Exhibit 24

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:[1]

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.[2]

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.[3]

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.[4]

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

[1] *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.

[2] Easton Report, ¶ 10.

[3] 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.

[4] 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.[5] 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?[6]

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[7] 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),[8] 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?[9]

II. SUMMARY OF OPINIONS

3. Based on my academic training and teaching experience,[10] 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

[5] 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.

[6] *See* [redacted] Report, ¶¶ 44-46.

[7] *See* [redacted] Report, ¶¶ 9.f. and 53-54.

[8] *See* [redacted] Report, ¶ 47; [redacted] Report, ¶¶ 41-47.

[9] *See* [redacted] Report, ¶¶ 38-40.

[10] *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.[11] 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),[12] 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[13] 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

[11] [redacted] Report, ¶ 9.f.

[12] [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.

[13] [redacted] Report, ¶¶ 38-40.

professionals at Compass Lexecon working under my direct supervision.[14] 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.[15]

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.

[14] 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.

[15] [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.[16]

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.[17]

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."[18] 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

[16] [redacted] Report, ¶¶ 53-56.

[17] Easton Report, note 71 (quoting Ripple 2020 Audited Financial Statements ("AFS") p. 40).

[18] 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."[19]

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.[20] 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.[21] 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

[19] 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").

[20] [redacted] Report, ¶ 53.

[21] 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.[22, 23] 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.[24] 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"[25] 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.

[22] 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.").

[23] 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).

[24] 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.

[25] [redacted] Report, ¶ 9.f.

13. Moreover, Professor [redacted] 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 [redacted] 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.[26]

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."[27] 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."[28]

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

[26] [redacted] 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 [redacted] opines. *Id.*

[27] Easton Report, ¶ 86.

[28] 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.[29]

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.[30] 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.[31]

[29] [redacted] Report, ¶ 55.

[30] 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.").

[31] Easton et al. (2021), at 8-3.

18. Based on my understanding of Ripple's sales of XRP (and as Professor [redacted] 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.[32] 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 [redacted] 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 [redacted] 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,[33] 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

[32] *See*, *e.g.*, Easton et al. (2021), pp. 7-9 to 7-10.

[33] [redacted] Report, ¶¶ 41-47.

XRP.[34] 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.[35] 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),[36] 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.[37]

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[34] [redacted] Report, ¶¶ 48-49.

[35] [redacted] Report, ¶ 53.

[36] 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.

[37] 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.[38] 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."[39] According to Professor [redacted] these contractual provisions

[38] 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.

[39] [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."[40]

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.[41] 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.[42] 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.[43]

28. In contrast, Ripple paid [redacted] in 2020, and [redacted] in 2019, to repurchase common and preferred stock.[44] 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

[40] [redacted] Report, ¶ 9.c.

[41] Easton Report, ¶ 51.

[42] Ripple 2020 AFS, p. 3 & 6. Ripple did not purchase any XRP in 2019. *Id.*, p. 6 & 21.

[43] Easton Report, ¶ 78 (citing MoneyGram 2020 10-K, p. F-45).

[44] 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.[45] Similarly, Ripple's repurchases of preferred stock are recorded as a reduction in the equity balance of Preferred Stock.[46] 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."[47] 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."[48] Mr. [redacted] points to Ripple's commercial agreement with MoneyGram as one example of such a business relationship.[49]

[45] Ripple 2020 AFS, p. 5 & 35.

[46] *Id*.

[47] [redacted] Report, ¶ 8.

[48] [redacted] Report, ¶ 38.

[49] [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).[50]

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.

[50] 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.[51]

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."[52] 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."[53]

[51] Easton Report, ¶ 89 (citations omitted).

[52] Easton Report, ¶ 77.

[53] 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.[54] 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."[55] 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."[56]

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."[57] 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

[54] *See* Easton Report, ¶ 78.

[55] Easton Report, ¶ 79.

[56] MoneyGram 2020 10-K, p. F-45.

[57] MoneyGram 2019 10-K, p. F-44.

Consolidated Balance Sheets as of December 31, 2019."[58] 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."[59] 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."[60] 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).[61] Moreover, U.S. GAAP required that MoneyGram disclose both the SPA and the commercial agreement as related

[58] MoneyGram 2019 10-K, p. F-44.

[59] MoneyGram 2019 10-K, p. F-44.

[60] [redacted] Report, ¶ 39.

[61] MoneyGram 2020 10-K, pp. 32, F-17, & F-45.

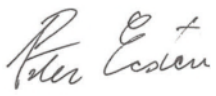
party transactions given that Ripple became a significant holder of MoneyGram common stock as a result of the SPA.[62]

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.



Peter Easton

[62] 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 data and documents referenced in this report.

Exhibit 25

FILED UNDER SEAL

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.	20-cv-10832 (AT)

EXPERT REPORT OF BRADLEY BORDEN

October 4, 2021

I. Background and Qualifications

1. I am a Professor of Law at Brooklyn Law School and the principal of Bradley T. Borden PLLC. For more than 20 years, I have studied, taught, researched, written about, and advised clients with respect to the federal income tax classification of property and the federal income tax consequences of property transactions. I counsel property owners regarding the tax consequences of property transactions as they decide whether to buy or sell property and advise them regarding reporting the tax consequences of such transactions. My scholarship also considers how the tax consequences of transactions may affect property owners' business decisions. My academic and practical work focuses on the classification of property and the tax consequences of property transactions.

2. I am the author or co-author of the following books on federal income tax: SECTION 1031 EXCHANGES FOR REAL ESTATE INVESTORS AND PROFESSIONALS (Vandeplas Publishing 2021); FEDERAL INCOME TAXATION: CASES AND MATERIALS (8th ed., Foundation Press 2020) (with Martin J. McMahon, Jr., Daniel L. Simmons & Bret Wells); LLCS AND PARTNERSHIPS: LAW, FINANCE, AND TAX PLANNING (Wolters Kluwer 2019); FEDERAL TAXATION OF CORPORATIONS AND CORPORATE TRANSACTIONS (Aspen Publishers 2018) (with Steven Dean); TAXATION AND BUSINESS PLANNING FOR REAL ESTATE TRANSACTIONS (2d ed., Carolina Academic Press 2017); TAXATION AND BUSINESS PLANNING FOR PARTNERSHIPS AND LLCS (Aspen Publishers 2017); and TAX-FREE LIKE-KIND EXCHANGES (2d ed., Civic Research Institute 2015). I am also the author or co-author of more than 125 articles published in leading professional and academic journals. Attached as Exhibit A is my CV, including cases in which I have previously testified as an expert during the previous four years and a complete list of my publications over the last ten years.

3. My publications have been cited by the United States Court of Appeals for the Fifth[1] and Ninth Circuits,[2] the United States Court of Federal Claims,[3] and state courts and commissions.[4] I am also one of the most frequently downloaded tax authors on the Social Science Research Network.[5]

4. I have extensive experience in the tax bar. I am the past chair of the Sales, Exchanges & Basis Committee of the American Bar Association Section of Taxation, which focuses on the federal income tax treatment of property transactions. I am also currently or formerly a member of other professional organizations, including the American College of Tax Counsel, the New York State Bar Association, the New York City Bar Association, the Texas Bar Association, and the Tax Forum. I am also a Fellow of the American Bar Foundation.

5. I am frequently invited by members of the tax bar to speak at conferences of professional tax advisors, and I have spoken at some of the most prestigious tax conferences. I also have an active tax advisory practice. My clients include large publicly-traded companies, real estate fund managers, large real estate developers, investors, and single-property owners. I am licensed to practice law in New York and Texas, and I am a certified public accountant.

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[1] *Southgate Master Fund, L.L.C. v. United States*, 659 F.3d 466, 483, n.56 (5th Cir. 2011) (citing Bradley T. Borden, *The Federal Definition of Tax Partnership*, 43 HOUS. L. REV. 925, 928–29 (2006).

[2] *Teruya Brothers, Ltd. v. Commissioner*, 580 F.3d 1038, 1047, n. 12 (9th Cir. 2009) (citing Kelly Alton, Bradley T. Borden & Alan S. Lederman, *Related-Party Like-Kind Exchanges*, 115 TAX NOTES 467 (Apr. 20, 2007)).

[3] *Fisher v. United States*, 82 Fed. Cl. 780, 786 (2008) (citing Bradley T. Borden, *Reverse Like-Kind Exchanges: A Principled Approach*, 20 Va. Tax Rev. 659 (2001)).

[4] *Wells Fargo Bank, N.A. v. Short*, 180 Wash. App. 1012 (2014) (citing Bradley T. Borden, David J. Reiss & W. KeAupuni Akina, *Show Me the Note!*, 19 J. BANK LENDER LIAB. 1 (2013)); *Dickerson v. Regions Bank*, No. M2012-01415-COA-R3CV, 2014 WL 1118076 (Tenn. Ct. App. Mar. 19, 2014) (same); *Central Dodge Title, LLC v. Wisconsin Department of Revenue*, 2009 WL 4883048 (Wis. Tax. App. Comm. 2009) (citing Bradley T. Borden, *Reverse Like-Kind Exchanges: A Principled Approach*, 20 VA. TAX REV. 659 (2001)).

[5] *See, e.g.,* Paul Caron, *SSRN Tax Professor Rankings*, TAXPROF BLOG (Sep. 29, 2021), https://taxprof.typepad.com/taxprof_blog/tax_prof_rankings (ranking me 21 for most all-time downloads and 19 for recent downloads).

6. I have been retained as an expert in litigation in various state and federal courts in the United States and in a foreign court on various matters. At issue in many cases in which I have been retained as an expert is the federal income tax classification of property or the application of federal income tax law's property-transaction rules. I have given expert testimony in depositions on multiple occasions.

7. In connection with this matter, I was retained by Kellogg Hansen Todd Figel & Frederick PLLC, on behalf of Ripple Labs Inc. ("Ripple"), to provide an expert opinion on matters of U.S. tax law. I am being reimbursed at the hourly rate of $1,290. Attached as Exhibit B is a list of all sources I have relied upon and considered in providing this opinion.

II. Questions Presented and Opinions

A. Questions Presented

8. I was asked to offer an expert opinion on the following issues in connection with the above-captioned matter:

(a) Has authoritative guidance been issued regarding the federal income tax classification of virtual currency such as XRP?

(b) Does that or any other guidance classify virtual currency such as XRP as a security for federal income tax purposes?

(c) From the perspective of federal income tax law (and focusing on the period prior to December 22, 2020, when the Complaint was filed in this matter), would a reasonable buyer or seller expect virtual currency such as XRP to be classified as a security for federal income tax purposes and qualify for application of federal income tax rules specific to securities?

B. Summary of Opinions

9. My opinions with respect to questions presented are as follows:

(a) The answer to question (a) is yes. The Internal Revenue Service ("IRS") issued guidance in 2014 classifying virtual currency such as XRP as property (the "IRS 2014 Guidance"). That guidance, which continues to represent the IRS's public position on virtual currency such as XRP, confirms that federal income tax law treats virtual currency as property that is subject to federal income tax law's general property-transaction rules (the "general property-transaction rules").

(b) The answer to question (b) is no. Existing IRS guidance does not classify virtual currency such as XRP as a security for federal income tax purposes. To the best of my knowledge, the IRS has not classified virtual currency as a security for federal income tax purposes in any regulation, rule, public proceeding, or any other guidance. I am also unaware of any federal income tax statute, administrative ruling, or judicial decision that classifies virtual currency as a security for federal income tax purposes or concludes the federal income tax definition of a security includes virtual currency.

(c) The answer to question (c) is no. A reasonable buyer or seller of virtual currency such as XRP would not expect it to be classified as a security for federal income tax purposes or qualify for federal income tax treatment specific to securities. Based on the IRS 2014 Guidance, reasonable buyers and sellers would expect the general property transaction rules to apply to

virtual currency such as XRP. Reasonable buyers and sellers would not expect any securities-specific exceptions to the general property-transaction rules to apply to virtual currency such as XRP. For example, a reasonable seller of such virtual currency would not expect the wash-sale rule, which applies to transactions in securities, to apply to such virtual currency because such virtual currency does not come within the wash-sale definition of securities and therefore is not classified as securities under the wash-sale rule. Furthermore, the reasonable buyer or seller of virtual currency such as XRP would not expect such virtual currency to come within the federal income tax definitions of securities, which include stock, bonds, and options to buy or sell such property. Thus, reasonable buyers and sellers of virtual currency such as XRP would not expect such virtual currency to qualify as a security for federal income tax purposes or expect the securities-specific exceptions to apply to such virtual currency.

III. Case Background

10. The Securities and Exchange Commission ("SEC") brought an action against Ripple, Bradley Garlinghouse, and Christian A. Larsen (together, the "Defendants") on December 22, 2020, claiming that the Defendants' offers and sales of XRP constituted investment contracts, and that those offers and sales were unlawful because they were not registered with the SEC.[6] The Defendants assert that their sales of XRP did not involve the offer or sale of an investment contract under U.S. securities laws, and therefore no registration was required.

[6] ECF No. 4 (Complaint filed in SEC v. Ripple Labs Inc., 20 Civ. 10832 (S.D.N.Y. Dec. 22, 2020)); *see also* ECF No. 46 (Amended Complaint filed on Feb. 18, 2021).

IV. Characteristics of XRP

11. From my review of materials in this case, including facts that the SEC has admitted, I understand that XRP has the following features and characteristics: it can be bought and sold on global exchanges;[7] holders of XRP are not entitled to receive dividends,[8] or to exercise any governance rights in respect of a separate legal entity;[9] and ownership of XRP does not convey any redemption rights or rights to return of capital.[10] Moreover, the holder of XRP is not entitled to fiduciary duties from Ripple or its management,[11] has no rights to liquidating distributions from Ripple,[12] and cannot exercise management or voting rights in Ripple.[13] XRP is not recognized as an interest in any legal person,[14] cannot own property, and cannot transact business in its own name. Finally, XRP does not grant any right to acquire or sell other property.[15] My understanding, therefore, is that XRP does not confer on the holder any governance, voting, or other rights with respect to Ripple or any other entity.

12. In 2015, the U.S. Department of Treasury's Financial Crimes Enforcement Network ("FinCEN") and the United States Attorney's Office for the Northern District of California expressly recognized that XRP is a "virtual currency" under applicable guidance issued by FinCEN.[16]

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[7] Pl.'s Answers and Obj.'s to Defs.' First Set of Req. for Admis. *Sec. Exch. Comm'n. v. Ripple Labs, Inc*., 20 Civ. 10832 (S.D.N.Y.) Nos. 50, 51, 52. I have received the Plaintiff's Answers and Objections to Defendants' First, Second and Third Requests for Admission, which will hereinafter be referred to as "Plaintiff's RFA Answer."
[8] Plaintiff's RFA Answer Nos. 57, 58, 59, 60, 62, 63; 133.
[9] Plaintiff's RFA Answer No. 61.
[10] Plaintiff's RFA Answer No. 64, 75.
[11] Plaintiff's RFA Answer No. 66.
[12] Plaintiff's RFA Answer Nos. 69, 70.
[13] Plaintiff's RFA Answer Nos. 71, 72, 75, 76, 77, 78; 219.
[14] Plaintiff's RFA Answer Nos. 19, 57, 58, 59, 60, 61, 62, 63, 66, 67, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78; 133; 219.
[15] Plaintiff's RFA Answer Nos. 57, 64, 72 75, 133.
[16] "Ripple and U.S. Department of Justice Settlement Agreement" (May 2015), https://www.justice.gov/usao-ndca/file/765721/download (hereafter, "the 2015 Settlement Agreement").

13. The characteristics of typical assets that come within the federal income tax definition of securities—namely, corporate stock, debt instruments, interests in tax partnerships, and options to acquire and sell such property—are significantly different from the characteristics of virtual currency such as XRP.

14. **Corporate Stock**. Stock, the quintessential example of a security, represents ownership in an entity that is taxed separately from the owners of such entity. That separate entity can hold property and transact business, report taxable income, and is a separate taxpayer that is liable for its own federal income tax. Stock typically provides its owner with the voting rights and rights to distributions or a return of capital on liquidation of the corporation.[17] Owners of stock only have an indirect ownership in the assets and operations of the corporation. Stock derives value from several variables, including the value of property and operations of the corporation.

15. **Debt Instruments**. A debt instrument grants the holder of the instrument the right to repayment of principal and (if applicable) interest.[18] Debt instruments derive value from several variables, including the creditworthiness of the borrower, collateral securing the instrument, and the borrower's payment history.

16. **Options to Acquire or Sell Property**. Options to acquire or sell property are interests that grant the holder the right to acquire or sell property subject to the option.[19] Options derive value from several variables, including the value of the underlying property the option holder is entitled to acquire or sell.

[17] I.R.C. §§ 301, 302, 331, 332.
[18] I.R.C. § 1275(a)(1); *Gilbert v. Comm'r*, 248 F.2d 399, 402 (2d Cir. 1957) ("The classic debt is an unqualified obligation to pay a sum certain at a reasonably close fixed maturity date along with a fixed percentage in interest payable regardless of the debtor's income or lack thereof").
[19] Rev. Rul. 78-182, 1978-1 C.B. 265.

17. **Interests in Tax Partnerships**. Interests in partnerships and entities taxed as partnerships (collectively, "tax partnerships") may grant the owners of such interests a share in the management of the tax partnership, grant the owners rights to distributions, and subject the owners to allocations of the tax partnership's income and losses.[20] Owners of interests in tax partnerships are deemed to have an indirect ownership in the tax partnership's business. Ownership interests in a tax partnership derive value from several variables, including the value of the property and operations of the tax partnership.

V. Analysis

A. The IRS 2014 Guidance Treats Virtual Currency such as XRP as Property that Is Not a Security.

18. In 2014, the IRS, citing FinCEN guidance, announced that "[f]or federal tax purposes, virtual currency is treated as property."[21] According to that IRS 2014 Guidance, "[v]irtual currency is a digital representation of value that functions as a medium of exchange, a unit of account, and/or a store of value."[22] The IRS presented Bitcoin as an example of such virtual currency because it "can be digitally traded between users and can be purchased with or exchanged into U.S. dollars, Euros, and other real or virtual currencies."[23] XRP has similar characteristics and is subject to the IRS 2014 Guidance. In answer to the question of how virtual currency such as XRP is treated for tax purposes, the IRS responded that it is treated as property, and the IRS applies the general property-transaction rules to virtual currency such as

[20] I.R.C. § 701, et seq.
[21] IRS Notice 2014-21, 2014-16 I.R.B. 938 (Apr. 14, 2014) at § 2 (citing FinCEN, Application of FinCEN's Regulations to Persons Administering, Exchanging, or Using Virtual Currencies, FIN-2013-G001 (March 18, 2013)). The 2015 Settlement Agreement, which stated that XRP is a "virtual currency," cited to the same 2013 FinCEN guidance about virtual currencies that the IRS relied on in the IRS 2014 Guidance.
[22] *Id.* at § 2 (distinguishing virtual currency from "'real'" currency—i.e., the coin and paper money of the United States or any other country that is designated as legal tender, circulates, and is customarily used and accepted as a medium of exchange in the country of issuance").
[23] *Id.* at § 2.

XRP.[24] The IRS also answered that virtual currency is not treated as a currency that could result in foreign currency gain or loss.[25] Based upon the characteristics of XRP enumerated above, reasonable buyers and sellers of XRP would expect the IRS 2014 Guidance to apply to it.

19. The IRS 2014 Guidance is considered authoritative as to the classification and tax treatment of virtual currency such as XRP and has remained authoritative since it was issued in 2014 up to the present.[26]

20. Taxpayers consider the following authorities in evaluating the federal income tax classification and treatment of property: the Code, case law, Treasury regulations, IRS published guidance, legislative history, and private IRS rulings. I am unaware of anything in any of those sources that contradicts or diminishes the authority in the IRS 2014 Guidance as to the federal income tax classification and treatment of virtual currency. I am also unaware of any such source concluding that the federal income tax definition of a security includes virtual currencies.

21. Therefore, the only authoritative guidance (the IRS 2014 Guidance) relating to the federal income tax classification and treatment of virtual currency such as XRP classifies such virtual currency as property that is not a security.[27]

[24] *Id.* at § 4, Q-1, A-1.
[25] *Id.* at § 4, Q-2, A-2.
[26] The IRS has released additional guidance on specific aspects of the taxation of cryptocurrency since 2014, but the subsequent guidance did not contradict or override the relevant aspects of the IRS 2014 Guidance. *See. e.g.*, Rev. Rul. 2019-24, 2019-44 I.R.B. 1004.
[27] There are, of course, other types of property that are subject to special tax rules (e.g., commodities and foreign currency). While the IRS 2014 Guidance indicated that virtual currency was not a "foreign currency," it is possible that it may fit into some other, non-security-specific set of special tax rules, such as those applicable to commodities.

B. Based on the IRS 2014 Guidance, Reasonable Buyers and Sellers of Virtual Currency such as XRP Would Expect the General Property-Transaction Rules to Apply to Such Virtual Currency.

22. In my experience, and as a general matter, reasonable buyers and sellers of property take the tax treatment of transactions into account when making commercial decisions and when reporting the tax consequences of transactions. Often, the expected tax consequences of a purchase or sale may inform or dictate the decisions of reasonable buyers and sellers—i.e., whether, when, and how to buy or sell property. The IRS 2014 Guidance, including the IRS's related publication, "Frequently Asked Questions on Virtual Currency Transactions," signals that reasonable buyers and sellers of virtual currency seek guidance regarding the federal income tax classification and tax consequences of transactions of such virtual currency. Furthermore, reasonable buyers and sellers of virtual currency such as XRP rely upon the IRS 2014 Guidance, in the absence of other guidance to the contrary, when making decisions related to transactions of such virtual currency and when they report the tax consequences of such transactions.

23. The IRS 2014 Guidance states that virtual currency such as XRP is property subject to the general property-transaction rules. Further IRS guidance has reinforced this conclusion by clarifying how the general property-transaction rules apply to certain events unique to cryptocurrency (which the IRS considers to be a subset of virtual currencies) such as airdrops or hard forks.[28] In fact, the general property-transaction rules apply to all types of property (real estate, trucks, cows, commodities, virtual currency, foreign currency, securities, and many others) unless a special, narrowly tailored exception overrides the application of the general property-transaction rules. The following briefly summarizes those general rules.

[28] Rev. Rul. 2019-24, 2019-44 I.R.B. 1004.

24. **Acquisition**. A person who acquires property for services or by windfall has gross income upon the receipt of such property.[29] A person who acquires property with cash has no gross income on receipt of the property.[30] A person who acquires property in exchange for other property has gross income under the rules governing dealings in property.[31]

25. **Basis and Holding**. The buyer of property for cash takes a basis in the property equal to the amount of cash paid for the property.[32] The recipient of property who recognizes income upon receipt of the property (such as a person who receives property in exchange for services) takes a basis in the property equal to the amount of gross income recognized upon the receipt of the property plus any amount paid for the property.[33] The person acquiring property in an exchange generally takes a basis in the property equal to the acquired property's fair market value.[34] The basis of property, regardless of how it is acquired, might be adjusted under various provisions of the Code (e.g., depreciation or amortization deductions).[35]

26. **Disposition**. Upon disposition of property, the person transferring the property realizes gain or loss based upon the amount realized and the adjusted basis of the transferred property.[36] As a general matter, the transferor must recognize (i.e., report on a tax return) any

[29] *See, e.g.*, *Commissioner v. Glenshaw Glass Co.*, 348 U.S. 426 (1955); *Cesarini v. United States*, 428 F.2d 812 (6th Cir. 1970); Treas. Reg. § 1.61-2(d) (1960), Treas. Reg. § 1.61-14 (1960).
[30] I.R.C. § 1001(a); Treas. Reg. § 1.61-(6)(a) (1960) (limiting the application of the gain and loss realization rules to sales and exchanges of property).
[31] I.R.C. §§ 61(a)(3), 1001(a), (b); Treas. Reg. § 1.61-6(d)(2)(i) (1960).
[32] I.R.C. § 1012(a) ("The basis of property shall be the cost of such property[.]").
[33] *See, e.g.*, *Id.*; Treas. Reg. § 1.61-2(d) (1960).
[34] *See, e.g.*, *Philadelphia Park Amusement Co. v. United States*, 130 Ct. Cl. 166, 171–172 (1954).
[35] I.R.C. §§ 1011, 1016.
[36] I.R.C. § 1001(a).

gain or loss realized on the transfer of property.[37] A person who transfers property in exchange for services recognizes gain based upon the value of the services received.[38]

27. Based upon the IRS 2014 Guidance and the foregoing general property-transaction rules, a person buying, holding, or selling virtual currency such as XRP would expect the following tax consequences: (i) when the person acquires the virtual currency through a cash purchase, the person does not have current income and takes a basis in the virtual currency equal to the amount paid for the virtual currency;[39] (ii) when the person acquires the virtual currency in a compensatory transaction or by windfall, the person has gross income[40] and takes a basis in the virtual currency equal to any amount included in gross income upon receipt of the virtual currency plus any amount paid for the virtual currency;[41] and (iii) when the person transfers the virtual currency for for cash, other property, or services, the person would recognize gain or loss on the transfer.

C. Reasonable Buyers and Sellers of Virtual Currency such as XRP Have No Reason to Expect that Securities-Specific Exceptions Apply to such Virtual Currency.

28. The Code includes multiple securities-specific exceptions to the general property-transaction rules ("securities-specific exceptions"). Those securities-specific exceptions often provide for non-recognition of gain or loss on the transfer or receipt of securities in qualifying transactions. The securities-specific exceptions only apply to property that qualifies as a security by coming within the appropriate federal income tax definition of securities. Because federal income tax law does not have a single definition of securities that applies throughout the Code, particular securities-specific exceptions often include their own particular definition

[37] I.R.C. § 1001(c).
[38] *International Freighting Corporation, Inc. v. Commissioner*, 135 F.2d 310 (2d Cir. 1943).
[39] I.R.C. § 1001(a) (explaining that a gain is triggered on a sale); Treas. Reg. § 1.61-2(d) (1960).
[40] IRS 2014 Guidance § 4, Q-3, A-3.
[41] IRS 2014 Guidance § 4, Q-4, A-4.

of securities. Those particular definitions can be found in the relevant Code section, IRS guidance, case law, or a combination of those authorities.

29. As a general matter, the federal income tax definitions of securities includes stock, evidences of indebtedness, and options to purchase and sell such assets,[42] but some federal income tax definitions of security are broader than the general definition.[43] Even if a digital asset could be designed with characteristics that fit into a federal income tax definition of a security, reasonable buyers and sellers would understand that virtual currencies with XRP's characteristics enumerated above do not come within the general federal income tax definition of securities.

30. As set forth in the federal income tax regulations, "[t]he exceptions from the general rule requiring recognition of all gains and losses, like other exceptions from a rule of taxation of general and uniform application, are strictly construed and do not extend beyond the words or the underlying assumptions and purposes of the exception."[44] Under this "strict-

[42] *See, e.g.*, I.R.C. § 165(g)(2) (defining security for purposes of the worthless-security rules as "(A) a share of stock in a corporation; (B) a right to subscribe for, or to receive, a share of stock in a corporation; or (C) a bond, debenture, note, or certificate, or other evidence of indebtedness, issued by a corporation or by a government or political subdivision thereof, with interest coupons or in registered form"); I.R.C. § 1236(c) (defining security for purposes of determining the character of gains and losses recognized by a dealer in securities as "any share of stock in any corporation, certificate of stock or interest in any corporation, note, bond, debenture, or evidence of indebtedness, or any evidence of an interest in or right to subscribe to or purchase any of the foregoing"); I.R.C. § 1058(a) (incorporating the section 1236(c) definition for purposes of denying gain or loss on certain transfers of securities that do not sufficiently shift the economics of ownership).

[43] *See, e.g.*, I.R.C. § 475(c)(2)(A–E) (stating the term "security" includes notional principal contracts and other derivatives as well as stock, partnership interests and debt; the 475 definition includes: (A) share of stock in a corporation; (B) partnership or beneficial ownership interest in a widely held or publicly traded partnership or trust; (C) note, bond, debenture, or other evidence of indebtedness; (D) interest rate, currency, or equity notional principal contract; and (E) evidence of an interest in, or a derivative financial instrument in, any security described in subparagraph (A), (B), (C), or (D), or any currency, including any option, forward contract, short position, and any similar financial instrument in such a security or currency))

[44] Treas. Reg. § 1.1002-1(b) (continuing, "[n]onrecognition is accorded by the Code only if the exchange is one which satisfies both (1) the specific description in the Code of an excepted exchange, and (2) the underlying purpose for which such exchange is excepted from the general rule. The exchange must be germane to, and a necessary incident of, the investment or enterprise in hand. The relationship of the exchange to the venture or enterprise is always material, and the surrounding facts and circumstances must be shown. As elsewhere, the taxpayer claiming the benefit of the exception must show himself within the exception."). The IRS identifies several exceptions to the general property-transaction recognition rules and the reason for such exceptions: "Exceptions to the general rule are

construction rule," a securities-specific exception depends upon a strict construction of the exception, including definitions that apply to the exception. A securities-specific exception only applies to property that comes within the exception's definition of securities. Thus, reasonable buyers and sellers of virtual currency such as XRP would not expect a securities-specific exception to apply to their virtual currency unless, applying a strict reading of the exception's definition of securities, such virtual currency comes within that definition. The following analysis shows that the securities-specific exceptions do not apply to virtual currency such as XRP under a fair reading, and especially not under a strict reading, of the federal income tax definitions of securities.

31. As an initial matter, the IRS 2014 Guidance affirms that virtual currency such as XRP is property subject to the general property-transaction rules and nowhere suggests that virtual currency is a security that could qualify for any securities-specific exception. The IRS's affirmative application of the general-property transaction rules to virtual currency such as XRP provides certainty that such virtual currency is not a security for federal income tax purposes—even before applying the strict-construction rule.

32. The IRS also has not, to the best of my knowledge, determined in any ruling, regulation, guidance, or public proceeding that any virtual currency such as XRP comes within the federal income tax definition of securities or qualifies for a securities-specific exception. I am also unaware of any case law that holds virtual currency such as XRP is a security under federal income tax law. Finally, Congress has not enacted any legislation

made, for example, by sections 351(a), 354, 361(a), 371(a)(1), 371(b)(1), 721, 1031, 1035 and 1036. These sections describe certain specific exchanges of property in which at the time of the exchange particular differences exist between the property parted with and the property acquired, but such differences are more formal than substantial. As to these, the Code provides that such differences shall not be deemed controlling, and that gain or loss shall not be recognized at the time of the exchange. The underlying assumption of these exceptions is that the new property is substantially a continuation of the old investment still unliquidated; and, in the case of reorganizations, that the new enterprise, the new corporate structure, and the new property are substantially continuations of the old still unliquidated." Treas. Reg. § 1.1002-1(c).

adding virtual currency such as XRP to any statutory federal income tax definition of security. Moreover, XRP's undisputed features lack characteristics of a security for federal income tax purposes: it pays no dividends, provides no governance rights in respect to any entity, does not represent a debt or equity interest in any entity, and is not a derivative instrument such as an option or forward with respect to such debt or equity.

33. Thus, reasonable buyers and sellers of virtual currency such as XRP would not expect such currency to come within a federal income tax definition of securities. Here are several examples of the securities-specific federal income tax rules that do not apply to virtual currencies:

1. The Wash-Sale Rule

34. The wash-sale rule is a securities-specific exception that does not apply to virtual currency. The rule disallows loss deductions on the sale or other disposition of stock or securities if the seller reacquires substantially identical stock or securities within 30 days of disposition.[45] For example, if an investor sells one share of Company A stock for a $5,000 tax loss and one week later purchases one share of Company A stock, the wash-sale rule disallows the deduction of that $5,000 loss.

35. The definition of securities used in the wash-sale rule has been the subject of judicial decisions,[46] and under the IRS interpretations the wash-sale definition of securities does not include commodity futures contracts or foreign currencies.[47] I am unaware of any

[45] I.R.C. § 1091(a).
[46] *See, e.g.*, *Trenton Oil Co. v. Commissioner*, 147 F.2d 33, 37 (6th Cir. 1945); *Corn Products Refining Co. v. Commissioner*, 16 T.C. 395 (1951), *aff'ing on other grounds* 348 U.S. 911 (1955); *Horne v. Commissioner*, 5 T.C. 250 (1945).
[47] *See* Rev. Rul. 74-218, 1974-1 C.B. 202 (relying upon the definition in section 1236(c), to rule that foreign currency is not a security for purposes of the wash-sale rule because "[c]urrency in its usual and ordinary acceptation means gold, silver, other metals or paper used as a circulating medium of exchange, and does not embrace bonds, evidences of debt, or other personal property or real estate"); IRS Publication 550, Investment Income and Expenses (2020) ("The wash sale rules apply to losses from sales or trades of contracts and options to

cases or rulings interpreting the wash-sale definition of securities to include virtual currency such as XRP. In fact, under the strict-construction rule, an act of Congress would be required to include virtual currency such as XRP within the wash-sale definition of securities.

36. To illustrate that Congress knows how to legislate the statutory expansion of federal income tax rules when it wants to, Congress has expanded the wash-sale definition of securities to include property that is otherwise excluded by a court's construction of the wash-sale definition. For instance, in response to a Tax Court decision holding that the wash-sale definition of stock or securities does not include options,[48] Congress amended the statute to provide that "the term 'stock or securities' shall . . . include contracts or options to acquire or sell stock or securities."[49] Therefore, Congress amended the statute to expand the definition's scope to include asset classes that the Tax Court previously excluded from the definition.

37. Members of Congress have signaled their understanding that the current wash-sale definition of securities does not include virtual currency such as XRP and that legislative action would be required to expand the wash-sale rule to apply to such virtual currency. In that regard, Congressman Richard Neal, Chairman of the House Ways and Means Committee (the committee with the principal responsibility for tax legislation in the House of Representatives) proposed legislation that would make "specified assets" subject to the wash-

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acquire or sell stock or securities. They do not apply to losses from sales or trades of commodity futures contracts and foreign currencies.").

[48] *Gantner v. Commissioner*, 91 T.C. 713 (1988) (holding that the section 1091 definition of securities does not include options). The court applied basic tenets of statutory interpretation to rule that section 1091 did not apply to options to acquire stock. Section 1091(a) then (and now) disallows loss on the sale of shares of stock or securities if the taxpayer "has acquired . . . , or has entered into a contract or option so to acquire, substantially identical stock or securities." *Id.* at 721. The Tax Court reasoned that if it read options into the definition of stock and securities it would render "or has entered into a contract or option so to acquire" superfluous and "violate the cardinal rule of statutory construct that 'effect shall be given to every clause and part of a statute.'" *Id.*

[49] I.R.C. § 1091(a), Pub. L. 106-554, § 1(a)(7), 102 Stat. 3682 (1988).

sale rule.[50] "Specified assets" is defined in the proposal to include four types of property: (1) any security as defined in the meaning of Section 475,[51] (2) any foreign currency, (3) any commodity,[52] and (4) "*any digital representation of value which is recorded on a cryptographically secured distributed ledger or any similar technology as specified by the Secretary*."[53] This proposed legislation, separately listing a category for virtual currency as a "specified asset"—i.e., one that is separate from a security or foreign currency—reflects an understanding by the ranking tax member of the House of Representatives that virtual currency does not come within the wash-sale definition of securities.

38. Note further that Chairman Neal's proposed legislation would classify foreign currency within the proposed new definition of "specified assets." That proposal addresses a class of assets that the IRS had earlier excluded from the wash-sale definition of securities. This enumeration reflects awareness among members of Congress of the need for legislative action to extend the wash-sale rule beyond its current reach, either by expanding its definition of securities or, as in the Neal proposed legislation, to expand its scope to apply to other types of non-security assets such as foreign currency and virtual currency or other digital assets.

39. This analysis illustrates that a reasonable buyer or seller of virtual currency such as XRP would have no grounds to apply the wash-sale exception to such virtual currency. Based upon that knowledge, reasonable buyers and sellers could conclude that they can recognize losses incurred on the sale of virtual currency such as XRP within 30 days of acquiring the same quantity of such virtual currency. Understanding that the wash-sale rule

[50] Amendment in the Nature of a Substitute to the Committee Print Offered by Mr. Neal of Massachusetts, Proposed Amendment to S. Con. Res. 14, 117th Cong. (2021), available at https://waysandmeans.house.gov/sites/democrats.waysandmeans.house.gov/files/documents/NEAL_032_xml.pdf, at 634:19–635:11; see also H.R. 5376 (2021) (same language proposed in budget reconciliation), available at https://www.congress.gov/bill/117th-congress/house-bill/5376/text, at 2219:19–2220:11.
[51] *Id.*
[52] *Id.* at § 138153(d)(1)(h)(3) (incorporating the definition of commodity in section 475(e)(2).
[53] *Id.* at §138153(d)(1) (emphasis added).

does not apply to virtual currency such as XRP could affect the decisions of reasonable buyers and sellers of such virtual currency.

40. Another bill now pending in Congress—the proposed Infrastructure Investment and Jobs Act—would add "digital asset[s]" to the definition of "specified security" for the purpose of the broker reporting rules in Section 6045 of the Code.[54] This is yet another example of members of Congress recognizing that the federal income tax definition of securities for very specific purposes does not currently include virtual currency. Section 6045 is outside Subtitle A (Income Taxes) of the Code and would not apply to the federal income tax classification of virtual currency such as XRP and the tax consequences of transactions of such virtual currency. Nonetheless, the proposed legislation is yet another example of members of Congress recognizing that federal income tax definitions of securities do not include virtual currency without affirmative action to expand the definitions.

2. Other Examples

41. The Code includes other security-specific exceptions to the general property-transaction rules, including rules applicable only to "stock," that manifestly have no application to virtual currency, and nothing in IRS guidance or other federal income tax law would cause reasonable buyers or sellers of virtual currency such as XRP to believe otherwise.

42. **Corporate-Formation Rules**. The corporate-formation rules apply only to stock—the quintessential security—which is so fundamentally different from virtual currency such as XRP to leave no doubt that provisions restricted to stock do not apply to such virtual currency. In brief, the corporate-formation rules provide an exception to the general property-transaction rules for qualifying transfers of property to a corporation in exchange for stock in

[54] H.R. 3684, 117th Cong. § 80603 (2021).

the corporation. In particular, the corporate-formation rules provide that, with such transactions, no gain or loss is recognized on the transfer of property in exchange for the issuance of stock.[55] These rules cannot apply to virtual currency such as XRP that lack the features of stock.

43. **Corporate-Reorganization Rules**. The corporate-reorganization rules are a securities-specific exception that do not apply to virtual currency such as XRP. Under this exception, no gain loss is recognized when ParentCo distributes SubCo stock or securities (i.e., SubCo debt) to ParentCo shareholders in a qualifying reorganization.[56]

44. The federal income tax law's definition of securities for purposes of the corporate-reorganization rules generally includes certain debt instruments of SubCo with a sufficiently long maturity representing a continuation of the taxpayer's interest in the reorganized entity,[57] as well as the option to acquire SubCo stock.[58]

45. Virtual currency such as XRP clearly falls outside the definition of securities for purposes of these corporate-reorganization rules, and the rules' application to such virtual currency would make no sense. Virtual currency such as XRP is not an interest in an entity, provides no right to repayment, and has no maturity date or other indicia of being the type of instrument that represents a continuing interest in a corporation. Lacking the features of qualifying debt instruments virtual currency such as XRP does not qualify as securities for

[55] I.R.C. § 351(a).
[56] I.R.C. § 355(a)(1).
[57] *See, e.g.*, Rev. Rul 2004-78, 2004-2 CB 108 (setting forth the general rule that a debt instrument with a term of less than five years is generally not a security for this purpose; the ruling sets forth an exception where debt instruments received in the reorganization represent "a continuation of the security holder's investment in the Target Corporation").
[58] Treas. Reg. § 1.354-1(e) (1998) (providing "[e]xcept as provided in section 1.356-6, for purposes of section 354, the term securities includes rights issued by a party to the reorganization to acquire its stock").

purposes of those rules.[59] Thus, reasonable buyers and sellers of virtual currency such as XRP would not expect the securities-specific corporate reorganization rules to apply.

46. **Tax partnerships**. Some definitions of securities include interests in tax partnerships.[60] Exceptions to the general property-transaction rules also apply to transactions of interests in tax partnerships. Under those exceptions, no gain or loss is generally recognized when property owners contribute property to tax partnerships or when tax partnerships distribute property to partners.[61] Because virtual currency such as XRP does not share the characteristics of interest in a tax partnership, and based on existing IRS guidance, reasonable buyers and sellers of such virtual currency would not apply those partnership rules to transactions of virtual currency such as XRP.

47. **Options**. The general definition of security includes options to buy or sell stock or debt instruments. The IRS provides guidance governing transactions with options that applies an open-transaction doctrine until the option is sold, expires, or is exercised.[62] These "option-specific rules" are exceptions to the general property-transaction rules, so they must be strictly construed, but even without such scrutiny, virtual currency such as XRP clearly does not qualify for the option-specific rules. Virtual currency such as XRP is stand-alone property with no right to buy or sell other property, so reasonable buyers and sellers of virtual currency such as XRP would conclude that such virtual currency is not an option and would not expect the option-specific rules to apply to such virtual currency.

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[59] I.R.C. § 356(a)(1).
[60] I.R.C. § 163 (describing tax treatment for interests in partnerships as based on the partnership's income, gain, deduction, loss, and distribution of excess income).
[61] I.R.C. § 721(a), 731(a)(1). These exceptions apply generally to all property, but the general nonrecognition rule may not apply to some distributions of marketable securities by a partnership. I.R.C. § 731(c).
[62] *See, e.g.,*Rev. Rul. 78-182, 1978-1 C.B. 265 (discussing the tax treatment of options traded on the Chicago Board Options Exchange, Incorporated).

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

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- Member, TAX MANAGEMENT REAL ESTATE Advisory Board, 2011–2016

PUBLICATIONS (PAST TEN YEARS)

ARTICLES IN LAW REVIEWS
- *Contribution and Distribution Flexibility and Tax Pass-Through Entities*, 23 FLA. TAX. REV. 349 (2019) (with Brett Freudenberg)
- *Effective Tax Rates and Entity Selection Following the 2017 Tax Act*, 71 NAT'L TAX J. 613 (2018)
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- SECTION 1031 FOR REAL ESTATE INVESTORS AND PROFESSIONALS, (Vandeplas Publishing, 2021)
- FEDERAL INCOME TAXATION: CASES AND MATERIALS (8th ed., Foundation Press 2020) (with Martin J. McMahon, Jr., Daniel L. Simmons & Bret Wells)
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- INCOME TAX CONCEPTS FOR BUSINESS AND TRANSACTIONAL LAWYERS (Aspen Publishers, in progress) (with Steven Dean)
- TAXATION OF BUSINESS ENTITIES (Aspen Publishers, in progress) (with Steven Dean)
- FEDERAL TAXATION OF CORPORATIONS AND CORPORATE TRANSACTIONS (Aspen Publishers 2018) (with Steven Dean)
- TAXATION AND BUSINESS PLANNING OF PARTNERSHIPS AND LLCS (2d ed., Aspen Publishers 2017)
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- TAX-FREE LIKE-KIND EXCHANGES (2d ed., Civic Research Institute 2015)
- LIMITED LIABILITY ENTITIES: STATE BY STATE GUIDE TO LLCS, LPS AND LLPS (Wolters Kluwer Law & Business 2012) (with Robert J. Rhee)

BOOK CHAPTERS AND SIMILAR PUBLICATIONS
- *Effective Tax Rates for Typical High-Income Taxpayers*, TAX SERIES SPECIAL UPDATE: TAX PRACTICE AFTER THE TAX CUTS AND JOBS ACT (Louis S. Freeman, ed.) (Practicing Law Institute 2018)
- *Real Estate Transactions by Tax-Exempt Entities*, TAX MANAGEMENT 591-3rd/480-2nd (2015)
- *Tax Aspects of Partnerships, LLCs and Alternative Forms of Business Organizations*, in RESEARCH HANDBOOK ON PARTNERSHIPS, LLCS AND ALTERNATIVE FORMS OF BUSINESS ORGANIZATIONS (Robert W. Hillman & Mark J. Lowenstein eds.) (Edward Elgar Publishing 2015)
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- *Real Estate Gain Deferral and Exclusion Through Investments in Qualified Opportunity Funds*, 18 DAILY TAX REP. 8 (Sep. 18, 2018) (with Alan S. Lederman)

- *Rolling Real Estate Gain into a Qualified Opportunity Fund: Comparison with § 1031*, 34 TAX MGT. REAL EST. J. 155 (Sep. 5, 2018) (with Alan S. Lederman)
- *How the New Tax Act Creates Complexity and Inequity for Small Businesses*, 23 BROOK. L. NOTES 40 (Spring 2018)
- *Code Sec. 1031 After the 2017 Tax Act*, 21 J. PASSTHROUGH ENT. 17 (May-June 2018), *republished in* 34 PRAC. REAL EST. LAW. 35 (July 2018); 33 PRAC. TAX LAW. 49 (Fall 2018)
- *Effect of IRS Nonacquiescence on Tax Planning and Reporting*, 21 J. PASSTHROUGH ENT. 19 (Jan.-Feb. 2018)
- *Like-Kind Exchanges of Timber Rights*, 20 J. PASSTHROUGH ENT. 27 (Sep.-Oct. 2017)
- Malulani *and the Entrenchment of Mechanical Analysis of Related-Party Exchange Rules*, 20 J. PASSTHROUGH ENT. 15 (May-June 2017)
- *It's a Bird, It's a Plane, No, It's a Board-Managed LLC*, 26 BUS. L. TODAY, No. 7 (Mar. 2017) (with A. Christine Hurt & Thomas E. Rutledge)
- Bartell *and the Expansion of Facilitated Exchanges*, 20 J. PASSTHROUGH ENT. 13 (Jan.-Feb. 2017)
- *Expected-Cost Analysis as a Tool for Optimizing Tax Planning and Reporting*, 44 REAL EST. TAX'N 21 (4th Quarter 2016) (with Ken H. Maeng)
- *Equity Structure of Non-Corporate Entities* 31 REAL EST. FIN. J. 35 (Summer/Fall 2016)
- *Code Sec. 1031 Drop-Swap Cash-Outs and Unrecaptured Section 1250 Gain*, 19 J. PASSTHROUGH ENT. 27 (Sep.-Oct. 2016)
- *Navigating the Confluence of Code Secs. 1031 and 1250*, 19 J. Passthrough Ent. 25 (May-June 2016)
- *Proposed Anti-Fee-Waiver Regulations: A Blueprint for Waiving Fees?*, 57 TAX MGT. MEMO 87 (Mar 7, 2016) (with Douglas L. Longhofer and Lena E. Smith)
- *Section 1031 Drop-and-Swaps Thirty Years After* Magneson, 19 J. PASSTHROUGH ENT. 11 (Jan.-Feb. 2016)
- *Maximizing Capital Gains in Real Estate Transactions*, 74-8 NEW YORK UNIVERSITY ANNUAL INSTITUTE ON FEDERAL TAXATION (2016) (with James M. Lowy)
- *XIRR Guessing Games and Distribution Waterfalls*, BUS. L. TODAY, No. 435 (Jan. 2016)
- *Section 1031 Drop-and-Swaps Thirty Years After* Bolker, 18 J. PASSTHROUGH ENT. 21 (Sep.-Oct. 2015)
- North Central *and the Expansion of Code Sec. 1031(f) Related-Party Exchange Rules*, 18 J. PASSTHROUGH ENT. 19 (May-June 2015)
- *To Repeal or Retain Section 1031: A Tempest in a $6 Billion Teapot*, 34 A.B.A. SEC. TAX'N NEWS Q. 1 (Spring 2015) (with Joseph B. Darby III, Charlene D. Luke & Roberta F. Mann)
- *Section 1031 Exchanges: Death of a Related-Party Exchange—Did "Butler" Do it?*, 75 DAILY TAX REP. J-1 (Apr. 20, 2015) (with Alan S. Lederman)
- *Counterintuitive Tax-Revenue Effect of REIT Spinoffs*, 146 TAX NOTES 381 (Jan. 19, 2015)
- *Math Behind Financial Aspects of Partnership Distribution Waterfalls*, 145 TAX NOTES 305 (Oct. 20, 2014)
- *Accounting for Pre-Transfer Development in* Bramblett *Transactions*, 41 REAL EST. TAX'N 162 (3rd Quarter, 2014) (with Matthew E. Rappaport)

- *Navigating State Law and Tax Issues Raised by Partnership and LLC Reorganizations*, 16 BUS. ENT. 4 (July/Aug. 2014)
- *Notable Partnership Tax Articles of 2013*, 143 TAX NOTES 1513 (June 30, 2014)
- *Are Related-Party Acquisitions in Anticipation of Exchange Technically and Theoretically Valid?*, 120 J. TAX'N 52 (Feb. 2014) (with Kelly E. Alton & Alan S. Lederman)
- *Section 179(f) Deductions and Recapture of Costs of Qualified Real Property*, 120 J. TAX'N 4 (Jan. 2014) (with Cali Lieberman)
- *Avoiding Adverse Tax Consequences in Partnership and LLC Reorganizations*, 23 BUS. L. TODAY (Dec. 2013) (with Brian J. O'Connor & Steven R. Schneider)
- *Dirty REMICs, Revisited*, 27 PROB. & PROP. 8 (Nov./Dec. 2013) (with David Reiss)
- *IRS Blesses Tax-Free Exchange of Negative-Equity Property*, BLS PRACTICUM (Sep. 12, 2013)
- *Goliath Versus Goliath in High-Stakes MBS Litigation*, 19 SEC. LIT. & REG. 3 (Sep. 4, 2013) (with David Reiss)
- *Show Me the Note!*, 19 BANK & LENDER LIABILITY 3 (June 3, 2013) (with KeAupuni Akina & David Reiss)
- *Notable Partnership Tax Articles of 2012*, 139 TAX NOTES 639 (May 6, 2013)
- *Dirt Lawyers and Dirty REMICs*, 27 PROB. & PROP. 12 (May/June 2013) (with David Reiss)
- *Cleaning Up the Financial Crisis of 2008: Prosecutorial Discretion or Prosecutorial Abdication?*, 92 CRIM. L. REP. 765 (Mar. 20, 2013), 100 BANKING REP. 579 (Mar. 26, 2013), 18 BLS LAW NOTES 32 (Spring 2013) (with David J. Reiss)
- *Once a Failed REMIC, Never a REMIC*, 30 CAYMAN FIN. REV. 65 (1st Quarter 2013) (with David Reiss)
- *Preserving the Conservation Contribution Deduction*, 30 J. TAX'N INV. 23 (Winter 2013) (with Andrew M. Wayment)
- *Beneficial Ownership and the REMIC Classification Rules*, 28 TAX MGMT. REAL EST. J. 274 (Nov. 7, 2012) (with David J. Reiss)
- *Sales of Church Real Property to Parishioners*, 24 TAX'N EXEMPTS 3 (July/Aug. 2012) (with Katherine E. David)
- *The Overlap of Tax and Financial Aspects of Real Estate Ventures*, 39 J. REAL EST. TAX'N 67 (1st Quarter 2012)
- *Tax-Free Exchanges of Art and Other Collectibles*, 29 J. TAX'N INV. 3 (Spring 2012)
- *From Allocations to Series LLCs: 2011's Partnership Tax Articles*, 134 TAX NOTES 1433 (Mar. 12, 2012)

PUBLIC SCHOLARSHIP

- *Who Cares About Taxing REIT Spinoffs?*, THE HUFFINGTON POST (Dec. 17, 2015)
- *REITs—Benign, Benevolent Structures*, THE HUFFINGTON POST (June 24, 2015)
- *The Art (and Law) of Tax-Free Exchanges of Art and Collectibles*, THE HUFFINGTON POST (June 10, 2015)
- *Third-Party Litigation Financing and the Impending Resurgence of the Legal Profession*, THE HUFFINGTON POST (May 4, 2013)
- *An Uneasy Justification for Prosecutorial Abdication in the Subprime Industry*, THE

HUFFINGTON POST (Nov. 7, 2012) (with David Reiss)

- *Did the IRS Cause the Financial Crisis?*, THE HUFFINGTON POST (Oct. 18, 2012)
- *Wall Street Rules Applied to REMIC Classification*, THOMSON REUTERS NEWS & INSIGHTS (Sep. 13, 2012) (with David Reiss)
- *The Symbiosis of a Fly Fisherman and Creek Fish*, THE HUFFINGTON POST (Feb. 6, 2012)
- *Romneys' Tax Returns Underscore Gross Inequity and Extent of Class Warfare*, THE HUFFINGTON POST (Jan. 25, 2012)

PRESENTATIONS (PAST TEN YEARS)

SELECTED ACADEMIC PRESENTATIONS

- *The Prediction Model in Tax Law's Substantial Authority*, Faculty Workshop, University of Florida Frederic G. Levin College of Law, Gainesville, Florida, February 2017
- *Capital Structure of Noncorporate Business Entities*, J. Reuben Clark Law Society Faculty Group Conference, New York, New York, January 2016
- *Probability, Professionalism, and Protecting Taxpayers*, Standards of Practice and their Implications in Law and Accounting Firms, Northwestern University Pritzker School of Law, Chicago, Illinois, October 2015 (with Dennis J. Ventry, Jr.)
- *REIT Stuff*, Graduate Tax Program Colloquium, University of Florida Frederic G. Levin College of Law, Gainesville, Florida, October 2014
- *REMIC Tax Enforcement as Financial-Market Regulator*, Faculty Colloquium, University of Washington School of Law, Seattle, Washington, January 2014
- *Using the Client-File Method to Teach Transactional Law*, The Future of Law, Business, and Legal Education: How to Prepare Students to Meet Corporate Needs, Chapman Law Review Symposium, Orange, California, February 2013
- *The Law School Firm: A Legal Teaching Model for the 21st Century*, Education Law and Policy Society, Columbia Law School, New York, New York, October 2012

SELECTED OTHER PRESENTATIONS

- *Business, Tax and Ethical Fundamentals Every Transactional Lawyer Needs to Know: Finding Your Way Out of the Transactional Maze*, New York County Lawyers Association Continuing Legal Education Institute, Webinar, June 2020 (with Lewis Tesser)
- *Contribution-Default Remedies of LLCs and Partnerships*, American Bar Association, Business Law Section, LLC Institute, Tampa, Florida, November 2019 (with Michael D. Soejoto)
- *Annual Review of Ethical Issues for QIs and Advisors in Like-Kind Exchanges*, Jeremiah Long Memorial National Conference on Like-Kind Exchanges Under Section 1031 I.R.C., Scottsdale, Arizona, October 2019 (with Mary Foster, David Shechtman, Derrick Tharpe)
- *Installment Sale Adjuncts/Substitutes to Exchanges*, Jeremiah Long Memorial National Conference on Like-Kind Exchanges Under Section 1031 I.R.C., Scottsdale, Arizona, October 2019 (with Anne Andrews, Alan Lederman)
- *TICs and DSTs as Replacement Property*, Jeremiah Long Memorial National Conference on Like-Kind Exchanges Under Section 1031 I.R.C., Scottsdale, Arizona, October 2019 (with Dick Lipton, Darryl Steinhause)

- *Annual Review of State Law Issues Affecting Exchanges*, Jeremiah Long Memorial National Conference on Like-Kind Exchanges Under Section 1031 I.R.C., Scottsdale, Arizona, October 2019 (with Ciro Immordino, Mary Foster, Joyce Welch)
- *Hot Like-Kind Exchange Issues*, New York University 78th Annual Institute on Federal Taxation, New York, New York, October 2019 (with Robert D. Schachat)
- *A Financial Analysis of Disguised Sales of Partnership Interests*, Tax Forum, New York, New York, October 2019
- *Related Party Exchanges—Risks and Opportunities*, Federation of Exchange Accommodators 2019 Annual Conference, New Orleans, Louisiana, September 2019
- *Maximizing Capital Gains in Real Estate Transactions*, New York University Federal Restate and Partnerships Tax Conference, Washington, D.C., June 2019 (with James M. Lowy)
- *Basic and Non-Basic Tax Issues for Leasing Lawyers*, Commercial Real Estate Leases 2019, New York State Bar Association, Real Property Law Section, New York, New York, February 2019
- *Don't Get Caught in the Transactional Maze: Income Tax Fundamentals and Their Ethical Implications for the Transactional Lawyer*, New York County Lawyers Association Continuing Legal Education Institute, New York, New York, February 2019 (with Lewis Tesser)
- *Effect of Property Tax Policy and Real Estate Transactions*, NYC Advisory Commission on Property Tax Reform, New York, New York, January 2019 (no published materials)
- *Breaking Up is Hard To Do: Handling Partnership Split-Ups on Sale of Property*, Jeremiah Long Memorial Conference on Like-Kind Exchanges Under Section 1031 I.R.C., Austin, Texas, November 2018 (with Steve Breitstone, Adam Handler, Lou Weller)
- *Current Thinking on What is Real Property*, Jeremiah Long Memorial Conference on Like-Kind Exchanges under Section 1031 I.R.C., Austin, Texas, November 2018 (with Mary Foster, Dick Lipton, Bob Schachat)
- *Tax Issues in Commercial Leasing*, New York State Bar Association, Commercial Real Estate Leasing, Real Property Law Section, New York, New York, October 2018
- *Maximizing Capital Gains in Real Estate Transactions*, Creative Tax Planning for Real Estate and Partnership Transactions 2018, The American Law Institute Continuing Legal Education, Chicago, Illinois, September 2018 (with James M. Lowy, Andrea Macintosh Whiteway)
- *Real Estate and Partnerships Under the Tax Cuts and Jobs Act*, Creative Tax Planning for Real Estate and Partnership Transactions 2018, The American Law Institute Continuing Legal Education, Chicago, Illinois, September 2018 (with Jerald D. August, Richard E. Levine, David Polster, Blake D. Rubin, Bahar A. Schippel, Steven R. Schneider, Stefan F. Tucker, Andrea Macintosh Whiteway)
- *S-Corp and Partnership Taxation, and Potential Implications of the New Tax Code*, New York State Bar Association, Business Law Section Spring Meeting, Business Organizations Law Committee, New York, New York, May 2018 (with Russell Kranzler and Matthew Moisan)
- *Choice-of-Entity Decisions Under the New Tax Act*, National Tax Association 48th Annual Spring Symposium, Washington, D.C., May 2018
- *Implications of IRS Nonacquiescences*, American Bar Association, Section of Taxation, Sales, Exchanges & Basis Committee Meeting, Washington, D.C., May 2018 (with Diana

L. Erbsen, Mary B. Foster, R. Matthew Kelley, Howard J. Levine, Steven J. Toomey)

- *Structuring Waterfall Provisions in LLC and Partnership Agreements*, Strafford Continuing Education, Tax Law 2018: New Challenges & Opportunities, New York, New York, May 2018 (with Anthony Minervini)
- *My Principal Purpose in Acquiring Related Party Property Didn't Include Tax Avoidance,* American Bar Association, Section of Taxation, Sales, Exchanges & Basis Committee Meeting, Washington, D.C., May 2017 (with Christina M. Glendening, Matthew E. Rappaport & Heather Ripley)
- *Section 1038 as an Alternative to Mixing Bowl Transactions*, Bloomberg BNA Tax Advisory Board Meeting, New York, New York, December 2016 (with Mark E. Wilensky & Glenn Johnson)
- *Structuring the Management of an LLC "Board,"* American Bar Association, Business Law Section, LLC Institute, Arlington, Virginia, October 2016 (with Christine Hurt & Thomas E. Rutledge)
- *Are Sale-Leasebacks on the Menu?*, American Bar Association, Section of Taxation and Section of Real Property, Trust & Estate Law, Trust & Estate Division, Boston, Massachusetts, October 2016 (with Stephen M. Breitstone, Aaron S. Gaynor & Glenn Johnson)
- *Ensuring an Internal Rate of Return (IRR) Distribution Waterfall Flows Correctly*, University of Texas School of Law 25th Annual LLCs, LPs and Partnerships Conference, Austin, Texas, July 2016
- *Developments in Income Taxation of Real Estate, Capital Gains Taxation and Section 1031 Exchanges*, Hofstra University Maurice A. Dean School of Law and Meltzer, Lippe, Goldstein & Breitstone, LLP, Private Wealth and Taxation Institute, Hempstead, New York, May 2016 (with Glenn M. Johnson & Mark E. Wilensky)
- *Dealing with Unrecaptured Section 1250 Gain in Drop-Swap Cash-Outs*, American Bar Association, Section of Taxation, Sales, Exchanges & Basis Committee Meeting, Washington, D.C., May 2016 (with Katherine E. David & Mark E. Wilensky)
- *Can the Tenant Provide Tax-Free Financing of the Landlord's Construction Costs?*, American Bar Association, Section of Taxation, Sales, Exchanges & Basis Committee Meeting, Los Angeles, California, January 2016 (with Aaron S. Gaynor, Glenn M. Johnson & E. John Wagner, II)
- *Proposed Anti-Fee Waiver Regulations: A Blueprint for Waiving Fees?*, Bloomberg BNA Tax Management Advisory Board Meeting, New York, New York, December 2015 (with Douglas L. Longhofer & Lena E. Smith)
- *The State of Section 1031 Drop-and-Swaps Thirty Years After* Bolker *and* Magneson, The University of Texas School of Law 63rd Annual Taxation Conference, Austin, Texas, December 2015
- *Maximizing Capital Gains in Real Estate Transactions*, New York University 74th Annual Institute on Federal Taxation, San Francisco, California, November 2015 (with James M. Lowy)
- *Did You Really Mean What You Wrote in that IRR Distribution Waterfall?* American Bar Association, Business Law Section, LLC Institute, Arlington, Virginia, November 2015 (with John Grumbacher, Thomas Kaufman & Steven Schneider)
- *Maximizing Capital Gains in Real Estate Transactions*, New York University 74th Annual Institute on Federal Taxation, New York, New York, October 2015 (with James M. Lowy)

- Panelist, *Non-Entity Real Estate Structures*, American Bar Association, Business Law Section, LLCs, Partnerships and Unincorporated Entities Committee, 2013 LLC Institute, Arlington, Virginia, October 2014 (with Daniel F. Cullen)
- Moderator, *Duties of an Attorney in a Basic Section 1031 Exchange*, American Bar Association, Section of Taxation, Sales, Exchanges & Basis Committee Meeting, Denver, Colorado, September 2014 (with Suzanne Goldstein Baker, Howard J. Levine & Beat U. Steiner)
- Panelist, *Tax Planning Workshop: Drop & Swap and Section 704(c)(2) Strategies*, ABA Tax Section CLE Webinar and Teleconference, December 2013 (with Mark E. Wilensky, Stephen M. Breitstone, Lou Weller, Donna M. Crisalli, Clifford M. Warren)
- Panelist, *Partnership and LLC Reorganizations*, American Bar Association, Business Law Section, LLC Institute, Arlington, Virginia, October 2013 (with Brian J. O'Connor and Steven R. Schneider)
- Moderator, *TICs and DST Transactions: They're Back!*, American Bar Association, Section of Taxation, Sales, Exchanges & Basis Committee Meeting, Washington, D.C., May 2014 (with Daniel F. Cullen & Darryl Steinhause)
- *Individual and Partnership Tax Developments*, Tulane Tax Institute, New Orleans, Louisiana, October 2013
- Panelist, *The Very Rare Find: A Section 1031 Collectible Exchange with Definite Answers*, American Bar Association, Section of Taxation, Sales, Exchanges & Basis Committee Meeting, San Francisco, California, September 2013 (with Alan Lederman, Suzanne Goldstein Baker, Timothy Shortess, Donna M. Crisalli)
- *Dirt Lawyers, Dirty REMICs*, American Bar Association Real Property, Trust & Estate Law Section's Legal Education and Uniform Law Group, Professors' Corner Teleconference, February 13, 2013 (with David J. Reiss)
- Panelist, *Tax Issues Involving Flawed Securitizations*, American Bar Association Section of Taxation, Sales, Exchanges & Basis Committee Meeting, Orlando, Florida, January 2013 (with Alan S. Lederman & John W. Rogers, III)
- *REMICs*, Idaho State Tax Institute, Pocatello, Idaho, November 2012
- *Is It Treated as a Sale? Something Else?—Part III: Issues Surrounding Tax Ownership of U.S. Residential Mortgage Debt*, American Bar Association Section of Taxation and Section of Real Property, Trust & Estate Law, Trust and Estate Division, Sales, Exchanges & Basis Committee Meeting, Boston, Massachusetts, September 2012 (with Alan S. Lederman)
- *Professional Ethics in the Transactional Setting*, Pocket MBA: Summer 2012, San Francisco, California, June 2012

EXPERT TESTIMONY (PAST FOUR YEARS)

BERNSTEIN V. NNN REALTY INVESTORS, LLC, NO. 30-2011-00449598, Superior Court of the State of California, County of Orange,
Expert retained in 2020 by defendant's counsel in an action for claimed breach of contract, breach of implied covenant of good faith and fair dealing, negligent misrepresentation, market manipulation, securities fraud, control person liability, setting aside fraudulent transfers—constructive fraud, setting aside fraudulent transfers—actual fraud, and common-law fraud.

Exhibit B

MATERIALS CONSIDERED

In addition to materials directly cited in the text of my Report, which are incorporated by reference as materials I considered, I considered the following materials in forming my opinions:

SEC V. RIPPLE CASE MATERIALS

Defs.'s Letter Mot. Regarding Pl's Resp. to Defs' Interrogs., dated Sept. 15, 2021, ECF No. 352

ECF No. 4 (Complaint filed in Sec. Exch. Comm'n v. Ripple Labs Inc., 20 Civ. 10832 (S.D.N.Y. Dec. 22, 2020))

ECF No. 46 (Amended Complaint filed in Sec. Exch. Comm'n v. Ripple Labs Inc., 20 Civ. 10832 (S.D.N.Y. Dec. 22, 2020))

Pl.'s Answers and Obj.'s to Defs.' First Set of Req. for Admis. Sec. Exch. Comm'n. v. Ripple Labs, Inc., 20 Civ. 10832

Pl.'s Answers and Obj.'s to Defs.' Second Set of Req. for Admis. Sec. Exch. Comm'n. v. Ripple Labs, Inc., 20 Civ. 10832

Pl.'s Answers and Obj.'s to Defs.' Third Set of Req. for Admis. Sec. Exch. Comm'n. v. Ripple Labs, Inc., 20 Civ. 10832

TAX AUTHORITIES, REGULATIONS, AND GUIDANCE

Internal Revenue Code of 1986, as amended, §§ 61, 163, 165, 301, 354, 351, 355, 356, 475, 701, 721, 731, 761, 1001, 1011, 1012, 1016, 1275, 1058, 1091, 1236

Internal Revenue Code of 1986, § 1091(a), Pub. L. 106-554, § 1(a)(7), 102 Stat. 3682 (1988)

IRS Gen. Couns. Memo. (GCM) 39551 (August 26, 1986)

IRS Gen. Couns. Memo. (GCM) 38369 (May 9, 1980)

IRS, FREQUENTLY ASKED QUESTIONS ON VIRTUAL CURRENCY TRANSACTIONS, https://www.irs.gov/individuals/international-taxpayers/frequently-asked-questions-on-virtual-currency-transactions (updated Oct. 9, 2019; Dec. 6, 2019; Sept. 22, 2020; Oct. 8, 2020; Mar. 2, 2021; June 4, 2021)

IRS Publication 550, Investment Income and Expenses (2020)

IRS Notice 2014-21, 2014-16 I.R.B. 938 (Apr. 14, 2014)

Rev. Rul. 71-568; 1971-2 C.B. 312

Rev. Rul. 74-128, 1974-1 C.B. 202

Rev. Rul. 78-11, 1978-1 C.B. 254

Rev. Rul. 78-182; 1978-1 C.B. 265

Rev. Rul. 81-204, 1981-2 C.B. 157

Rev. Rul. 2004-78, 2004-2 CB 108

Rev. Rul. 2019-24 2019-44 I.R.B. 1004

Treas. Reg. §§ 1.61-2; 1.61-6; 1.61-14; 1.354-1; 1.1001-1; 1.1002-1; 1.354-1

OTHER REGULATORY AUTHORITIES

FinCEN, Application of FinCEN's Regulations to Persons Administering, Exchanging, or Using Virtual Currencies, FIN-2013-G001 (March 18, 2013)

FinCEN, "Statement of Facts and Violations," In re Ripple Labs Inc. (May 5, 2015) , https://www.fincen.gov/sites/default/files/shared/Ripple_Facts.pdf

"Ripple and U.S. Department of Justice Settlement Agreement" (May 2015), https://www.justice.gov/usao-ndca/file/765721/download"

Press Release, Financial Crimes Enforcement Network, "FinCEN Fines Ripple Labs Inc. in First Civil Enforcement Action Against a Virtual Currency Exchanger" (May 5, 2015)

SEC, "Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO," Release No. 81207 (July 25, 2017)

OTHER STATUTORY AUTHORITY

15 U.S.C. §§ 80a-1–80a-64

PROPOSED LEGISLATION

Amendment in the Nature of a Substitute to the Committee Print Offered by Mr. Neal of Massachusetts, Proposed Amendment to S. Con. Res. 14, 117th Cong. (2021)

H.R. 3684, 117th Cong. (2021)

H.R. 5376, 117th Cong. (2021)

S. Con. Res. 14 (2021)

ACADEMIC AUTHORITIES

K. Keyes & J. Knapp, FEDERAL TAXATION AND FINANCIAL INSTRUMENTS AND TRANSACTIONS (1997)

William J. Wilkins, et al., *Digital Currency: The IRS Should Issue Guidance to Assist Users of Digital Currency*, TAXPAYER ADVOCATE SERVICE (2013)

Lee A. Sheppard, *The Fashion in Cryptocurrency Taxation*, 170 TAX NOTES F. 1969 (March 29, 2021)

ARTICLES AND REPORTS

A.B.A., "Comments on Mark-to-Market Rules Under Section 475" (May 7, 2015)

A.B.A., "Report on the Taxation of Cryptocurrency," ABA Report No. 1433 (January 26, 2020)

Am. Ass'n of Certified Pro. Accts., "Request for guidance Regarding Virtual Currency," Notice 2014-21 (May 30, 2018)

Andrea Kramer, *Can a Virtual Currency Position be Treated as a Security for Tax Purposes?*, McDermott Will & Emery (June 10, 2020)

Krisetn Parillo, *House Democrats Propose Dramatic Changes to Wash Sale Rule*, TAX ANALYSTS, Sept. 14, 2021

IRS, Presentation on Tax Treatment of Transactions in Cryptocurrency and IRS Tax Enforcement, IRS Nationwide Tax Forum (2019)

IRS, Presentation on Bitcoin/Cryptocurrency: An Introduction and the Related Tax Consequences of Buying, Holding, and Selling, IRS Nationwide Tax Forum (2018)

Jo Lynn Ricks, *IRS Outlines Procedures for Electing Mark-to-Market Accounting Method*, TAX ANALYSTS, Feb. 8, 1999

CASES

Cesarini v. United States, 428 F.2d 812 (6th Cir. 1970)

Commissioner v. Baan, 382 F.2d 485 (9th Cir. 1967)

Commissioner v. Gordon, 382 F.2d 499 (2d Cir. 1967), *rev'd* 391 U.S. 83 (1968)

Commissioner v. Glenshaw Glass Co., 348 U.S. 426 (1955)

Corn Products Refining Co. v. Commissioner, 16 T.C. 395 (1951)

Gantner v. Commissioner, 91 T.C. 713 (1988)

Gilbert v. Commissioner, 248 F.2d 399 (2d Cir. 1957)

Horne v. Commissioner, 5 T.C. 250 (1945)

International Freighting Corporation, Inc. v. Commissioner, 135 F.2d 310 (2d Cir. 1943)

Philadelphia Park Amusement Co. v. United States, 130 Ct. Cl. 166 (1954).

Trenton Oil Co. v. Commissioner, 147 F.2d 33 (6th Cir. 1945)

Exhibit 26

FILED UNDER SEAL

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.	20-cv-10832 (AT)

Expert Report of Prof. Carol Osler

I. Background and Qualifications

1. I am the Martin and Ahuva Gross Professor of Financial Markets and Institutions at Brandeis University. My Curriculum Vitae is included as Exhibit A to this report.

2. I have earned an MA and Ph.D. in Economics, with specialization in International Finance, from Princeton University. That was preceded by a BA in Economics from Swarthmore College. At Brandeis I usually teach about 125 master's students and supervise one or two Ph.D. theses each year. Prior to teaching at Brandeis, I taught at Dartmouth's Amos Tuck School of Business, Northwestern University's Kellogg School of Management, Columbia University's Economics Department and, separately, its School for International and Public Affairs. I have also taught a Ph.D. course at the Norwegian Business School (BI).

3. At Tuck and Kellogg I taught an MBA course entitled "International Capital Markets," in which foreign exchange ("FX") markets naturally occupied some weeks. At Brandeis I teach a master's-level course on financial markets. At its inception the course was called "Foreign Exchange," and it was entirely dedicated to exchange rates and currency trading. Over the years I added substantial material on equity, bond, and commodity markets, so the course title was changed to "Trading and Exchanges."

4. My research primarily focuses on currency markets and exchange rates, about which I have published roughly twenty papers. All but two of these appeared in A-rated journals, according to the well-regarded Australian Business Deans Council ("ABDC") ranking. Five of my research articles were published by the ABDC's highest quality (A*) journals including the *Journal of Finance*, the *Journal of Financial and Quantitative Analysis*, and the *Review of Finance*.

5. I have been retained by Kellogg, Hansen, Todd, Figel & Frederick, PLLC, counsel to Defendant Ripple Labs Inc. ("Ripple"), to offer my expert opinions in this case. I am being compensated at the rate of $600 per hour for my work on this matter. My compensation is not dependent upon the outcome of this case, and all of the opinions I express in this report are my own. The materials I have relied on and considered in forming my opinions are cited throughout this report.

II. Expert Assignment and Opinions

6. I have been asked to offer an expert opinion on the following questions

Q1. From an economic perspective, does the digital asset XRP function as a "currency"?

Q2. Does Ripple's On-Demand Liquidity product ("ODL") present an economically sound option for making cross-border and cross currency payments? Why or why not?

7. For reasons described in greater detail below, my opinions on these questions are as follows:

Q1. XRP fits the economic definition of a "currency" because it has the functions and attributes commonly assigned to currencies by experts.

- Functions: XRP serves as a medium of exchange, means of payment, unit of account, and store of value.
- Attributes: XRP is durable, portable, divisible, uniform, acceptable, in limited supply, and inexpensive to store.

Q2. ODL, which operates using the open-source XRP Ledger system and leverages the digital asset XRP as a bridge currency, presents an economically sound option for making cross-border and cross-currency payments.

- Compared to the dominant traditional payments platforms, ODL provides less costly, faster, and more transparent payments.
- Compared to the dominant cryptocurrency ledger systems, the XRP Ledger is faster, less costly, equally transparent, more scalable, and less resource-intensive.
- The XRP Ledger, which ODL leverages, not only realizes the advantages of digital technologies but advances them by implementing original solutions to well-known challenges in computer science.
- XRP is a logical part of its eponymous Ledger system. It embodies a centuries-old solution for limiting the unmanageably extreme multiplicity of connections among currencies.
- The dominant payment platforms have not fully incorporated the potential advantages of digital technologies. Furthermore, the modernization process is proceeding slowly in part because the dominant payment processors have both the incentives and the power to maintain high costs.
- Ripple faces specific, well-known challenges as a start-up. The dominant firms in its industry benefit from "network externalities" that create barriers to entry.
- Ripple follows a strategy known as "disruptive innovation" in promoting its ODL system. According to economists, this strategy is appropriate for a firm, like Ripple, which has technological advantages but financial disadvantages relative to the dominant firms.

III. Opinion on Question 1: XRP has the functions and attributes commonly assigned to currencies by experts

8. To ascertain whether XRP has the economic characteristics of a currency, one must first identify the nature of a currency.[1] It is commonly assumed that all currencies are state-sponsored, in part because the currencies in use for exchanging goods and services have been state-sponsored for roughly two centuries. However, state sponsorship is neither necessary nor sufficient for legitimate currencies. Currencies came into use as early 40,000 years ago,[2] far before the emergence of states.[3] Early currencies included natural objects that are independent of any government by definition, such as feathers, ivory, jade, cows, and shells. Early currencies also included objects that were made by humans without government guidance or control, such as beads, drums, gongs, knives, spades, vodka, wampum, and zappozats (decorated axes).[4] As recently as WWII a man-made currency with no government endorsement – cigarettes – circulated as currency in a prisoner-of-war camp.[5]

9. Economists and economic anthropologists have identified four standard functions of a currency and a number of attributes that promote a currency's success. This section reviews these functions and attributes and concludes that XRP demonstrates them all.

10. Evidence gathered by economic anthropologists indicates that the first function for currencies was means of payment in circumstances dictated by social norms. Two common examples provided are (i) bride payments and other gift exchanges and (ii) debt repayments, such as compensation to a crime victim.[6]

11. Economists typically highlight that currencies have long served the function of medium of exchange, meaning they enabled efficient exchanges of goods and services. Under a barter

[1] Note: The terms currency and money are used interchangeably in this document. This is consistent with today's common practice as manifested in phrases such as a "currency crisis" and "currency markets" (synonymous with FX markets).

[2] Kusimba, Chapurukha (19 June 2017). When – and why – did people first start using money? *The Conversation*. https://theconversation.com/when-and-why-did-people-first-start-using-money-78887.

[3] Spencer, Charles S. (2010). Territorial expansion and primary state formation. *Proceedings of the National Academy of Sciences of the United States of America* (PNAS) 107(16): 7119, 7126. https://doi.org/10.1073/pnas.1002470107

[4] Davids, Glyn (2002). *A history of money from ancient times to the present day, 3rd ed.* (Cardiff: University of Wales Press).

[5] Radford, R.A. (1945). The economic organisation of a POW camp. *Economica* 12(48): 189-201.

[6] Kusimba (2008), *op. cit.*

system, which is considered the main alternative, any exchange requires a hard-to-find "double-coincidence of wants." To illustrate: the farmer with excess eggs who needs an ox must find someone willing to part with an ox in exchange for eggs. With currencies the farmer can acquire the ox in two steps: first, sell eggs for money; second, purchase the ox with money. The eggs can be sold to anyone who is willing to pay money; the ox can be purchased from anyone willing to sell an ox for money. Because currencies eliminate the need for a double-coincidence of wants, the number of feasible routes to converting eggs into an ox is vastly multiplied.

12. Economists also highlight two additional functions of a currency: unit of account and store of value.[7] A unit of account is a measure of value. To disentangle this concept from a medium of exchange, it helps to recognize the following: British pounds and shillings had no physical form until they were first minted around 1500.[8] Instead, pounds and shillings existed as concepts, and were used to measure castle inventories and the like, as early as the eighth century C.E. During the eight centuries from the 700s to the 1500s, the main medium of exchange in Britain was the silver penny (worth 1/12 shilling), and other coins of relatively small value such as the groat (worth four pence), first issued in 1361. A store of value is an asset that will still be valuable in the future.

13. XRP serves all four of the functions of a currency just discussed. Means of payment: Every transaction on the XRP Ledger, including transactions through Ripple's ODL product, described in Section IV, costs a fraction of an XRP. That is, XRP is used to pay for the service of liquidity. In addition to that payment for use of the XRP Ledger itself, XRP can be used to pay for physical goods through online platforms including Bitcoin Superstore and Shopify and travel through Travala.[9] Medium of exchange: One function of XRP is to serve as a medium of exchange between two other currencies and currently serves that function for the client firms using Ripple's ODL. Unit of account: XRP is used to value other things available to exchange.

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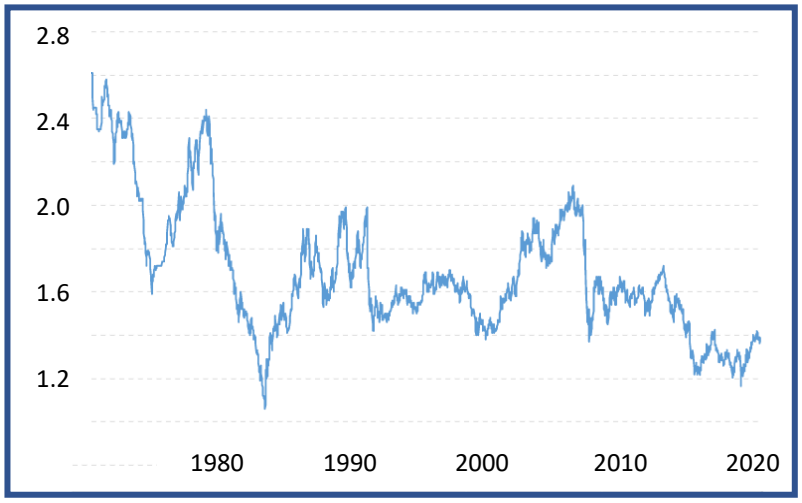
[7] Federal Reserve Bank of St. Louis. Functions of money. *The Economic Lowdown Podcast Series.* https://www.stlouisfed.org/education/economic-lowdown-podcast-series/episode-9-functions-of-money. Virtually any standard economics textbook will list the same three functions of money. *See, e.g.*, Mankiw, N. Gregory (2008). *Principles of Economics* 5th ed., (Southwestern Cengage Learning, Ohio): p. 642.

[8] Lowther, Ed (14 February 2014). A short history of the pound. *BBC News*. https://www.bbc.com/news/uk-politics-26169070.

[9] https://www.xrparcade.com/xrpecosystem/.

14. The final function commonly ascribed to currencies, store of value, benefits from a more extended discussion. Specifically, volatility does not necessarily negate the ability to serve as a store of value. This is illustrated in Figure 1 by the exchange rate between the U.K. pound and the US dollar, which has ranged from $1.1/£ and $2.5/£ since the early 1970s. Prior to the early 1970s this exchange rate was generally fixed, as were virtually all exchange rates worldwide. Importantly, the shift from fixed to fluctuating exchange rates had no bearing on whether the US dollar and the UK pound were still considered currencies. By this same logic, the existence of day-to-day fluctuations in XRP exchange rates does not change the nature of XRP as a currency.

Figure 1: Exchange rate between U.K. pound and U.S. dollar (as dollars per pound)[10]



15. A wide range of prices between a currency, on the one hand, and goods and services, on the other, is also irrelevant to the nature of that currency. At the time of writing there is substantial uncertainty about US inflation, or equivalently there is concern about the US dollar's future value in terms of goods and services. No one questions, however, whether the US dollar is a currency. Likewise, the rate at which Venezuelan bolivar loses value in terms of goods and services has been extremely difficult to predict in recent years. In 2018, for example, that currency lost 88% of its value in February, 1% in September, and 85% in December. This has no influence on whether the bolivar is a currency.

16. The Federal Reserve, the world's dominant central bank for the past century, identifies six attributes that enhance the use value of a currency: durability, portability, divisibility, uniformity,

[10] Source: https://www.macrotrends.net/2549/pound-dollar-exchange-rate-historical-chart.

acceptability, and limited supply.[11] Other economists often include low storage costs on this list.[12] An ideal currency would have all these attributes, but no single attribute is individually necessary and many objects have succeeded as currencies with only a few. Cows were a very early form of money in societies from Egypt[13] to Ireland[14] and remain "the preferred form of currency" in South Sudan even today.[15] However, cows are not portable, divisible, or uniform, their durability is limited, and they are costly to store. For many centuries boulders have served as currency on the Micronesian island of Yap, though they are extraordinarily difficult to transport and divide.[16]

17. Cowrie shells, depicted in Figure 2, were a highly successful currency across Africa, Asia, Australia, Oceana, and parts of Europe from the 13th century BCE to the early 20th century.[17] They were once so widely used in China that the symbol for cowrie shell can be found within many Chinese words involved with money.[18] Cowrie shells succeeded as a currency because they have the helpful attributes identified by economists. Durability: Cowrie shells can last for centuries and are not attractive to pests. They do not tarnish. Portability: Cowrie shells are small and light. In China they were strung into groups of 20; in Bengal they were carried in baskets of roughly 12,000.[19] Divisibility: The length of an individual cowrie shell ranges from a quarter inch to six inches and they are valued proportionately. Uniformity: As can be seen in Figure 2, cowries of a given species are remarkably consistent in shape.[20] Acceptability: Cowrie shells were accepted by common consent across much of the globe. Low storage costs: Beyond a

[11] Federal Reserve Bank of St. Louis, *op. cit*.

[12] Bagus, Philipp (2009). The quality of money. *The Quarterly Journal of Austrian Economics* 12(4): 22-45.

[13] Federal Reserve Bank of Atlanta. The story of money: 02 – Cows as a form of money. https://www.atlantafed.org/about/tours/story-of-money/02-common-products-as-money/cows-as-money.aspx.

[14] Carmody, Isolde (22 July 2012). Cows as currency. *StoryArcheology.com*. https://storyarchaeology.com/cows-as-currency/.

[15] Warner, Gregory (15 November 2017). Understanding South Sudan's cow currency is key to understanding the country's war. *NPR.* https://www.npr.org/2017/11/15/564443821/understanding-south-sudans-cow-currency-is-key-to-understanding-the-countrys-war.

[16] Fitzpatrick, Scott M. and Stephen McKeon (2020), Banking on Stone Money: Ancient Antecedents to Bitcoin. *Economic Anthropology* 7: 7-21.

[17] https://www.istockphoto.com/photo/white-cowrie-shells-gm952073298-259929937.

[18] Van Damme, Ingrid. Cowries. *Citéco: Cité de l'Économie*. https://www.citeco.fr/en/cowries-. Accessed October 3, 2021.

[19] Van Damme, *op. cit*.

[20] Van Damme, *op. cit*.

secure bit of space, cowrie shells cost nothing to store. Limited supply: Cowrie shells "occur rarely in nature"[21] and are challenging to harvest.

Figure 2: Cowrie shells

18. XRP has all of the attributes that economists agree to be valuable in a currency. Durability: Units of XRP do not rot, hold no appeal to animals, and do not tarnish. Portability: Units of XRP are effectively portable insofar as they can be accessed anywhere one finds an internet connection. Divisibility: Units of XRP are divisible because, like Bitcoin, they can be traded in decimal fractions. Uniformity: Unlike a shell, a bead, or a silver coin that must be stamped by a craftsperson and will naturally vary slightly, units of XRP are identical by construction. Each XRP comprises precisely 1 million drops, the smallest sub-unit.[22] Acceptability: XRP can be traded on myriad exchanges around the world. Low storage costs: XRP is stored in "wallets," which effectively "cost" 10 XRP (to satisfy a reserve requirement) for on-Ledger electronic repositories[23] and can be stored in hardware wallets that cost roughly the same range as a medium-quality physical wallet: $50 to $200.[24] Wallet security is high because transaction ledgers are maintained on many independent servers around the world and updated frequently. This means that the underlying record of XRP ownership is robust to physical or electronic disasters. Limited supply: The long-term supply of XRP is limited to the 100 billion already in existence. No additional units of XRP can be created without changing the XRP Ledger itself.

[21] Kusimba, *op. cit*.

[22] https://xrpl.org/xrp.html.

[23] https://xrpl.org/reserves.html.

[24] Martindale, Jon (19 July 2021). The Best Crypto Wallets for Storing Bitcoin, Ethereum, Dogecoin and More. *Forbes*. https://www.forbes.com/sites/forbes-personal-shopper/2021/07/19/best-crypto-wallet/.

18. To summarize: Experts on money have identified four major functions of a currency and a long list of attributes that foster a currency's success. XRP fulfills all these functions and has all these attributes. Consequently, XRP fully qualifies as a currency in the economic sense.

IV. Opinion on Q2: Ripple's ODL product provides an economically sound option for making cross-border and cross currency payments

A. Cross-border payments

19. Ripple's ultimate goal is to become a major hub for cross-currency payments, as it has publicly stated. As early as 2013, when the firm was quite young, Chris Larsen – a Ripple co-founder, then-CEO, and now Executive Chairman – stated that the firm's goal was "money without borders," a system in which "buyers and sellers [could] transfer money between each other more directly."[25]

20. Ripple continues to publicize its goals with respect to payments processing. To illustrate, the first item listed upon a Google search for "Ripple" is sponsored by Ripple itself and has this lead line: "Learn More About Ripple - Faster Cross-Border Payments." Next in the search results is Ripple's homepage, which states: "Ripple: Global Payment Solutions - Instant Processing." As illustrated in later paragraphs, Ripple sends this message at conferences, in the self-produced videos on its website, and in interviews by senior executives.

21. Ripple has stated that its main business strategy in the short-to-medium term is remittance payments. Worldwide remittance flows were small and largely ignored by economists and policymakers until the early 1990s, when workers began moving across borders en masse to support their families at home. By 2020, 170 million expatriate workers around the world[26] were formally remitting $540 billion to low- and middle-income economies.[27] For perspective, this is more than three times total foreign aid from all official donors, $161 billion, in that same year.[28]

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[25] Larsen presentation at the May 2013 "Finovate" conference: https://www.youtube.com/watch?app=desktop&v=t06YEtQjVvU.

[26] Guthrie, Jonathan (17 August 2021). Lex in depth – remittance fintechs herald a payments revolution. *Financial Times of London.* https://www.ft.com/content/1f11b38b-54d6-451c-ba4b-48843efa329d.

[27] World Bank (12 May 2021). Defying predictions, Remittance flows remain strong during COVID-19 crisis. https://www.worldbank.org/en/news/press-release/2021/05/12/defying-predictions-remittance-flows-remain-strong-during-covid-19-crisis.

[28] OECD (13 April 2021). COVID-19 spending helped to lift foreign aid to an all-time high in 2020 but more effort needed. https://www.oecd.org/newsroom/covid-19-spending-helped-to-lift-foreign-aid-to-an-all-time-high-in-2020-

22. A brief review of the process for a formal remittance transfer provides helpful context. A sender brings funds to a remittance service provider ("RSP") in the sender's country. This RSP, RSP ***S***, sends the funds to RSP ***R*** in the recipient's country. Finally, RSP ***R*** makes the funds available to the ultimate recipient, typically a member of the sender's family. Ripple's ODL product facilitates, and can offer faster settlements and lower costs for, transfers among RSPs, which can but need not be related institutions. A Western Union office in Hong Kong could send funds to a Western Union office in the Philippines or, alternatively, Citibank's Hong Kong subsidiary could send funds to the Bank of the Philippine Islands.

23. The outright cost of a remittance transfer is naturally higher if the source and/or recipient use physical cash (bills and coins). If the sender arrives with cash then RSP ***S*** must first convert it to digital form; if the recipient needs cash then RSP ***R*** must convert the digital funds received to cash. Dealing with cash is expensive in terms of employee time, space, and security. The additional cost of cash transfers is about 1.7% of the amount transferred, a figure that ranges across regions from 1.4% to 2.7%.[29]

24. Remittances can be sent via formal or informal channels. The four formal channels are: banks; money transfer operators such as Western Union; mobile operators such as MoneyGram; and post offices. Informal channels include foot, bus, or boat.[30] The magnitude of informal remittance flows is unknown: estimates vary from 50% to 250% of formal flows.[31] The choice between formal and informal channels is strongly influenced by the cost of remittances.[32] The total value of remittances, however, is determined primarily by family needs and resources. This means that if Ripple succeeds at bringing lower remittance costs for banks and money transfer organizations, the total flow of remittances through those channels could greatly exceed current levels.

25. One might naturally assume that, in our digital age, cross-border transactions are speedy and efficient. Indeed, debit cards have long been able to complete domestic payments within

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but-more-effort-needed.htm.

[29] World Bank (2021), *op. cit.*

[30] Cronje, Jan (10 May 2017). High bank charges force immigrants to send money home "hand-to-hand." *Ground Up*. https://www.groundup.org.za/article/high-bank-charges-force-immigrants-send-money-home-hand-hand/.

[31] Freund, Caroline and Nikola Spatafora (2008). Remittances, transaction costs, and informality. *Journal of Development Economics* 86: 346-366.

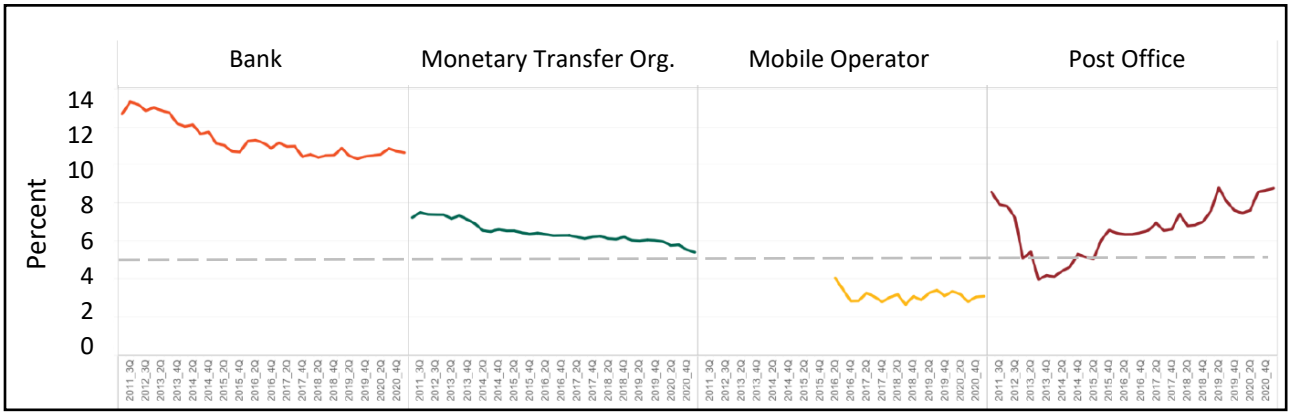
[32] Cronje (2017), *op. cit*.

minutes and at low cost. However, in the third decade of the 21st century, cross-border payments are still processed using mid-20th-century payment technologies. In consequence, remittance processing is slow, opaque, and costly. Slow: Most remittances arrive after one to 10 business days. The average speed is so slow that the World Bank considers delays of five days or less to be reasonably fast.[33] Opaque: During a standard funds transfer, neither sender nor receiver knows the status of the transfer.

26. Costly: The World Bank regularly estimates the total cost of formal remittance transfers: estimates for such costs from 2011 to the present are shown in Figure 3. In 2020, the worldwide average total cost to remit $200 by formal channels was estimated to be 6.7%.[34] (This figure includes costs to both sender and receiver. Note that it does not include the interest foregone during the delays just discussed, which is earned instead by the remittance service providers.) In that same year banks and other remittance service providers claimed at least $35 billion of the remittance money sent via formal channels to low- and middle-income countries.[35] For perspective, that represented over 20% of total official foreign aid from donors worldwide.

Figure 3: Average cost to remit $200[36]

Each figure begins in 2011:4Q and ends in 2020:4Q; dashed line represents 5% target level



[33] In selecting "smart" choices among remittance providers, the World Bank accepts any delay of five days or less. World Bank (March 2021). *Remittance prices worldwide quarterly.* https://remittanceprices.worldbank.org/sites/default/files/rpw_main_report_and_annex_q121_final.pdf.

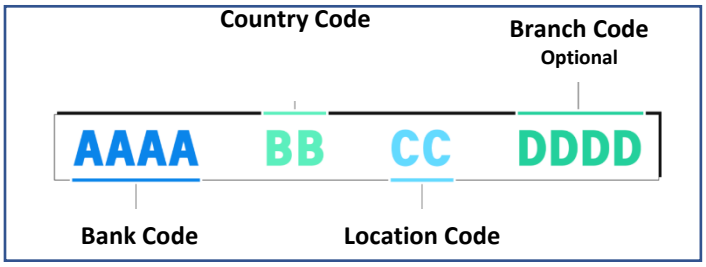
[34] *Ibid.*

[35] Arnold, Tom (12 May 2021). Remittances to developing nations resilient in 2020-World Bank. *Reuters*. https://www.reuters.com/article/health-coronavirus-remittances-int/remittances-to-developing-nations-resilient-in-2020-world-bank-idUSKBN2CT22L.

[36] *Ibid.*

27. Banks are the most expensive type of remittance service provider, as shown in Figure 3. The average cost to remit $200 via a bank was most recently estimated at 10.7%, well above the average cost across all formal remittance service providers of 6.7%.[37] The high cost of remittances via banks can be traced, in part, to their reliance on the global communications network run by SWIFT, the Society for Worldwide Interbank Financial Telecommunication. Relative to the Telex machines that preceded it, SWIFT greatly improved payment speeds and accuracy for cross-border payments in the 1970s. They did so by assigning unique identifying codes to each bank, as shown in Figure 4. The SWIFT network now includes over 10,000 banks and processes over 40 million transaction messages per day.[38]

Figure 4: SWIFT bank identification system[39]



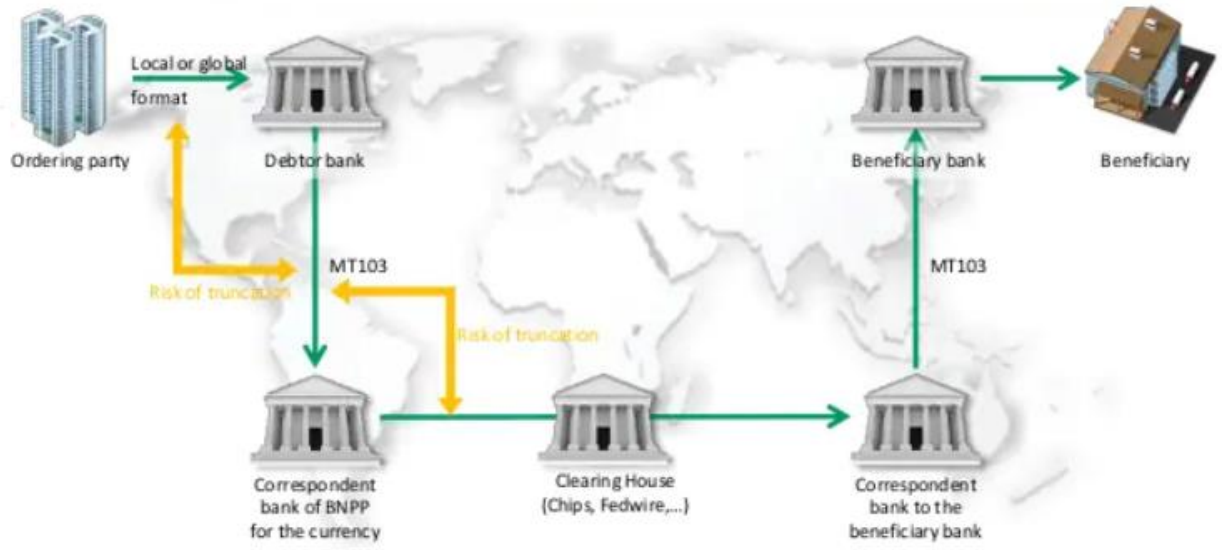
28. SWIFT only recently began to incorporate digital solutions to communication challenges. In consequence, by today's standards most cross-border remittance payments among banks are especially slow, opaque, and costly. To get from one bank to another the funds must pass through a chain of correspondent banks, as shown in Figure 5. Each bank in the chain imposes additional delays, raises the remittance cost, and increases the risk of error or misconduct.

[37] Source: World Bank (March 2021). *Remittance prices worldwide quarterly:* p. 14. https://remittanceprices.worldbank.org/sites/default/files/rpw_main_report_and_annex_q121_final.pdf.

[38] SWIFT website accessed October 3, 2021. https://www.swift.com/about-us/discover-swift/fin-traffic-figures.

[39] Sullivan, Tom (12 August 2021). What is SWIFT and what is its future? *Plaid.com.* https://plaid.com/resources/banking/what-is-swift/.

Figure 5: Correspondent chain for international payment[40]



29. In 2015 SWIFT introduced a new system known as the Global Payments Initiative ("GPI"), which is faster and substantially more transparent.[41] However, GPI remains slow relative to Ripple's ODL system because transfers through GPI still involve chains of correspondent banks.[42] GPI also remains costly because each bank in the chain must still be paid. Perhaps unsurprisingly, membership in the GPI system remains relatively limited. As of August 2021, SWIFT reported 785 member banking groups in the GPI system, less than 10% of the banks in the traditional SWIFT network.[43]

30. Ripple sees SWIFT as one of the firms it intends to challenge and has gone out of its way to publicize this message. In a November 2018 interview with Bloomberg, the current CEO, Brad Garlinghouse, stated: "What we're doing and executing on a day-by-day basis is, in fact, taking over SWIFT."[44]

[40] Yang, Eric, and Wim Grosemans (28 November 2016). An Introduction to SWIFT GPI. https://www.slideshare.net/BNPPCMCC/an-introduction-to-swift-gpi.

[41] SWIFT website. https://www.swift.com/our-solutions/swift-gpi.

[42] Westerhaus, Christian (2017). SWIFT gpi: Time for action. *Deutsche Bank Global Transaction Banking.* https://corporates.db.com/files/documents/SWIFT-gpi-Time-for-action.pdf.

[43] Sullivan, Tom (12 August, 2021). What is SWIFT and what is its future? A guide to the Society for Worldwide Interbank Financial Telecommunication (SWIFT). *Plaid.com*. https://plaid.com/resources/banking/what-is-swift/.

[44] Lam, Eric, and Haslinda Amin (13 November 2018). Ripple is aiming to overtake Swift banking network, CEO says. *Bloomberg Quint.* https://www.bloombergquint.com/technology/ripple-is-destined-to-overtake-swift-banking-network-ceo-says.

31. Ripple's goal of reducing remittance costs has long been recognized among global leaders. According to the World Bank in 2015, "Remittances contribute to sustaining the welfare of about 700 million people globally and they often represent the only source of income to provide food, healthcare, housing, and education to migrants' families."[45] Remittances can be especially important at times of crises, where a crisis could be anything from a family health emergency to major national catastrophes such as India's early-2021 COVID surge and Haiti's earthquake in August of 2021. According to Michal Rutkowski, Global Director of World Bank's Social Protection and Jobs Global Practice, "As COVID-19 still devastates families around the world, remittances continue to provide a critical lifeline for the poor and vulnerable."[46]

32. Remittance flows also promote financial development[47] and financial inclusion. "Remittances [are] … often a critical first point of entry into the regulated financial market for conventionally unbanked segments of the population."[48] Remittance transfers provide "migrants and their families … the opportunity to progressively access a more sophisticated set of financial products, such as savings, microcredit and insurances."[49]

33. In 2009, the G8 committed to reducing the cost of migrants' remittances from 10% to 5% in five years, the so-called "5x5 target."[50] In 2011, the full G20 committed to the 5x5 target at Cannes, anticipating that it would "contribut[e] to release an additional 15 billion USD per year for recipient families."[51] Though the 5% target was not reached by 2014, the G20, meeting in Brisbane that year, recommitted itself to reducing remittance costs to 5%, though they no longer

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[45] World Bank Group, Finance and Markets Global Practice (October 2015). Report on the G20 survey on de-risking in the remittance market. https://documents1.worldbank.org/curated/en/679881467993185572/pdf/101071-WP-PUBLIC-GPFI-DWG-Remittances-De-risking-Report-2015-Final-2.pdf.

[46] World Bank (12 May 2021). Defying predictions, remittance flows remain strong during COVID-19 crisis. https://www.worldbank.org/en/news/press-release/2021/05/12/defying-predictions-remittance-flows-remain-strong-during-covid-19-crisis.

[47] Giuliano, Paola, and Marta Ruiz-Arranz (2009). Remittances, financial development, and growth. *Journal of Development Economics* 90: 144-152.

[48] Global Partnership for Financial Inclusion (November 2018). 2018 Update to Leaders on Progress Towards the G20 Remittance Target. https://www.gpfi.org/sites/gpfi/files/documents/2018%20Update%20to%20Leaders%20on%20Progress%20Towards%20the%20G20%20Remittance%20Target.pdf.

[49] World Bank Group (October 2015), *op. cit.*

[50] Beck, Thorsten, and María Soledad Martínez Pería (2009). What explains the high cost of remittances: An examination across 119 country corridors. *World Bank Policy Research Working Paper* 5072. https://documents1.worldbank.org/curated/en/730331468338938197/pdf/WPS5072.pdf.

[51] G20 (4 November 2011). Cannes Summit Final Declaration – Building Our Common Future: Renewed Collective Action for the Benefit of All. http://www.g20.utoronto.ca/2011/2011-cannes-declaration-111104-en.html.

set a target date.[52] The United Nations' Sustainable Development Goals, adopted in 2015, have a more ambitious target: average remittance cost should fall to 3% by 2030, with costs below 5% in every remittance corridor.[53]

34. Global progress towards these goals has been disappointingly slow across all four formal channels, as is visible in Figure 3. At banks, which in 2011 charged on average 13% to remit $200, costs fell to around 10.5% by 2015, and then ceased declining altogether.

35. Progress on reducing costs has not been any more impressive at other formal remittance service providers. The cost of remitting $200 through a post office was near 9% in 2011 and rapidly achieved the 5% target, which might seem logical because Post Offices are under greater government control than private firms. However, the cost of remitting through a post office then began rising, in direct conflict with governments' stated aspirations, and has continued rising to its current level near 8%. The cost at money transfer operators was not far above the 5% target in 2011 and declined gradually but consistently and has essentially reached the target. The cost at mobile operators is not known for 2011 but was well below the target when data began in 2016 and has remained low.

36. The potential for a company like Ripple to compete effectively with SWIFT is a function not only of the high costs, slow speeds, and low transparency of SWIFT payments but also SWIFT's two interlocking obstacles to progress. First, a multitude of banks would earn less income from any payment system that does not require funds to flow through chains of correspondent banks. Second, SWIFT is owned and controlled by its member banks.

37. The extent to which these forces can delay a firm's adoption of new technology, even while undermining the firm's long-run viability, is clear from the New York Stock Exchange's ("NYSE") long-delayed adoption of electronic trading. For most of the 20th century the NYSE dominated US stock issuance and trading with a system that relied on "specialists" on the floor of the exchange. Crucially, those specialists also owned the exchange. During the late 1980s and 1990s, electronic trading systems were developed that proved highly attractive to traders. Stock exchanges around the world began switching to all-electronic trading in the 1990s: the Toronto

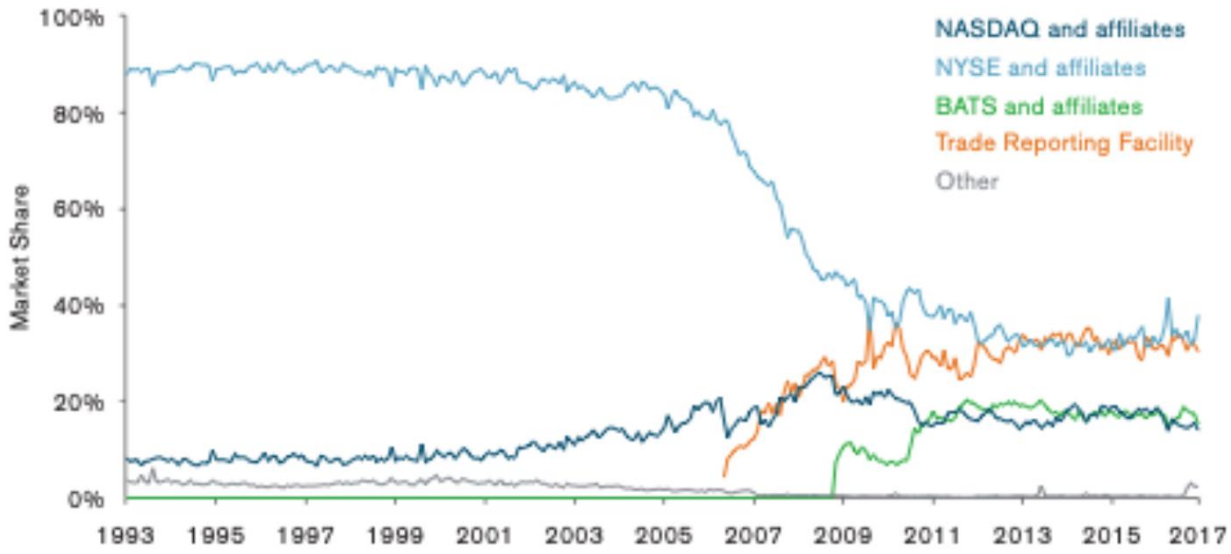
[52] G20 Leaders' Communiqué, Brisbane Summit, 15-16 November 2014. https://www.mofa.go.jp/files/000059841.pdf.

[53] UN Department of Economic and Social Affairs. The 17 goals. (Goal 10c.) https://sdgs.un.org/goals.

Stock Exchange, for example, closed its trading floor and implemented an electronic trading platform in 1997. Closer to home, new electronic exchanges emerged in the U.S. and began siphoning NYSE's market share.

38. The NYSE's specialists had become obsolete, in essence. However, they were still profitable and reluctant to adopt a trading system in which they would have little role, much like the banks that participate in remittances today. The specialists resisted any move towards electronic trading, which compromised the exchange's long-run success. From 2001 through 2007 the NYSE's market share collapsed from roughly 87% to roughly 50%, as shown in Figure 6. The NYSE eventually solved this conundrum by going public, which meant the specialists could monetize their seats. The damage done through delay proved lasting, however: the once-dominant exchange's market share continued to decline through 2012, and subsequently stabilized at roughly 35%.

Figure 6: Market shares among U.S. stock exchanges[54]

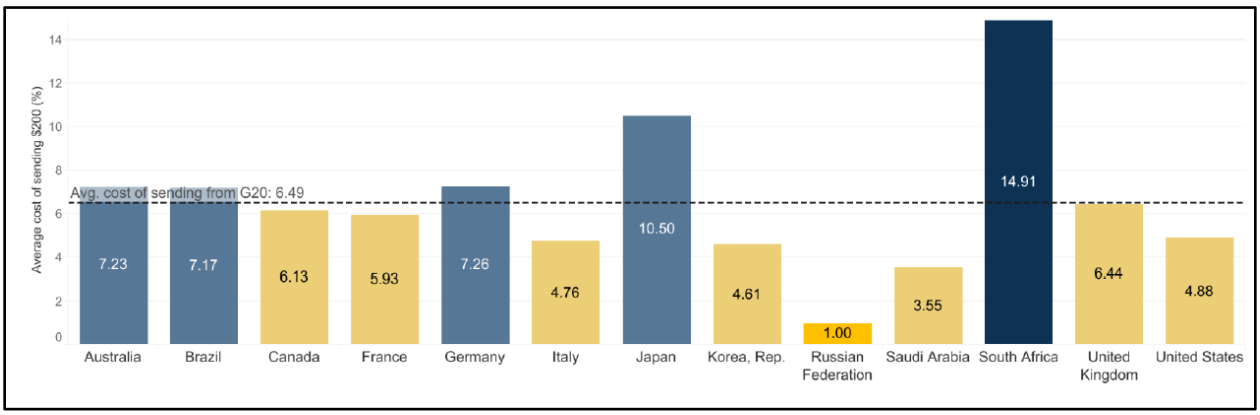


39. Despite the world's slow progress in reducing remittance costs, there have been pockets of success. Digital transfer systems clearly have an advantage in lowering costs. Figure 3 shows that it is least costly to remit $200 via mobile operators, which are digital by design. Confirmation that remittance costs can be reduced dramatically comes from Russia, whose 1%

[54] Moolji, Amyn, and Briand Smith (October 2017). A financial system that creates economic opportunities: Capital markets. *U.S. Department of the Treasury*: p. 53. https://www.treasury.gov/press-center/press-releases/Documents/A-Financial-System-Capital-Markets-FINAL-FINAL.pdf

average total cost to remit $200 is far below the average total cost in other G20 countries, as shown in Figure 7 (as a reminder, the total cost combines costs to sender and receiver).

Figure 7: Average total cost of remittances, 13 of the G20 countries[55]



40. Ripple is not the only firm to recognize the potential for profits from using a blockchain platform for remittance processing, though it was among the first. Other start-ups pursuing this market segment include Currency Cloud[56] and Earthport[57] (now owned by Visa).[58]

41. Ripple has achieved significant progress towards its goals of becoming a significant competitor among remittance service providers. By 2015 many of the world's biggest banks had joined Ripple's Global Payments Steering Group as founding members. The group's intent is "to use Ripple's technology to slash the time and cost of settlement while enabling new types of high-volume, low-value global transactions."[59] ("Settlement" refers to the actual process of moving funds.) Original members include Bank of America Merrill Lynch, Japan's MUFG Bank (formed via mergers of five commercial banks during 1996-2002), Standard Chartered Bank, Westpac, and Banco Santander.

42. Though only commercially available since 2019, I understand that ODL has customers in locations as diverse as the near-east, Latin America, and Asia's Pacific Rim. It has achieved the

[55] Source: World Bank (March 2021), *op. cit.*, p. 12.

[56] https://www.currencycloud.com/global-payments-for-fintech-platforms.

[57] https://www.thepower50.com/profiles/earthport/

[58] PYMNTS (15 May 2019). Why Visa brought Earthport into its orbit. https://www.pymnts.com/visa/2019/earthport-acquisition-cross-border-payments/.

[59] Finextra.com (28 September 2016). Ripple rudely gatecrashes Sibos party. https://www.finextra.com/newsarticle/29512/ripple-rudely-gatecrashes-sibos-party.

greatest growth in the latter region, which is economically logical because payments systems there have been more advanced than in the "advanced economies" for over a decade. Among Ripple's clients or ODL partners is Tranglo in Malaysia,[60] Coins.ph in the Philippines, at least two remittance service providers in South Korea (Sentbe and CoinOne), and SBI Remit in Japan.[61] SBI, one of Japan's largest banks, is a natural partner for Ripple because it is young and tech-savvy and growing rapidly; it did not even exist before 1999.

43. Ripple's long-run strategic goals extend well beyond remittances. The firm's ambition is to modernize international payments. In the firm's own words, its goal is "[e]nabling the world to move value like it moves information today."[62] This goal encompasses the payments associated with international trade in goods and services. In 2020 these were worth $17.6 trillion, over thirty times the value of remittance flows, and the bulk of these payments were necessarily facilitated by the SWIFT system of the banks.[63] Payment for international trade has been identified by multiple firms as a potentially lucrative market for innovative protocols. IBM has developed its own blockchain and embedded it in the trade finance network We.trade.[64] Other challengers to SWIFT's dominance in payments for international trade are government sponsored, including Instex (EU),[65] CIPS (China),[66] and SPFS (Russia).[67]

44. Ripple's ODL service is designed to provide a cost-effective and efficient alternative to the cross-border payments market. As explained below, ODL provides fast, secure, transparent, and low-cost cross-border and cross-currency payments. Customers licensing ODL from Ripple use XRP to make cross-border and cross-currency payments "in as little as three seconds," which allows them to eliminate pre-funding of destination accounts, reduce operations costs, and unlock capital.[68] In my opinion, for the reasons explained below, the ODL system is superior to

[60] Tranglo (9 April 2021). Tranglo levels up with Ripple to power cross-border payments in Southeast Asia. https://tranglo.com/blog/tranglo-levels-up-with-ripple-to-power-cross-border-payments-in-southeast-asia/.
[61] Ripple (25 February 2020). Ripple on full-scale to tap into South Korean market. https://ripple.com/ripple-press/ripple-on-full-scale-to-tap-into-south-korean-market/.
[62] https://ripple.com/company.
[63] Statista. Trends in global export value of trade in goods from 1950 to 2020. https://www.statista.com/statistics/264682/worldwide-export-volume-in-the-trade-since-1950/.
[64] IBM. What are smart contracts on blockchain? https://www.ibm.com/topics/smart-contracts.
[65] https://instex-europe.com/about-us/.
[66] https://www.cips.com.cn/cipsen/7052/7057/index.html.
[67] http://www.cbr.ru/eng/psystem/fin_msg_transfer_system/.
[68] https://ripple.com/ripplenet/on-demand-liquidity/.

existing cross-border payment systems and therefore a viable competitor. Relative to current payment systems with fiat money, ODL is faster, more transparent, and less costly. Relative to the dominant cryptocurrency ledger systems, the XRP Ledger is faster, less costly, equally transparent, and less resource-intensive.

B. Innovative technology

45. ODL, at its core, leverages the XRP Ledger, a blockchain ledger system for recording and verifying transactions. Complete records of all transactions – "ledgers" – are simultaneously maintained on many computers, typically located worldwide. As transactions arrive, they are verified individually or in a group ("block") by these same computers.

46. The decentralized nature of a blockchain reflects the commitment among the founders of Bitcoin and other cryptocurrencies to avoiding central control. Even so, like any monetary system, these systems must be trusted to succeed. Fiat currency systems are trusted in part because they have state sponsorship. In addition, residents learn through experience that their local monetary institutions can be trusted: commercial banks, savings banks, and the central bank successfully collaborate to provide accurate and timely payments. A decentralized currency system must generate trust as well, and a common approach for new cryptocurrencies is to implement and publicize a technology that assures fast and accurate payments.[69]

47. For blockchain ledgers, a major requirement for trust is a solution to the "double-spend" problem:

> Decentralized cryptocurrency networks need to make sure that nobody spends the same money twice without a central authority like Visa or PayPal in the middle. To accomplish this, networks use something called a "consensus mechanism," which is a system that allows all the computers in a crypto network to agree about which transactions are legitimate.[70]

48. Computers can be taken over by corrupt parties, and falsely label invalid transactions as valid. A consensus mechanism identifies when the signals from a set of computers can be

[69] Andrews, Edmund L. (24 September 2013). Chris Larsen: Money without borders. *Insights by Stanford Graduate School of Business*. https://www.gsb.stanford.edu/insights/chris-larsen-money-without-borders.

[70] Coinbase. What is "proof of work" or "proof of stake"? Accessed October 3, 2021. https://www.coinbase.com/tr/learn/crypto-basics/what-is-proof-of-work-or-proof-of-stake.

trusted. This represents a version of the "Byzantine Generals Problem" in computer science: How can one verify information from multiple sources, without knowing which are trustworthy?

49. Bitcoin pioneered the most common solution to the Byzantine Generals Problem among cryptocurrencies in a protocol known as "proof-of-work." In essence, computers seeking to verify a given block of transactions are given a processing challenge that almost invariably requires a lot of time and computing power. The first computer to solve the challenge is rewarded with a small number of Bitcoins, potentially worth hundreds of thousands of dollars at current prices. The challenge, known as "mining," involves putting numbers chosen largely at random through a special mathematical function until a sufficiently small outcome is generated.[71]

50. Proof-of-work transaction verification, though reliable and transparent, is slow and expensive by digital standards and resource-intensive by any standard. Slow: The average time to verify a Bitcoin transaction is generally about ten minutes, as shown in Figure 8. The time occasionally rises when transaction volumes are high, as happened when the price fell dramatically in May of 2021. Ten minutes is certainly speedy relative to the days or weeks required for traditional currency conversion channels. However, time is now measured in microseconds in financial markets, which makes even ten minutes an extremely long time. If each microsecond were a full second, a "ten-minute delay" would be 57 years. Expensive: As shown in Figure 9, Bitcoin transaction fees over approximately the past year have been at least $2 and can range up to $60 per transaction. As discussed below in paragraphs 51-54, this is many multiples of the cost per transaction on the XRP Ledger, and a major contributor is the cost of computing resources (electricity and dedicated mining computers).

[71] For details, *see* Foley, Maxwell (12 September 2019). How Bitcoin works: Hashing. *Certick*. https://medium.com/certik/how-bitcoin-works-hashing-e897157f7940.

Figure 8: Bitcoin Average Confirmation Time[72]

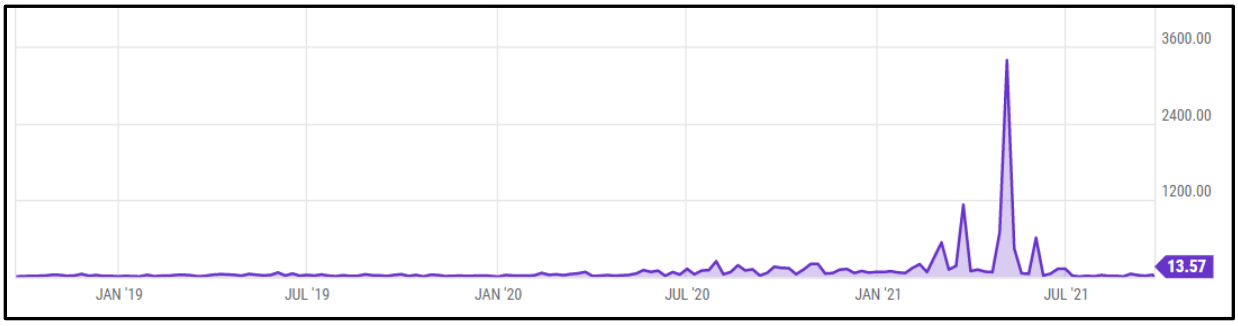
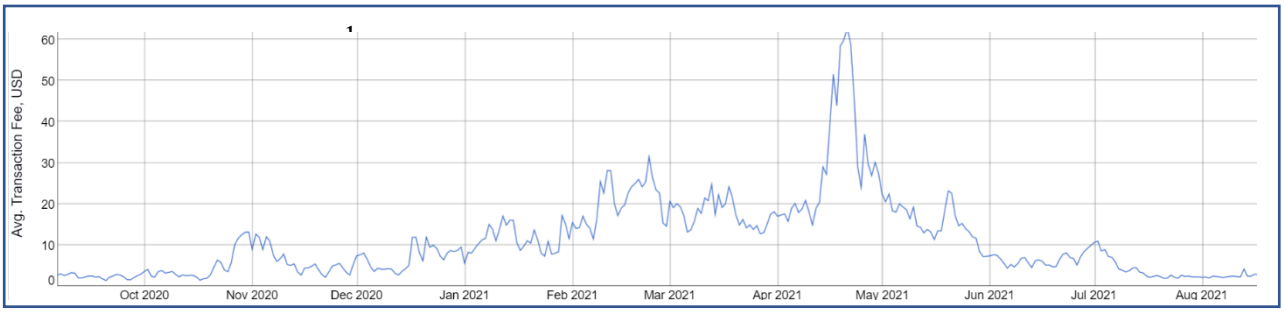


Figure 9: Average transaction fees for Bitcoin over 12 months[73]



51. Resource intensive: It would be natural to assume that Bitcoin's 10- to 60-minute average verification time – and the amount of resources required to verify Bitcoin transactions using proof-of-work – would decline as computers become more powerful. This is not the case, however. It *is* true that every advance in computer sophistication provides the first miners to exploit it with an advantage over their peers. However, that first-mover advantage is fleeting because other miners quickly upgrade their computers. It is estimated that computers dedicated to Bitcoin mining are used for only 1.3 years, on average – and because they are tailored to that purpose they cannot be used for others. In consequence, Bitcoin miners collectively generate as much physical electronic waste (e-waste) as the Netherlands, and little of it is recycled.[74]

52. Rising computer speeds also do not reduce the energy-intensity of Bitcoin mining. To ensure that just 2,016 new bitcoin are put in circulation every two weeks, the ledger system is

[72] Source: https://ycharts.com/indicators/bitcoin_average_confirmation_time.

[73] Source: https://bitinfocharts.com/comparison/bitcoin-transactionfees.html#1y. Accessed September 7, 2021.

[74] BBC News (September 2020). Bitcoin mining producing tonnes of waste. https://www.bbc.com/news/technology-58572385.

programmed to track the average time required to verify a block and, whenever that time declines, to increase the difficulty of verification.[75] By 2018 verifying a single Bitcoin transaction required 80,000 times the electricity as a single Visa credit card transaction.[76] In 2019 the Bitcoin blockchain system alone consumed approximately as much energy, and generated as many carbon emissions, as the economies of Jordan or Sri Lanka.[77]

53. The XRP Ledger does not use proof-of-work verification. Instead, it relies on a "consensus protocol." The consensus mechanism in the XRP Ledger is faster, less costly, and less energy-intensive than proof-of-work because its solution to the Byzantine Generals Problem is based on voting. Each computer in the XRP Ledger specifies a set of other network computers whose votes it will consider. A transaction is verified if it is confirmed by a sufficient share of computers in that set. The critical share is determined mathematically to guarantee accuracy even if some members of the set are corrupt.

54. The performance of XRP Ledger is striking. Speed: The XRP Ledger's verification protocol requires just a few seconds, less than 1% of the 10 minutes required by proof-of-work.[78] Cost: The cost to transact on the XRP Ledger is well below the cost of a Bitcoin transaction. The cost for any XRP Ledger transaction is fixed at 0.00001 XRP; at the current USD-XRP exchange rate this is worth about $0.00001 (1/1000th of a cent). A Bitcoin transaction fee of $10 (which appears to be a bit below the average of the past year, according to Figure 9) would be roughly 1 million times the cost of an XRP transaction.[79] For perspective, a tall oak tree is roughly one million times the height of half a grain of sand. Resource intensity: The voting protocol on the XRP Ledger requires less than 0.002% of the computing power required by proof-of-work.[80] There is no gain to be anticipated from applying greater computing power.

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[75] Rosenfeld, Meni (2016). How many zeros should I require for proof-of-work and how should this change through the years? https://www.quora.com/How-many-zeros-should-I-require-for-proof-of-work-and-how-should-this-change-through-the-years.

[76] Popper, Nathaniel (21 January 2018). There is nothing virtual about Bitcoin's energy appetite. *New York Times.* https://www.nytimes.com/2018/01/21/technology/bitcoin-mining-energy-consumption.html?searchResultPosition=1.

[77] Smith, Alexander (13 May 2021). Factbox: How big is Bitcoin's carbon footprint? *Reuters*. https://www.reuters.com/technology/how-big-is-bitcoins-carbon-footprint-2021-05-13/.

[78] https://xrpl.org/xrp-ledger-overview.html.

[79] https://bitinfocharts.com/comparison/bitcoin-transactionfees.html#1y.

[80] Schwartz, David (8 July 2020). The Environmental Impact: Cryptocurrency Mining vs. Consensus. https://ripple.com/insights/the-environmental-impact-cryptocurrency-mining-vs-consensus/.

55. A further advantage of the XRP Ledger relative to the Bitcoin proof-of-work ledger is **scalability**, meaning the ability to handle a high number of transactions per period. On average just 4.6 transactions per second can be processed on the Bitcoin ledger, a limit that is essentially programmed into the ledger. The goal of the limit is important: protecting the system against the possibility that someone with ill intent might spam the system by sending a massive number of transactions through the system at once, slowing the system down, and effectively crowd out other transactions. Ether can handle 30 transactions per second.[81] The XRP Ledger has had far greater capacity for years – it could handle 500 transactions per second in 2015.[82] By now it can readily process 1,500 transactions per second.[83]

56. Given the high cost of proof-of-work verification, Ether and a few other crypto-currency platforms are shifting to a newer solution to the Byzantine Generals Problem. In this "proof-of-stake" system, transaction verifiers must set aside or "stake" a substantial quantity of the platform's native currency (*e.g.*, Ether on the Ethereum platform). A greater stake brings higher odds of being included as a verifying party and, crucially, the amount of native currency received in compensation when that happens. To further enhance security, verifiers lose part of their stake if a bad transaction is verified.[84] Proof-of-stake has lower transaction costs than proof-of-work and imposes lower costs on the environment. Nonetheless, a proof-of-stake transaction will be more costly than a transaction over the XRP Ledger because the former requires substantial resources to be set aside (and be paid in case of a false verification) that could otherwise be earning income.

C. XRP is a logical solution to well-known challenges in cross-currency conversion

57. From an economic perspective, the features of XRP and the XRP Ledger are well suited to the ODL product. Any cross-border transaction processing network, including today's foreign exchange ("FX") market, faces a major challenge from the multiplicity of currencies. The United

[81]Conway, Luke (1 September 2021). What is Ethereum 2.0? *The Street*. https://www.thestreet.com/crypto/ethereum/ethereum-2-upgrade-what-you-need-to-know.

[82] Travis, Mark (2 October 2017). Ripple: The most (demonstrably) scalable blockchain. *High Scalability*. http://highscalability.com/blog/2017/10/2/ripple-the-most-demonstrably-scalable-blockchain.html.

[83] Bhalla, Anshika. Top cryptocurrencies with their high transaction speeds. *The Blockchain Council*. https://www.blockchain-council.org/cryptocurrency/top-cryptocurrencies-with-their-high-transaction-speeds/.

[84] Coinbase, *op. cit.*

Nations lists 195 sovereign countries in the world, with 154 "operational" currencies.[85] Suppose that every unique national currency could be converted directly to every other one: Omani rial could be converted directly to Cambodian riel, Colombian pesos could be converted directly to Ugandan shillings. There would be 11,628 unique exchange rates, each of which would be changing frequently during every day. To ensure they offer appropriate exchange rates when a client reaches out to trade, dealing banks would have to actively monitor each exchange rate, which would require massive and expensive staffing. Trading rooms would hire hundreds of new dealers, each of them requiring significant salaries plus bonuses, and each bank's electronic trading staff would likewise expand to generate and stream up-to-the-microsecond values for each exchange rate. There would be commensurate increases in back-office staff – those involved in settlement, risk, and compliance.

58. The extreme multiplicity of country pairs and exchange rates has been a challenge to the FX market for roughly two centuries. Throughout that period a single solution has been consistently adopted: a vehicle (or bridge) currency. Suppose V is the vehicle currency. Conversion of, say, Colombian pesos to Ugandan shillings involves two transactions: (1) a purchase of V with pesos; (2) a sale of V for shillings.[86] Though it involves two transactions rather than one, this system of indirect currency conversion proves to be less costly than having 11,000+ directly-traded currency pairs. In addition to the labor savings, when trading is concentrated in a relatively small number of currency pairs the liquidity of each traded pair increases sufficiently to reduce total transaction costs.

59. The world's first vehicle currency was the pound sterling, which acquired that role in the 19th century when the UK dominated world trade and finance. After WWI the vehicle-currency function began shifting to the US dollar. By the end of WWII, when the Bretton Woods system of fixed exchange rates was adopted, the US dominated world trade and finance so the dollar became the only vehicle currency. The euro, created in 1999, has become a vehicle currency for a few fiat currencies from countries adjacent to the European Monetary Zone (*e.g.*, the

[85] United Nations. UN Operational Rates of Exchange. https://treasury.un.org/operationalrates/OperationalRates.php.

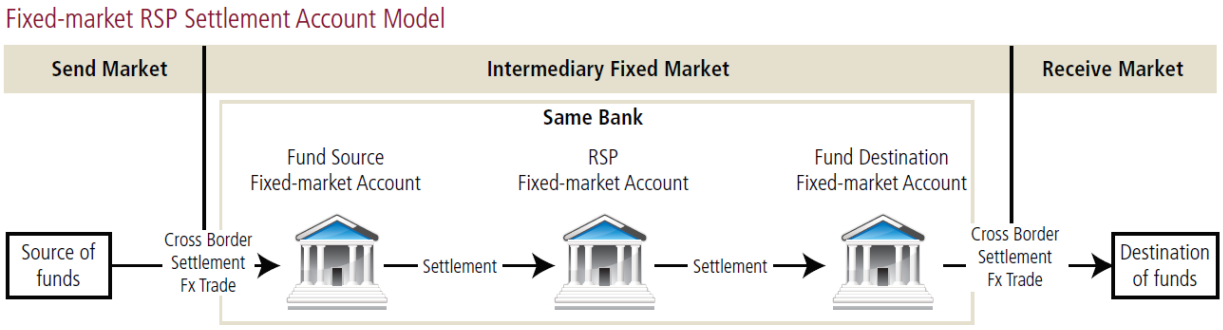
[86] Vehicle currencies have long been a subject of research in economics. Notable contributions from the past 40 years include: Magee, Stephen P., and Ramesh K. Rao (1980). Vehicle and nonvehicle currencies in international trade. *American Economic Review* 70(2): 368-373.

Devereux, Michael B., and Shouyong Shi (2013). Vehicle Currency. *International Economic Review* 54(1): 97-133.

Norwegian krone). China seeks to develop this function for its currency, known as the yuan or the renminbi.

60. A vehicle-currency system has also proved valuable for digital transactions. Some mobile remittance service providers adopt a "fixed-market [remittance service provider] settlement accounts model," depicted in Figure 10, which is, in essence, a vehicle-currency system. The sender's currency, whatever it may be, is traded into the currency of a specific "intermediary" market. This amount is then converted by local banks into the receiver's currency and moved to the destination country. The "intermediary" currency is effectively a vehicle currency.

Figure 10: Using a vehicle currency to process remittances[87]



61. The XRP Ledger can be used to facilitate payments across not just fiat currencies, but also cryptocurrencies. As of August, 2021 there were 5,840 cryptocurrencies in existence.[88] To provide direct convertibility for all pairs of fiat and crypto currencies would involve tracking and verifying exchange rates across 17,955,028 unique currency pairs. A vehicle currency system reduces that figure by 99.97%.

62. So far, this section has discussed the logic behind using a vehicle currency to streamline currency conversions. Ripple also had to decide on a specific currency to perform that function. Critically, today's fiat currencies could be immediately ruled out because FX transactions in fiat currencies currently take days to settle. In the wholesale FX markets settlement requires two

[87] Daly, Neil (May 2010). International remittance service providers. *GSMA Mobile Money Transfer*: p. 7. https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2012/03/gsmaremittanceserviceproviderwhitepaper182.pdf.

[88] Source: Statista. Number of cryptocurrencies worldwide from 2013 to August 2021. https://www.statista.com/statistics/863917/number-crypto-coins-tokens/. Accessed August 24, 2021.

business days[89] during which each counterparty contacts the other, verifies trade specifics, and exchanges information about bank accounts and the like. This makes fiat currencies unsuitable for payments that are designed to process in real time, meaning settlement happens within minutes of the initial trade (the initial agreement to exchange certain assets at a certain price). In contrast, the XRP Ledger is designed to achieve real-time settlement, and XRP is the native currency of the XRP Ledger.

63. The most efficient cryptocurrency on any decentralized platform is one that is carefully designed to fulfill that platform's intended purpose. The software behind Bitcoin and the vast majority of other cryptocurrencies is not designed to facilitate efficient payments from a holder of one fiat currency to the holder of another fiat currency. That, however, is precisely the purpose of the XRP Ledger, and XRP is the specially-designed or "native" currency of the XRP Ledger. XRP therefore maximizes the efficiency of the XRP Ledger which, in turn, minimizes the cost of Ledger transactions.

64. To summarize: the XRP Ledger relies on a vehicle currency to reduce the number of active currency pairs to a manageable level, the same solution adopted for two centuries in the FX market. ODL is intended to achieve settlement in real time and therefore cannot rely on a fiat currency as vehicle currency, because fiat currencies require two days to settle. ODL therefore relies on the XRP Ledger's native currency, XRP, to serve as vehicle currency.

D. Disruptive innovation

65. The competitive viability of ODL leveraging the XRP Ledger is supported by Ripple's choice of global strategy. Economic theory suggests that a firm with superior technology but fewer resources than the currently-dominant firms will wisely adopt the strategy known as "disruptive innovation." The relevance of this strategy is immediately apparent from this description by the economists who first outlined this strategy:

> "Disruption" describes a process whereby a smaller company with fewer resources is able to successfully challenge established incumbent businesses. Specifically, as incumbents focus on improving their products and services for their most demanding (and usually most profitable) customers, they exceed the needs of some segments and

[89] There is one exception to this two-day rule: just one business day is required to settle trades between the US and Canadian dollars.

> ignore the needs of others. Entrants that prove disruptive begin by successfully targeting those overlooked segments, gaining a foothold by delivering more-suitable functionality—frequently at a lower price. Incumbents, chasing higher profitability in more-demanding segments, tend not to respond vigorously. Entrants then move upmarket, delivering the performance that incumbents' mainstream customers require, while preserving the advantages that drove their early success. When mainstream customers start adopting the entrants' offerings in volume, disruption has occurred.[90]

66. Amazon provides a classic example of disruptive innovation. Amazon began as a small online bookseller. Its technology proved so successful that it quickly gathered market share from many brick-and-mortar book retailers, including large chain book sellers. Amazon used that experience to refine its systems for marketing, inventory management, payment, and shipment, and then went on to disrupt retail markets in many other products. By now almost anything tangible and reasonably portable can be purchased through Amazon, including groceries, streamed movies, and furniture.

67. Like Amazon when it started, Ripple fulfills the economic conditions that make disruptive innovation an appropriate strategy. It has a product that provides improved functionality at faster speeds and lower costs than incumbent products. As a start-up it has far fewer resources than incumbents such as SWIFT or Western Union.

68. Ripple's actions conform to the disruptive innovation strategy. The firm has focused on remittances, which is not a core business for most banks, and has avoided challenging the dominant payments systems head-on. It has collaborated with big banks on prototype digital payment systems rather than compete directly with SWIFT. Likewise, Ripple has intentionally avoided any direct challenge to the dominant money transfer operator, Western Union, as stated explicitly by David Schwartz, Ripple's Chief Technology Officer, in 2016.[91]

69. Gaining market share with a disruptive product that must ultimately create a network to thrive is extremely challenging. The reason is that the network of a dominant firm creates an almost insurmountable "barrier to entry" for challengers. SWIFT, with its network of over 10,000 banks worldwide, provides an apt illustration of a phenomenon known in economics as

[90] Christensen, Clayton, Michael E. Raynor, and Rory McDonald (December 2015). What is disruptive innovation? *Harvard Business Review*: 44–53. https://hbr.org/2015/12/what-is-disruptive-innovation.

[91] Ripple Live: Ask me anything with David Schwartz (21 December 2017). https://www.youtube.com/watch?v=NNuu7NIJAN4.

"network externalities." SWIFT's network gives it an advantage (or "positive externality") as the firm seeks new member banks. Any non-member bank can be confident that a SWIFT membership will make it easy and profitable to send funds to banks in a myriad of locations.

70. Economists would say that a dominant firm with an established network is "highly defensible" because it is extremely difficult to challenge them, even for a firm with far better products.[92] The challenger needs a network to attract clients, but without clients there is no network. Further, the dominant firm can set up additional roadblocks by giving second-class treatment to network members that collaborate with a challenger.

71. Some of Ripple's key strategic moves to date seem directly aimed at finding a route past the barricades associated with network externalities. Its 2019 commitment of up to $50 million to seed a partnership with Moneygram was likely intended to seed or jumpstart the necessary network. With this agreement in hand, Ripple could make a stronger case with other potential partners. For example, Ripple's choice to focus on one region, Asia's Pacific Rim, can be seen as leveraging that seed to create a strong network in one region. Many of the clients that Ripple has gained in this region are relatively small and focus on a narrow set of remittance "corridors." Coins.ph is focused on Philippine clients and, one infers, remittances into the Philippines; Siam Commercial Bank focuses on clients in Thailand; SBI Remit in Japan is focused on remittances from Japan. Such clients would benefit from ODL in their remittance corridors but do not need it to be available in all others. The network Ripple is creating in the Pacific Rim includes ties to countries in other regions including Latin America, and Africa. In theory those ties could next be leveraged to reinforce its still-limited links to one or more of those other regions. There is no rush, however. According to experts on the disruptive innovation strategy, "a headlong rush to fast growth is often unnecessary and can even backfire…"[93]

72. I understand that the SEC has argued that ODL is unprofitable or earns Ripple only *de minimis* revenue.[94] Assuming that is true, it provides no information on the firm's ability to compete as a payments service provider using ODL. Put differently, ODL can be (and in my opinion is) a viable option for making cross-border payments even if it is not currently profitable.

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[92] Haiglu, Andrei, and Simon Rothman (April 2016). Disruptive innovation: Network effects aren't enough. *Harvard Business Review:* 65-71. https://hbr.org/2016/04/network-effects-arent-enough.

[93] *Ibid.,* p. 65.

[94] Amended Complaint, ¶ 374.

Young technology-driven firms that must build networks often take many years to reach profitability. Airbnb, established in 2008, did not become profitable until 2020 and then returned to losses in 2021.[95] Uber, founded in 2009, is not yet profitable.[96] Pinterest, also established in 2009, may have finally reached profitability in 2021.[97] However, the viability of a start-up is not evaluated according to its profitability: Airbnb is currently worth $105 billion, Uber is worth $89 billion, and Pinterest is worth $34 billion. Indeed, profitability eluded over 80% of the firms that launched initial public offerings during the first three quarters of 2018.[98]

73. Profitable or not, Ripple is certainly getting noticed as a market disruptor. In 2020 CNBC listed Ripple as 28th on its list of the top 50 "Disruptor" firms, citing specifically the ODL service and XRP.[99]

74. To summarize this section, Ripple is a start-up with an innovative platform for cross-currency payments, ODL, that makes transfers more rapidly, at lower cost, and with greater transparency than existing platforms. The firm hews closely to the economically-logical strategy for firms in this situation, disruptive innovation. It faces massive barriers to entry, however, because it is attempting to disrupt an industry in which network externalities are substantial. Consistent with the principle of disruptive innovation, Ripple has so far avoided direct challenges to the dominant players by focusing on relatively small or new segments of the payments industry. The firm has always been clear, however, that its ultimate goal is to remake the $2 trillion business of payments processing.

[95] https://finance.yahoo.com/quote/ABNB/. Market capitalization as of 1 October 2021.

[96] https://finance.yahoo.com/quote/UBER/. Market capitalization as of 1 October 2021.

[97] https://finance.yahoo.com/quote/PINS?p=PINS&.tsrc=fin-srch. Market capitalization as of 1 October 2021.

[98] Cremades, Alejandro (4 December 2018). Profit vs growth: How to select the right strategy for your business. *Forbes*. https://www.forbes.com/sites/alejandrocremades/2018/12/04/profit-vs-growth-how-to-select-the-right-strategy-for-your-business/?sh=54b023a1410e.

[99] CNBC.com Staff (16 June 2020). *Disruptor 50 2020*. https://www.cnbc.com/2020/06/16/ripple-disruptor-50.html.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on October 4, 2021

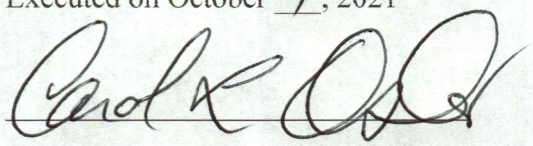

Exhibit A

Carol Osler, Ph.D.
Martin and Ahuva Gross Professor of Financial Markets and Institutions
Brandeis International Business School

cosler@brandeis.edu
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Brandeis University
415 South Street
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BIO

Carol Osler, Ph.D. is the Martin and Ahuva Gross Professor of Financial Markets and Institutions at the International Business School of Brandeis University. Dr. Osler's research focuses on exchange rates and foreign exchange trading. She has also recently published research on workplace bullying. Dr. Osler's courses cover behavioral finance, financial market structure and the trading process, and applied macroeconomic analysis. Dr. Osler's legal consulting engagements have the foreign exchange, bond, and precious-metals markets.

Dr. Osler served as research economist at the Federal Reserve Bank of New York and has also taught at the Norwegian School of Business (BI), the Amos Tuck School of Business at Dartmouth College, the Kellogg School of Management at Northwestern University, Columbia University, and the Massachusetts Correctional Institution at Concord.

EDUCATION

Ph.D., Economics: Princeton University
M.A., Economics: Princeton University
BA: Swarthmore College

PROFESSIONAL EXPERIENCE

ACADEMIC ENGAGEMENTS

PRESENT:	Martin and Ahuva Gross Professor of Financial Markets and Institutions, Brandeis International Business School, Brandeis University
2019	Taught basic finance to prisoners at MCI Concord, MA.
2002-2013	Associate Professor of Finance and Economics, Brandeis International Business School
1991-2002	Federal Reserve Bank of New York. Capital Markets Division of Research and Market Analysis Group. Senior Economist
1994	Visiting Economist, Foreign Exchange Trading Desk, Federal Reserve Bank of New York
1993-1996	Columbia University, Adjunct Assistant Professor of Economics.
1990-1991	Kellogg School of Management, Visiting Assistant Professor of Finance.
1988	NBER Ford Foundation Fellow
1985-1991	Assistant Professor, Amos Tuck School of Business Administration, Dartmouth College.

EXPERT RETENTIONS

2019-PRESENT *Joseph S. Mancinelli et al. v. Bank of America et al.*, Ontario Superior Court of Justice (SSA Bonds)

2018-PRESENT *Julius di Filippo and David Caron v. Bank of Nova Scotia et al.,* Ontario Superior Court of Justice (Silver)

2017-PRESENT *Julius di Filippo and David Caron v. Bank of Nova Scotia et al.,* Ontario Superior Court of Justice (Gold)

2017-PRESENT Maurice Blackburn Pty Ltd., Melbourne, Australia. Economic consultant on FX antitrust suit (FX).

2018 *Axiom Investment Advisors, LLC, v. Deutsche Bank AG*. US Southern District of New York.

2018 *James Contant, et al., v. Bank of America Corporation, et al.,* US District Court, Southern District of New York (Indirect FX)

2016-PRESENT *Chris Staines v. Royal Bank of Canada et al., Defendants*, Ontario Superior Court of Justice (FX)

2018 *Axiom Investment Advisors, L.L.C. v. Deutsche Bank AG*, US District Court, Southern District of New York (FX: Last look)

2015-2016 U.S. Department of Justice action on price-fixing conspiracy in FX markets

2014 Lovell Stewart Halebian Jacobson L.L.P. Preliminary work towards class-action complaint on price-fixing conspiracy in FX markets

2011-2012 Consultant for Charles River Associates in their support of State Street Bank in *People of the State of California v. State Street et al.,* Superior Court of the State of California County of Sacramento.

ADMINISTRATION

2021-2022: Chair, Brandeis Faculty Senate

2019 – 2021: Member, Faculty Senate and Faculty Senate Council, Brandeis University

2020 – 2021: Library Advisory Committee

2019: Co-facilitator, Course Design Workshop, Brandeis Center for Teaching and Learning

2016 – 2020: Co-Chair, Dignity at Work Task Force of the Faculty Senate, Brandeis University

2015: Chair, Provost Search Committee, Brandeis University

2010 – 2018: Chair, University Budget Committee, Standing Committee of Brandeis University.

2009 – 2012: Member, Faculty Senate Council, Brandeis University

2008 – 2015: Program Director, Master of Arts in International Economics and Finance, Brandeis International Business School

2007-2008: Acting Program Director, Ph.D. Program, Brandeis International Business School

Chair and member of numerous search committees including those for presidential direct reports and other senior administrators. Member and chair of committees on undergraduate mental health, tenure and promotion committees, contract review committees, etc.

RESEARCH

PUBLICATIONS

Workplace Bullying: Nature, Consequences, and Recommended Policies. *Journal of Organizational Psychology* 21(2).

Price Discovery in Two-tier Markets, joint with Geir H. Bjønnes and Dagfinn Rime (2021). *International Journal of Finance and Economics* 26(2): 3109-3133.

The Market Microstructure Approach to Foreign Exchange: Looking Back and Looking Forward, joint with Michael King and Dagfinn Rime (2013). *Journal of International Money and Finance* 38 (November): 95-119.

The Microstructure of Currency Markets: Market Microstructure in Emerging and Developed Markets (2013), with Xuhang Wang. Chapter 5 in: Ed. Kent Baker and Halil Kiymaz, Eds. (John Wiley, Inc.: New York and London).

Currency Market Microstructure and the Profitability of Currency Trading (2012). *Annual Review of Financial Economics* 4: 469-495.

Noise Trading and Illusory Correlations in US Equity Markets, joint with Jennifer Bender and David Simon (2012). *Review of Finance* 17(2): 625-652.

Survival of Overconfidence in Currency Markets, joint with Thomas Oberlechner (2012). *Journal of Financial and Quantitative Analysis* 47(1): 92-113.

Foreign Exchange Market Structure, Players, and Evolution (2012), with Michael King and Dagfinn Rime. In: James, J., Marsh, I., Sarno, L. (Eds), *Handbook of Exchange Rates*. (Wiley and Sons: New York and London).

Price Discovery in Currency Markets, joint with Alexander Mende and Lukas Menkhoff (2011). *Journal of International Money and Finance* 30 (8): 1696-1718.

Extreme Returns: The Case of Currencies, joint with Tanseli Savaser (2011). *Journal of Banking and Finance* **35**: 2868-2880

Limit-Order Submission Strategies under Asymmetric Information. Joint with Lukas Menkhoff and Maik Schmeling (2010). *Journal of Banking and Finance* 34(11): 2665-2677.

Foreign Exchange Microstructure: A Survey (2009). *Encyclopedia of Complexity and System Science,* Robert A. Meyers, Ed (Springer: New York).

The Exchange Rate in a Behavioral Finance Framework (2007). Book Review: *Journal of International Economics* 72: 265-270.

Macro Lessons from Microstructure (2006). *International Journal of Finance and Economic*s 11: 55-80.

Stop-Loss Orders and Price Cascades in Currency Markets (2005). *Journal of International Money and Finance* 24: 219-241.

Currency Orders and Exchange-Rate Dynamics: Explaining the Success of Technical Analysis (2003). *Journal of Finance* 58: 1791-1819.

The Changing Landscape of the Financial Services Industry: What Lies Ahead? (2000). *Economic Policy Review* 6 no. 4: 39-54. www.ny.frb.org/rmaghome/econ_pol/900lown.pdf

Support for Resistance: Technical Analysis and Intraday Exchange Rates (2000). *Economic Policy Review* 6, no. 2: 53-67. http://www.newyorkfed.org/research/epr/00v06n2/0007osle.html

Rapidly Rising Corporate Debt: Are Firms Now Vulnerable to an Economic Slowdown? (2000). *Current Issues in Economics and Finance* 6, no. 7: 1-6.

Rational Speculators and Exchange Rate Volatility with John Carlson (2000). *European Economic Review* 44: 231-253.

Methodical Madness: Technical Analysis and the Irrationality of Exchange-Rate Forecasts, with Kevin Chang (1999). *Economic Journal* 109: 636-661.

Second District House Prices: Why So Weak in the 1990s? joint with Matthew Higgins and Anjeli Sridhar (1999). Federal Reserve Bank of New York *Current Issues in Economics and Finance* 5(January).

Short-Term Speculators and the Puzzling Behavior of Exchange Rates (1998). *Journal of International Economics* 43(1): 37-58.

Is More Always Better? Head-and-Shoulders and Filter Rules in Foreign Exchange Markets, joint with P.W. Kevin Chang (1998). In: E. Acar and S. Satchell, eds., *Advanced Trading Strategies and Tactics.* (Irwin-Probus: London).

Asset Market Hangovers and Economic Growth: U.S. Housing Markets, joint with Matthew Higgins (1998). In: *The Role of Asset Prices in the Formulation of Monetary Policy*, BIS Conference Papers Vol. 5 (Bank for International Settlements, Basle).

Asset Market Hangovers and Economic Growth: The OECD During 1984-1993, join with Matthew Higgins (1997). *Oxford Review of Economic Policy* 13(3): 110-34.

Charting : Chaos Theory in Disguise? joint with William Clyde (1997). *Journal of Futures Markets* 17(August): 489-514.

Exchange Rate Dynamics and Speculators' Horizons (1995). *Journal of International Money and Finance* 14: 695-719.

The Credit Slowdown Abroad, joint with S. Hickok (1994). In: *Studies on Causes and Consequences of the 1989-92 Credit Slowdown* (Federal Reserve Bank of New York): 429-73.

High Real Interest Rates and Investment in the 1990s (1994). Federal Reserve Bank of New York *Quarterly Review* 19(1): 38-44.

Interest Rate Term Premiums and the Failure of Uncovered Interest Rate Parity (1992). *Journal of International Financial Markets, Institutions and Money* 2(2): 1-26.

Factor Prices Under Integrated Markets for Risky Capital, (1991). *European Economic Review* 35: 1311-40.

Explaining the Absence of International Factor-Price Convergence (1991). *Journal of International Money and Finance* 10: 89-107.

Optimal Growth Under Uncertainty (1991). *Economic Letters* 36: 31-35.

OTHER PUBLICATIONS

Greece Illustrates the Importance of Staying Within Economic Limits (2015). *European Politics and Policy* (London School of Economics) September 1. http://blogs.lse.ac.uk/europpblog/2015/09/01/greece-illustrates-the-importance-of-staying-within-economic-limits/

Reading Between the Lines of Greece's Bailout: Debt Relief is Inevitable – Just Not Yet (2015). *The Conversation*. July 20. http://theconversation.com/reading-between-the-lines-of-greeces-bailout-debt-relief-is-inevitable-just-not-yet-44744

The Fix Is In (2014). *The Conversation*. November 13. http://theconversation.com/the-fix-is-in-how-banks-allegedly-rigged-the-us-5-3-trillion-foreign-exchange-market-33828.

WORKING PAPERS

Shrouding and the Forex Trades of Global Custody Banks. (with Tanseli Savaser). https://ideas.repec.org/p/brd/wpaper/118.html. Resubmitted to the *Journal of Banking and Finance.*

Price Discrimination in OTC Markets. (with Geir Bjønnes and Neophytos Kathitziotis). January, 2017.

Dealer Trading at the Fix (with Alasdair Turnbull). September 2020.

Private Non-fundamental Information and Adverse-Selection in Cryptocurrencies, November 2019, joint with Shuran Zhang.

Information Content of Marketable Limit Orders, November 2019, joint with Shuran Zhang.

Short-Run Exchange-Rate Dynamics: Theory and Evidence, with J. A. Carlson and C. Dahl.

WORK IN PROGRESS

Explaining the Intraday Behavior of Spreads in the Foreign Exchange Interbank Market, joint with David Simon and Shuran Zhang

OTHER ACADEMIC ENGAGEMENTS

THESIS ADVISING

Current Ph.D.
Neophitos Kathitziotis (Hamburg Univ.)
Karen Smith

Completed Masters Theses
Olzas Kuramazov
Damir Ćosić

Completed Ph.D., Chair
Shuran Zhang
Ly Tran
Rawley Heimer
David Simon
Rimma Yusim Sherman
Vitaliy Vandrovych
Prasandjeet (Vinay) Nundlall
Tanseli Savaser
Jennifer Chu Bender

Completed Ph.D., Committee
Henok Tewolde
Siri Valseth (Norwegian Schl.Mgmt.)
Kjell Jorgenson (Norwegian Schl.Mgmt.)
Tyler Hull Gotham George
Ritti Bumiputra
Eskandar (Sandro) Tooma
Xia Meng
Ma Gang
Heidi Zhao

TEACHING

Courses taught since 2002

- Human Psychology and Financial Decision Making (Brandeis, undergraduates)
- Behavioral Finance and Economics (Brandeis - master's students)
- Applied International Macroeconomics (Brandeis - master's students)
- Trading and Exchanges (Brandeis - master's students)
- Central Banking (Brandeis - master's students)
- Investments (Brandeis - master's-level)
- International Finance (Brandeis - Ph.D. students)
- Financial Market Microstructure (Norwegian School of Management - Ph.D. students)
- Basic Finance (Massachusetts Correctional Institution, Concord)

Past teaching expertise

- Macroeconomics (Amos Tuck School of Business, Dartmouth)
- Bank Management (Amos Tuck School of Business, Dartmouth)
- International Capital Markets (Amos Tuck School of Business, Dartmouth; Kellogg Graduate School of Management, Northwesterm)
- Monetary Theory (Columbia University, undergraduates)
- International Finance (Columbia University, undergraduates and SIPA)

FELLOWSHIPS AND AWARDS

Brandeis University International Business School Teaching Award, 2018.

Martin and Ahuva Gross Chaired Professorship in Financial Markets and Institutions.

Brandeis Teaching Innovation Grant, 2015

Market Technicians Association, Inc., Recognition Award for the Teaching of Technical Analysis in Academia.

Brandeis University International Business School Teaching Award, 2008.

First Prize, Academic Papers Competition, Investors' Forum, December, 1996, for Rational Speculators and Exchange Rate Volatility (with John Carlson).

Faculty Research Fellow, National Bureau of Economic Research, 1987-1991.

Ford Foundation Scholar, National Bureau of Economic Research, Fall 1988.

REFEREE

Ad hoc referee: *Journal of Economic Literature, NSF, Review of Financial Studies, Journal of Finance, Journal of Financial Markets, Journal of Financial and Quantitative Analysis, Journal of Financial Markets, International Economic Review, Journal of Money, Credit, and Banking, European Economic Review, Economic Bulletin, Journal of International Economics, Journal of Development Economics, Journal of Financial Management, IMF Staff Papers, Science, Review of Economics and Statistics, Journal of International Money and Finance, Journal of Economic Behavior and Organizations, European Journal of Finance, Journal of Empirical Finance, Canadian Journal of Economics, Journal of Financial Services Research, Journal of Economics and Business, Journal of Macroeconomics, Journal of Futures Markets, Quarterly Review of Economics and Finance, Applied Operations Research, Quantitative Finance.*

SEMINARS AND CONFERENCE PRESENTATIONS

Discussant: Locked-in at home: Female Analysts' Attention at Work During the COVID-19 Pandemic. Mengqiao Du. Northern Finance Association Annual Meeteings, September 2021.

Presenter: Workplace Bullying in Economics: Nature, Consequences, and Recommended Policies, Southern Economic Association Annual Meetings, 2020.

Presenter: Dealer Trading at the Fix. December, 2019. 3rd Sydney Banking and Stability Conference, Sydney, Australia. Also: discussant.

Presenter: Dealer Trading at the Fix. October, 2018. FMA Meetings, San Diego, CA. Also: discussant.

Presenter: Dealer Trading at the Fix. June 12, 2018. Infiniti Conference on International Finance, Poznan, Poland. Also: discussant.

Presenter: Dealer Trading at the Fix. December 15, 2017. Second annual Conference on High Frequency Exchange Rate Dynamics: Econophysics and Econometric Analysis Based on the EBS data sets. Tokyo, Japan.

Presenter: Dealer Trading at the Fix. December 21, 2017. Eurofidai Conference, Paris, France.

Discussant, Did the Reform Fix the London Fix problem? By Takatoshi Ito and Masahiro Yamada. March, 2017: International Conference on High Frequency Exchange Rate Dynamics: Econophysics and Econometric Analysis Based on the EBS data sets. Tokyo, Japan

Discussant: Puzzles in the Tokyo Fixing in the Forex Market: Order Imbalances and Bank Pricing? By Takatoshi Ito. March 2017: International Conference on High Frequency Exchange Rate Dynamics: Econophysics and Econometric Analysis Based on the EBS data sets. Tokyo, Japan

Presenter: Dealer Trading at the Fix. December 2016: 6th Workshop on Financial Determinants of Foreign Exchange Rates, Cass Business School, London.

Presenter: Bank Reserve Management After the Global Financial Crisis, IBS Brown Bag, December 2016.

Presenter: Price Discrimination in OTC Markets. November 2016, Wilfried Laurier University, Ontario, Canada.
Presenter: Dealer Trading at the Fix. October 2016: Financial Management Association Annual Meetings, Las Vegas.
Presenter: Dealer Trading at the Fix. October 2016. OECD, Paris.
Presenter: Dealer Trading at the Fix September 2016: 12th Annual Central Bank Workshop on the Microstructure of Financial Markets, Banque de France, Paris.
Presenter: Dealer Trading at the Fix. September 2016: Portsmouth-Fordham Conference on Banking and Finance, University of Portsmouth, UK.
Presenter: Dealer Trading at the Fix. September 2016: Cass Business School, London.
Presenter: Price Discrimination in OTC Markets. September 2016, CFM (Hedge Fund) Paris.
Presenter: Dealer Trading at the Fix. September 2016: University of Essex Business School, Colchester, England.
Discussant: June 2016: Illiquidity in the stock and FX markets: an investigation of their cross-market dynamics by Chiara Banti. Women in Microstructure conference, Park City, UT
Presenter: Price Discrimination in OTC Markets. April 2016: Eastern Finance Association meetings, Baltimore, MD.
Discussant: Libor's Poker. By Jiakai Chen. April 2016: Eastern Finance Association meetings, Baltimore, MD.
Presenter: Depth and Information in the Foreign Exchange Limit Order Book: A Nonlinear Approach (with Ly Tran). June 2015, Women in Microstructure Conference.
Discussant: Forex Trading and the WMR Fix, by Martin D.D. Evans. NYU-Stern Annual Microstructure Meetings, May 2015.
Discussant: Understanding FX Liquidity, Karnaukh, Ranaldo, Soöerlind, 10th Annual Central Bank Workshop on the Microstructure of Financial Markets, Rome, Italy, October 2014.
Presenter: Asymmetric Information and the Foreign Exchange Trades of Global Custody Banks, Joint with Tanseli Savaser and Thang Tan Nguyen. Midwest Finance Association Annual Meeting, New Orleans, February 23, 2012.
Discussant: Mink, Mark, Procyclical Bank Risk-Taking and the Lender of Last Resort, DNB Working Paper No. 301 (July 2011). Midwest Finance Association Annual Meeting, New Orleans, February 23, 2012.
Presenter: Noise Trading and Illusory Correlations in U.S. Equity Markets, joint with Jennifer Bender and David Simon. Behavioral Finance Working Group Conference, Cass Business School, London. (presented, due to time conflict, by David Simon) April 7, 2011.
Discussant: Market Reaction to Second-Hand News: Attention Grabbing or Information Dissemination? Cervellati, Enrico Maria, Riccardo Ferretti, and Pierpaolo Pattitoni (presented by David Simon). April 7, 2011.
Presenter: Extreme Returns: The Case of Currencies, joint with Tanseli Savaser. Boston QWAFAFEW, July 2010.
Presenter: Hedge Funds and the Origins of Private Information in Foreign Exchange Markets, French Finance Association Meetings, Paris, December 16, 2009.
Presenter: Uninformed Momentum Traders, Ali Emre Konokoglu, Discussion, French Finance Association Meetings, Paris, December 16, 2009.
Presenter: Technical Analysis of Equity Indexes, Warwick Business School, University of Warwick, U.K. December 2, 2009.
Presenter: Technical Analysis of Equity Indexes, AFATE, Paris, December 16, 2009.
Presenter: Technical Analysis of Equity Indexes, Society of Technical Analysts, London, November 10, 2009.
Presenter: Overconfidence in Currency Markets, Cass Business School, London, November 4, 2009.

Presenter: Exchange-Rate Effect of Multi-Currency Arbitrage, Harald Hau, Discussion, Sixth Annual Central Bank Workshop on the Microstructure of Financial Markets, Zurich, Switzerland, October 8, 2009.

Presenter: Hedge Funds and the Origins of Private Information in Foreign Exchange Markets, Bank for International Settlements, Basel, October 7, 2009.

Presenter: Extreme Returns Without News: The Case of Currencies, Financial Economics Research Center Conference on Microstructure, September 23, 2009.

Discussant, Crash Risk in Currency Markets, Romain Ranciere, Xavier Gabaix, Adrien Verdelhan, Emmanuel Farhi, Discussant, Western Finance Association Meetings, San Diego, June 17-20, 2009.

Presenter: Hedge Funds and the Origins of Private Information in Foreign Exchange Markets, Third Annual Microstructure Workshop, Emerging Markets Group, Cass Business School, London, May 1, 2009.

Panelist, Causes and Consequences of the Financial Crisis, Jean Beer Center for Ethics, Philosophy Department, Georgia State University, Atlanta, GA, March 18, 2009.

Presenter: Extreme Returns Without News: The Case of Currencies, State Street Advanced Research Center, March 11, 2009.

Presenter: Extreme Returns Without News: The Case of Currencies, International Federation of Technical Analysts, Paris, November 6-8, 2008.

Presenter: Extreme Returns Without News: The Case of Currencies, Midwest Finance Association meetings, Dallas, Texas, October 2008.

Presenter: Short-Run Exchange-Rate Dynamics: Theory and Evidence, Infiniti Conference, Dublin, Ireland, June 2008.

Presenter: Short-Run Exchange-Rate Dynamics: Theory and Evidence, Seminar at UNH Durham, October 2007.

Presenter: Asymmetric Information in the Interbank Foreign Exchange Market, Joint with Geir Bjønnes and Dagfinn Rime, *Third Annual Conference on Market Microstructure*, Budapest, Hungary, September 15, 2007.

Presenter: Extreme Returns: The Case of Currencies, joint with Tanseli Savaser. *Third Annual Conference on Market Microstructure*, Budapest, Hungary, September 15, 2007

Presenter: Price Discovery in Currency Markets, Seminar Presentation at the NBER Conference on Microstructure, May 11, 2007.

Presenter: Price Discovery in Currency Markets, Seminar Presentation at Acadian Asset Management, April 4, 2007.

Presenter: Short-Run Exchange-Rate Dynamics: Theory and Evidence, Seminar at Williams College, April 2, 2007.

Presenter: Price Discovery in Currency Markets, Seminar presentation at Rutgers University, November 28, 2006.

Presenter: Price Discovery in Currency Markets, Seminar at State Street Global Research Advanced Research Center, December 2007.

Presenter: Short-Run Exchange-Rate Dynamics: Theory and Evidence, seminar presentation at Hannover University, Hannover, Germany, November 15, 2006.

Presenter: Price Discovery in Currency Markets, seminar presentation at the University of Copenhagen, Copenhagen, Denmark, November 13, 2006.

Presenter: Price Discovery in Currency Markets, Bank of Canada/Norges Bank Conference on the Microstructure of Equity and Foreign Exchange Markets, Ottawa, Canada. October 20-21, 2006.

Presenter: Price Discovery in Currency Markets, Seminar presentation at the Federal Reserve Bank of St. Louis, October 4, 2005.

Presenter: Price Discovery in Currency Markets, Hong Kong Institute for Monetary Research Conference on financial Markets and the Macroeconomy. Hong Kong, July 13-14, 2006.
Presenter: Price Discovery in Currency Markets, MMF/ESRC/WFRI Workshop on the Micro Structure of FX markets and Fixed Income. Warwick University Business School, Wednesday 28th June 2006.
Presenter: Macro Lessons from Microstructure, Seminar presentation at University of North Carolina, April 1, 2006.
Presenter: Macro Lessons from Microstructure, Seminar presentation at the Bank of Canada, April 12, 2006.
Presenter: Macro Lessons from Microstructure, Seminar presentation at University of Virginia, March 1, 2006.
Presenter: Getting Tenure, CSWEP Annual Mentoring Conference, Boston, MA, January 10, 2006.
Presenter: Short-Run Exchange-Rate Dynamics: Theory and Evidence, American Economic Association Annual Meetings, Boston, MA January 8, 2006.
Presenter: Macro Lessons from Microstructure, Econometric Society Annual Meetings, Boston, MA, January 7, 2006.
Presenter: Short-Run Exchange-Rate Dynamics: Theory and Evidence, Norges Bank Conference on Equity and Foreign Exchange Microstructure, Oslo, Norway: September 7-8, 2005.
Presenter: Asymmetric Information and Currency Spreads, Bank of Canada/University of British Columbia Workshop on International Financial Markets, University of British Columbia: August 23-24, 2005.
Presenter: Asymmetric Information and Currency Spreads, Summer School and Workshop on Market Microstructure, Aix-en-Provence: July 4-8, 2005.
Presenter: Short-Run Exchange-Rate Dynamics: Theory and Evidence, Seminar presentation at the Federal Reserve Bank of Boston: May 2005.
Presenter: Stop-Loss Orders and Price Cascades in Currency Markets, Eighth International Conference on International Macroeconomics and Finance, University of Crete, Greece: May 26-28, 2004.
Presenter: Short-Run Exchange-Rate Dynamics: Theory and Evidence, Seminar at Federal Reserve Bank of Boston May 2004.
Presenter: Extreme Exchange-Rate Returns Without News: A Microstructural Approach, A series of seminars and private presentations to the clients of the Royal Bank of Scotland in London and New York. Fall 2003 and summer 2004.
Presenter: Identifying Noise Traders: The Head-and-Shoulders Pattern in U.S. Equities. 4th Empirical Finance Conference, Financial Markets Group, London School of Economics: April 30, 2003.
Presenter: Stop-Loss Orders and Price Cascades in Currency Markets, Currency Market Microstructure Conference, Stockholm Institute of Finance, Stockholm: April 12, 2003.
Presenter: Identifying Noise Traders: The Head-and-Shoulders Pattern in U.S. Equities. Conference on Computational Finance, New York, NY, January 1999.
Presenter: Identifying Noise Traders: The Head-and-Shoulders Pattern in U.S. Equities. Financial Management Association Annual Meetings, New York City, October 1998.
Presenter: Identifying Noise Traders: The Head-and-Shoulders Pattern in U.S. Equities. Conference on Forecasting Financial Markets sponsored by Imperial College, London, and Banque National de Paris. London, May 27-29, 1998.
Presenter: Identifying Noise Traders: The Head-and-Shoulders Pattern in U.S. Equities. French Finance Association Annual Meetings, Grenoble, France, June 23-25 1997.
Presenter: Head-and-Shoulders: Not Just a Flaky Pattern, System Committee on International Economics Fall Meeting, Kansas City, 1995
Presenter: Head-and-Shoulders: Not Just a Flaky Pattern, Financial Management Association Annual Meetings, New York, New York, October 1995.

Presenter: Head-and-Shoulders: Not Just a Flaky Pattern, Conference on Forecasting Financial Markets, London, April 1995.

Presenter: Head-and-Shoulders: Not Just a Flaky Pattern, Eastern Economic Association Meetings, New York, NY, March 1995.

Presenter: Origins of Near-Random Walk Exchange Rate Behavior, American Economic Association Annual Meeting, Anaheim, California, January 1993.

Presenter: Origins of Near-Random Walk Exchange Rate Behavior, European Economic Association Annual Meeting, Dublin, Ireland, August 1992.

Presenter: Origins of Near-Random Walk Exchange Rate Behavior, Eastern Economic Association Annual Meeting, New York, New York.