues.” See BS-LTD-00000005, *Letter from Preiskel & Co LLP on behalf of Bitstamp Ltd.*

<sup>110</sup> For example, Mr. Changpeng Zhao, CEO of Binance, started his career building trading systems for the Tokyo Stock Exchange as well as for a high-speed automated trader. Sam Bankman-Fried, Founder of FTX, also began in a more traditional trading firm, Jane Street Capital. See Pamela Ambler, *From Zero to Crypto Billionaire In Under A Year: Meet The Founder Of Binance*, FORBES, Feb. 27, 2018; Roger Parloff, *Portrait of a 29-Year-Old Billionaire: Can Sam Bankman-Fried Make His Risky Crypto Business Work?* YAHOO, Aug. 12, 2021, <https://news.yahoo.com/ftx-ceo-sam-bankman-fried-profile-085444366.html>.

<sup>111</sup> Frank Chaparro, *Jump Trading No Longer Wants To Be Secretive About Its Multi-Billion Dollar Crypto Operation*, THE BLOCK, Sept. 14, 2021, <https://www.theblockcrypto.com/post/117595/jump-trading-no-longer-wants-to-be-secretive-about-its-multi-billion-dollar-crypto-operation>; Frank Chaparro, *Market Making Giant Virtu Financial is Now Active on Coinbase and Gemini*, THE BLOCK, Aug. 5, 2021, <https://www.theblockcrypto.com/post/113683/market-making-giant-virtu-financial-is-now-active-on-coinbase-and-gemini>.

59. As with traditional exchanges, one of the key benefits of cryptocurrency exchanges is that they allow for trading with predictability, confidence, and certainty of outcome. Market participants understand that their trades will be executed and then immediately settled within the confines of the exchange. Many cryptocurrency exchanges, including several on which I understand XRP to have been transacted, contractually stipulate rules-of-the-road for order submission, matching, trade execution and settlement that are consistent with this understanding. Users that wish to transact on an exchange are generally required to agree to a set of pre-agreed set of rules and trading standards when they apply. As with traditional exchanges that enter into contracts with users, thereby creating a unique trading environment, cryptocurrency exchanges tend to similarly establish a core set of rules and standards for their particular market. I reviewed user agreements for a number of high-profile and well-known cryptocurrency exchanges on which XRP has been traded. The Ascendex (BitMax), Binance, Bittrex, Coinbase, and Korbit agreements provide examples of this industry practice.

60. For Binance, the user agreement states that it represents a contractual agreement between exchange operators and the user to create a binding legal relationship (Article II(1)(a)). To onboard a user, it specifies the personal and financial information that it must receive before the user can begin activities on the exchange (e.g., Article II(3)(a)-(e)). It also details the services that it is contracted to provide to a user, and its responsibilities vis-à-vis the user's data and trading information (e.g., Article II(3)(f)). To settle any disputes, the contract requires users to contact Binance first before mandating the use of arbitration proceedings by the Hong Kong International Arbitration Centre (HKIAC) (Article X). User agreements also specify disciplinary procedures for users that fail to comply.

61. In the Ascendex (BitMax) user agreement, Article 4.13 of the agreement sets out types of trading behavior that are prohibited on the venue. These include practices such as price manipulation, wash trading and front running. Pursuant to this provision, users can be fined for misbehavior. Further, under Articles 2.6-2.8, the exchange can investigate user accounts and take steps to freeze and suspend users that are suspected of breaching the rules.

62. As part of this onboarding into a cryptocurrency exchange, it is common to see that exchanges require a user to use an exchange's specific trading systems and

technology. For example, exchanges require that a user apply to the exchange for an account and crypto-wallet(s) that are specifically hosted by the exchange, as opposed to a wallet or wallets on the underlying blockchains for the cryptocurrencies users wish to trade. Binance, for example, requires that users open an account with Binance for the deposit of digital assets into that account (Article II (3)). These accounts serve as the basis for transactions on the Binance platform (Definitions, Article I (8)). In the terms of service for Coinbase US and Coinbase Singapore, the exchanges provide hosted accounts for digital currencies and fiat currencies as part of opening an account with the Coinbase exchange (e.g., Coinbase US, Part I (2)). In some cases, the wallet bears the name of the exchange itself. For example, the Korbit terms of service call the wallet, “the Korbit Wallet” (Chapter I (2)(10)). Bittrex Global provides users with a Bittrex Global Account that includes a hosted wallet for trading in digital currencies.

63. Based on my review of their user agreements, exchanges mostly use a trading model that closely resembles a central order book that matches buy and sell orders in accordance with a set matching algorithm. Offers to buy or sell are made on the exchange and appear on the central order book within the confines of the exchange. For example, in Article 21, Korbit describes the processes by which users must submit buy and sell orders – offers to buy or sell – into the exchange, conforming to any minimum order size that the exchange requires. At Binance, offers are submitted using the Binance order submission system and then enter the Binance order book. Orders may be canceled until such time as they match (Article III(2)(a) & (b)). Bitstamp captures orders and quotes using its TRADExpress Trading System. It “matches orders and quotes in accordance with trade schedules and order books.” This trading system allows orders to be submitted to a single order book or a combination of order books and accommodates a variety of order types and trading actions to enable implementation of various trading strategies.<sup>112</sup>

64. Orders, once matched, then become automatically binding in the exchange’s trading system.<sup>113</sup> In other words, they become binding within the exchange’s order matching systems, such that trades then become final and binding on the parties and are quickly

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<sup>112</sup> RPLI\_SEC 1078045, *Bitstamp Terms of Service*; BS-LTD-00000005, *Letter from Preiskel & Co LLP on behalf of Bitstamp Ltd.*

<sup>113</sup> Johnson, *supra* note 106.

reflected through debits and credits to accounts of participants on the exchange (discussed more fully below). The terms of service of most of the exchanges that I reviewed refer to specific in-house order matching systems that result in orders becoming binding as soon as a sell and buy order match. For example, Bitstamp notes that once orders match on its platform, they are executed and sent for post-trade processing. It specifies that “all sales and purchases of virtual assets . . . are final . . . there is no stage at which a customer is able to cancel the trade.”<sup>114</sup> To be sure, exchanges might deploy various degrees of sophistication in their order matching technologies. For example, some platforms offer a larger and more nuanced menu of order types.<sup>115</sup> Variation in the sophistication of matching algorithms would make sense given that some exchanges attract far higher volumes of trading than others, professional traders, trades in assets with varying levels of liquidity and user demand, etc. Once offers entering the exchange are matched by the exchange and become final, reversal can occur only on narrow grounds (as described below) and, per my review of several user agreements, only at the discretion of the exchange. This aligns with practice in traditional exchanges that affords exchanges “absolute” discretion in determining when traders can be adjusted or reversed.<sup>116</sup>

65. Per many of the terms of service that I reviewed, cryptocurrency exchanges appear to use the common order matching conventions seen in traditional financial exchanges to create binding finality for offers entering an exchange once they match on the exchange in accordance with exchange rules. For example, BitBank describes a trading process that follows a price/time priority matching system. BitBank reserves the right to cancel a limit order where the price band specified by a user is distant from a suddenly changing price of a cryptocurrency (Written Delivery Instructions, Section 4). BitBank’s trading terms therefore imply that the exchange is systematically vetting the orders within its order submission engines to ensure they conform to acceptable order types and price bands. Similarly, Coinbase’s order

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<sup>114</sup> BS-LTD-00000005, *Letter from Preiskel & Co LLP on behalf of Bitstamp Ltd.*

<sup>115</sup> See, e.g., *Overview of Order Types and Settings (Stop, Limit, Market)*, COINBASE, <https://help.coinbase.com/en/pro/trading-and-funding/orders/overview-of-order-types-and-settings-stop-limit-market>; *Understanding Bittrex Order Types*, BITTREX, Nov. 3, 2020, <https://bittrex.com/discover/understanding-bittrex-order-types>; BS-LTD-00000005, *Letter from Preiskel & Co LLP on behalf of Bitstamp Ltd.*

(noting availability of a variety of order types to enable a variety of trading strategies).

<sup>116</sup> CME Group, *Rulebook: Trade Cancellations and Price Adjustments* (588), <https://www.cmegroup.com/content/dam/cmegroup/rulebook/CME/I/5/5.pdf>.

matching rules describes the system as based on a central limit order book that operates in accordance with price/time priority.<sup>117</sup> It sets out price bands for orders and terms for protecting orders (Coinbase Trading Rules, Section 1). Once offers coming into the exchange are matched on the exchange, trades are final, unless the system detects a serious technical error or some abusive conduct like manipulation (Rules of Trading, Section 2). On Ascendex (BitMax), “orders that are filled, executed or matched (in whole or in part) settle immediately and are recorded on...the Exchange Ledger” (Article 4.3). Customers cannot cancel, modify or seek reversal of any trade that is marked by the exchange as “complete,” “under review,” or “pending” (Article 4.6). The exchange, however, retains “sole” discretion to reverse trades even when these trades are marked as “complete.” Ascendex also retains the power to reverse trades and cancel orders in the event that the exchange suffers some form of system malfunction (Article 4.5). CoinOne details that user orders, once matched, become final. Order submission is performed in accordance with the exchange’s particular instructions (Section 16). As noted above, Bitstamp deems all sales and purchases to be final and users cannot cancel trades for a refund.<sup>118</sup> For Binance, once offers on the exchange match, either in whole or in part, the matched portions are final, meaning that the user loses the right to cancel, modify or revoke any filled part of the order. The user’s account is then updated to note that the transaction has been executed and closed. Orders may be canceled until such time as they match (Articles III(2)(a) & (b)).

66. This order matching process and the finality of trades is further corroborated by industry participants’ understanding of how trades are executed on cryptocurrency exchanges. In his deposition, Mr. Cristian Gil, a principal of GSR, a well-established cryptocurrency market maker, was asked “how . . . buyers [are] matched with sellers at the exchanges?” He responded “there is something called a matching engine” and “[w]hen an order and a bid cross, a transaction occurs.”<sup>119</sup> He elaborated that “[t]here’s an order book where there are a whole bunch of different offers at different price levels and with different sizes, and

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<sup>117</sup> Coinbase’s rules provide detailed matching protocols depending on whether a user is providing price improvement (maker order) or posting at an existing price in the order book (taker order).

<sup>118</sup> BS-LTD-00000005, *Letter from Preiskel & Co LLP on behalf of Bitstamp Ltd.*

<sup>119</sup> Gil Dep. Tr. 289:22–290:2.



same on the bid side. And when those cross, transactions occur.”<sup>120</sup> He explained that an offer to sell is accepted when there is an “opposite order that wants to purchase at least that much size at that price.”<sup>121</sup>

67. Cryptocurrency exchanges vary from traditional exchanges in relation to the clearing and settlement of transactions. Rather than rely on third-party clearinghouses and custodians to implement the bargain and move cash and assets between users, it is common for cryptocurrency exchanges to do this task themselves and within their own institutions. Cryptocurrency exchanges face a particular challenge when it comes to clearing and settlement of trades. While underlying blockchains are created with the assumption of a lack of central player, most exchanges operate as centralizing focal points within the market. This mismatch raises some key difficulties: (i) transactions on blockchains – like in the Bitcoin blockchain – to move value from one account to another must be signed using private keys whose unique identifier is known only to an account holder; (ii) consensus-based verification may take time and this time may vary depending on traffic; (iii) transparent ledgers may not always be desirable for professional traders; and (iv) speed and transaction ledger entry may be impaired by slow and unreliable blockchains. To better assure a workable, active, and liquid exchange, permitting the rapid flow of transactions, most centralized cryptocurrency exchanges offer users a custody function for their wallets and private keys to enable rapid “off-chain” settlement. Off-chain settlement means that the exchange reconciles trades on its own books and records, rather than on the blockchain, and moves any value from one wallet to another within the exchange’s wallet-hosting system. For example, User A holds 10 Bitcoin in its Exchange wallet. User B holds 100 ether. Hypothetically (and without making any reference to the conversion rate between these different pairs), they agree to trade 2 Bitcoin for 5 ether. Once the offer and sale orders are matched by the Exchange and become binding, the Exchange simply adjusts the wallet balances within its private in-house ledger for Users A and B. There is no need for the Exchange to do any more. It does not need to send information to the underlying blockchains.<sup>122</sup>

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<sup>120</sup> Gil Dep. Tr. 290:9–12.

<sup>121</sup> Gil Dep. Tr. 291:17–21.

<sup>122</sup> Johnson, *supra* note 106, 1953–54.



Whenever a user wishes to withdraw their cryptocurrency, the Exchange can make a transfer from its hosted wallet system to the user's address on a blockchain.<sup>123</sup>

68. A few examples from the user agreements I reviewed highlight the role of off-chain settlement and its importance for exchange liquidity and efficiency. In the case of Coinbase Singapore, for example, digital assets are held in hosted wallets by Coinbase. Coinbase does not assert any kind of ownership rights over the assets. However, it does offer custody and rapid (“immediate[.]”) settlement once a transaction is executed (Coinbase Singapore, Article 5.18, Rules of Trading, 1.82) by reconciling balances between different users' accounts. Korbit's user agreement stipulates that it provides custody for customer wallets (Article 22). Transactions are reflected immediately in the books and records of the exchange once they become final upon matching (Article 21). The company does not post transactions to underlying blockchains (Article 21). Korbit does state that any transfers of assets to and from the exchange may occur on external blockchains but that the company takes no responsibility for this type of transaction (Article 20.1, 20.2). Bittrex adopts a slightly different model. It offers users two options: (i) the irregular option; and (ii) the regular option. The irregular option is stated as being the more common. Under this option, Bittrex assumes ownership over the tokens in the hosted wallet and can dispose of them as it chooses. For irregular holdings, Bittrex functionally acts as a traditional clearinghouse by novating each leg of the claim to itself and settling the trade, giving the user a direct claim for the asset against Bittrex. For such an option, both traders must have agreed to irregular holdings and settlement is off-chain. Under the regular option, Bittrex does not take ownership but is the custodian of customer assets. Once a trade is matched on an exchange, it becomes final. In the case of regular holdings, Bittrex matches users (both must have agreed to regular holdings), finalizes the trade, and then uses underlying blockchains to transfer value between the users *on-chain* (Articles 7.3-7.6). Execution of the trade is final as soon as the matching engine – which is run by the exchange – matches buy and sell orders. As described by Bitstamp, once trades are matched, the exchange's internal ledger is updated to reflect the transfer of assets.<sup>124</sup>

<sup>123</sup> Casteleyn, *supra* note 78 (noting the use of off-chain settlement for the “vast majority” of transactions).

<sup>124</sup> BS-LTD-00000005, *Letter from Preiskel & Co LLP on behalf of Bitstamp Ltd.* As noted in this Letter, Bitstamp contracts with BitGo for custody and wallet services. BitGo operates the digital wallets for Bitstamp

69. The fact that transactions are executed instantaneously and are final following matching is supported by the understanding of market participants. Mr. Gil testified that “[t]he sale is . . . final when the bid and the offer cross” because “in crypto, there is instantaneous settlement”—“[w]hen that bid and offer cross, if we were selling XRP, we no longer have that XRP. Now we have Bitcoin or dollars or yen or whatever it was that the buyer used to purchase the XRP from us.”<sup>125</sup> He testified that it is his understanding that, when GSR makes a trade on a client’s behalf on a cryptocurrency exchange, “that sale only becomes final after . . . the offer and acceptance are matched.”<sup>126</sup>

70. In summary, cryptocurrencies represent an entirely digital asset class hosted on decentralized blockchains. In the absence of a central authority, the blockchain acts by consensus to verify transactions and transfer value between users. Cryptocurrency exchanges are, by contrast, mostly centralized institutions. As seen in the user agreements of exchanges that listed XRP, many exchanges also tend to internalize clearing, settlement, and custody functions. Cryptocurrency exchanges otherwise resemble traditional financial exchanges in important ways. They (i) organize their markets in accordance with stipulated contractual rules; (ii) seek to grow volume and liquidity; (iii) provide a unique transactional environment with distinct, exchange-specific trading processes; (iv) run a central order book that matches buy and sell orders; (v) order matching results in a final bargain subject to modification only at the discretion of an exchange; and (vi) endeavor for rapid settlement by using off-chain settlement through custody of customer digital assets, resulting in limited real-time interaction with underlying blockchains.

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customers and is also the custodian of their digital assets. BitGo holds wallets in the name of Bitstamp, with Bitstamp acting as agent for its customers.

<sup>125</sup> Gil Dep. Tr. 293:7–16.

<sup>126</sup> Gil Dep. Tr. 293:17–294:1.

V. **Opinion: Offers to Buy and Sell Cryptocurrencies on an Exchange are Made on the Exchange. Once Offers to Buy and Sell Are Matched, They Become Final and Binding Trades on the Exchange and, thus, at the Geographic Location of the Exchange**

71. I have been asked to provide an opinion on whether offers to buy and sell cryptocurrencies like XRP, trading on an exchange, take place on the exchange itself or elsewhere. Based on my research and experience, I conclude that offers to buy and sell cryptocurrencies take place on an exchange and become binding trades as soon as they are matched within the books and records of the exchange in accordance with the rules of the exchange. Therefore, both offers and trades occur on the exchange and at the geographic location of the exchange.

72. As a first and basic matter, for the reasons detailed below, an offer to buy and sell cryptocurrencies on an exchange can only be made on that particular exchange, where that exchange matches the offer with another in accordance with exchange rules. Put another way, an offer to buy or sell cryptocurrencies on an exchange may only be executed on the exchange itself. An executable offer to trade does not materialize when and where a client instructs their agent to buy/sell certain assets at a future date and time. At that stage, there is no actual offer to trade on an exchange – and certainly none that can be seen by or bind an exchange to act in a certain way because it is simply not available on the exchange to be accepted. The act of a client instructing an execution agent – like Mr. Cristian Gil of GSR<sup>127</sup> – to eventually trade for the client is, microstructurally, irrelevant to the specific processes that must be engaged when the agent seeks to implement their client’s instructions on an exchange to buy and sell cryptocurrency assets like XRP. Indeed, hypothetically speaking, if the agent decided not to implement their client instructions to trade, any consequences would be a matter to be resolved between the agent and client. The exchange and its users would not have come to

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<sup>127</sup> Gil Dep. Tr. 281:24–282:1.

know of any contemplated offer because exchanges play no role until such time as an actual order is placed on an actual exchange using the exchange's specific and actual processes.<sup>128</sup>

73. Conversely, it is commonplace for agents to have discretion in how they execute their client's instructions, particularly to account for volatile and shifting markets. An agent may decide not to trade, to transact across multiple exchanges depending on the trading conditions in the asset, and to take such time to trade as might most optimally reflect a client's instructions and preferences. Often, this process is dynamic, where agents are constantly responding to shifting market environments with adjusted execution strategies. To propose that any general instruction to buy and sell XRP represents an offer to trade on a particular exchange thus runs completely counter to the standard market practice that affords agents discretion in how they give effect to their client's wishes. In short, an offer to trade is made on the actual exchange where the trade takes place and at the geographical location of the exchange in accordance with the exchange's unique rules and processes. Based on my understanding of exchange processes and rules, it cannot arise at any other geographical location, like where an instruction to trade may be given. As detailed in Section III, traditional exchanges now constitute highly global venues, attracting customers from around the world. All instructions must be converted into executable orders to be submitted to the exchange, enter the exchange's order submission system, be vetted, processed, matched, and rendered binding within and on its books.

74. The reasons for this opinion are as follows. As detailed in Section III, exchanges establish rules-of-the-road for their users as a basis for enabling vibrant trading to take place. These rules reflect a set of distinct contractual measures to tailor the trading process to such aspects as the assets being bought and sold (*e.g.*, commodities versus stock), the specific risks presented by the asset (*e.g.*, risk of wastage for some commodities), availability of leverage (*e.g.*, for derivatives trades), the types of traders involved (*e.g.*, high speed algorithmic traders versus fundamental institutional actors), the state of technology (*e.g.*, open outcry pit-trading versus high-speed automated trading) and the post-trade services provided by an

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<sup>128</sup> Gil Dep. Tr. 306:5–18 (a potential purchaser of XRP knows when an offer to sell XRP has been placed when they “see an offer in the order book” on the exchange).

exchange for clearing and settlement. These exchange rules thus set the basis for better assuring a smooth transfer of cash and assets between a dispersed set of traders. They also affect what users expect from the exchange (*e.g.*, execution, delivery, and payment within a certain timeframe) and what the exchange expects from them (*e.g.*, good behavior, honest dealings, and solvency). Importantly, as highlighted by the history of Boards of Trade and the NYSE, such exchanges would not exist as they do without such rules. Investment in their creation reflected a recognition by the industry itself that the needs of a market required its members to submit to a set of specific measures to formalize risk sharing, predictability, reliance, and standardization. By establishing a particular contractual ecosystem designed for their market, exchanges created the conditions for active trading, hedging, speculation, information sharing, price efficiency, monitoring, and more effective capital allocation. The logic behind this model is intuitive. The more effectively an exchange can offer a safe, standardized, and trustworthy environment for its users, the more likely it is to attract more users and generate positive network effects. This can enhance the quality of the market. It should also bolster the profitability of the exchange itself – and ideally, the productive capacity of the larger economy.

75. As further discussed in Section III, this need to ground trading in a distinctive set of common standards is reflected in the highly technical processes that convert a broad instruction from a client into an actual order that is practicably executable on an exchange.

76. The electronification and automation of today's traditional financial exchanges further underscores the unique microstructural environment within each venue. As seen by reference to the order submission process for the CME in Section III, order submission generally follows a format established by a venue. Once orders are verified by the venue's algorithms (*e.g.*, to ensure conformity of limit orders with applicable format conventions, price bands, and check for errors, etc.), they enter the exchange's proprietary matching engine. Matching algorithms utilize a specific sorting formula (*e.g.*, price/parity priority or price/time priority as a reward for faster traders) to fill outstanding orders. Exchanges tend to competitively offer an array of order types in a bid to attract liquidity to their venue.<sup>129</sup> To

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<sup>129</sup> Dolgoplov, *supra* note 600.

distinguish themselves, some venues might offer a “speed bump” in the order submission system to slow down high-speed traders from getting ahead of other market participants.<sup>130</sup> Others sell co-location and data services designed to maximize the speed of liquidity provision.<sup>131</sup>

77. The need for exchanges to stipulate a set of house rules combined with the particularities of a venue’s rulebook and trading microstructure mean that each platform generally offers a distinctive trading ecosystem for its users legally, contractually, and economically. For any offer to materialize and become executable, therefore, it must both be published on the exchange’s platform, or otherwise be entered into the exchange’s systems, and be matched in the books and records of the exchange itself. Without being entered into the submission process established by an exchange, an order – as understood in a microstructural context – cannot be considered to exist. Rather, it only achieves form and executability by being absorbed and processed by the specific rules and systems that an exchange establishes for trading on its venue. Only by doing so does an idea or instruction about a potential future trade become converted into an actual and realizable offer that can be available on the exchange to become an executable trade. For completeness, it is worth highlighting that electronic order matching trading systems are, overwhelmingly, anonymous spaces.<sup>132</sup> In other words, parties do not generally know in advance with whom they are trading. They cannot submit an offer with the express aim of trading with a specific party on the other side.<sup>133</sup> It seems extremely unlikely that cryptocurrency exchanges would depart from this model. First, anonymity is a prized value for the cryptocurrency industry in general. Second, transparency about counterparties would

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<sup>130</sup> Our Story, INVESTORS EXCHANGE, [https://iextrading.com/about/?gclid=Cj0KCQjw18WKBhCUARIsAFiW7Jx7-n\\_ycfE0BcAS97Bphktj4zSqssR4VHmgF9psgNJGDj5AkV4QlcoaAikkEALw\\_wcB](https://iextrading.com/about/?gclid=Cj0KCQjw18WKBhCUARIsAFiW7Jx7-n_ycfE0BcAS97Bphktj4zSqssR4VHmgF9psgNJGDj5AkV4QlcoaAikkEALw_wcB); Alexander Osipovich, *More Exchanges Add ‘Speed Bumps,’ Defying High-Frequency Traders*, WALL ST. J., Jul. 29, 2019.

<sup>131</sup> See, e.g., McDowell, *supra* note 56.

<sup>132</sup> See, e.g., CME Group, *Rulebook: Disclosing Orders Prohibited* (532), <https://www.cmegroup.com/content/dam/cmegroup/rulebook/CBOT/I/5.pdf>; Chicago Board of Trade, *Definitions: Futures Contract*, [https://www.cmegroup.com/rulebook/files/CBOT\\_Definitions.pdf](https://www.cmegroup.com/rulebook/files/CBOT_Definitions.pdf); Chicago Board of Trade, *Definitions: Order Types*, [https://www.cmegroup.com/rulebook/files/CBOT\\_Definitions.pdf](https://www.cmegroup.com/rulebook/files/CBOT_Definitions.pdf). For discussion, see Tom Grimstedt Meling, *Anonymous Trading in Equities*, 76 J. FIN. 707 (2020).

<sup>133</sup> Indeed, in some circumstances, this may be considered to be potentially manipulative behavior where parties pre-arrange illusory trades. For example, the user agreement for Ascendex (BitMax) notes that pre-arranged trades can constitute prohibited conduct where they are entered into as part of a fictitious, anti-competitive or unfair course of trading (Article 4.13.5).

likely work to reduce liquidity on exchanges, a phenomenon observed on traditional exchanges.<sup>134</sup> Given that cryptocurrency exchanges have modeled many aspects of their trading systems on those of traditional markets, added to the gains of anonymity between users for liquidity and exchange reputation within the crypto community, it seems implausible that they would create an open environment. From the user agreements I reviewed, the terms of DigiFinex explicitly underscored the importance of pre-trade anonymity. The exchange notes that it will not disclose information about a counterparty to a user. As such, the terms note that orders “. . . will be listed anonymously setting out only the price and lot size in the Order Book and presented to other users of the Platform for trading.” (Article 9: Order Books). Finally, anecdotally, Mr. Cristian Gil testified in this deposition that he did not know the identities of those with whom he was trading, in other words, that the venues on which he had been trading anonymized participant identities.<sup>135</sup>

78. The idea that an order can only exist within an exchange’s system of rules and microstructure also follows from an understanding of the steps that an exchange takes when it accepts this order into its system. In confirming that the order can enter the venue, the exchange gains a form of authorization from the user to automatically match their order against a corresponding one so long as the order is in line with the exchange’s rules. In so doing, the exchange acts to make the deal on behalf of a user that results in the user becoming subject to a host of financial obligations to the exchange and to the user’s counterparty. Because of this authorization, the user stands to be deprived of their property, become subject to a host of financial risks, and face potential sanction if they cannot perform. In other words, an order works to confer a form of specific authority to the exchange that can cause the exchange to bind the user to a set of financial and legal obligations. Numerous user agreements that I reviewed specifically describe the authority that the user confers on the exchange to execute an order on the user’s behalf and to make subsequent debits and credits to their account. For example, Bittrex Global’s terms of service define an order as an authority given by a user to the exchange

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<sup>134</sup> Meling, *supra* note 132.

<sup>135</sup> Gil Dep. Tr., 297:25–298:11 (“Q. Okay. So we’ve talked a little bit about the buyers of XRP on these exchanges. And I believe that you previously testified that GSR has no way of knowing the identity of the buyer of the XRP. Do I have that right? A. Correct. . . . Q. Do you have any way of knowing whether or not that purchaser is a foreign buyer? . . . A. I have no way of knowing who is on the other side of the trades. . . .”).



to “execute a Trade on a spot basis for all or a portion of the number of Tokens specified . . . .” The order also creates additional authority for the exchange to deduct any fees owed by the user to Bittrex for executing the trade (Article 7.1). Similarly, under DigiFinex’s terms of service, a user authorizes the exchange to match its orders on the platform in accordance with price/time priority (Article 9).

79. In my view, therefore, for such authority to exist, for an exchange to have the power to match the order and bind a user, as well as debit and credit funds from the user’s account subsequently, this order needs to be seen and accepted by the specific exchange itself.

80. As detailed in Section IV, most cryptocurrency exchanges are and have been centralized firms that resemble traditional exchanges in significant ways. In my opinion, the reasons and arguments described above, therefore, generally also apply to centralized cryptocurrency exchanges. Per my review of various user agreements, cryptocurrency exchanges stipulate their own rules-of-the-road for users. These exchanges also appear to use particularized processes to ensure that a user becomes native to that venue and required to use the order submission, custody and settlement processes required by the platform. This is exemplified by the demand that users each open an account with the exchange that acts as a conduit for the exchange to hold the user’s digital assets and private keys for trading. In addition, many of the user agreements describe specific order submission and matching processes. Several agreements stipulate rules on transaction sizes for the venue (often subject to change at the discretion of the venue), verification protocols (*e.g.*, to check for price bands) and procedures for transaction error, reversal, or modification after matching (largely at the discretion of the exchange).

81. As with traditional exchanges, the user agreement and the distinct microstructural environment created by a cryptocurrency exchange highlight the need for an order to be actually entered into the exchange’s systems so that this order can have any realizable form and content. Without such input, the order is not visible to the exchange or any potential counterparties. As stipulated by a number of user agreements, to become an order – microstructurally – an instruction to buy/sell a cryptocurrency needs to be translated into a specific form as required by the exchange to become an order to buy/sell on the exchange.



82. For cryptocurrency exchanges, the location of the order within a particular venue is reinforced by the role of the exchange as a frequent custodian and settlement services provider. Because exchanges demand that users open an account and hold digital wallets with the exchange, the link between an order as existing within the institution of a particular exchange is even more inextricable. An order to buy/sell a cryptocurrency thus cannot exist unless it can connect to the exchange that can settle it by updating the entitlements in the user's exchange account. By the act of submitting an order, the user is also conferring specific authorization on the exchange to match its order and adjust the user's proprietary entitlements in the digital wallets/accounts that the exchange maintains for the user on the user's behalf.

83. In view of the above, it is my opinion that an offer to trade is made on an exchange and becomes binding on the exchange as soon as it matches with a corresponding offer in accordance with exchange rules. Order submission, matching and finality take place only within the exchange, reflecting a particularized authority conferred by the user to the exchange to conduct the transaction and to adjust the user's proprietary entitlements on this exchange. The frequent role played by cryptocurrency exchanges as custodians for their users' digital assets further deepens the singular nexus between the user and the exchange. Once binding, most cryptocurrency exchanges use off-chain settlements to move value between users rapidly after execution. With offers to buy and sell becoming binding trades on an exchange in accordance with exchange rules, both the offers and resulting trades thus become binding in the geographic location of the exchange. As per my review of various user agreements, these rules establish, *inter alia*, processes and procedures relating to dispute resolution, governing law, place of domicile and incorporation. In doing so, they also work to tie an exchange more formally to a geographic locale as a matter of its operation and, arguably also, in the expectations of those that use the venue.

**VI. Opinion: Trades of Cryptocurrencies on Exchanges Become Final When Orders Are Matched By An Exchange Pursuant To Exchange Rules—Not When Any Transactions Are Reflected on the Blockchain (Which May Never Occur).**

84. I have been asked to provide an opinion on when trades on cryptocurrency exchanges become final. Based on my research and work experience in exchange trading

microstructure, the operation of clearing and settlement systems in traditional markets, as well as in blockchain-based settlement systems for cryptocurrencies, and having reviewed cryptocurrency exchanges' user agreements, I conclude that a trade becomes final on a cryptocurrency exchange as soon as an order to trade is matched with another order in accordance with the exchange's rules. Further, the fact of becoming binding on the exchange in this way is sufficient to make this deal final and binding on the parties. In the context of cryptocurrency exchange-trading, binding finality thus generally occurs without regard for entry into an underlying blockchain.

85. As an initial matter, it does not make sense to conflate the process of consensus building, validation, and publishing on a decentralized blockchain with the process of achieving execution, finality, and settlement of a cryptocurrency trade on a centralized exchange. These arenas represent two distinct paradigms for trading in cryptocurrencies. Cryptocurrency traders can choose the ecosystem they wish to inhabit, whether they wish to buy/sell using the decentralized blockchain, or whether they wish to enter an exchange to do so. In the case of the former, consensus building, validation, and publishing on a decentralized blockchain is necessary to authenticate a trade. In the case of the latter, it is not. Rather, the exchange undertakes to perform the validation and verification necessary to maintain transactional authenticity. The technology of the blockchain is not required. Crucially, the mission behind decentralized blockchains is to provide a proxy process to realize integrity in trading in the absence of a central trusted authority. This means that users need the innovations of the blockchain – like automated consensus-building, validation, verification, trust-creation, and ledger transparency – because no central trusted authoritative mechanism exists to instrumentalize these aspects of trading. By choosing to transact on an exchange – and according to its rules – users declare that they wish to affirmatively become bound by an exchange's process and to enjoy the advantages that an exchange can generally provide, like liquidity, timely and convenient execution, and centralized verification. Equally, they also miss out on the advantages of blockchain-based trading like those attached to being mostly outside the purview of a centralized authority. Moreover, some users may lack the technological know-how to transact fully on blockchain but may be more comfortable buying crypto assets on an exchange owing to familiarity with exchange-based trading mechanics.

86. To make an exchange's tried-and-tested processes for ensuring transactional certainty (order matching) and settlement subject to a largely separate blockchain-based system would disregard the principal reasons why exchange-trading in cryptocurrencies exists and has become immensely popular in the first place.<sup>136</sup> To be sure, some exchanges (*e.g.*, Bittrex's regular-account settlement) do use underlying blockchains to move funds (on-chain settlement). However, two points are worth noting even in these cases. First, on-chain activity in that circumstance is an explicit part of the exchange's rules and process. This means that customers accept these rules as a part of their agreement with the exchange. In the case of Bittrex, it affords customers both options to accommodate on-and-off-chain settlement, such that those wishing to be on-chain in this manner can do so. Second, the fact of an exchange moving value on-chain and publishing transaction details on the ledger does not change the basic microstructural reality that the transaction becomes binding on the exchange when two orders are matched in accordance with exchange rules. On-chain value-transfer and ledger publishing memorializes and implements a binding bargain made on the exchange – much like a clearinghouse implements a bargain reached on the CME. It does not change the fact that, in accordance with the rules accepted by the user and the exchange, the transaction became binding – and the user does not have the discretion to undo that transaction – once orders are matched on the platform by the exchange's order matching system.

87. The reasons supporting this opinion are as follows. As exemplified extensively in each of the user agreements I reviewed and discussed in Section IV, centralized cryptocurrency exchanges set clear rules for when a transaction becomes final and binding on the exchange. These rules reflect the normal microstructural approach common to order matching markets, namely that orders become legally binding on parties as soon as the orders match in accordance with exchange rules. In traditional markets, after a trade is matched on and by the exchange, clearinghouses and custodians tend to assume responsibility for ensuring that this binding trade is honored, and its terms implemented in accordance with the expectations of the parties. A clearinghouse usually becomes a central counterparty (through novation of both legs of the deal to itself) to ensure that the terms of the bargain are performed and the parties receive their contracted-for assets and payment on time. This intercession by the clearinghouse

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<sup>136</sup> Cong et al., *supra* note 14; Ledesma, *supra* note 16.

– designed to provide an ultra-safe counterparty to both traders – reflects the paramount importance of the bargain reached on the exchange. It does not create a fundamentally novel economic bargain. It simply offers maximum assurance that the bargain reached on the exchange will actually be performed.

88. Similarly, as seen in the user agreements discussed in Section IV above, these cryptocurrency exchanges also create binding obligations for their users when trades are matched in accordance with their rules and microstructural processes. Except in narrow circumstances (*e.g.*, in case of serious technical error), trades cannot be reversed or modified except by an exchange itself. In contrast to traditional markets, cryptocurrency exchanges do not frequently rely on third-party clearinghouses and custodians to ensure the performance of the bargain. Most carry out the task in-house and settle transactions off-chain by updating the entitlements recorded in the exchange’s hosted wallets for each user. This enables rapid trading to occur and for a user to see their account balance quickly adjusted to reflect the fruits of their trading.

89. Moreover, as detailed in Section V above, an exchange user can only revoke their offer until such time as the offer is matched by an exchange. After the offer and bid are matched, the trade becomes irreversible.<sup>137</sup> Several of the user agreements that I reviewed reflect this position. For example, the Binance Terms of Use provide that “[o]nce your Order has been matched with another user’s Order, you may not change, revoke or cancel Binance’s authorization to complete the Order” (Article 2(b)). Similarly, the BitMart Terms of Service state that “[y]ou cannot cancel, reverse, or change any transaction marked as complete or pending” (Article 5.9), and Bittrue provides that “[b]y using this service you accept that all trade executions are final and irreversible” (Article 3).

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<sup>137</sup> Gil Dep. Tr. 291:22–293:8 (“Q . Okay. Now, before an offer is accepted, could a client tell GSR, actually, I don’t want to trade this XRP anymore, I’d like it back? A . Yes. ... But before the bid is accepted, could the client modify their -- the amount of XRP, for example, that they wanted to sell? A . Yeah, they could -- they could tell us to pause, they could tell us to ratchet up or slow down. Yeah. Q . And the bid isn’t -- or the sale isn’t final, at that point, right? ... THE WITNESS: Correct. The sale is only final when the bid and the offer cross.”); *Id.* at 296:15–20 (“Q. Okay. When does GSR have the ability to stop a trade, if the answer is any different? A. We can – that’s a different question. We can stop a trade whenever we want. But once the bid and the offer has crossed the trade has occurred and you cannot reverse it.”).

90. At no point in this process is the underlying blockchain needed to verify the trade and to move value between users (or implicated at all). Per exchange rules, transactions are final once orders are matched, and the exchange immediately verifies and settles the trade accordingly. To the extent a user wishes to renege on its bargain, user agreements will forbid such an action except in extremely narrow circumstances, such as a large technical error.<sup>138</sup> If there is a dispute, the user agreement generally sets out a process to follow. As detailed in Section III, the reason for such binding finality goes to the heart of why exchanges have become essential for their markets. Without it or if such finality were contingent, parties transacting on exchanges could not depend on the integrity of their economic bargains, compromising any number of onward transactions. Similarly, per the user agreements that I reviewed, transaction finality appears to be also viewed as essential to cryptocurrency exchanges and to their users helping ensure that trades are not subject to idiosyncratic unwinding.<sup>139</sup>

91. The fact that trades on cryptocurrency exchanges become final within the confines of the relevant exchange is supported by the testimony of market participants, notably Mr. Gil, who testified that “a sale of XRP . . . done on an exchange” is not “recorded on the XRP Ledger.”<sup>140</sup> He testified that certain “movements” of XRP are shown on the XRP Ledger, but those are not necessarily sales.<sup>141</sup> He testified that activity on the XRP Ledger does not necessarily show a change in ownership of XRP.<sup>142</sup> Further, the fact that these transactions become final on an exchange ties finality to the geographic location of an exchange. As noted above, the operation of various legal anchors within the user agreements that I reviewed, such as applicable governing law, dispute resolution processes, and corporate head office suggest a close geographical intersection between an exchange’s rules and the location noted in its legal

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<sup>138</sup> See, e.g., RPLI\_SEC 1078162, Coinbase Trading Rules (permitting review on account of a large technical error).

<sup>139</sup> The inability of a customer to reverse a trade once matching has occurred is confirmed by the testimony of Mr. Gil, a market participant. Mr. Gil’s understanding as a market participant is that GSR and any client cannot reverse a trade “once the bid and offer has crossed” because “the trade has occurred.” Gil Dep. Tr. 296:7–20; *id.* at 293:4–294:1 (“The sale is only final when the bid and the offer cross.... in crypto, there is instantaneous settlement. When that bid and offer cross, if we were selling XRP, we no longer have that XRP. Now we have Bitcoin or dollars or yen or whatever.”).

<sup>140</sup> Gil Dep. Tr. 299:3–5.

<sup>141</sup> Gil Dep. Tr. 300:11–17.

<sup>142</sup> Gil Dep. Tr. 301:18–21.

agreements. This aspect is especially pertinent in the context of matters concerning digital asset storage and settlement of user accounts. In particular, governing laws and the location of an exchange's corporate domicile will likely impact critical issues such as the location where the exchange would declare insolvency, the procedures governing asset distribution and the controls on extra-territorial asset transfer that might apply in such circumstances (*e.g.*, ringfencing).

92. It has become common industry practice to settle exchange trades off-chain and to avoid publishing information to blockchains in real-time.<sup>143</sup> There are compelling reasons to justify this approach, chiefly, to enable transactions to take place quickly and reliably, creating liquidity, certainty, and greater conformity with investor expectations. Importantly, this industry norm in favor of off-chain settlement means that a requirement for on-chain settlement as a precondition for finality is not only incorrect as a matter of exchange process but also unworkable in practice. My reasons for this opinion are as follows. Importantly, exchanges vary in their use of on-chain and off-chain settlement, making a blockchain-based finality rule unworkable in practice. As seen in the user agreements I reviewed, a significant proportion of exchanges favor off-chain settlement, where the exchange adjusts user balances on hosted wallets following a trade. This approach allows exchanges to transact rapidly while minimizing contingencies for themselves and users (on which more below). As acknowledged by certain user agreements (*e.g.*, Korbit), transactions on these exchanges are, therefore, never/infrequently published to the cryptocurrency blockchains.<sup>144</sup> In other words, most exchanges provide an in-house ledger that constantly updates with adjusted book entries and revised balances to native in-house wallets (*e.g.*, the CoinOne Exchange Service). They do not need to (and thus do not) communicate constantly with the underlying blockchains. Instead, trades are reported with a confirmation “fill” from the exchange to the trading entities using the exchange.<sup>145</sup>

93. This widespread reliance on off-chain settlement means that a meaningfully large proportion of exchange-traded cryptocurrency transactions are never

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<sup>143</sup> Casteleyn, *supra* note 78.

<sup>144</sup> As detailed in Section IV, an exchange might send transactions to a blockchain where a user instructs the exchange to transfer its digital assets to a blockchain-based address, thus withdrawing these assets from the exchange.

<sup>145</sup> Gil Dep. Tr. 294:18–295:5.

recorded on an underlying blockchain ledger. A hypothetical rule subjecting all cryptocurrency trades to ledger-based finality would mean that an unknown and likely extraordinarily large number of exchange trades would never effectively settle nor become final. To be clear, in my opinion, there is currently no such rule or accepted norm in cryptocurrency exchange markets, nor has there ever been. Based on my research and experience, such a rule or approach would (i) be antithetical to the norm established in traditional markets where finality, predictability, and protecting market participants carries signal priority (*e.g.*, reliance on clearinghouses to implement exchange bargains even at grave risk to systemic stability), (ii) create chaos for the cryptocurrency industry and users, and (iii) create legal and economic inconsistency between transactions in the same cryptocurrencies that are executed on different exchanges. Indeed, even within the same exchange (*e.g.*, Bittrex), it would mean that trades that settle on-chain carry finality, while those settled off-chain do not. As an aside, to the extent that exchanges settle large amounts of trades off-chain, blockchains do not now constitute an up-to-date public account of transactions in a cryptocurrency. It is unclear what transparency gains might thus be offered by a requirement for ledger-based publication to ground settlement that are not already provided by exchanges circulating transaction data (likely in a more accessible/readable form) to its users and the public.

94. A hypothetical rule that looks to blockchains to finalize trades on cryptocurrency exchanges would import systematic contingencies to the settlement process that are inconsistent with market practice in traditional markets that seeks to minimize uncertainties about transaction finality and settlement. Two aspects of cryptocurrency blockchains create especially problematic sources of fragility for exchange-based trading.

95. One, as detailed and exemplified in the discussion in Section IV, certain blockchains can be slow to update and it is not guaranteed that miners will pick up transactions. The Bitcoin and Ethereum blockchains, for example, have experienced slowdowns arising out of high traffic. In addition, as detailed with respect to Bitcoin, transactions can be left behind by miners.<sup>146</sup> This creates obvious problems for exchange users that might experience delays or rejection of their trades by blockchains. For an exchange-based environment, it would also

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<sup>146</sup> Voell, *supra* note 99.



mean that an entire marketplace is vulnerable to the machinations of multiple different blockchain networks whose workings are outside of the control of exchanges but that create random delays and stoppages impacting the risks that exchanges carry. From a consumer protection standpoint, a dependence on blockchain networks would force users to internalize high transaction fees when seeking to ensure that their trades have maximum chance of being validated. Whereas off-chain settlement likely keeps costs consistent and low, on-chain settlement exposes users to uncertain fees (whose costs are not controlled by an exchange).<sup>147</sup> Some user agreements (*e.g.*, Korbit, CoinOne) mention that users might have to cover the exchange's expenses when it sends value on-chain to a blockchain destination specified by the user (*e.g.*, when withdrawing assets from the exchange). As these agreements often mention, the exchange takes fees from a user to compensate itself for having to pay fees to miners. Speculating, the need for customers to pay high on-chain settlement fees would likely result in diminished liquidity and perhaps restrict trading only to those that are willing and able to pay systematically.

96. Two, blockchains may have fragilities in the form of possible malicious attacks or outages. As exemplified in Section IV, blockchains have suffered various hacks, collusive attacks, outages, and rollbacks that have caused the blockchain to stop working, unwind trades or fork.<sup>148</sup> While this is unfortunate when it happens, connecting an exchange-based settlement to ledger-based settlement would create a direct risk of contagion between the fate of underlying blockchains and the finality of any number of exchange-settled trades. In other words, if a blockchain is hacked resulting in large-scale loss of trade data (*e.g.*, see the discussion in Section IV on the Verge blockchain), exchanges would also face direct repercussions for unwinding or otherwise reviewing concluded trades on their venues. If this causes an exchange to have to cover customer costs, it may find itself in financial peril, potentially setting the stage for large-scale failure. Given that exchanges can offer off-chain settlement by adjusting the balance of in-house accounts, while also appearing to increase user

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<sup>147</sup> Easley et al., *supra* note 97.

<sup>148</sup> See, *e.g.*, *Consensus Protections Against Attacks and Failure Modes*, XRP LEDGER, <https://xrpl.org/consensus-protections.html> (highlighting the various attacks that may be experienced by the XRP Ledger and the steps taken to maintain network resiliency against these vulnerabilities).



volumes, it is not clear what meaningful gains would be offered by subjecting finality to the need for validation by potentially fragile blockchains.

97. In my time working and researching market structure, I have understood exchanges as having special responsibilities for assuring that markets remain safe and liquid.<sup>149</sup> A rule that effectively delegates responsibility for settlement to decentralized blockchains could let exchanges off the hook for the responsibility of assuring that their own in-house settlement and custody processes are ironclad and failsafe. It would risk an eventuality where cryptocurrency exchange customers lacked all recourse for trades that fail to settle on blockchains. As a result, some exchanges could end up less likely to maintain top-of-the-line settlement, security, and custody mechanisms, avoiding responsibility for creating an ecosystem that boasts rapid and reliable settlement for customer trades. If customers are currently choosing exchange-based trading as a way to protect themselves from the frictions of blockchain-based trading, blockchain-based finality would cause them to lose these gains and be left exposed to the uncertainties and risks they wish to avoid, while insulating exchanges from taking execution and settlement safety seriously. In this way, such a default rule would be out-of-step with general market practice in financial markets and, presumably also, the expectations of cryptocurrency market participants.

98. To summarize, offers to buy and sell cryptocurrencies that occur on an exchange and are matched in accordance with exchange rules become final and binding on the exchange. Exchanges mostly settle their transactions off-chain. Even so, the settlement process merely follows from the fact of transactions becoming final and binding as soon as offers are matched on the exchange. Further, transmission and publication to a blockchain are not needed where transactions take place on a cryptocurrency exchange that settles trades off-chain. Indeed, the widespread use of off-chain settlement means that requiring blockchain publication for transaction finality represents an unworkable and unsafe proposition for the exchanges, their users and the market. By becoming final and binding within an exchange and not requiring settlement on a blockchain, it is my opinion that transactions become binding in the geographic location of the exchange upon which the trades are made.

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<sup>149</sup> See, e.g., Yadav, *supra* note 20.

**VII. Opinion: For 21 of 25 of the Exchanges Listed in Table A, There is No Indication that Trades on the Exchange Become Final and Binding in the United States**

99. I have been asked to provide an opinion, based on my expertise in the operation of domestic and international exchanges (both traditional and cryptocurrency), on whether offers and trades on the exchanges listed in **TABLE A** below are made and become final within the U.S. or outside the U.S. on foreign exchanges.<sup>150</sup> I conclude that, for all but four of the exchanges listed in **TABLE A**, there is no indication that offers are made on the exchanges in the U.S., or that trades on these exchanges become final in the U.S. While a small handful of the exchanges listed below may bear some indicia of a U.S. presence, they also have foreign exchanges/units affiliated with them. Given the possible presence of a foreign arm on which a trade may have occurred, it is not determinable in the abstract whether, for any particular trade, the transaction became final within the U.S. or outside the U.S. through a unit located in a foreign jurisdiction. To determine whether a trade through such entities is domestic, one would need to determine whether a trade was made on the domestic, or the foreign arm of the exchange. If orders were made and trades became final on the foreign arm, the offer and the trade would, therefore, have been made and become final outside of the U.S.

100. As an initial matter, exchanges are subject to national, domestic regulatory regimes despite conducting a highly internationalized business.<sup>151</sup> Cryptocurrency exchanges operate in and from locations around the world, just as other types of businesses do.<sup>152</sup> As businesses that transact in digital assets and embrace electronic, automated solutions for their trading processes (rather than physical pit trading, for example), they are quintessentially primed to be global players.

101. As detailed in Sections V and VI, I conclude that offers are made, and transactions become final and binding, where exchanges match buy and sell orders in accordance with the rules of the exchange. This means, therefore, that offers are made and

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<sup>150</sup> Note that I have analyzed the information that is available regarding the location of various cryptocurrency exchanges today. It is possible that the exchanges for which there is a U.S. nexus today did not have any U.S. nexus at earlier points in time.

<sup>151</sup> IOSCO, *supra* note 69.

<sup>152</sup> Cong et al., *supra* note 144; Hileman & Rauchs, *supra* note 86, at 8.

transactions become final and binding in the jurisdiction where an exchange is geographically located to match trades. In determining where offers are made, and where transactions match and become final, pinpointing the exact geographic location of cryptocurrency exchanges poses logistical and analytical challenges.<sup>153</sup> With usually lower start-up costs (*e.g.*, limited need to buy real-estate) and high mobility, cryptocurrency exchanges have proliferated around the world.<sup>154</sup> With a much shorter history in the marketplace than established exchanges like the CME or London Stock Exchange, cryptocurrency exchanges can lack deep roots within a particular geographic location, introducing an additional layer of complexity.<sup>155</sup>

102. The mobile, digital nature of cryptocurrency exchanges arguably exacerbates the challenge of ascribing particular weight to various potential indicia of location (*e.g.*, location of employees, servers, cold key storage) as providing definitive “proof” of the location of the exchange on which trades are made final. In some cases, an exchange might locate different functions in different jurisdictions. Bitstamp, for example, has its registered office in the United Kingdom but states that its location of “principal financial functions and operational control” is in Slovenia. It also has servers in Ireland and Germany.

103. Nevertheless, based on my research and experience relating to how offers to buy and sell are made on exchanges and how exchanges finalize trades, I believe the question of where offers are made and trades on an exchange become final should be answered by examining a number of indicia to determine the location of exchanges on which offers were made and trades finalized. It is my view that a trade on an exchange bearing no significant indicia of being located in the United States is not finalized within the United States. The same is true with respect to where offers to trade are made. To begin, I examine factual criteria about the corporation that operates the exchange. Here, certain core indicia stand out as being especially important. *First*, where is the exchange’s place of business, registered office and domicile? These identify the location of operations for the exchange on which offers are made and trades finalized. In some cases, of course, an exchange may conduct most of its business in

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<sup>153</sup> Ryan Brown, *Cryptocurrency Traders Seek Damages from Binance After a Major Outage Cost Them Millions*, CNBC, Aug.19, 2021.

<sup>154</sup> Hileman & Rauchs, *supra* note 86, at 28.

<sup>155</sup> *Id.* at 27–28.

a different jurisdiction from its registered domicile. *Second*, what location is mentioned in the exchange's terms of use or terms of service? Based on my review, user terms generally identify a jurisdiction to cover dispute resolution and claims against the exchange. They also often note a governing law to which matters concerning use of the exchange, including trades that are finalized on the exchange, are subject. Sometimes these two locations are the same, but in some cases, they are not (*e.g.*, Binance Holdings identifies a forum for dispute resolution but does not mention a governing law for itself). *Third*, in what country do market participants and the public believe the exchange does business? By examining informed media reports and terms of use, it is possible to gauge reasonable market participants' understanding about where an exchange is located and does its business. *Fourth*, where do regulators believe an exchange is located for purposes of addressing requests to the corporation operating the exchange? In this case, the SEC's various requests to foreign regulators to capture information about an exchange's activities pursuant to IOSCO's cross-border co-operative procedures are indicative that the SEC understands such exchanges to be located abroad.

104. These indicia might not all be applicable for every exchange, or even knowable for every exchange. Not every factor is necessary, and no factor is sufficient, to understand the location of the exchanges. But together they allow market participants, regulators, and others to form an understanding of where a given exchange is located and accordingly where offers on that exchange are made and trades are finalized. In circumstances where there are no significant indicia that an exchange is located in the United States, it is my opinion that offers on that exchange are not made in the United States, and trades on that exchange do not become final and binding in the United States.

105. These indicia are important for a variety of reasons. They provide concrete attributes that are possible to identify for the large majority of exchanges with a degree of certainty. These attributes are also pertinent to determine the question of where trades become final. The place of domicile and place of business point to the possible location of an exchange's books and records. Moreover, local laws can stipulate strict recordkeeping demands on regulated entities. To take one such illustration, firms under the jurisdiction of the CFTC are required to keep detailed paper and electronic records of their activities that must be stored

safely and reliably and be capable of being inspected promptly by the regulator.<sup>156</sup> In practice, the significance of such recordkeeping rules for major exchanges can mean a direct link between their home base and the location where they maintain an accounting of their activities and those of their users. Even if an exchange locates some of its data servers in a different jurisdiction, the need for documents to always be kept safe and available can mean that it also maintains storage capacity close to home, where it can be accessed by its regulators as well as by itself when it needs information on its users. Governing laws offer an anchor to situate its business operations within a legal framework that clarifies aspect of its corporate constitution, location of assets, contract disputes and forum for insolvency. For example, in the U.S., the CME is subject to a special regulatory designation as a “systemically important financial markets utility” (SIFMU) – one of eight national firms to be classified under this category. As a result, it falls under an intensive regulatory scheme designed to oversee market infrastructure providers with heavy significance for the financial system.<sup>157</sup> Furthermore, national exchanges like the NYSE and Nasdaq are classified by the U.S. as self-regulatory organizations. This designation subjects them to a host of responsibilities in relation to how they organize their business and treat their users.<sup>158</sup> The perception of market participants develops a picture of market expectations about where exchange users believe they are doing business and where their trades become binding (*e.g.*, where do they think they will get redress if an exchange loses their assets?). For example, foreign traders looking to transact on the London Stock Exchange generally have to open an account with and trade using the services of a firm with representation rights to trade directly on the Exchange.<sup>159</sup> This kind of interaction can reinforce expectations about location and about where offers are being made and trades becoming final. The need for a user to take steps to “naturalize” themselves within the jurisdiction of the London Stock Exchange can thus work to concretize perceptions about what rules and processes will be applicable in case a trader suffers harm and where redress may be found (*e.g.*, in the courts of England and Wales). Finally, formal inquiries by regulators to their foreign

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<sup>156</sup> For example, Regulatory Records; Retention and Production, 17 CFR § 1.31 (noting the importance of “prompt” production of information for the regulator upon request to a regulated firm).

<sup>157</sup> *Designated Financial Market Utilities*, BD. GOVERNORS FED. RSRV. SYS., [https://www.federalreserve.gov/paymentsystems/designated\\_fmu\\_about.htm](https://www.federalreserve.gov/paymentsystems/designated_fmu_about.htm).

<sup>158</sup> Exchange Act § 6(a), 15 U.S.C. § 78f(b) (2000).

<sup>159</sup> *See, e.g.*, Jay Hawk & Julie Hawk, *How to Trade on the London Stock Exchange*, BENZINGA, Apr. 5, 2021, <https://www.benzinga.com/money/how-to-trade-on-london-stock-exchange/>.

counterparts provide evidence of what jurisdiction's laws regulators believe govern the operations of the exchange. As in this case, this may be evidenced by the SEC relying on measures for cross-border cooperation, notably those set out by IOSCO, to liaise with foreign counterparts about a particular exchange.

106. In certain circumstances, these indicia will clearly point to a single jurisdiction where offers are made on an exchange and the trades become final. In others, it may not be possible to determine a single jurisdiction, but it may be possible to *exclude* jurisdictions that plainly have no connection to trading activity on the exchange. In other words, even if the indicia point to multiple foreign jurisdictions (such as the United Kingdom and Slovenia for Bitstamp) but with no link to the United States, I can exclude the United States as the site where trades on an exchange became final. As described below, I have identified 21 exchanges that contain no significant indicia of being located in the United States.

107. Applying this approach to determining where trades on cryptocurrency exchanges become final, I first examined certain core pieces of information on the exchanges listed in **TABLE A**. Specifically, I have reviewed information about their place of domicile, principal place of business (where known), registered address (where known), the choice of law listed in the user terms and conditions of user agreements, as well as various public sources and media reports. I have also reviewed certain requests for assistance to foreign regulators issued in this litigation by the SEC.

108. For the next step, after studying these pieces of information, it is my opinion that, for 21 out of 25 exchanges listed in **TABLE A**, there does not appear to be any indication that offers are made, or trades become final, in the United States.

109. My understanding is corroborated by the deposition of Mr. Cristian Gil of GSR. He testified that it was "fair" to suggest that "GSR executes cryptocurrency strategies on

behalf of [its] clients mostly on non-U.S. exchanges,” a matter that had been true since these platforms came online.<sup>160</sup>

TABLE A

Exchange	Place of Incorporation/ Domicile	Principal Place of Business	Registered Office Address (as applicable)	Locations Referenced in ToS/ToU/ToA	Notable Items in Public Sources and Media
Binance	Grand Cayman <sup>161</sup> Hong Kong, China <sup>162</sup>	N/A <sup>163</sup>	23 Lime Tree Bay, Georgetown, Grand Cayman, KY 1203. Cayman Islands <sup>164</sup>	Governing law of the ToS is that of Hong Kong. <sup>165</sup> Arbitrations to be administered in Hong Kong. <sup>166</sup>	Grand Cayman <sup>167</sup>
Bitbank	Japan <sup>168</sup>	Japan <sup>169</sup>	7F, KDX Nishigotanda Building, 7-20-9 Nishigotanda, Shinagawa-ku, Tokyo 141-0031 <sup>170</sup>	Governing law of the ToS is that of Japan, <sup>171</sup> the Tokyo District Court has exclusive jurisdiction. <sup>172</sup>	Japan <sup>173</sup>

<sup>160</sup> Gil Dep. Tr.158:17–159:7, 302:8–305:12 (with the exception of four exchanges on which Ripple sold XRP that have some ties to the United States, “the rest of the exchanges are located outside of the United States,” and more than 90 percent of Mr. Larsen’s, Mr. Garlinghouse’s, and Ripple’s exchange trades, on a dollar-adjusted basis, were done on these foreign exchanges).

<sup>161</sup> See *D&B Business Directory: Binance Holdings Limited*, DUN & BRADSTREET, [https://www.dnb.com/business-directory/company-profiles/binance\\_holdings\\_limited.4c5e5e9fe1cb37cf1e43e9dc3be92377.html](https://www.dnb.com/business-directory/company-profiles/binance_holdings_limited.4c5e5e9fe1cb37cf1e43e9dc3be92377.html) (last visited Oct. 3, 2021), Exhibit B1.

<sup>162</sup> *Binance Holdings Limited*, CIPHERTRACE, Exhibit B2; *Binance Holdings Limited*, S&P CAPITAL IQ, Exhibit B3.

<sup>163</sup> See, e.g., Scott Chipolina & Daniel Roberts, *Binance CEO CZ Still Says His Company Has No Headquarters*, DECRYPT (May 7, 2021), <https://decrypt.co/70045/cz-pressed-on-binance-headquarters-at-ethereum-summit>.

<sup>164</sup> *Binance Holdings Limited*, CIPHERTRACE, Exhibit B2.

<sup>165</sup> RPLI\_SEC 1077884, *Binance Terms of Use*, *Binance*.

<sup>166</sup> *Id.*

<sup>167</sup> See, e.g., Adam Samson & Philip Stafford, *Financial Watchdog Bans Crypto Exchange Binance from UK*, FIN. REV. (Jun. 28, 2021), <https://www.afr.com/markets/currencies/financial-watchdog-bans-crypto-exchange-binance-from-uk-20210628-p584ye> (“The FCA also at the weekend issued consumer warnings against the Cayman Islands-registered Binance holdings company”); Shivam Vahia, *Binance’s Compliance ‘Journey’ Gets Bumpier As Another Partner Backs Out*, BUSINESS INSIDER (July 14, 2021), <https://www.businessinsider.in/cryptocurrency/news/binances-compliance-journey-gets-bumpier-as-another-partner-backs-out/articleshow/84373786.cms> (“Binance was originally founded in China by Canadian Changpeng Zhao but was forced to move out during the 2017 crackdown by the authorities. Since then, the exchange has been based out of the Cayman Islands.”).



Exchange	Place of Incorporation/ Domicile	Principal Place of Business	Registered Office Address (as applicable)	Locations Referenced in ToS/ToU/ToA	Notable Items in Public Sources and Media
Bitfinex	British Virgin Islands <sup>174</sup>	Hong Kong, China <sup>175</sup>	13/F 1308 Bank of America Tower 12 Harcourt Road Central, Hong Kong <sup>176</sup>	Governing law of the ToS is that of the British Virgin Islands. <sup>177</sup>	Hong Kong <sup>178</sup>
BitForex	Singapore <sup>179</sup> / Seychelles <sup>180</sup>		Paya LeBar Rd. #10-24 Singapore, 409051 <sup>181</sup>	Governing law of ToS is “the laws of the Website registration country”. <sup>182</sup>	
Bithumb	South Korea <sup>183</sup>	South Korea <sup>184</sup>	17, Teheran-ro-16-gil, Gangnam-gu, Seoul, South Korea, (Dongwoo Bldg.) 08378 <sup>185</sup>	Governing law of ToS is that of South Korea. <sup>186</sup>	South Korea <sup>187</sup>

<sup>168</sup> *About Us*, BITBANK CO., Exhibit B4.

<sup>169</sup> *Id.*

<sup>170</sup> *Bitbank*, CIPHERTRACE, Exhibit B2; *see also* GSR00002411.

<sup>171</sup> RPLI\_SEC 1077900, *Terms of Service*, *Bitbank*.

<sup>172</sup> *Id.*

<sup>173</sup> *See, e.g.*, Thomas Wilson, *Japan Watchdog Orders Improvement*, REUTERS (June 22, 2018), <https://www.reuters.com/article/us-cryptocurrencies-japan/japan-watchdog-orders-improvements-at-cryptocurrency-exchanges-idUSKBN1JI0R0> (Japan’s financial regulator said on Friday it has ordered cryptocurrency exchanges including bitFlyer, Inc., one of the country’s biggest, to make improvements to lax measures on money laundering . . . Others targeted by the FSA included well-known exchanges Quione and Bitbank Inc.”).

<sup>174</sup> *Bitfinex*, CIPHERTRACE, Exhibit B2; *see also In the Matter of: BFXNA INC. d/n/a BitFinex*, CFTC No. 16-19, Comm. Fut. L. Rep. P 33766 (2016).

<sup>175</sup> *In the Matter of: BFXNA INC. d/n/a BitFinex*, CFTC No. 16-19, Comm. Fut. L. Rep. P 33766 (2016)

<sup>176</sup> *Bitfinex*, CIPHERTRACE, Exhibit B2.

<sup>177</sup> RPLI\_SEC 1077963, *Terms of Service*, *Bitfinex*.

<sup>178</sup> *See, e.g.*, Amie Tsang, *Bitcoin Plunges After Hacking of Exchange in Hong Kong*, NY TIMES (Aug. 3, 2016), <https://www.nytimes.com/2016/08/04/business/dealbook/bitcoin-bitfinex-hacked.html> (“The digital currency Bitcoin plunged on Wednesday after Bitfinex, an exchange based in Hong Kong, said it had been hacked and funds stolen.”).

<sup>179</sup> *BitForex*, CIPHERTRACE, Exhibit B2.

<sup>180</sup> RPLI\_SEC 1077993, *BitForex Terms of Service*, *BitForex*; Certificate of Incorporation of a Private Limited Company, Noah Trade LTD, Co. No. 11386260 (filed on May 29, 2018), Exhibit B5.

<sup>181</sup> *BitForex*, CIPHERTRACE, Exhibit B2.

<sup>182</sup> RPLI\_SEC 1077993, *BitForex Terms of Service*, *BitForex*.

<sup>183</sup> *Bithumb*, CIPHERTRACE, Exhibit B2; *Bithumb*, S7P CAPITAL IQ, Exhibit B6; *see also* GSR00014791.

<sup>184</sup> *Bithumb*, CIPHERTRACE, Exhibit B2; *Bithumb*, S&P Capital IQ, Exhibit B6.

<sup>185</sup> *Bithumb*, CIPHERTRACE, Exhibit B2.

<sup>186</sup> RPLI\_SEC 1078001, *Terms of Service*, *Bithumb*.



Exchange	Place of Incorporation/ Domicile	Principal Place of Business	Registered Office Address (as applicable)	Locations Referenced in ToS/ToU/ToA	Notable Items in Public Sources and Media
Bitlish	United Kingdom <sup>188</sup>	United Kingdom <sup>189</sup>	Suite 14056 43 Bedford Street, London, Greater London, WC2E 9HA, United Kingdom <sup>190</sup>		United Kingdom <sup>191</sup>
BitMart	Cayman Islands <sup>192</sup>		23 Lime Tree Bay Avenue, Grand Cayman KY1-1110, Cayman Islands <sup>193</sup>	Governing law of ToS is that of the Cayman Islands. <sup>194</sup>	
BitMAX	Singapore <sup>195</sup>			Governing law of the ToS is that of Singapore. <sup>196</sup>	Singapore <sup>197</sup>
Bitrue	Singapore <sup>198</sup>	Singapore <sup>199</sup>			Singapore <sup>200</sup>

<sup>187</sup> See, e.g., Nathaniel Popper, *Bitcoin Bug Bites Japan and South Korea as China Clamps Down*, NY TIMES (Oct. 1, 2017), <https://www.nytimes.com/2017/10/01/technology/bitcoin-japan-south-korea.html> (“Trading has been so popular that two South Korean exchanges, Bithumb and Coinone, have set up storefronts in Seoul that people can visit to buy and sell in person.”).

<sup>188</sup> *Bitlish*, CIPHERTRACE, Exhibit B2; *Bitlish*, S&P CAPITAL IQ, Exhibit B7; *Bitlish*, ARACHNYS, Exhibit B8.

<sup>189</sup> *Bitlish*, CIPHERTRACE, Exhibit B2.

<sup>190</sup> *Id.*

<sup>191</sup> See, e.g., William Suberg, *We Plan to Open 5,000 Bitcoin ATMs in Europe in 2017: Bitlish*, COINTELEGRAPH (May 29, 2017), <https://cointelegraph.com/news/we-plan-to-open-5000-bitcoin-atms-in-europe-in-2017-bitlish> (“UK-based Bitlish thus surprised when one of its branded machines opened in Russia’s second city St. Petersburg, closely followed by another.”).

<sup>192</sup> *BitMart*, CIPHERTRACE, Exhibit B2.

<sup>193</sup> *Id.*

<sup>194</sup> RPLI\_SEC 1078012, *User Agreement, BitMart*.

<sup>195</sup> *BitMax*, CIPHERTRACE, Exhibit B2; *BMXDM Technology Pte. Ltd.*, S&P CAPITAL, Exhibit B9; *BMXDM Technology Pte. Ltd.*, ARACHNYS, Exhibit B10.

<sup>196</sup> RPLI\_SEC 1078022, *Terms of Service, AscendEX*.

<sup>197</sup> See, e.g., Yoon Young-sil, *Bithumb to Collaborate with Singaporean Exchange BitMax*, BUSINESSKOREA (Feb. 20, 2020), <http://www.businesskorea.co.kr/news/articleView.html?idxno=41587> (“Bithumb, a cryptocurrency exchange, said on Feb. 18 that it signed a strategic partnership agreement with BitMax, a Singaporean exchange.”).

<sup>198</sup> *Bitrue*, CIPHERTRACE, Exhibit B2; *Bitrue Singapore Pte. Ltd.*, ARACHNYS, Exhibit B11.

<sup>199</sup> *Bitrue Singapore Pte. Ltd.*, ARACHNYS, Exhibit B11.

<sup>200</sup> See, e.g., Daniel Palmer, *Singapore Exchange Bitrue Hacked for Over \$4 Million in Crypto*, CoinDesk (July 27, 2019), <https://www.coindesk.com/markets/2019/06/27/singapore-exchange-bitrue-hacked-for-over-4-million-in-crypto/> (“Singapore-based cryptocurrency exchange Bitrue has been hacked for around \$4.2 million in user assets.”); Danny Nelson, *Bitrue Exchange to Launch Crypto-Backed Loan Platform* (Sept. 24, 2019), <https://www.coindesk.com/markets/2019/09/24/bitrue-exchange-to-launch-crypto-backed-loan-platform/> (“Singapore-based exchange Bitrue is launching a low-interest crypto lending platform.”).

Exchange	Place of Incorporation/ Domicile	Principal Place of Business	Registered Office Address (as applicable)	Locations Referenced in ToS/ToU/ToA	Notable Items in Public Sources and Media
Bitstamp	United Kingdom <sup>201</sup>	Slovenia <sup>202</sup>	5 New Street Square, London <sup>203</sup>	Governing law of the ToU is that of England and Wales. <sup>204</sup>	United Kingdom / Slovenia <sup>205</sup>
Bittrex	United States <sup>206</sup>	United States <sup>207</sup>	Bittrex, Inc. 701 5th Ave., Ste 4200 Seattle, WA 98104-7047 <sup>208</sup>	Governing law of the ToS is that of Washington State. <sup>209</sup>	United States <sup>210</sup> Bittrex (Global): Bermuda <sup>211</sup>
BW	Australia <sup>212</sup>	Australia <sup>213</sup>			
Coinbase	United States <sup>214</sup>	N/A <sup>215</sup>	548 Market Street #23008, San Francisco, CA 94104 <sup>216</sup>	Governing law for the User Agreement is that of California. <sup>217</sup>	United States <sup>218</sup>

<sup>201</sup> BS-LTD-00000051, Certificate of Incorporation of a Private Limited Company, Bitstamp Ltd, Company No. 8157033 (filed on July 25, 2012); *see also* Bitstamp, CIPHERTRACE, Exhibit B2.

<sup>202</sup> BS-LTD-00000013, *Bitstamp's Annual Report and Financial Statements for 2020*; Exhibit B13; BS-LTD-00000005, *Letter from Preiskel & Co LLP on behalf of Bitstamp Ltd.*

<sup>203</sup> BS-LTD-00000013, *Bitstamp Ltd 2019 Annual Report*; *see also* RPLI\_SEC0057357.

<sup>204</sup> RPLI\_SEC 1078033, *Terms of Use, Bitstamp Ltd.*

<sup>205</sup> *See, e.g.,* Sydney Ember, *Dealbook: Jitters After Bitcoin Exchange Suspends Services*, NY TIMES (Jan. 6, 2015), <https://dealbook.nytimes.com/2015/01/06/jitters-after-bitcoin-exchange-suspends-services/> (“On Tuesday morning, Bitstamp, based in London, posted a message on its website saying it had ‘temporarily suspended Bitstamp services’ and urged its customers not to make deposits to previously issued Bitcoin deposit addresses.”); Robert Hackett, *Bitcoin Exchange Bitstamp Wins EU Approval*, FORTUNE (Apr. 25, 2016), <https://fortune.com/2016/04/25/bitcoin-exchange-eu-approval-bitstamp/> (“Bitstamp, a Slovenian Bitcoin exchange now based in the United Kingdom, said on Monday that it had received a license from Luxembourg’s Ministry of Finance to operate as a payment institution.”).

<sup>206</sup> *Bittrex, Inc.*, DEL. DEP’T OF STATE: DIV. OF CORPS., Exhibit B12.

<sup>207</sup> *Privacy Policy*, BITTREX, INC., Exhibit B13.

<sup>208</sup> *Id.*

<sup>209</sup> *Id.*

<sup>210</sup> *See, e.g.,* Kellie Ell, *Bittrex Exchange Will Let Investors Swap Their Dollars for Cryptocurrency*, CNBC (June 1, 2018), <https://www.cnbc.com/2018/06/01/bittrex-exchange-will-let-investors-swap-their-dollars-for-cryptocurrency.html>.

<sup>211</sup> *See, e.g.,* *Bittrex Global to Operate Cryptocurrency Exchange from Bermuda*, BUSINESSWIRE (Sept. 30, 2020), <https://www.businesswire.com/news/home/20200930005717/en/Bittrex-Global-to-Operate-Cryptocurrency-Exchange-From-Bermuda>.

<sup>212</sup> *BW*, CIPHERTRACE, Exhibit B2. *BW* was acquired by CollinStar Holdings in 2017. *See CollinStar Holdings to Acquire BiWang Group in a 100 Million US Dollars Buyout*, BUSINESSWIRE (Dec. 3, 2017), <https://www.businesswire.com/news/home/20171203005059/en/CollinStar-Holdings-to-Acquire-BiWang-Group-in-a-100-Million-US-Dollars-Buyout>. CollinStar Holdings is incorporated in Australia. *See CollinStar Holdings Pty, Ltd.*, AUSTRALIAN BUSINESS REGISTER, Exhibit B14.

<sup>213</sup> *CollinStar Holdings Pty, Ltd.*, AUSTRALIAN BUSINESS REGISTER, Exhibit B14; *Collinstar Holdings Pty. Ltd.*, AUSTRALIAN SECS. & INVS. COMM’N, Exhibit B15.

Exchange	Place of Incorporation/ Domicile	Principal Place of Business	Registered Office Address (as applicable)	Locations Referenced in ToS/ToU/ToA	Notable Items in Public Sources and Media
CoinBene	Vanuatu <sup>219</sup>		1 Coleman Street, Adelphi, Singapore 179803 <sup>220</sup>	User Agreement requires that any arbitration would occur in Vanuatu. <sup>221</sup>	
CoinOne	South Korea <sup>222</sup>	South Korea <sup>223</sup>	4F, Coinon, 69, Hangang-daero, Yongsan-gu, Seoul, South Korea, 04378 <sup>224</sup>	The ToS frequently references Korea. <sup>225</sup>	South Korea <sup>226</sup>
DigiFinex	Singapore <sup>227</sup>	Hong Kong, China <sup>228</sup>		Governing law of the ToS is that of Singapore. <sup>229</sup> The ToS also stated that the company is registered in the Seychelles. <sup>230</sup>	

<sup>214</sup> *Coinbase Global, Inc.*, DEL. DEP'T OF STATE: DIV. OF CORPS., Exhibit B16.

<sup>215</sup> Coinbase Global Inc. S-1 Filing (filed on Feb. 25, 2021), Exhibit B17 (“In May 2020, we became a remote-first company. Accordingly we do not maintain a headquarters”); *see also* Andrew Chamings, *Coinbase to Close San Francisco Offices for Good, Will Have No Headquarters*, SFGATE (May 6, 2021), <https://www.sfgate.com/local/article/2021-05-coinbase-san-francisco-office-closure-tech-16157042.php>.

<sup>216</sup> *Coinbase*, CIPHERTRACE, Exhibit B2.

<sup>217</sup> RPLI\_SEC 1078173, *Coinbase Legal Agreement (US)*, Coinbase.

<sup>218</sup> *See, e.g.*, Jason Brett, *With Coinbase And SAP, Vast Bank Offers Bitcoin, Ethereum, Cardano and Litecoin*, FORBES (Sept. 1, 2021), <https://www.forbes.com/sites/jasonbrett/2021/09/01/with-coinbase-and-sap-vast-bank-offers-bitcoin-ethereum-cardano-and-litecoin/>.

<sup>219</sup> *CoinBene*, CIPHERTRACE, Exhibit B2.

<sup>220</sup> *Id.*

<sup>221</sup> RPLI\_SEC 1078201, *Terms of Service, Coinbene*.

<sup>222</sup> *CoinOne*, CIPHERTRACE, Exhibit B2.

<sup>223</sup> *Id.*; *Home*, COINONE, <https://coinone.co.kr> (identifying South Korea as the location of CoinOne’s offices at bottom of homepage); *see also* GSR00014791.

<sup>224</sup> *Id.*

<sup>225</sup> RPLI\_SEC 1078206, *Basic Terms of Use, Coinone*.

<sup>226</sup> *See, e.g.*, Nathaniel Popper, *Bitcoin Bug Bites Japan and South Korea as China Clamps Down*, NY TIMES (Oct. 1, 2017), <https://www.nytimes.com/2017/10/01/technology/bitcoin-japan-south-korea.html> (“Trading has been so popular that two South Korean exchanges, Bithumb and Coinone, have set up storefronts in Seoul that people can visit to buy and sell in person.”); Joori Roth, *As Crackdown Looms, South Korea’s Defiant Crypto Fans Dig In*, REUTERS (July 12, 2021), <https://www.reuters.com/technology/crackdown-looms-south-koreas-defiant-crypto-fans-dig-2021-07-12>.

<sup>227</sup> *DigiFinex*, THE GRID, Exhibit B18.

<sup>228</sup> *DigiFinex Global*, LINKEDIN (last visited Oct. 1, 2021), <https://sg.linkedin.com/company/digifinex-global>.

<sup>229</sup> *Terms and Conditions*, DIGIFINEX, Exhibit B19.

<sup>230</sup> *Id.*

Exchange	Place of Incorporation/ Domicile	Principal Place of Business	Registered Office Address (as applicable)	Locations Referenced in ToS/ToU/ToA	Notable Items in Public Sources and Media
HitBTC	Hong Kong, China <sup>231</sup>		Viru väljak 2, Tallinn 10111, Estonia <sup>232</sup>	User Agreement requires that any arbitration would occur in British Virgin Islands. <sup>233</sup>	
Huobi Global <sup>234</sup>	Seychelles <sup>235</sup>		Asia Square Tower 1, 8 Marina View, Central Business District, 01, Singapore <sup>236</sup>	User Agreement requires that any arbitration would occur in Belize. <sup>237</sup>	China <sup>238</sup>
Korbit	South Korea <sup>239</sup>	South Korea <sup>240</sup>	Seonjeongreung Gangnam-gu Yeoksam-dong Seoul, Seoul-t Seonjeongreung Gangnam-gu Yeoksam-dong Seoul, Seoul-tukpyolsi 135080 South Korea <sup>241</sup>	Governing law of the ToS is that of South Korea. <sup>242</sup>	South Korea <sup>243</sup>

<sup>231</sup> *HitBTC*, CIPHERTRACE, Exhibit B2.

<sup>232</sup> *Id.*

<sup>233</sup> RPLI\_SEC 1078221, *Terms of Service, HitBTC*.

<sup>234</sup> Huobi Global had an exclusive partner in the United States from July 2018. *See HBUS. The Strategic Partner of Huobi Will Launch on July 6*, HUOBI (July 6, 2018), <https://www.huobi.com/support/en-us/detail/360000117702>. That partner subsequently traded XRP pairs for a period of time in 2019. *See Aziz Abdel-Qader, Huobi's US Arm Goes Live with Trading Three XRP Pairs*, FINANCE MAGNATES (Apr. 18, 2019), <https://www.financemagnates.com/cryptocurrency/exchange/huobis-us-arm-goes-live-with-trading-three-xrp-pairs>. There is no indication that trades of XRP executed on behalf of Ripple by GSR during that eight month period occurred on Huobi's U.S.-based partner as opposed to Huobi Global, where XRP trades had been previously executed. *See* GSR00003239. During his deposition, Mr. Gil of GSR identified Huobi as one of the exchanges on which GSR traded XRP and confirmed that it was located outside of the United States. *See* Gil Dep. Tr. 303:17—304:2.

<sup>235</sup> *Huobi Global*, CIPHERTRACE, Exhibit B2.

<sup>236</sup> *Id.*

<sup>237</sup> RPLI\_SEC 1078239, *User Agreement, Huobi Global*.

<sup>238</sup> *See, e.g.,* Gregor Stuart Hunter & Chao Deng, *China Buying Sparks Bitcoin Surge*, WALL ST. J. (May 30, 2016), <https://www.wsj.com/articles/china-buying-sparks-bitcoin-surge-1464608221> (“Huobi and OKCoin, two Chinese exchanges, now collectively account for some 92% of global trading in bitcoin.”).

<sup>239</sup> *Korbit*, CIPHERTRACE, Exhibit B2; *Korbit*, S&P CAPITAL IQ, Exhibit B20.

<sup>240</sup> *Home*, KORBIT (last visited Oct. 1, 2021), [www.korbit.co.kr](http://www.korbit.co.kr) (identifying South Korea as the location of Korbit's offices at bottom of homepage).

<sup>241</sup> *Korbit*, CIPHERTRACE, Exhibit B2.

<sup>242</sup> RPLI\_SEC 1078247, *Terms and Conditions, Korbit*.

Exchange	Place of Incorporation/ Domicile	Principal Place of Business	Registered Office Address (as applicable)	Locations Referenced in ToS/ToU/ToA	Notable Items in Public Sources and Media
Kraken	United States <sup>244</sup>	United States <sup>245</sup>	237 Kearny Street #102, San Francisco, CA <sup>246</sup>	Governing law of the ToS is that of California. <sup>247</sup>  Non-US residents are directed to contact Payward Trading Ltd., c/o SHRM Trustees (BVI) Limited, Trinity Chambers, Ora et Labora Building, Road Town, Tortola, VG1110, British Virgin Islands. <sup>248</sup>	United States <sup>249</sup>
Aux Cayes FinTech Co. Ltd d/b/a OKEx	Seychelles <sup>250</sup> / Malta <sup>251</sup>	Seychelles <sup>252</sup>		Governing law of the ToS are that of England and Wales. <sup>253</sup>  User Agreement requires that any arbitration would occur in Hong Kong. <sup>254</sup>	China <sup>255</sup>

<sup>243</sup> See, e.g., Nathaniel Popper, *Bitcoin Bug Bites Japan and South Korea as China Clamps Down*, NY TIMES (Oct. 1, 2017), <https://www.nytimes.com/2017/10/01/technology/bitcoin-japan-south-korea.html>; Joori Roth, *As Crackdown Looms, South Korea's Defiant Crypto Fans Dig In*, REUTERS (July 12, 2021) <https://www.reuters.com/technology/crackdown-looms-south-koreas-defiant-crypto-fans-dig-2021-07-12>.

<sup>244</sup> *Payward Ventures Inc.*, CAL. SEC. OF STATE, Exhibit B21; *Payward Ventures, Inc.*, DEL. DEP'T OF STATE: DIV. OF CORPS., Exhibit B22.

<sup>245</sup> *Payward Ventures Inc.*, S&P CAPITAL IQ, Exhibit B23.

<sup>246</sup> *Id.*

<sup>247</sup> RPLI\_SEC 1078259, *Terms of Service, Kraken*.

<sup>248</sup> *Terms of Service, Kraken* (last updated June 23, 2021), <https://www.kraken.com/en-us/legal/>.

<sup>249</sup> See, e.g., Steven Russolillo, *Coinbase Wants to Pounce on Another Cryptocurrency Paradise: Japan*, WALL ST. J. (June 5, 2018), <https://www.wsj.com/articles/coinbase-wants-to-pounce-on-another-cryptocurrency-paradise-japan-1528178585>; Laura Saunders, *The IRS Is Coming for Crypto Investors Who Haven't Paid Their Taxes*, WALL ST. J. (May 14, 2021), <https://www.wsj.com/articles/bitcoin-irs-comes-for-crypto-investors-who-havent-paid-their-taxes-11620937095>.

<sup>250</sup> RPLI\_SEC 1078293, *Terms of Service, OKEx*.

<sup>251</sup> *OKEx*, CIPHERTRACE, Exhibit B2.

<sup>252</sup> *Contact Us*, *OKEx*, Exhibit B24.

<sup>253</sup> RPLI\_SEC 1078293, *Terms of Service, OKEx*.

<sup>254</sup> *Id.*

Exchange	Place of Incorporation/ Domicile	Principal Place of Business	Registered Office Address (as applicable)	Locations Referenced in ToS/ToU/ToA	Notable Items in Public Sources and Media
Poloniex	United States <sup>256</sup>	United States <sup>257</sup>	99 High Street, Suite 1701 Boston, MA 02110	Governing law of the User Agreement is that of Panama. <sup>258</sup>	United States <sup>259</sup>
Upbit	Upbit (Global) Singapore <sup>260</sup>  Upbit Korea: South Korea <sup>261</sup>		Upbit Global: 1 Harbourfront Avenue #16-02, Keppel Bay Tower, S098632, Singapore <sup>262</sup>  Upbit Korea: 5th Floor 14, Teheran-ro 4-gil, Gangnam-Seoul Korea <sup>263</sup>		South Korea <sup>264</sup>
ZB	United Arab Emirates <sup>265</sup>			Governing law of the ToS is that of the United Arab Emirates. <sup>266</sup>	Singapore <sup>267</sup>

<sup>255</sup> See, e.g., Kenneth Rapoza, *Chinese Founder of OKEx Crypto Exchange 'Arrested' Again; Whales Bail*, FORBES (Oct. 16, 2020), <https://www.forbes.com/sites/kenrapoza/2020/10/16/chinese-ceo-of-okex-crypto-exchange-arrested-again-whales-bail/?sh=65423d141461>.

<sup>256</sup> *Poloniex, LLC*, MASS. CORPS. DIV., Exhibit B25; *Poloniex, LLC (E1082390)*, MONT. SEC. OF STATE, Exhibit B26.

<sup>257</sup> *Id.*

<sup>258</sup> RPLI\_SEC 1078300, *User Agreement, Poloniex*.

<sup>259</sup> See, e.g., Mengqi Sun, *Circle Sets Aside \$10.4 Million to Settle SEC Case on Poloniex*, WALL ST. J. (July 20, 2021), <https://www.wsj.com/articles/circle-sets-aside-10-4-million-to-settle-sec-case-on-poloniex-11626825346>.

<sup>260</sup> RPLI\_SEC 1078314, *Terms of Use, UpBit*.

<sup>261</sup> *Home*, UPBIT KOREA (last visited Oct. 1, 2021), <https://www.upbit.com/home> (identifying South Korea as the location of Upbit Korea's offices at bottom of homepage).

<sup>262</sup> *Home*, UPBIT (last visited Oct. 1, 2021), <https://sg.upbit.com/home> (identifying Singapore as the location of Upbit's offices at bottom of homepage).

<sup>263</sup> *Upbit*, CIPHERTRACE, Exhibit B2.

<sup>264</sup> See, e.g., *Over 60 South Korean crypto exchanges set to suspend services next week*, CNBC (Sept. 17, 2021), <https://www.cnbc.com/2021/09/17/over-60-south-korean-crypto-exchanges-set-to-suspend-services.html>.

<sup>265</sup> RPLI\_SEC 1078338, *User Agreement, ZB*.

<sup>266</sup> *Id.*

<sup>267</sup> See, e.g., Kenneth Rapoza, *Does China Have a Role in Bitcoin's Rise?*, FORBES (Jan. 10, 2021), <https://www.forbes.com/sites/kenrapoza/2021/01/10/does-china-have-a-role-in-bitcoins-rise>.



Exchange	Place of Incorporation/ Domicile	Principal Place of Business	Registered Office Address (as applicable)	Locations Referenced in ToS/ToU/ToA	Notable Items in Public Sources and Media
ZBG	Hong Kong, China <sup>268</sup>	Hong Kong, China <sup>269</sup>			Hong Kong <sup>270</sup>

110. As part of reviewing information, I noted that the SEC has acknowledged in this litigation that certain of the exchanges on which Ripple traded XRP are located outside of the United States. For example, I have reviewed a number of requests for assistance issued by the SEC to various overseas regulators in connection with this litigation to obtain documents from cryptocurrency exchanges based outside the United States. These requests were made pursuant to IOSCO procedures for inter-regulatory cooperation. As detailed below, the requests illustrate that the SEC perceives these exchanges to be based and/or located outside the United States. For example, the SEC issued requests for assistance to:

- a. The Financial Services Commission in South Korea, pursuant to the IOSCO Multilateral Memorandum of Understanding, seeking its assistance to obtain documents from “the following digital asset trading platforms based in South Korea: Upbit, Bithumb, Coinone, and Korbit.”<sup>271</sup>
- b. The Financial Conduct Authority in the United Kingdom, pursuant to the IOSCO Enhanced Multilateral Memorandum of Understanding, seeking its assistance to obtain documents from “UK-based Bitlish.”<sup>272</sup> The request also noted that “Bitlish is located at Suite 14056, 43 Bedford Street, London, England, WC2E 9HA.”<sup>273</sup>

<sup>268</sup> ZBG, CIPHERTRACE, Exhibit B2.

<sup>269</sup> ZBG Exchange, LINKEDIN (last visited Oct. 1, 2021), <https://hk.linkedin.com/company/zbexchange>.

<sup>270</sup> See, e.g., Rachel McIntosh, *Time & Power: APAC's Continued Influence on Crypto Markets*, Finance Magnates (Nov. 15, 2019), <https://www.financemagnates.com/cryptocurrency/news/time-power-apacs-continued-influence-on-crypto-markets/>.

<sup>271</sup> NYRO\_RIPPLE\_RFA\_00011.

<sup>272</sup> NYRO\_RIPPLE\_RFA\_000118.

<sup>273</sup> *Id.*

- c. The Monetary Authority of Singapore, pursuant to the IOSCO Enhanced Multilateral Memorandum of Understanding, seeking its assistance to obtain documents from “the following digital asset trading platforms based in Singapore: Bitmax, Bitrue, and Coinbene.”<sup>274</sup> The request also noted that Bitmax was “located at 114 Lavender Street, Number 09-88, Ct Hub 2, Singapore, 338729,” that Bitrue was “located at 8 Wilkie Road #03-01, Wilkie Edge, Singapore, 228095,” that Coinbene was “located at 1 Coleman St., Singapore, 179803.”<sup>275</sup>
- d. The Cayman Islands Monetary Authority, pursuant to the May 2002 IOSCO Multilateral Memorandum of Understanding, seeking its assistance to obtain documents from “BitMart, a digital asset exchange platform and company incorporated in the Cayman Islands.”<sup>276</sup> The request also noted that BitMart was “located at 23 Lime Tree Bay Avenue, Grand Cayman, Cayman Islands KY1-1110, KY.”<sup>277</sup>
- e. The Cayman Islands Monetary Authority, pursuant to the May 2002 IOSCO Multilateral Memorandum of Understanding, seeking its assistance to obtain documents from “Binance Holdings, Inc. . . . a digital asset exchange platform and company incorporated in the Cayman Islands.”<sup>278</sup> The request also noted that Binance is “located at Suite 5-204, 23 Lime Tree Bay Avenue, P.O., George Town, Grand Cayman, KY11104, Cayman Islands.”
- f. The Malta Financial Services Authority, pursuant to the May 2002 IOSCO Multilateral Memorandum of Understanding, seeking its assistance to obtain documents from “Okex, a digital asset trading platform based in Malta.”<sup>279</sup> The

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<sup>274</sup> NYRO\_RIPPLE\_RFA\_00124.

<sup>275</sup> *Id.* at -125.

<sup>276</sup> NYRO\_RIPPLE\_RFA\_000130.

<sup>277</sup> *Id.* at -131.

<sup>278</sup> NYRO\_RIPPLE\_RFA\_000143.

<sup>279</sup> NYRO\_RIPPLE\_RFA\_000137



request also noted that Okex is located at “35, Room 1A, Salvu Psaila Street, Birkirkara, Malta.”<sup>280</sup>

- g. The Hong Kong Securities and Futures Commission, pursuant to the Memorandum of Understanding between the SEC and the Hong Kong authorities dated October 5, 1995 and the IOSCO Enhanced Multilateral Memorandum of Understanding, seeking its assistance to obtain documents from “Bitfinex, Inc. . . . a digital asset trading platform that is wholly owned and operated by iFinex, Inc., which is headquartered in Hong Kong.”<sup>281</sup> The request also noted that iFinex is “located at Suite 13/F, 1308 Bank of America Tower, 12 Harcourt Road Central, Hong Kong.”
- h. The Securities Commission of Malaysia, pursuant to the May 2002 IOSCO Multilateral Memorandum of Understanding, seeking its assistance to obtain documents from “Okex, a digital asset trading platform with offices in Malaysia.”<sup>282</sup> The request noted that Okex is “located at 18th Floor, Menara TA One 22, Jalan P. Ramlee, Kuala Lumpur 50250.”<sup>283</sup>

111. The only four exchanges where there are indicia that a trade may occur within the United States are Bittrex, Poloniex, Coinbase, and Kraken. However, these indicia do not conclusively determine that any given offer or trade on any one of these four exchanges definitively took place and became final in the U.S. Trades may have occurred outside of the U.S. even in these cases because (1) the relevant market-maker might have been interfacing with a foreign unit or platform of the particular exchange (e.g., trading on a foreign affiliate like Bittrex Global); and (2) some exchanges may have been based outside of the U.S. for a particular period of time before domiciling themselves within U.S. borders through a U.S. affiliate. In analyzing trades purported to have occurred on these four exchanges, it is important to proceed on a case-by-case basis to establish on which platform/unit of the exchange, in fact, offers were being made and the trades were being executed and finalized.

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<sup>280</sup> *Id.* at -138.

<sup>281</sup> NYRO\_RIPPLE\_RFA\_000150.

<sup>282</sup> NYRO\_RIPPLE\_RFA\_000163.

<sup>283</sup> *Id.* at -164.

112. For example, when asked whether he considered Bittrex to be a “U.S. exchange” in connection with GSR’s trades on Bittrex on behalf of Ripple, Mr. Gil answered that he did not know because Bittrex “spun out their international entity” and “they pushed all the non-U.S. people to the international entity.”<sup>284</sup> Thus, at some points in time, trades through Bittrex may actually have been made on a foreign exchange. With respect to Poloniex, Mr. Gil also testified that it “might have been in one of th[o]se Caribbean Islands.”<sup>285</sup> As to Coinbase, its User Agreement refers to Coinbase Singapore Pte. Ltd., which is incorporated in Singapore. With respect to Kraken, its terms of service provide that “products and services are provided through local operating entities that are subsidiaries of Payward, Inc.” If the user resides outside of countries such as the U. S., then the counterparty to the terms of service is a British Virgin Islands entity.<sup>286</sup>

113. There are two final points worth noting on this question of where exchange-traded cryptocurrency transactions become final. First, I am aware that certain of the exchanges listed in Table A, including those that I do not believe finalize trades in the U.S., have had contact with or submitted license applications to certain U.S. regulators.<sup>287</sup> The existence of these contacts and filings do not change my conclusions. Importantly, to the best of my understanding, these interactions with regulators do not constitute evidence that these exchanges were finalizing trades in the U.S. Rather, a more plausible account is that these exchanges were trying to get permission to engage in some exchange business in the U.S. (e.g., through registration with FinCEN as a money services business). Indeed, based on my impressions of the current marketplace for cryptocurrency exchanges, those looking to trade in the U.S. try to do so through a special U.S. domiciled affiliate that operates with a distinct transactional profile and with a stated intention to gain compliance with applicable rules.<sup>288</sup>

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<sup>284</sup> Gil Dep. Tr.159:3–7.

<sup>285</sup> Gil Dep. Tr. 303:15–16.

<sup>286</sup> *Summary of Terms of Service*, KRAKEN, at Section 1.5, <https://www.kraken.com/en-us/legal> (“If you reside in any other country not set forth in 1.1-1.4 above (other than Japan, in which case, you have been provided with a separate terms of service that is applicable to you)- Payward Trading Ltd., c/o SHRM Trustees (BVI) Limited, Trinity Chambers, Ora et Labora Building, Road Town, Tortola, VG1110, British Virgin Islands.”).

<sup>287</sup> For example, I have reviewed records via FinCEN’s public “MSB Registrant Search” page and identified registered entities that appear to be affiliated with Binance US, BitMart, Bitstamp, Bittrex, Coinbase, DigiFinex, Korbit, Kraken, Aux Cayes FinTech Co. Ltd d/b/a OKEx, and Poloniex. *See MSB Registrant Search*, FINCEN, <https://www.fincen.gov/msb-registrant-search>.

<sup>288</sup> Emily Flitter, *The World’s Biggest Crypto Exchange Still Lacks U.S. Footing*, N.Y. TIMES, Aug. 19, 2021.

Thus, absent other specific indicia, and based on the approach outlined in this Section, I would continue to conclude that trades on the exchanges in Table A other than Bittrex, Poloniex, Coinbase, and Kraken would not have occurred in the U.S.

114. Second, I do not find it surprising that the vast majority of exchanges do not execute and finalize trades in the U.S. Based on my research, it is my understanding that many cryptocurrency exchanges tend to avoid becoming located in the U.S. and falling within the purview of U.S. regulators.<sup>289</sup> For example, it is common to discover advice online to would-be cryptocurrency exchange providers that exhorts them to try and remain distant from U.S. shores.<sup>290</sup> Indeed, even businesses run by U.S. citizens and residents often operate offshore.<sup>291</sup> Within this environment, it makes sense that most of the exchanges noted above would locate themselves in jurisdictions outside of the U.S. and would seek to avoid falling within U.S. territorial borders. To the extent they do so, it is likely to be an accidental and inadvertent mistake or by way of minor, inconsequential physical presence that does not affect the location of the underlying exchange or where trades on the exchange become final.

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<sup>289</sup> See, e.g., Eric Lipton and Ephrat Livni, *Crypto Nomads: Surfing the World for Risk and Profit*, N.Y. TIMES, Jul. 13, 2021.

<sup>290</sup> See, e.g., Christian Reeves, *How to Build a Cryptocurrency Exchange*, PREMIER OFFSHORE, Apr. 7, 2018, <https://premieroffshore.com/how-to-build-an-international-cryptocurrency-exchange/>.

<sup>291</sup> Lipton & Livni, *supra* note 297.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on October 4, 2021

A handwritten signature in black ink, appearing to read 'Yesha Yadav', written over a horizontal line.

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Yesha Yadav