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UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

AMENDED EXPERT REPORT OF █████████████

October 13, 2021

Securities and Exchange Commission v. Ripple Labs, Inc. et al.
Index No. 1:20-CV-10832-AT

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I.   INTRODUCTION

A. Assignment

1.   I have been engaged by the Securities and Exchange Commission ("SEC") to provide expert testimony in the matter of *Securities and Exchange Commission v. Ripple Labs, Inc., et al.* pending in the United States District Court for the Southern District of New York. The SEC has retained me to independently analyze and comment on two areas. First, the SEC asked me to opine on whether Ripple Labs Inc. ("Ripple"), Chris Larsen ("Larsen"), and Brad Garlinghouse ("Gsarlinghouse") took steps to influence XRP prices. Second, I have also been retained to opine on the incentives that might have been present for Ripple to attempt to influence the price of XRP.[1]

2.   My opinions are based upon my professional knowledge and experience, my review of documents and information relevant to this matter, and the analyses described in this report. My analyses in this report rely partly on data, documents, and statements produced to the SEC by Ripple. I am not currently opining on the validity of the data, documents, and statements made by Ripple or produced to the SEC by Ripple in this matter.

B. Qualifications

3.   ██ ██. I have also served on the faculty at ██ ████████████████. I received a B.A. in Economics from ████████████████, a M.S. in Finance from ████████████████████ and my Ph.D. in Finance from ████████.

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[1] I have also been retained to potentially provide additional analysis or opinion, if necessary, in response to additional information which may be presented in Defendants' expert reports.

███████████. I have been teaching investments to undergraduate and Ph.D. students over the last twenty-four years. I have also taught international finance to undergraduate and MBA students at ████████████████████████████. I am a past President and Vice-President of the ████████████████████████, former director of the ████████████████████████████, and current President and former Vice-President of the ████████████████.

4.   My research focuses on forensic finance, with specific interest in ██████████ ███████████, market manipulation, structured finance, credit ratings, initial public offerings (IPOs) and international finance. I have published 30 papers, mostly in the ████████████ ███ and have been cited ██████████ times according to Google Scholar. In the ████████████, my academic research on ████████████████████, titled ███████████████████?", was published in ██████████████ and has been extensively featured in over ██████████ outlets around the world including Bloomberg, The New York Times, The Wall Street Journal, and The Financial Times. I have also co-authored a significant number of published journal papers related to ████████████████████. In particular, my academic research on ██████ ████████████████████████████████ was similarly featured on many of the top media outlets and published in the ████████████████, and my paper analyzing ██████████████████████████████████████ ████████████ was published in the ████████████████

5.   ████████████████████████████████████

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██████████████ I have advised and consulted for the U.S. Department of Justice, the Securities and

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Exchange Commission, the Commodity Futures Trading Commission, state-level enforcement and regulatory entities, and private parties.

6.   My curriculum vitae, attached as Appendix A to this report, provides more details about my educational and professional background and experience, as well as a list of my publications in the last ten years. A list of cases for which I have provided testimony or submitted court-filed expert reports in the past four years is attached as Appendix B. I have been compensated at a rate of $700 per hour for my personal time and I have been assisted by employees of Integra FEC ████████████████. My compensation is not contingent upon the findings of this report or outcome in this or any other matter. The use of "I" in this report includes all analyses of data performed by the staff of Integra FEC under my direction and oversight. My opinions are based on my own understanding of the analysis and results presented in this report.

C. Documents Considered

7.   Documents, data, and other information that I have relied upon as the basis for my opinions are cited in this Report and listed in Appendix C. These include, but are not limited to, XRP sales reports from market makers retained by Ripple, Ripple internal communications, deposition transcripts and related exhibits reflecting communications of Ripple employees, XRP digital wallet addresses identified to be associated with Ripple, Larsen, and Garlinghouse, and Ripple financial statements. Other sources relied upon include publicly available XRP Ledger transactions and historical digital asset prices from CoinMarketCap and CryptoTick.

8.   It is possible that I may review additional new information that may become later available, as well as the reports and depositions of other experts. I reserve the right to supplement my report and analyses based on any additional evidence, including any evidence brought to my attention by the defense, other experts, or obtained through discovery.

II.   SUMMARY OF OPINIONS

9.   Based on i) the analysis of Ripple's internal and external communications, documents and data provided by the SEC, ii) analysis of publicly available XRP Ledger transactions and historical price data, and iii) my academic research and knowledge of this field, I conclude that Ripple and its executives at specific times took steps to influence the price of XRP and their sales of XRP functioned similarly to that of a public equity offering for Ripple.[2] The facts I have reviewed reflect the following, among others:

a. At specific times, Ripple and its executives directed GSR, a digital asset trading and market making firm,[3] to buy XRP in a manner consistent with i) pushing prices upward, or ii) providing a price floor to stabilize and keep prices from falling. In analyzed episodes of Ripple-directed trading, GSR traded exactly as directed and XRP prices generally moved upward or stopped declining.

b. Through market making firms, Ripple sold XRP to purchasers in a manner designed to minimize downward pressure on the price of XRP. Ripple employed trading strategies to protect the price of XRP.

c. 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. These 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.

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[2] Throughout this report, I frequently use the present tense as a stylistic preference, however, unless otherwise indicated, my report covers the period from when Ripple began selling XRP in 2013 to the filing of the complaint in this action, December 22, 2020. Additionally, analysis is performed only when data are available for specific date ranges within this period.
[3] https://www.gsr.io/our-team.

d. Ripple and its executives are incentivized to influence XRP prices in order to maximize the proceeds raised from XRP sales. In addition to Ripple's sales of XRP, Larsen and Garlinghouse collectively transferred 4.4 billion units of XRP (valued at $1.3 billion at the time of transfer) from their XRP digital wallet addresses. A large portion of these transfers were made to GSR, a market maker who also sold XRP programmatically on Ripple's behalf, to strategically sell their XRP holdings slowly over time.

e. From 2017 to 2020, Ripple relied on XRP sales to supplement a very significant funding gap of over $800 million that venture capital fundraising and other revenue items could not cover.

f. 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.

III. BACKGROUND ON RIPPLE AND XRP

10. According to Ripple, beginning in 2011, Jed McCaleb, David Schwartz, and Arthur Britto evidently began development of XRP and the XRP Ledger as an alternative to Bitcoin and the Bitcoin blockchain.[4] The ledger launched publicly in late 2012, and soon after Chris Larsen joined Ripple (then referred to as "OpenCoin") as co-founder and CEO. The native digital asset on the ledger, XRP, was created with a total fixed allocation of 100 billion XRP, of which 20

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[4] https://xrpl.org/history.html.

billion XRP were given to the founders and the remaining 80 billion XRP were transferred to Ripple.[5]

11.   XRP is a digital asset whose transactions are tracked and recorded on a publicly distributed database known as the XRP Ledger. The XRP Ledger is also referred to as a blockchain. Transactions are recorded and grouped together into "blocks" that are cryptographically-validated and chronologically connected, forming a chain of blocks (i.e., a blockchain). Transactions on the XRP Ledger, like other blockchains, are recorded, maintained, and verified autonomously across a peer-to-peer network of servers and validators, where each computer retains an identical copy of the transactions database and updates database records by consensus agreement. On other blockchains such as Bitcoin and Ethereum, this network of computers is incentivized to verify and record transactions because of transactional fees paid by users to those who verify and record transactions via "mining" processes. These fees are paid in Bitcoin (BTC) and Ether (ETH) on the Bitcoin and Ethereum blockchains, respectively. In contrast, computers operating the XRP Ledger do not receive fees and there is no "mining" on the XRP Ledger.

12.   Ripple sold XRP to the public beginning in 2013 and to at least December 22, 2020.[6] Ripple sells its XRP to the secondary markets via digital asset platforms and through bulk over-the-counter ("OTC") sales to institutional and individual purchasers.[7] Beginning in December 2017, Ripple placed 55 billion XRP into 55 escrow accounts controlled by Ripple, which were scheduled to be released at a rate of one billion XRP per month. Ripple continues to

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[5] https://xrpl.org/xrp-overview.html.
[6] Q4 2020 XRP Markets Report, https://ripple.com/insights/q4-2020-xrp-markets-report.
[7] Q1 2017 XRP Markets Report, https://ripple.com/insights/q1-2017-xrp-markets-report,
Q2 2017 XRP Markets Report, https://ripple.com/insights/q2-2017-xrp-markets-report/,
Q3 2017 XRP Markets Report, https://ripple.com/insights/q3-2017-xrp-markets-report,
Q4 2017 XRP Markets Report, https://ripple.com/insights/q4-2017-xrp-markets-report.

monetize XRP sales by releasing XRP from its escrow accounts, then deciding how much of the one billion XRP per month should be released into the market and how much should be re-escrowed. As of December 22, 2020, there is a circulating supply of 45.4 billion XRP that can be bought, sold, or transferred in the open markets and the price of XRP is $0.47 for a total (circulating and non-circulating supply) market cap of XRP of $47.1 billion.[8]

13.   Individuals or entities can interface with the XRP Ledger through computer applications and websites that enable them to send and receive XRP from a given XRP Ledger address (subsequently referred to as "XRP address"). XRP is controlled and spent using private keys, public keys, and public addresses. Private keys are randomly generated alphanumeric strings, public keys are alphanumeric strings mathematically derived from private keys, and public addresses are alphanumeric strings derived from public keys. In order to transfer XRP, the sender must know the private key that corresponds to the public address which stores the digital assets. Therefore, in a given transaction of XRP, one can infer that the sending party controls—i.e., has the private keys to—the XRP address that sent the funds, but the sending party may or may not have control of the receiving XRP address.

14.   XRP can be exchanged for other digital assets and fiat currencies either on-ledger or off-ledger mainly via digital asset platforms. On-ledger trades are recorded on the XRP Ledger and historical trade prices, amounts, and timing can be retrieved and analyzed. Trades can be attributed to unique blockchain digital wallet addresses, similar to bank account numbers. The identities of traders behind these transactions are generally anonymized on the Ledger but can sometimes be unmasked through various means including self-disclosure, forensic analytics, or proprietary Know-Your-Customer data from digital asset platforms. Beginning in 2017, XRP

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[8] Wayback Machine Internet Archive of XRP on CoinMarketCap as of December 22, 2020. Accessed on October 4, https://web.archive.org/web/20201222190557/https://coinmarketcap.com/currencies/xrp/

became more commonly listed on centralized digital asset platforms where customers can convert XRP to another digital asset like Bitcoin or to fiat currencies like U.S. dollars. Centralized digital asset platforms are online marketplaces controlled and maintained by a company or organization on one or multiple centralized computer servers. Trades on centralized digital asset platforms are aggregated and reconciled by private computer servers and therefore, individual trades can only be analyzed if one has access to data provided by such platforms.

IV.   RIPPLE COORDINATED WITH GSR TO BUY XRP IN A MANNER CONSISTENT WITH POSITIVELY INFLUENCING XRP PRICES

15.   I first evaluate whether Ripple and its executives expended efforts consistent with attempting to influence the price of XRP. Ripple and its executives played a central role in creating and overseeing a liquid market for secondary transactions.[9] Ripple has stated in its submissions in this litigation that Ripple and its executives "do not control the price of XRP" and that the price of XRP is "not based on the efforts of Ripple."[10] Yet, Ripple and its executives explicitly directed at least one of their market makers, GSR, to purchase or refrain from selling XRP at specific times with a stated intent of influencing the price of XRP. GSR traded in a manner consistent with the directions from Ripple executives to increase or stabilize the price of XRP as described in these emails and shown below.

16.   Since the XRP Ledger is a publicly available database and at least some of the addresses from which GSR sold Ripple's XRP are known through discovery, one can examine GSR's trading activities directly on the XRP Ledger. Using XRP addresses associated with GSR,

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[9] 2017-05-25 GSR Programmatic Market Activity Agreement (Bates GSR00017429), 2018-03-02 GSR amended programmatic market maker agreement (Bates GSR00018580), 2019-09-05 GSR Xrapid master agreement (Bates GSR00000988).
[10] Joint Submission by the Parties to Hon. Analisa Torres, February 15, 2021, Dkt. No. 45.

I am able to observe GSR's trades on behalf of Ripple. Technical details of the identification of GSR ledger trades can be found in Appendix D.

17.   Based on emails from as early as 2016, Ripple executives worked directly with GSR to devise trading strategies to positively influence XRP prices. In some instances, these were timed to maximize the price of XRP around large news announcements. For example, on September 14, 2016, ███████, the co-founder of GSR, received directions from Patrick Griffin (EVP of Business Development) and ████████████ (VP of Finance) to time Ripple's orders of XRP ahead of Ripple's announcements of new bank partnerships and Series B funding on the following day. Additional bank partners and funding would be highly positive news for XRP. GSR was then instructed by Griffin to "make purchases up to $300k" and asked to consider "plac[ing] offers on the ask side of the order book to tighten the spreads and attract more buying volume from the market."[11] Griffin's direction to "make purchases" and "[place] offers…to tighten the spreads and attract more buying volume" suggests that Griffin wanted GSR to purchase XRP and induce other buyers to do the same. If traders see a highly active buying market, they may also purchase XRP because they see potential upward price momentum. Purchasing around a key announcement and pushing the price upward in the process might further create the perception for other market participants that the news being released is extremely important. GSR was directed to trade for "24 hours starting at 6am PST" or 1pm UTC on September 15, 2016. On the following day, news of Ripple's new partnerships and Series B funding was released at 1:10pm UTC by Ripple.[12,13]

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[11] Email from Patrick Griffin, September 14, 2016 (Bates GSR00020001).

[12] https://ripple.com/ripple_press/ripple-adds-several-new-banks-global-network. This partnership announcement does not involve any bank using XRP or the XRP Ledger, but Ripple nevertheless touted the announcement as proof of Ripple's successful efforts to expand its network of banking partners that would adopt its technology for cross-border payments.

[13] https://ripple.com/ripple_press/ripple-raises-55-million-series-b-funding.

18.   Figure 1 examines GSR trading around this time to see if it traded as directed. The red bars denote hours of net buying by GSR on behalf of Ripple, while blue bars represent net selling. Net buying is calculated as total purchases minus total sales of XRP and net buying will be positive if there are more purchases than sales by GSR. Net selling is total sales minus total purchases of XRP. The red dots represent individual buy trades and the blue dots sell trades. As one can see from Figure 1, the price of XRP was flat in the six hours before GSR trading and GSR had no purchase or sale activity in the six-hour period prior to 1pm UTC. Beginning at 1pm UTC time, GSR begins net buying. This net buying directly corresponds to the time that GSR was directed to trade by Ripple. GSR is then a large net buyer of XRP for the next five hours. During these five hours, XRP jumps from $.0061 to a high of $0.0093, for a gain of $0.0032. This is a 53 percent price increase in five hours. By analyzing transactions publicly available on the XRP Ledger, I can confirm that GSR did in fact follow Ripple's directive to purchase XRP and that the activity appears successful as the price increased dramatically.

Figure 1 – GSR Trading on XRP Ledger on September 15th, 2016.
This figure plots XRP transactions conducted by GSR in a 30-hour window on September 15 and 16 around Ripple's announcement on September 15, 2016. Transactions are sourced from the XRP Ledger. XRP Price, denoted by the black line, was calculated using the volume weighted average price at 1-minute intervals across all trades on the XRP Ledger involving the XRP-USD trading pair. GSR net buys and net sales are reported as bars in hourly increments. Individual GSR buy and sell prices are plotted using red and blue circles. The dashed vertical line represents the time of the news announcement. Data are displayed in UTC time zone.
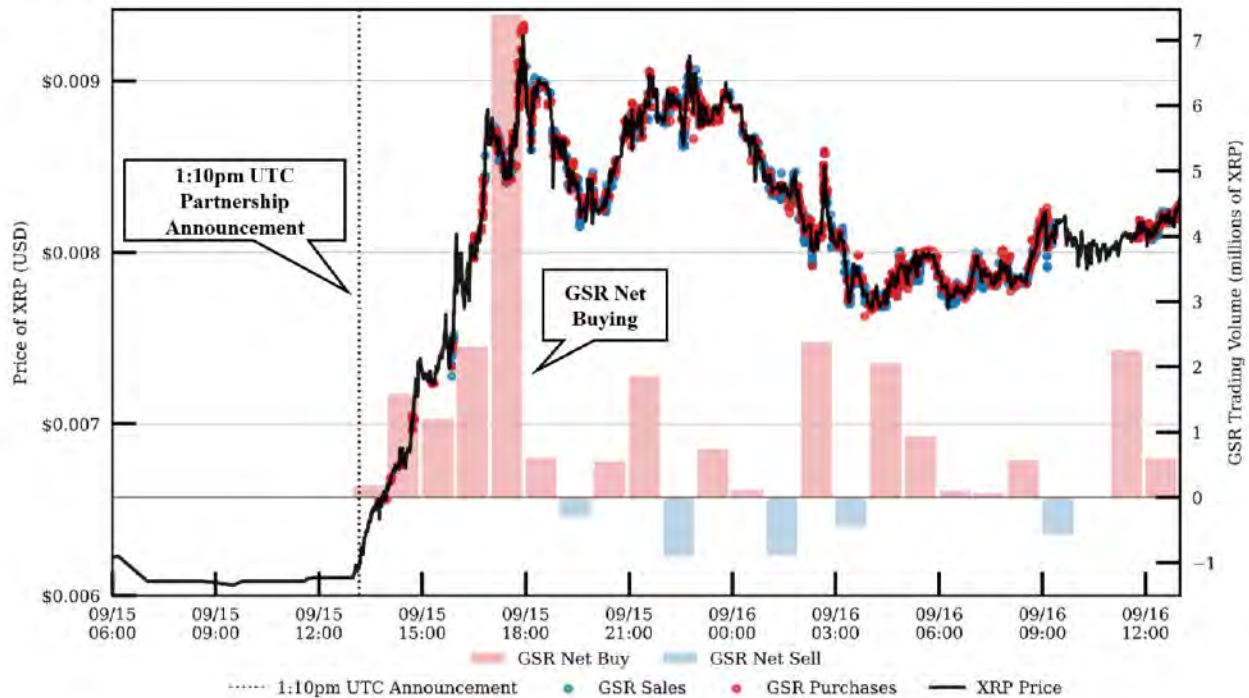
19.   In addition to this example of maximizing the price of XRP during a major announcement, from at least April 2016 to June 2017 certain Ripple executives also expended efforts that appear aimed at protecting the price of XRP at certain price floors. A price floor can be implemented to prevent large downward price movements that might lead to large losses for XRP holders, including Ripple, the largest XRP holder since XRP's inception. Declining prices are more likely to cause investors to sell their holdings, further exacerbating losses and making XRP appear as an unattractive investment to other buyers. In addition to having an economic incentive to make efforts to increase the price of XRP, Ripple had an economic incentive to attempt to stabilize or reverse any declining price trends in order to encourage investors to continue to hold

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or buy more XRP. Protecting a price floor for XRP would permit Ripple to maximize revenue from its own XRP sales, all else being equal.

20.   On November 1, 2016, Patrick Griffin instructed GSR to "aim to protect a $0.008 floor."[14] By analyzing GSR transactions on the XRP Ledger, the trading and price behavior of XRP is plotted in Figure 2. Around 5pm UTC, XRP prices declined near $0.008 USD. I make three observations. First, GSR made many purchases directly at $0.008 USD, consistent with implementation of a price floor just as directed by Ripple. Second, the trading seems to have succeeded in protecting XRP from dipping below $0.008 USD as the price did not go below this level. Third, the prices reverted higher in the subsequent hour.

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[14] Email from Patrick Griffin, November 1, 2016 (Bates GSR00005000).

Figure 2 – GSR Floor Setting on XRP Ledger on November 1, 2016.
This figure plots XRP transactions conducted by GSR on November 1, 2016. Transactions are sourced from the XRP Ledger. The XRP Price, denoted by the black line, was calculated using volume weighted average price at 1-minute intervals across all trades on the XRP Ledger involving the XRP-USD trading pair. GSR net purchases and net sales are reported as bars in 5-minute increments. Individual GSR buy and sell prices are plotted using red and blue circles. Data are displayed in UTC time zone.
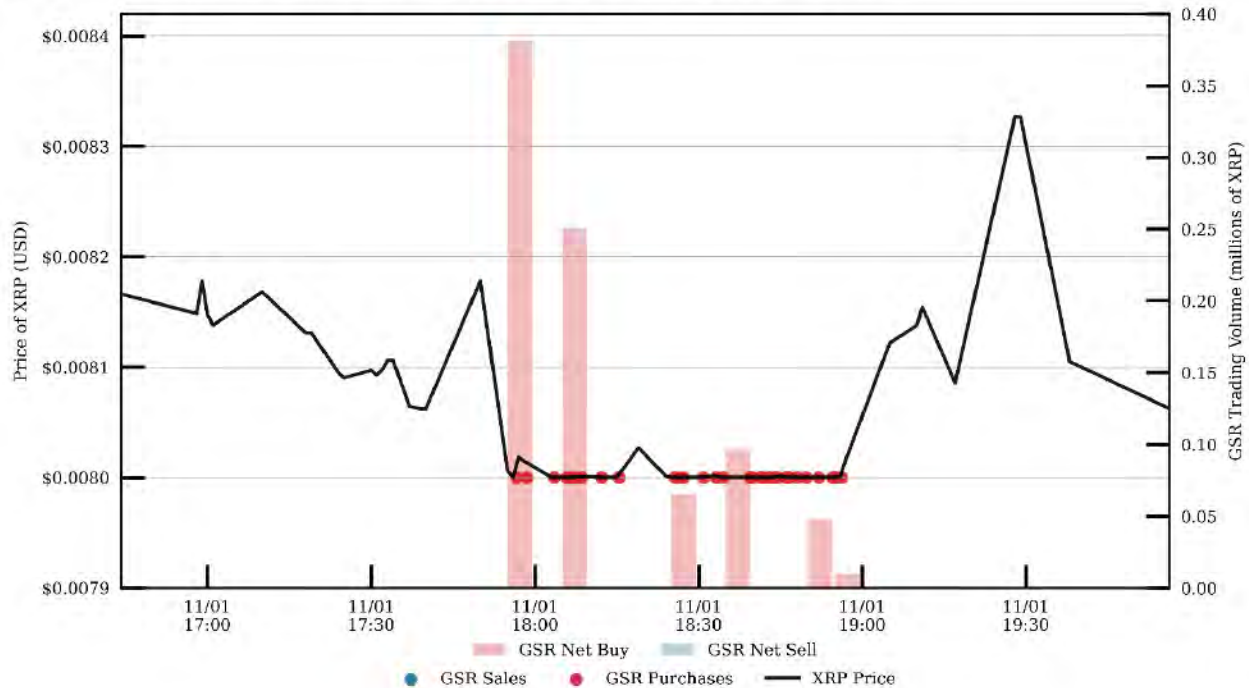
21.   GSR also executed uneconomic trades whose purpose appears to be to push the price of XRP upward. Traditional market makers add liquidity to markets by reducing the spread between buyers and sellers. They make a profit by purchasing at a low bid price and selling at a slightly higher price. In contrast, GSR would place bid prices at levels artificially higher than other traders. The economic incentive to make bids for XRP in the market at prices above the prevailing bids would be to attempt to push the price of XRP higher. For a market maker without an existing position, overpaying by purchasing at higher prices rather than lower prices would generally be an uneconomic trade. But since Ripple held large quantities of XRP, the small additional cost of pushing the price higher would be more than offset by the gains from the large XRP positions which would then be valued at a higher price.

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22.   For example, on September 23, 2016, Ripple announced the creation of the Ripple

Global Payments Steering Group.[15] The Steering Group was purported to be a consortium of global

banks that would help oversee the creation of Ripple transaction rules and promote Ripple's as of

then undeveloped payment network. On September 23, 2016, with the approval of Garlinghouse,

█████████ directed GSR "to keep the buying light post announcement and then do the bigger slug

starting Sunday night [September 25, 2016]," to coincide with Monday morning in Asia.[16] On the

XRP Ledger, we can see, as shown in Figure 3, that GSR made many purchases significantly above

market prices.

23.   As shown in in Figure 3, Panel A, GSR's large purchases are consistent with

placing a "bigger slug" starting on Sunday, September 25, 2016. GSR made several large

purchases of XRP that both preceded and accompanied a dramatic rise in the price of XRP of over

15 percent within 24 hours. Moreover, as shown in Figure 3, Panel B, many of GSR's purchases

(red dots) were consistently above average market prices (black line), and GSR on average

purchased XRP at a 1.5 percent premium compared to the last trade price. These uneconomic

trades, i.e., buying XRP above market prices, coincide with XRP's increase in value on September

25 and the early morning of September 26.

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[15] https://ripple.com/insights/announcing-ripples-global-payments-steering-group.
[16] GSR00006693.

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Figure 3 – GSR Transactions Overpayment on September 25 and 26, 2016.

This figure plots XRP transactions conducted by GSR on September 25 and 26, 2016. Transactions are sourced from the XRP Ledger. The XRP Price was calculated using the volume-weighted average price at 1-minute intervals across all trades on the XRP Ledger involving the XRP-USD trading pair. GSR net purchases and net sales are reported as bars in hourly increments. Individual GSR buys and sell prices are plotted using red and blue circles. Data are displayed in UTC time zone.


Panel A. GSR Trading on September 25 and 26, 2016
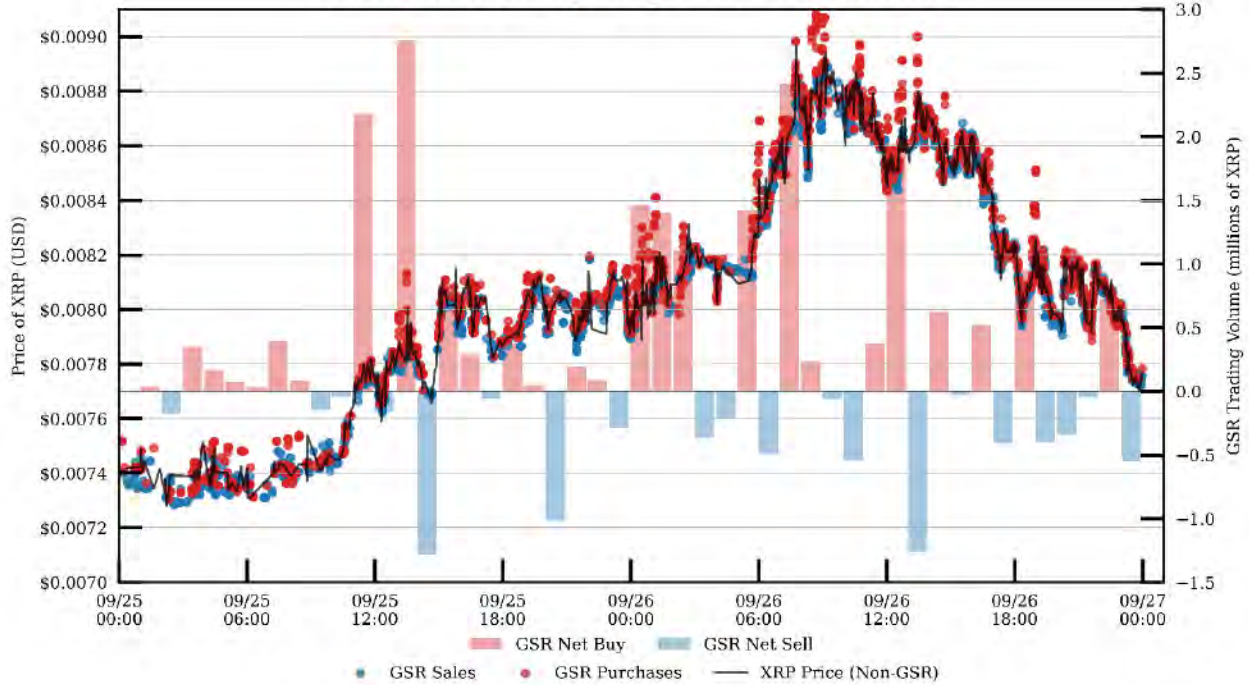
Panel B. GSR Transaction Overpayment

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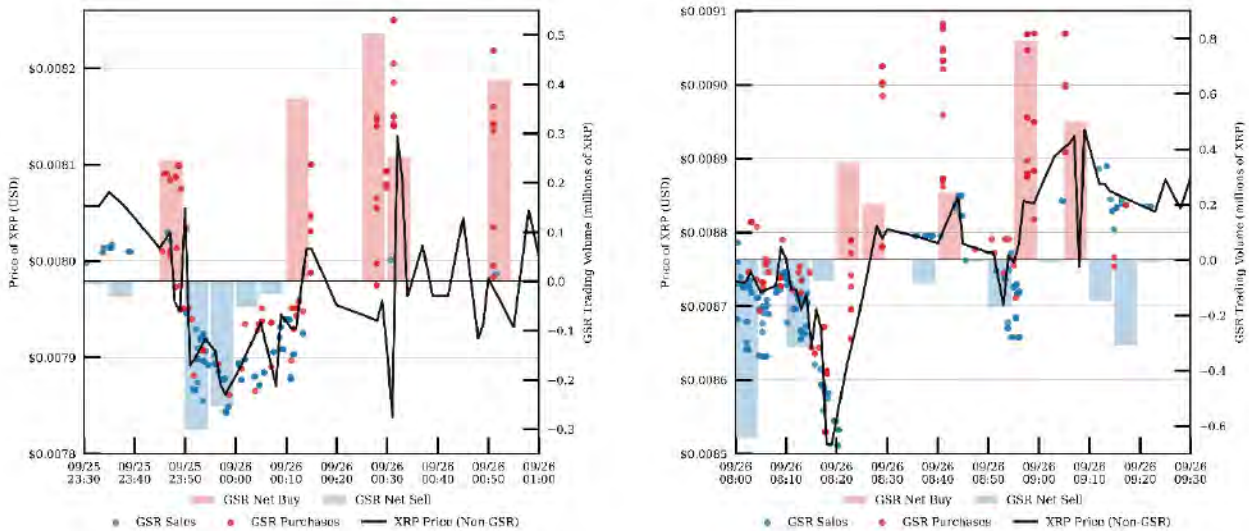
24.   In at least one instance, instructions for GSR to buy XRP on behalf of Ripple that appear aimed at price support came directly from Ripple's top executives, Larsen and Garlinghouse. For example, on April 10, 2016 Garlinghouse wrote to Larsen, "Given the sell off this weekend – I think we should halt the sales entirely tomorrow and Tuesday – instead purchase $20k each day."[17] After Larsen replied, 'Let's try it,"[18] Ripple executives passed on the directives to GSR to buy XRP, who confirmed with an email the next day that it had followed Ripple's instructions and "reversed bot 2.t to net-buy 5% of previous 24 hour trading volume."[19] As seen in Figure 4, at the direction of Ripple, GSR reversed its programmatic sales after the price of XRP continues to decline. Instead of net selling, XRP began net buying around 9:00am UTC.

Figure 4 – GSR Transactions on April 10 and 11, 2016.
This figure plots XRP transactions conducted by GSR on April 10 and 11, 2016. Transactions are sourced from the XRP Ledger. The XRP Price was calculated using volume weighted average price at 1-minute intervals across all trades on the XRP Ledger involving the XRP-USD trading pair. GSR net purchases and net sales are reported as bars in hourly increments. Individual GSR buys and sell prices are plotted using red and blue circles. Data are displayed in UTC time zone.

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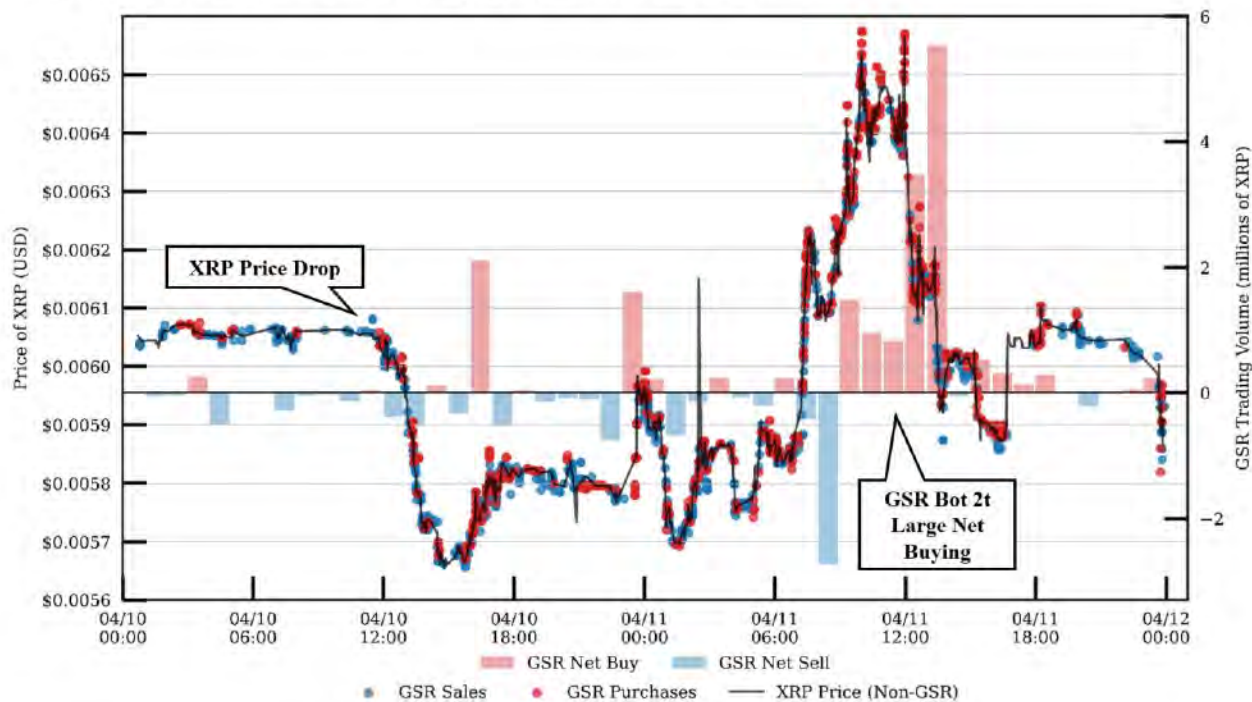
[17] Email from Brad Garlinghouse, April 10, 2016 (Bates RPLI_SEC 0307781).
[18] Email from Chris Larsen, April 10, 2016 (Bates RPLI_SEC 0307781).
[19] Email from ████████, April 11, 2016 (Bates GSR00011984).

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25.   The instances examined above provide specific examples of how Ripple and certain of its executives directed GSR to trade XRP on behalf of Ripple in a way consistent with an attempt to increase or stabilize the price of XRP. Indeed, as discussed above, contemporaneous statements from Ripple employees support the conclusion that Ripple took these steps to increase or stabilize the price of XRP. GSR did in fact trade just as directed. GSR executed trades with the stated motive of preventing the price of XRP from going down and moving the price of XRP upward when it was directed to by Ripple and its executives. GSR also seems to have been at least partially successful in its targeted efforts in these directed cases as the price of XRP generally increased or stabilized in the short term at the prices GSR set.

V.   LARSEN COORDINATED WITH GSR TO BUY XRP WITH HIS PERSONAL FUNDS IN A MANNER CONSISTENT WITH POSITIVELY INFLUENCING XRP PRICES

26.   In addition to instances where Ripple directed GSR to trade XRP in a manner consistent with positively influencing XRP prices, there are also instances where Larsen himself directed GSR to trade his personal holdings in a similar manner. For example, on February 18, 2017, Larsen emailed GSR, requesting "on my bot4, could you start buying as long as we're below 0.006 usd.bitstamp."[20] As covered in the next Section VII.A, GSR provided programmatic sales for Larsen's personal XRP holdings and "4t" was the name of one the trading algorithms, referred to by GSR as "bots," that conducted trades on behalf of Larsen.[21] Like Ripple, Larsen is a large holder of XRP and stands to financially benefit from higher XRP prices through his personal sales of XRP.

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[20] Exhibit CG-34 (Bates GSR0000104).
[21] GSR00000467A.

27.   Later in 2017, Larsen again used his personal holdings to buy XRP in a manner consistent with an effort to mitigate XRP price declines. On or around June 9, 2017, prices of XRP had declined by nearly 29% since the beginning of the month as shown on Figure 5. On June 11, 2017, Garlinghouse contacted Larsen, noting there had been "decent stability in the price over the past 36 hours."[22] Larsen responded that he personally bought a "total [of] $800k [of XRP] by end [of] weekend" through GSR. In response, Garlinghouse speculated that Larsen's purchases might be the reason for the recent XRP price stability.[23]

28.   Figure 5 plots Larsen's trading activity through GSR on the digital asset platform Poloniex in the XRP/BTC currency pair. In the eight days prior to June 10, Larsen was a large daily seller averaging 357,901 XRP in sales per day. Starting on June 11 and in the subsequent 72 hours, Larsen purchased a net total of 2,623,363 in XRP, or an average of 874,454 XRP per day and nearly 2.5 times more than his daily average of XRP volume in early June. Normally a seller of XRP, Larsen's purchases are consistent with selection of an opportune time to purchase XRP to provide support similar to implementing a price floor to keep the price of XRP from further declining. As can be seen in Figure 5, his buying beginning on June 10 coincided with the price of XRP stabilizing around 0.00009 XRP/BTC, and later reversing its earlier decline.

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[22] 2017.06.11 CL BG chat (Bates GARL_Civil_000877-78)
[23] *ibid.*

Figure 5 – Larsen Selling and Buying Activity in June 2017.
This figure plots XRP transactions conducted by GSR on behalf of Larsen from June 3 to 14, 2017. Transactions are sourced from the digital asset platform Poloniex.[24] The XRP Price, denoted by the black line, was calculated using the XRP-BTC price at 1-minute intervals on Poloniex.[25] Net purchases and net sales are reported as bars in daily increments. Individual GSR buy and sell prices on behalf of Larsen are plotted using red and blue circles. Data are displayed in UTC time zone.
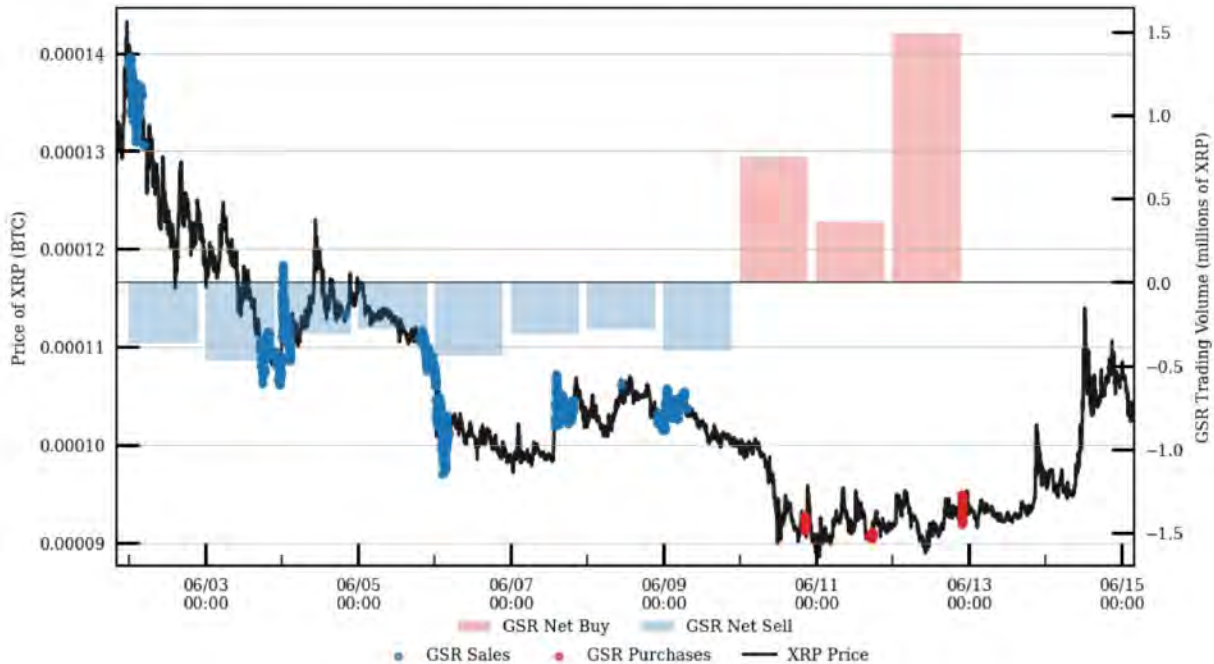
VI. RIPPLE DIRECTED ▮ TO SELL XRP IN A MANNER CONSISTENT WITH SEEKING TO MINIMIZE DOWNWARD PRESSURE ON XRP PRICES

29.   Ripple had an economic incentive to maximize proceeds gained from XRP sales by selling large amounts of XRP while also increasing and maintaining high XRP prices. There is evidence that Ripple executives closely monitored XRP price movements and directed ▮ to halt any sales activity that would further exacerbate sell-offs. This section finds that ▮ selling behavior is consistent with the directives from Ripple, and that from January 2015 to at least September 2019,[26] ▮ appears to carefully time when XRP would be sold so as to minimize the

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[24] Filename: polo_gsr_trades.csv (Bates CIRCLE_00001699).
[25] Historical XRP/BTC trade data at the 1-second interval on Poloniex was sourced from CryptoTick.com.
[26] Detailed daily programmatic sales data for GSR is only available from January 2015 to September 2019.

negative selling impact on the price of XRP. An analysis of ▉▉▉▉ XRP selling activity, together with the selling activity of ▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉ Ripple's other large programmatic XRP sales partner,[27] finds that they sold more XRP following price increases.

30. As per ▉▉▉▉▉▉▉, a member of Ripple's XRP Markets team which coordinated XRP sales, "Overall, our sales through GSR are done with sophisticated algorithms that 'drip' into the market, so the price impact should be marginal."[28] Specifically, Ripple set "target sell rates"[29] for XRP, which established a maximum amount of XRP it could sell as a percentage of the daily volume of XRP traded. Also, during times when the price of XRP experienced "downward pressure," Ripple executives including Bret Allenbach (then-CFO) and Garlinghouse discussed lowering the target sell rates, e.g., from 3.5% to 1.5%,[30] or even halting XRP sales in order to positively "impact the price."[31]

31. In April 2016, executives from GSR discussed trading strategies with Ripple noting that GSR "[has] analyzed the order books since Jan 1, 2015 in order to determine which days of the week there is more liquidity. We analyze the bid side of the order book in order to determine which days there is most demand for XRP" and that "this more dynamic strategy *may help maintain XRP prices higher* than the current strategy [emphasis added]."[32] It was economically rational for Ripple to pursue these trading strategies because they could help maximize the amount of money Ripple could raise through its sales of XRP, as long as Ripple did not sell so much XRP

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[27] Ripple also employed the services of ▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉, but it sold less than 2% of Ripple's total XRP sales between November 2014 to September 2019. Source: XRP Programmatic Sales Reporting FY14 to Date v2 (Bates RPLI_SEC 74559).
[28] Email from ▉▉▉▉▉ on April 10, 2016 (Bates RPLI_SEC 0205600).
[29] *ibid*.
[30] Email from Bret Allenbach (CFO) on April 10, 2016 (Bates RPLI_SEC 0205602).
[31] Email from Brad Garlinghouse on April 10, 2016 (Bates RPLI_SEC 0205601).
[32] Email from ▉▉▉▉▉, April 28, 2016 (Bates GSR00012857).

at one given time as to lower its price, since GSR "[has] observed that higher XRP prices result in more money-in and eventually higher volume" and help "distribute more XRP without adversely affecting the price of XRP."[33]

32.   Ripple turned to its programmatic selling partners to implement its XRP selling strategy. Ripple enlisted ▮▮▮ to provide programmatic sales on behalf of Ripple from November 2014 to January 2017 and from June 2017 to at least September 2019.[34] ▮▮▮▮▮▮ provided programmatic sales on behalf of Ripple from September 2017 to at least September 2019.[35] ▮▮▮ develops high frequency trading algorithms, or "bots", that programmatically place sales and purchases for XRP. ▮▮▮ employed a trading bot called bot 2, known at various times as bot 2s, 2t, and 2h, to submit orders programmatically on various trading platforms at the direction of Ripple.[36] For example, between December 2014 to January 2015, comments found in a historical daily sales report (also known as "liquidity extraction report") of bot 2t seem to show ▮▮▮ and Ripple coordinating XRP sales in a manner consistent with stopping or reducing sales to mitigate impact when XRP prices are declining.[37] Figure 6 shows an episode from December 31, 2014 to January 8, 2015 where the price of XRP was declining and includes captions from notes contained in ▮▮▮ liquidity extraction report. As seen in the chart, ▮▮▮ often purposefully stopped selling XRP in an apparent effort to minimize the negative impact on the price of XRP, followed by instructions from Ripple to resume selling at different target sell rates when the prices stabilized.[38]

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[33] *ibid.*
[34] XRP Programmatic Sales Reporting FY14 to Date v2 (Bates RPLI_SEC 74559).
[35] *ibid.*
[36] Bot 2s was active from November 2014 to July 2015. Bot 2t was active from July 2015 to January 2016. Bot 2h was active from June 2016 to at least September 2019. Detailed daily purchases and sales of these bots are sourced from Excel Export - 2014-2016 - 2t - Liquidity extraction report (Bates RPLI_SEC 0679467-467), Excel_Export_2017_OLD_2h_Liquidity_extraction_report (Bates GSR00000101), Excel_Export_2018_2h_Ripple_Liquidity_Extraction_Report (Bates GSR00000102), and Excel_Export_2019_2h_Ripple_Liquidity_Extraction_Report (Bates GSR00000103).
[37] Excel Export - 2014-2016 - 2t - Liquidity extraction report (Bates RPLI_SEC 0679467-467)
[38] Comments are only reported by dates without timestamps in the liquidity extraction reports.

Figure 6 – Net XRP Sales vs. Price of XRP.

This figure plots the net XRP sold by GSR as reported in GSR sales reports (blue bars) and the XRP/USD price (black dashed line). All data are sourced from GSR's Excel Export - 2014-2016 - 2t - Liquidity extraction report (Bates RPLI_SEC 0679467-467). The captions show notes from the "Comments" column on a given day in GSR's liquidity extraction report. The XRP Price, denoted by the black line, was calculated using volume weighted average price at 1-hour intervals across all trades on the XRP ledger involving the XRP-USD trading pair. Vertical gray line signifies 12pm UTC time for each day. As seen in the chart, GSR paused XRP sales when the notes indicate that XRP declined significantly (e.g., ">10%" or ">25"), and subsequently resumed sales upon either receiving specific sales targets or approval from Ripple.[39]
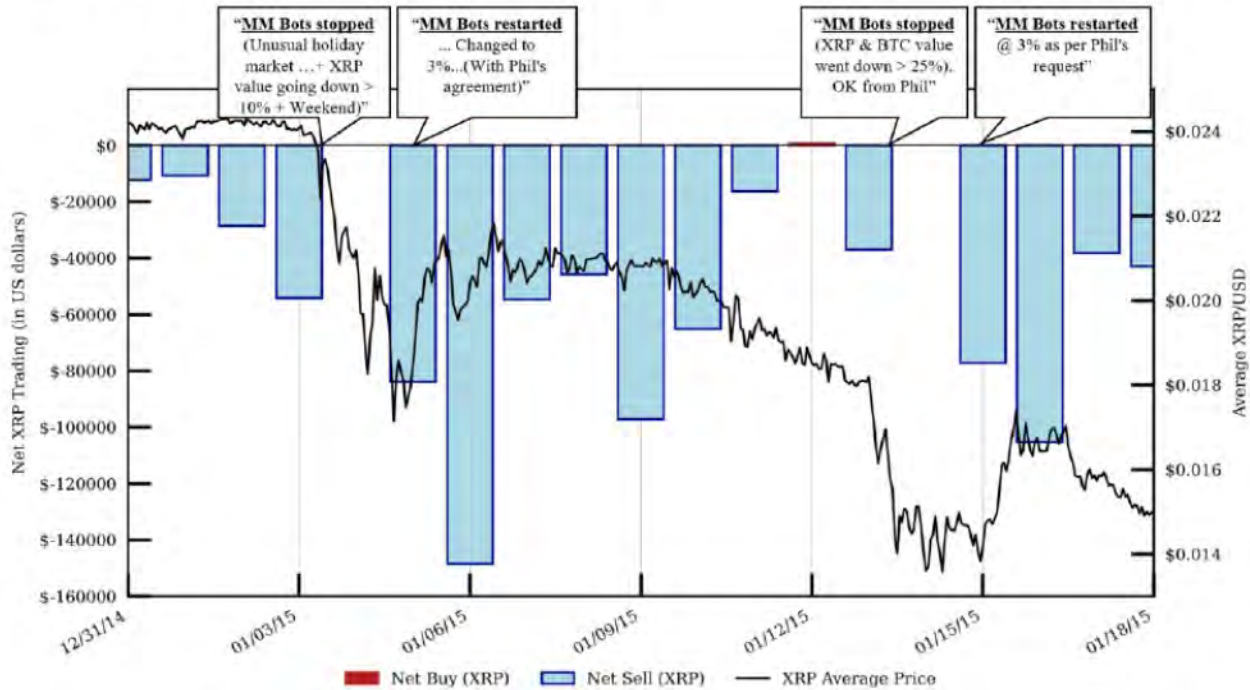
33.   To better understand whether the behavior observed in the example shown in Figure 6 is persistent across a wider time period, I next examine whether Ripple's market makers ▉ and ▉▉▉▉ tend to sell less when prices fall and sell more when prices are stabilized or rising. This selling pattern can be observed by analyzing the daily net buy-sell imbalance of XRP by ▉ and ▉▉▉▉ on behalf of Ripple. Imbalance is defined as the total number of XRP purchased minus total number of XRP sold in a day normalized by the average circulating supply

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[39] Based on an email exchange from December 2014 to January 2015 between GSR and Ripple that discusses XRP sales, it is inferred that the person referenced in GSR's liquidity extraction report as "Phil", who is giving instructions/approval to start/stop XRP buys/sales, is ▉▉▉▉ who at the time was the head of Ripple's XRP Markets Team. Sources: email exchange between ▉▉▉▉ [Ripple], ▉▉▉▉ [Ripple], ▉▉▉▉ [GSR] and ▉▉▉▉ [GSR] (GSR00007297) and Deposition of Patrick Griffin on June 29, 2021, at 75-76.

24

of XRP over the previous 30 days.[40] Imbalance regressions are often used in the finance literature to understand how different groups of traders react to past prices [(Chordia, Roll, Subrahmanyam (2002), Chordia and Subrahmanyam (2004), ███████████████ (2003), (2007)].

34.   A regression analysis of █████ and ████████████ trading activity shows that when the prior day returns of XRP increase, the amount of XRP that ████ and ██████████ sell also increases (Table 1).[41] The previous day return coefficient, β_1, is highly statistically significant and negative—consistent with net selling following a day of positive returns. Lagged 5-day returns and imbalances are added as controls. Based on this analysis of █████ and ████████ █████████ net trading of XRP,[42] I conclude that these sellers, on behalf of Ripple, sold more XRP when the price of XRP was increasing and relatively less when the price was decreasing on the previous day. By selling more XRP the day after XRP prices rise, ████ and ██████████████ on behalf of Ripple, were able to use rising XRP returns and increased demand to mitigate any potential negative effect of its XRP sales and thus keep XRP prices high.

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[40] Daily circulating supply is sourced from https://coinmarketcap.com/currencies/xrp.
[41] This regression follows the same buy-sell imbalance regression methodology as ████████████████████████ (2003).
[42] ████ trading activity is sourced from Excel Export - 2014-2016 - 2t - Liquidity extraction report (Bates RPLI_SEC 0679467-467), Excel_Export_2017_OLD_2h_Liquidity_extraction_report (Bates ███00000101), Excel_Export_2018_2h_Ripple_Liquidity_Extraction_Report (Bates ███00000102), and Excel_Export_2019_2h_Ripple_Liquidity_Extraction_Report (Bates ███00000103). ██████████████ trading activity is sourced from 3.d – Ripple XRP Sales – All Trades (SEC-████████████-E-0047622).

Table 1 – Regression Results of Programmatic Sellers' Trading Activity and XRP Returns.
A regression was estimated using XRP returns and net buy-sell imbalance calculated for each date between January 1, 2015 and September 12, 2019. *Imbalance* is defined as the number of XRP purchased minus number of XRP sold per day by ▮▮ and ▮▮▮▮▮ on behalf of Ripple, normalized by dividing by the average daily circulating supply of XRP over the previous 30 calendar days. Dates where all named parties reported no activity were excluded from analysis. This regression was performed using heteroscedasticity-consistent standard errors (HC3). The coefficient β_1 is signed negative, indicating that as prior day returns increase, the named parties sell more XRP tokens (or buy fewer). For ease of interpretation of coefficient, results are scaled by 100,000. Z-statistics for the regression coefficients are presented in parenthesis. $*p < 0.05$, $**p < 0.01$, $***p < 0.001$.

$$Imbalance_t = \alpha + \sum_{i=1}^{5} \beta_i * Return_{t-i} + \sum_{i=1}^{5} \lambda_i * Imbalance_{t-i} + \varepsilon_{t,R}$$

		XRP Return					Buy-Sell Imbalance					
Dep. Var.	α	β_1	β_2	β_3	β_4	β_5	λ_1	λ_2	λ_3	λ_4	λ_5	Adj. R²
	▮▮ and ▮▮▮▮ Trading on Behalf of Ripple											
$Imbalance_t$	-2.26 (-6.06) ***	-14.96 (-2.98) **	-6.89 (-1.64)	0.02 (0.01)	-2.59 (-0.73)	0.64 (0.02)	0.45 (6.56) ***	0.06 (1.07)	0.03 (0.58)	0.04 (0.80)	0.09 (2.39) *	0.285

35.   The findings from this regression analysis are also consistent with communications between Ripple and GSR where Ripple expressed a desire to sell XRP when the price of XRP increased. In an earlier mentioned email from ▮▮▮▮ (VP of Finance) to GSR where she anticipates the rise in the price of XRP based on a Ripple news announcement, she writes, "We want to keep the bots off for now but expect to make a news announcement on Thursday. If the news has positive impact and price rises, we would like to start selling into that. However, if price is not rising we will want to hold off."[43] This again indicates that Ripple systematically directed sales of XRP in a manner that was consistent with seeking to minimize the negative impact of sales on XRP prices.

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[43] Email from ▮▮▮▮ June 1, 2016 (Bates GSR0004438).

VII.   **LARSEN AND GARLINGHOUSE EMPLOYED GSR TO SELL THEIR XRP IN A MANNER THAT MINIMIZED THE NEGATIVE PRICE IMPACT OF THEIR XRP SALES, AND BLOCKCHAIN ANALYSIS CONFIRMS THAT THEY TRANSFERRED LARGE AMOUNTS OF PERSONAL XRP HOLDINGS TO GSR**

A.   Larsen and Garlinghouse Agreements with GSR

36.   Both Larsen and Garlinghouse entered into "Liquidity Extraction Activity" agreements[44] with GSR and retained GSR to sell XRP. These agreements have a "Market Maintenance" clause that stipulates how GSR is required to sell XRP "in a controlled manner taking care not to de-stabilize the global Tokens [XRP] market."[45] The earliest agreement between Larsen and GSR also adds specific language related to de-stabilization, which is that XRP sales should not "cause a ten (10) percent decline in the weighted average interday price of XRP."[46] That agreement also limited daily sales to "five (5) percent of total network XRP trading volume in the twenty-four (24) hour period immediately preceding any sale of [Larsen's] XRP."[47] These contract provisions suggest that Larsen and Garlinghouse employed the services of GSR to minimize the negative impact their XRP sales could have on XRP prices.

B.   Blockchain Tracing of Funds Leaving Larsen's Addresses

37.   Based on analysis of the XRP blockchain, I conclude that Larsen made significant use of GSR's liquidity extraction services described in the previous Section VII.A to sell his XRP. Larsen directly transferred 1.5 billion XRP ($495 million) to GSR out of a total of 4.0 billion XRP

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[44] 2015 GSR Larsen agreement (Bates LARSEN-SEC-LIT-00004869-70); GSR Loan and Purchase Agreement_Chris Larsen Trust (final) (Bates GSR00008433-442); and 2017 GSR Garlinghouse Liquidity Extraction agreement (Bates GSR00000673-80).
[45] *ibid.*
[46] 2015 GSR Larsen agreement (Bates LARSEN-SEC-LIT-00004869-70).
[47]*ibid.*

($1.1 billion) transferred out of his identified addresses.[48] This can be seen in Figure 7 which shows the cumulative amount of XRP transferred out of Larsen's identified addresses over time, including direct transfers to GSR. Other destinations receiving direct transfers of XRP from Larsen's identified addresses include digital asset platforms, other entities such as Coil (a startup where Larsen is a board member), or unidentified addresses. Unidentified addresses could be "over-the-counter" (OTC) trading counterparties or friends of Larsen to whom he sold XRP, as mentioned in his deposition.[49] Additional detail regarding where XRP flowed from Larsen's identified accounts as well as the methodology for the blockchain tracing can be found in Appendix D and Appendix E.

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[48] The US dollar equivalent shown is the value of the XRP on the date it first left one of Larsen's identified addresses. The XRP-USD exchange rate is obtained from CoinMarketCap. Larsen's identified addresses comprise of a list of addresses produced to the SEC by Larsen (Bates LARSEN_NAT 00000102).
[49] Chris Larsen deposition at 80-83. September 14, 2021.

Figure 7 – Cumulative Value of Direct Transfers Out of Larsen's Identified XRP Addresses
This figure plots the cumulative value, in US dollars, of the XRP that was transferred out of Larsen's identified addresses. The amount that was directly transferred to GSR is shaded in blue. The US dollar value is based on the XRP-USD exchange rate, obtained from CoinMarketCap, on the day that the XRP was transferred out of Larsen's identified addresses. Note: Larsen began transferring XRP out of his identified addresses beginning September 2013, but the amounts cannot be seen on the chart because of the scale.
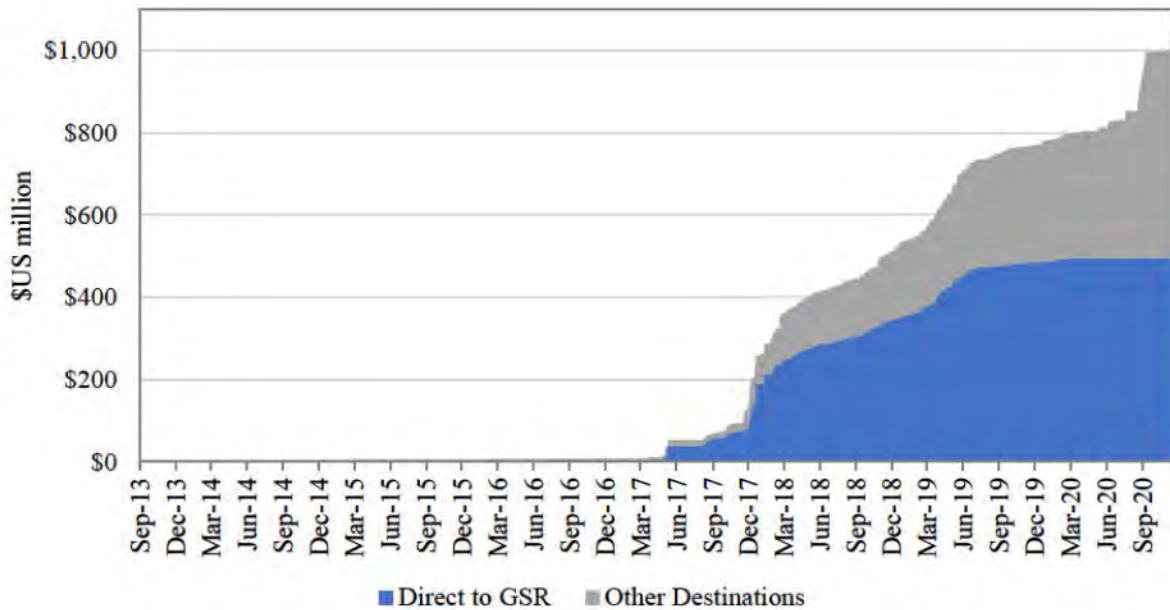
38.   The previous analysis is conservative because it looks only at direct transactions from Larsen to GSR. Larsen could have moved funds between blockchain addresses over multiple transfers, or 'hops'. When analyzing blockchain transactions over multiple hops, the certainty that the initial owner of funds still controls them decreases as the number of hops increases. Additional XRP moved from Larsen's identified addresses to GSR addresses over multiple hops. If one traces these out as far as seven hops, the total amount that Larsen transferred to GSR could be as high as 1.9 billion XRP ($599 million). As shown in Table 2, Larsen sent at least 1.50 billion XRP to GSR via one hop, but he could have sent up to 1.90 billion XRP to GSR over up to four hops, or 1.93 billion if tracing up to seven hops. It is worth noting that Larsen could have sold or gifted

XRP to entities or individuals who subsequently transferred the XRP to GSR; this could be a reason why XRP reached GSR from Larsen's identified wallets over a series of up to seven hops.

Table 2 – Cumulative Value of XRP Sent from Larsen to GSR Over up to Seven Hops
This table shows the cumulative amount of XRP sent to GSR from Larsen's identified addresses, given the number of transfers, as well as the USD equivalent on the date XRP left the identified addresses. For example, 1,496 million XRP was directly sent to GSR over 1 hop and 1,926 million was traced to GSR over up to seven hops. There is a small amount of XRP traced to GSR over 8 hops that is not shown because of rounding; blockchain analysis did not identify additional XRP sent to GSR beyond 8 hops.

Number of Hops	Cumulative XRP Transferred to GSR (million)	USD Equivalent (million)
1	1,496	495
Up to 2	1,519	499
Up to 3	1,860	568
Up to 4	1,901	590
Up to 5	1,906	592
Up to 6	1,916	596
Up to 7	1,926	599

Values rounded to the nearest 1 million XRP and 1 million USD.

C. Blockchain Tracing of Funds Leaving Garlinghouse's Addresses

39.   Similar to the Larsen analysis above, I also conclude that Garlinghouse made significant use of GSR's liquidity extraction services to sell his XRP. Garlinghouse directly transferred 167 million XRP ($104 million) to GSR out of a total of 377 million XRP ($186 million) transferred out of his identified addresses.[50] This can be seen in Figure 8 which shows the cumulative amount of XRP transferred out of Garlinghouse's identified addresses over time, including direct transfers to GSR. Other destinations receiving direct transfers of XRP from Garlinghouse identified addresses include digital asset platforms, Ripple, or unidentified addresses. Additional detail regarding where XRP flowed from Garlinghouse's identified accounts

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[50] The US dollar equivalent shown is the value of the XRP on the date it first left one of Larsen's identified addresses. The XRP-USD exchange rate is obtained from CoinMarketCap. Garlinghouse's identified addresses comprise of a list of XRP addresses produced to the SEC by Garlinghouse [Garlinghouse Subpoena Response Spreadsheet, "Request 4" Tab (Bates GARL00000001-1) and Garlinghouse XRP Award Addresses (Bates GARL00000002-9)].

as well as the methodology for the blockchain tracing can be found in Appendix D and Appendix

E.

Figure 8 – Cumulative Value of Direct Transfers Out of Garlinghouse's Identified XRP Addresses
This figure plots the cumulative value, in US dollars, of the XRP that was transferred out of Garlinghouse's identified addresses. The amount that was directly transferred to GSR is shaded in blue. The US dollar value is based on the XRP-USD exchange rate, obtained from CoinMarketCap, on the day that the XRP was transferred out of Garlinghouse's identified addresses.
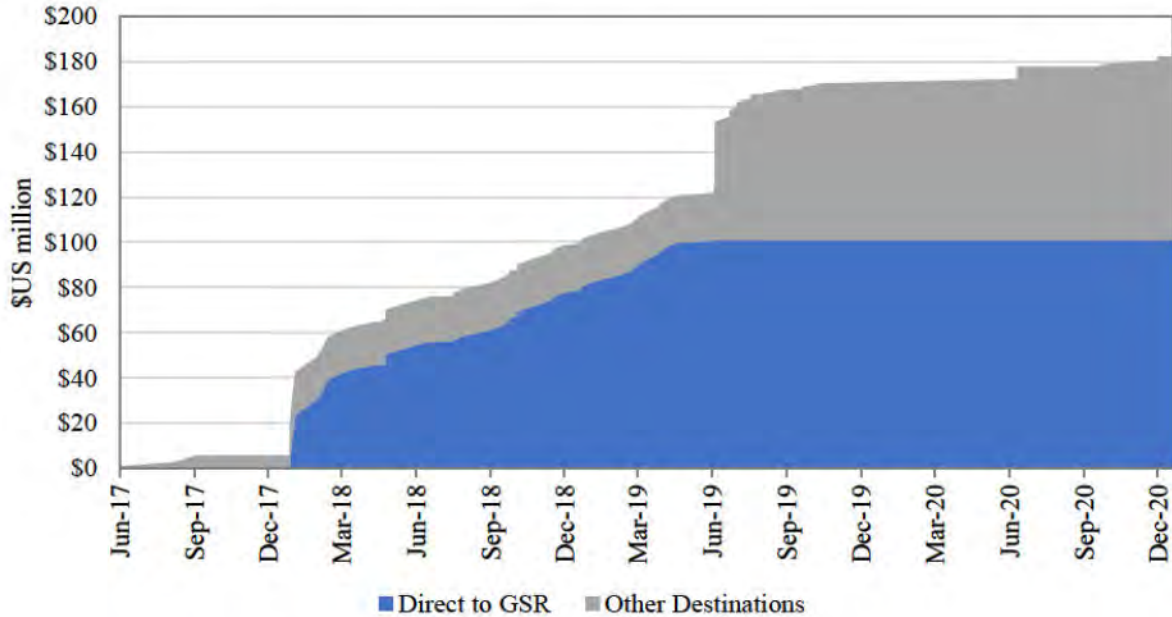
40.   The total amount that Garlinghouse transferred to GSR could be as high as 277

billion XRP ($139 million)[51] because additional XRP moved from Garlinghouse's identified

addresses to GSR addresses through up to two hops, as shown in Table 3. Unlike with Larsen's

accounts, blockchain analysis does not identify XRP going to GSR beyond two hops.

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[51] The US dollar equivalent shown is the value of the XRP on the date it first left one of Larsen's identified addresses. The XRP-USD exchange rate is obtained from CoinMarketCap.

Table 3 – Cumulative Value of XRP Sent from Garlinghouse to GSR Over up to Two Hops
This table shows the cumulative amount of XRP sent to GSR from Garlinghouse's identified addresses, given the number of hops, as well as the USD equivalent on the date XRP left the identified addresses. The blockchain analysis did not identify additional XRP sent to GSR beyond two hops.

Number of Hops	Cumulative XRP Transferred to GSR (million)	USD Equivalent (million)
1	167	104
Up to 2	277	139

Values rounded to the nearest 1 million XRP and 1 million USD.

VIII. RIPPLE ENTERED INTO PARTNERSHIP AND OTC AGREEMENTS WHICH INCLUDED TERMS THAT WOULD MINIMIZE DOWNWARD PRESSURE ON XRP PRICES

41.   Lock-up provisions are common on Initial Public Offerings (IPOs) of shares, typically last 180 days, and are a means to prohibit or slow insiders, venture capital, and other pre-IPO shareholders from selling shares [Field and Hanka (2001)]. The motivation behind these restrictions is to limit the supply of saleable shares or sellers and thus reduce the downward pressure on shares prices. Similar to these IPO practices, Ripple implemented lock-up periods and selling restrictions on the resale of XRP. By restricting the amount these purchasers and partners could resell on the open market for XRP, Ripple limited the supply of XRP tokens, thereby minimizing downward pressure on the price of XRP as I describe in more detail below.

42.   Ripple made use of lock-up periods and selling restrictions in its institutional sales. For example, in October 2014 when ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮,"[52] purchased ▮▮▮▮▮▮▮ worth of XRP, it was subject to a lock-up period of ▮▮▮▮▮▮.[53] When Ripple sold ▮▮▮▮ worth of XRP in June 2016 to ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮,"[54] Ripple required a ▮▮▮▮▮ lock-up period and a subsequent ▮▮▮▮

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[52] https://www.linkedin.com/company/▮▮▮▮▮▮▮/about.
[53] XRP II Master Agreement – ▮▮▮▮ 11.29.2014 (Bates RPLI_SEC 0259585-593).
[54] https://fortune.com▮▮▮▮▮▮▮▮▮▮▮▮

period where XRP sales were limited to ▮ of the average daily volume.[55] Subsequent XRP bulk

purchase agreements, for example in 2018 to ▮▮▮, an investment management firm,

also included a "Lockup Period" and a "Daily Sale Limitation."[56]

     43.   When distributing XRP as compensation or incentives to service providers and

partners, Ripple also made use of lock-up and selling restrictions. In its 2017 agreement with ▮

▮, which also helped Ripple sell XRP on the open markets, XRP payments from Ripple to

▮ were subject to a lock-up period of ▮, and sales after this lock-up period

were limited "to no more than ▮ of daily XRP notional value trading volume on all venues

where XRP is listed."[57] In 2019, Ripple entered into an agreement with ▮ to develop a

digital asset wallet and provided an "XRP Incentive" of ▮.[58] In that agreement, ▮

subsequent selling of this XRP incentive could not exceed ▮ of the three-day average total

trade volume of XRP.[59] Overall, these lock-up provisions and sales restrictions are consistent with

Ripple taking steps to protect the price of XRP.

IX.   RIPPLE HAD STRONG INCENTIVES TO MAXIMIZE XRP PRICES

A. Funding Operational Costs

     44.   Revenue from XRP sales comprise Ripple's key source of revenue. As seen in

Figure 9, from 2013 to 2020, in each year revenue from XRP sales accounted for over 90% of

Ripple's total revenue, and in some years was greater than 99% of total revenue.

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[55] 2016-06-09 ▮ summary of XRP purchase, (Bates RPLI_SEC 0000626-631) and 2016-06-23 ▮ summary of XRP purchase, (Bates RPLI_SEC 0000636-641).
[56] 2018-02-22 ▮ Purchase agreement, (Bates RPLI_SEC 0233130-148).
[57] 2017-02-14 ▮ MM and programmatic market activity agreement, (Bates RPLI_SEC 0899145-151).
[58] 2019-05-24 ▮ Incentive agreement, (Bates RPLI_SEC 0298094-102).
[59] *ibid*.

Figure 9 – Ripple Revenue Stream Proportions, 2013-2020.
This figure displays Ripple's revenue streams as a proportion of total revenue from 2013 to 2020. The bars for each year aggregate the XRP sales, XRP non-monetary transactions,[60] service and software revenue to show the total revenue. Data are sourced from the income statements from Ripple audited annual financial statements.[61]
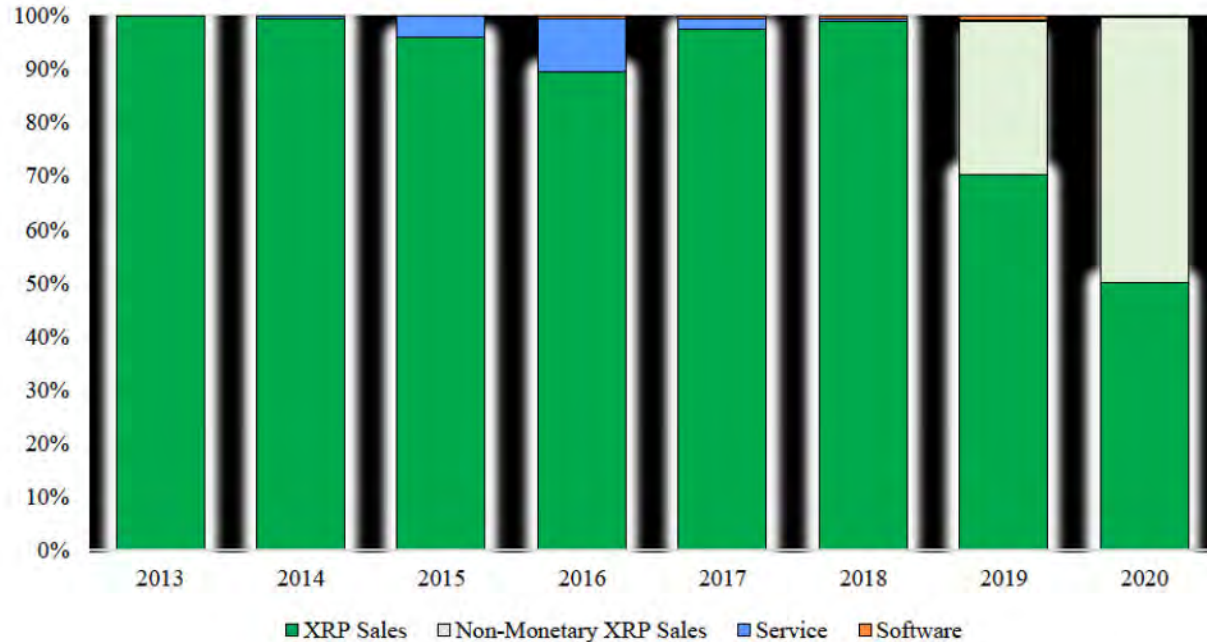
45.   Without revenue from XRP sales, Ripple would have faced enormous operating deficits. This is shown in Figure 10, which plots Ripple's operating expenses (orange line) against Ripple's revenue excluding revenue from XRP (blue line). Without revenue from XRP sales, Ripple would have operated with significant annual operating deficits (signified by the gap

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[60] Ripple's auditors define non-monetary XRP transactions as follows: "Non-monetary XRP transactions revenue consists of transactions where the Company delivers XRP to customers for consideration other than cash or other monetary consideration and is recognized upon delivery of XRP. Revenue for non-monetary XRP transactions is determined based on the value of consideration expected to be received from the customer. This is typically the value of the XRP delivered to the customer." Consolidated Financial Statements-as of December 31, 2019 (Bates RPLI_SEC 0301113-1160).
[61] Ripple Financial Statements 2013 and 2014 - with notes (Bates RPLI_SEC 0090938-962),
Ripple - 2015 FS (Bates RPLI_SEC 0426161-187)
Ripple Financial Statements 2016 and 2017 OCR (Bates NY-9875_T_00017816-854)
Ripple Financial Statements 2017 and 2018 OCR (Bates RPLI_SEC 0267872-911)
Consolidated Financial Statements-as of December 31, 2019 (Bates RPLI_SEC 0301113-1160)
2020 and 2019 Audited Financial Statements OCR (Bates RPLI_SEC 0920429-475)

between orange and blue lines) ranging from ▮▮▮▮▮▮▮▮▮▮ per year from 2017 to 2020.

Figure 10 – Ripple Total Non-XRP Revenue vs. Total Operating Expenses, 2013-2020.
This figure plots Ripple's total operating expenses (orange line) against total Ripple revenue excluding revenue from XRP sales (blue line). Without revenue from selling XRP, Ripple would have operated with large annual operating deficits ranging from ▮▮▮▮▮▮▮ from 2017 to 2020, which can be seen as the gap between the orange and blue lines. Data comes from the income statements from Ripple audited annual financial statements.
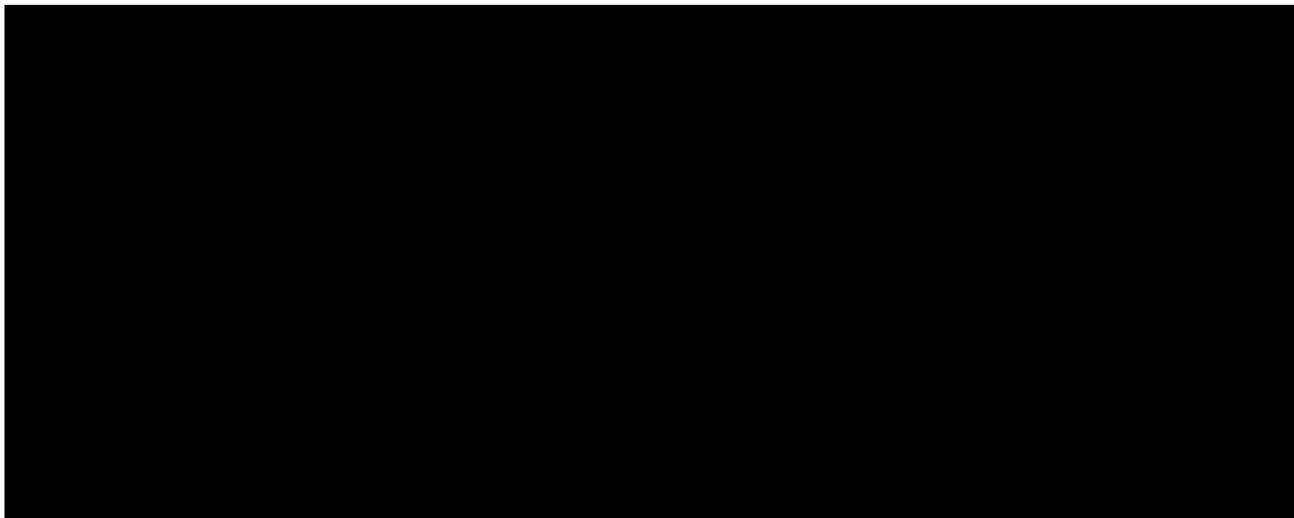

46.   From 2013 to 2020, Ripple has also received multiple rounds of outside capital funding, totaling $284 million, net of issuance fees.[62] While this funding has helped to cover Ripple's operational deficits to a certain extent, as seen in Figure 11, starting in 2017 Ripple has been dependent on XRP sales to fund its operations. Had Ripple not sold XRP to fund its operations, it would have had an annual funding gap of ▮▮▮▮▮▮ in 2017 which would have grown to nearly ▮▮▮▮▮▮ by the end of 2020, as denoted by the red line in Figure 11. Without additional funding Ripple could not have stayed in operation, given its cost structure, without its sales of XRP. Indeed, an early Ripple pitch deck stated that part of Ripple's business model

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[62] Value calculated from "Cash flows from financing activities" in the cash flow statements from Ripple audited annual financial statements.

included keeping a significant portion of XRP and "occasionally" selling XRP "to fund itself."[63] However, since 2017 Ripple has been dependent on selling XRP to fund its operations.
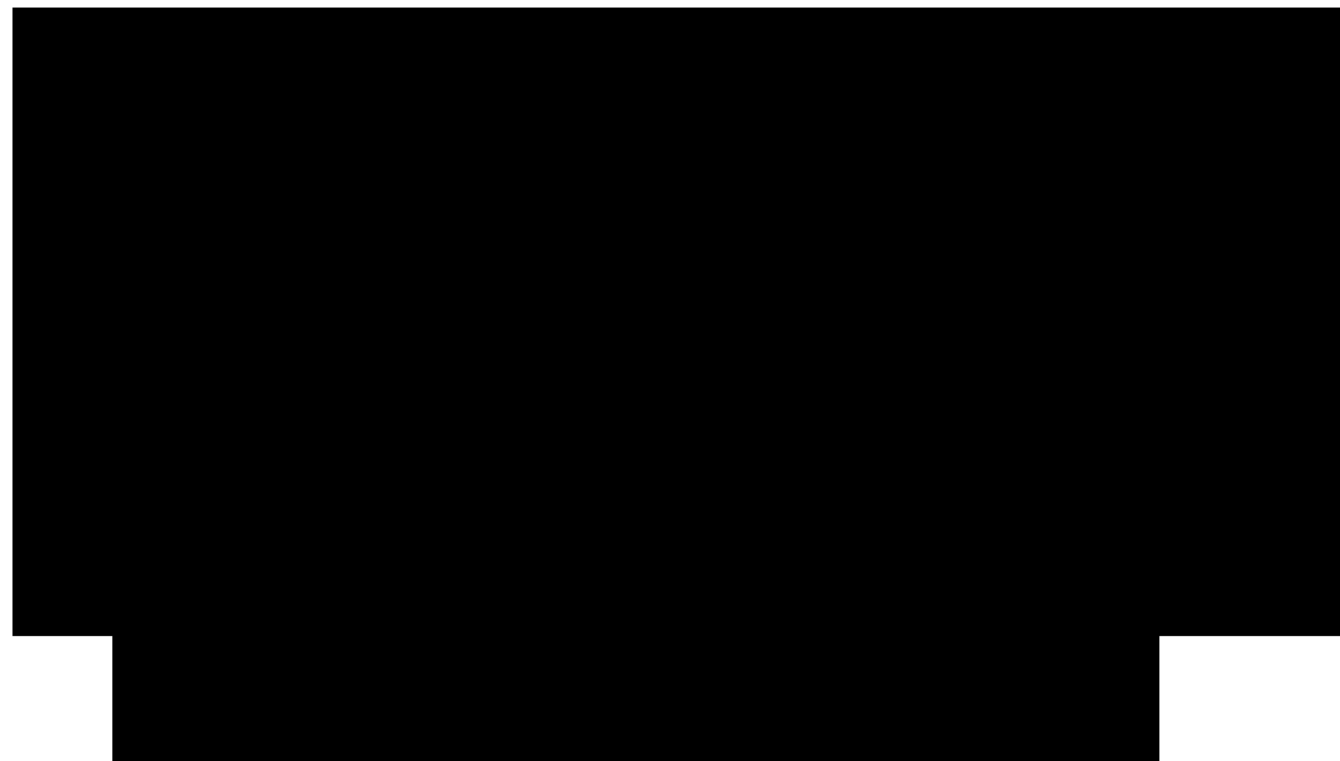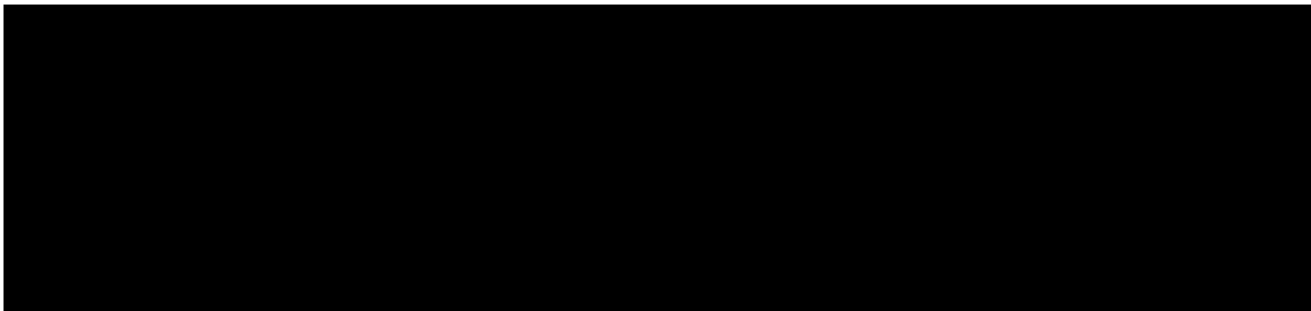
B. Funding for Shares Repurchases

47.   Sales of XRP have not only provided critical funding for Ripple's operations but have also enabled Ripple to undertake private share repurchases that have rewarded existing shareholders, who are likely mostly comprised of early investors, founders, and employees of

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[63] Ripple Financial Services, July 2013 (Bates RPLI_SEC 0088287).

Ripple.[64] Ripple has repurchased a total of ████████ in shares previously issued to its early investors and founders (Figure 12). Without XRP sales, Ripple would have had a significant cash deficit (denoted by the red line in Figure 11 above) and would not have had the cash to pay for shares repurchases. However, with XRP sales, Ripple has been able to fund shares repurchases that have rewarded early investors, founders or employees handsomely, as Ripple's private valuation apparently skyrocketed from $100 million in 2015 to $10 billion in 2020—a hundred-fold increase.[65]

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[64] It is possible that early investors, founders or employees may have sold their shares in private markets to other entities or individuals.

[65] Ripple was valued at $100 million after its funding round in 2015 (https://www.wsj.com/articles/BL-DGB-40105), and later valued at $10 billion after its funding round in 2020 (https://www.cnbc.com/2019/12/20/ripple-creator-of-xrp-crypotocurrency-is-now-valued-at-10-billion.html). This valuation does not include the holdings of XRP held in escrow or circulating supply of XRP in market held by public hands.

[66] Ripple Financial Statements 2013 and 2014 - with notes (Bates RPLI_SEC 0090938-962),
Ripple - 2015 FS (Bates RPLI_SEC 0426161-187)
Ripple Financial Statements 2016 and 2017 OCR (Bates NY-9875_T_00017816-854)
Ripple Financial Statements 2017 and 2018 OCR (Bates RPLI_SEC 0267872-911)
Consolidated Financial Statements-as of December 31, 2019 (Bates RPLI_SEC 0301113-1160)
2020 and 2019 Audited Financial Statements OCR (Bates RPLI_SEC 0920429-475)

C. Funding from Outside Investors vs. Through XRP Sales

48.   As established in the previous section, Ripple needed to sell XRP because outside sources of funding, which include venture and institutional investors, and sales of non-XRP related software and services[67] did not provide enough capital to fund its annual operational costs. Internally at Ripple, there was discussion that not being completely dependent on outside institutional investors was beneficial. According to David Schwartz (CTO), Ripple's revenue stream from XRP sales provided an important source of funding that would enable Ripple to be less dependent on outside funding. Specifically, he argues, "XRP price matters because it's a current and future revenue stream, securing our business and maintaining a level of independence of the company from outside funding. The value of the company's XRP holdings is significant and we have an obligation to be sensible stewards."[68]

49.   When companies raise funds by issuing equity to outside investors, their management loses a portion of control over the company since their share of equity is diluted with each round of new investments. This is the case when Ripple received venture capital funding from its outside investors.[69] However, the sales of XRP are not subject to a reduction of shareholder voting rights for executives because holders of XRP do not have any voting rights. This provided a further incentive to raise more funds through selling XRP and taking actions to increase its price. In other words, by selling XRP instead of equity, Ripple could enjoy the benefits of capital raising through sale of XRP, without the costs typically associated with such sales. Those costs typically

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[67] https://www.crunchbase.com/organization/ripple-labs/company_financials.

[68] David Schwartz Deposition Exhibit 84 (RPLI_SEC 0576405). In his deposition (pp 407-408), Schwartz states that his document, "Why Should We Care About XRP Right Now?" was imported into the referenced document under discussion. The quotation comes from the top of the "Why Should We Care About XRP Right Now?" section.

[69] For example, Ripple's Series A funding round provided voting rights to investors and entitled them to appoint a director to Ripple's Board of Directors, as seen in Ripple Labs, Inc. Consolidated Financial Statements As of December 31, 2014 At 16 (Bates RPLI_SEC 0090955).

include giving up control of its operations and the costs and scrutiny of complying with regular investor disclosures of financial records.

50.   Because sales of XRP helped to fund its operations with less strings attached relative to raising equity, Ripple had the incentive to increase both its sales of XRP and the price of XRP.

D. Executive Compensation

51.   Another incentive for Ripple and its executives to actively manage and increase the price of XRP is that Ripple executives and employees owned XRP and received compensation and bonuses in XRP. As detailed in Section VII, both Larsen and Garlinghouse received and subsequently transferred large amounts of XRP, valued at $1.1 billion and $186 million respectively. The average CEO of the top 350 publicly traded company makes approximately $9.5 million per year through shares and shares options awards.[70] In contrast, Larsen and Garlinghouse on average transferred $120 million per year out of their addresses,[71] more than 12 times the average annual executive shares and shares option awards at the top 350 publicly traded companies. Yet, Ripple's non-XRP revenue, as shown in Figure 10, is trivial compared to the annual revenue of these companies.

52.   Other Ripple executives also received compensation in XRP. For example, a Ripple General Manager was entitled to and received annual bonuses from Ripple of one million XRP.[72] This suggests that the team of Ripple managers and executives who received XRP, including

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[70] https://www.epi.org/publication/ceo-compensation-2018.
[71] Average is based on every full year that Larsen and Garlinghouse transferred funds out of their identified addresses, i.e., 2014-2020 for Larsen and 2018-2020 for Garlinghouse.
[72] Asheesh Birla deposition at 55. June 23, 2021.

Larsen and Garlinghouse, were incentivized to manage and increase the price of XRP and minimize downward pressure on the price of XRP.

E. XRP vs. Stock Similarities

53.   Based on my expertise in investments, IPOs,[73] and financial markets, I find that Ripple used XRP in a similar manner as companies use stock. Although Ripple had publicly stated plans to develop uses for XRP beyond the ways that a company uses stock (e.g., to potentially one day serve as a bridge currency for banking transactions), Ripple ultimately primarily used XRP to fund operations and enrich its executives. Companies sell shares either through initial public offerings ("IPOs") or seasoned equity offerings ("SEOs") to fund operations and new investments [Ritter and Welch (2002) and DeAnglo, DeAngelo, and Stulz (2010)]. IPOs typically have lock-up provisions on these shares to limit supply and selling pressure. As previously described, Ripple took actions to lock-up XRP tokens to limit supply and selling pressure.

54.   Companies also use equity or options on equity as a means to deliver substantial compensation to company executives and top managers [Murphy (2013)]. Ripple used and managed XRP in an almost identical capacity to pay Ripple executives and founders, as well as other key employees who sold significant amounts of XRP over time. Ripple employees who held XRP were incentivized to work together to increase the price of XRP and minimize downward pressure on the price of XRP in the same way that managers and executives holding company shares work to increase the share value of their company. Companies also use funding from IPOs and SEOs to fund new operations, and Ripple similarly funded the vast majority of its operations through XRP sales. Overall, in the way that XRP funded operations and incentivized executives

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[73] See ███████████████████ (2007) for IPOs. Expertise in areas of investments and financial markets are outlined in many papers and teaching expertise in Appendix A.

40

and managers through XRP sales, Ripple used XRP in an extremely similar capacity as firms use publicly traded equity.

55.   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.

56.   Another more peculiar Ripple practice not typically present with registered companies is Ripple's close relationship with market makers, wherein Ripple directed them to trade not only in such a way as to sell XRP to raise revenue, but also to buy XRP both to provide a price floor and to push the price upward. Companies may enter repurchase agreements to purchase shares in aftermarket trading, but not in a manner where they actively seek to set price floors at certain prices or push prices upward during news announcements. In other words, publicly traded companies are not allowed to use trading strategies to influence their stock price, but Ripple employed multiple market makers to manage the trading aspects in XRP. The increasing and high price of XRP over the period enabled Ripple executives to profit greatly.

Executed October 13, 2021

██████████████████████

██████ Ph.D.

X.   **APPENDIX A: CURRICULUM VITAE**

███████████████████████████████

███████████████████████████

████████████████████████████████████

ACADEMIC APPOINTMENTS

Sept 2015 – Present	████████████████
Sept 2012 – Aug 2015	████████████████████
Spring 2013	██████████ at ████████
Sept 2009 – Aug 2012	████████████████████
July 2008 – Feb 2009	██████████ at ████████
Jan 2004 – Aug 2009	██████████████████
Jan 2005 – May 2005	████████████████
Jan 2003 – Dec 2003	████████ at ██████████
May 2003 – Jul 2003	████████████████
Aug 1997 – May 2003	████████████████

RESEARCH INTERESTS

Cryptocurrencies, Market Manipulation, Conflicts of Interest, CDOs, MBS, Credit Ratings, International Finance, Insider Trading, Institutional and Individual Investors, Real Estate, Rational and Behavioral Pricing, Hedge Funds

PUBLISHED OR FORTHCOMING ARTICLES

47

London School of Economics, Texas Christian University,

51

XI.   APPENDIX B: RECENT TESTIMONY AND COURT-FILED EXPERT REPORTS

Testimony in the last four years and court-filed expert reports

Case Name: ███████████████████████████

Case No.:   ████████████████ United States District Court, Eastern District of
Arkansas, Central Division)

Date: ████████████████████████████████

Case Name: ████████████████████████

Case No.:   ██████████████ (United States District Court, Western District of
Louisiana, Shreveport Division)

Date: ████████████

53

XII.   APPENDIX C: LIST OF DOCUMENTS RELIED UPON

2015 ███ Larsen agreement, LARSEN-SEC-LIT-00004869-70.

2016-06-09 ████ summary of XRP purchase, RPLI_SEC 0000626-631.

2016-06-23 ████ summary of XRP purchase, RPLI_SEC 0000636-641.

2017 ███ Garlinghouse Liquidity Extraction agreement, ███ 00000673-80.

2017-02-14 █████ MM and programmatic market activity agreement, RPLI_SEC 0899145-151.

2017-05-25 ███ Programmatic Market Activity Agreement, ███ 00017429.

2017.06.11 CL BG chat, GARL_Civil_000877-78.

2018-02-22 ██████ Purchase agreement, RPLI_SEC 0233130-148.

2018-03-02 ███ amended programmatic market maker agreement, ███ 00018580.

2019-05-24 ████ Incentive agreement, RPLI_SEC 0298094-102.

2019-09-05 ███ Xrapid master agreement, ███ 0000098.

2020 and 2019 Audited Financial Statements OCR, RPLI_SEC 0920429-475.

XRP Ledger Foundation. (Accessed on September 29, 2021). https://xrpl.org/accounts.html#creating-accounts.

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Asheesh Birla deposition at 55, June 23, 2021.

Browne, Ryan. Ripple, which uses cryptocurrency for cross-border payments, is now valued at $10 billion. (Accessed October 4, 2021). CNBC. https://www.cnbc.com/2019/12/20/ripple-creator-of-xrp-crypotocurrency-is-now-valued-at-10- billion.html

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Casey, Michael J. and Chernova, Yuliya. Digital-Payments Company Ripple Labs Is Finalizing a $30 Million Funding Round. (Accessed October 4, 2021). The Wall Street Journal. https://www.wsj.com/articles/BL-DGB-40105.

Chordia, T., Roll, R., and Subrahmanyam, A. (2002). Order imbalance, liquidity, and market returns. Journal of Financial Economics, 2002, vol. 65, issue 1, 111-130.

Chordia, Tarun and Subrahmanyam, Avanidhar (2004). Order Imbalance and individual stock returns: Theory and evidence. Journal of Financial Economics, 2004, vol. 72, issue 3, 485-518.

Coil. Ripple's Xpring Makes 1 Billion XRP Grant to Drive XRP Adoption and Advance Coil's Monetized Platform for Creators. (Accessed on October 2, 2021). PR Newswire. https://www.prnewswire.com/news-releases/ripples-xpring-makes-1-billion-xrp-grant-to-drive- xrp-adoption-and-advance-coils-monetized-platform-for-creators-300902194.html

Consolidated Financial Statements-as of December 31, 2019, RPLI_SEC 0301113-1160.

██.

David Schwartz Deposition Exhibit 84, RPLI_SEC 0576405.

DeAngelo, H., DeAngelo, L., and Stulz, R. (2010). Seasoned equity offerings, market timing, and the corporate lifecycle. Journal of Financial Economics, 2010, vol. 95, issue 3, 275-295.

Deposition of Patrick Griffin at 75-76, June 29, 2021.

Email from Brad Garlinghouse, April 10, 2016, RPLI_SEC 0205601.

Email from Brad Garlinghouse, April 10, 2016, RPLI_SEC 0307781.

Email from Bret Allenbach, April 10, 2016, RPLI_SEC 0205602.

Email from ██████ █████ June 1, 2016, GSR00004438.

Email from Chris Larsen, April 10, 2016, RPLI_SEC 0307781.

Email from ████████, April 11, 2016, GSR00011984.

Email from ████████, April 28, 2016, GSR00012857.

Email from Patrick Griffin, September 14, 2016, GSR00020001.

Email from Patrick Griffin, November 1, 2016, GSR00005000.

Email from ████████, April 10, 2016, RPLI_SEC 0205600.

Excel Export - 2014-2016 - 2t - Liquidity extraction report, RPLI_SEC 0679467-467.

Excel_Export_2017_OLD_2h_Liquidity_extraction_report, GSR00000101.

Excel_Export_2018_2h_Ripple_Liquidity_Extraction_Report, GSR00000102

Excel_Export_2019_2h_Ripple_Liquidity_Extraction_Report, GSR00000103

Exhibit CG-34, GSR0000104.

Field, Laura Casares and Hanka, Gordon (2001). The expiration of IPO share lockups. The
　　　Journal of Finance 56, no. 2, 471-500.

Garlinghouse Subpoena Response Spreadsheet, "Request 4" Tab, GARL00000001-1.

Garlinghouse XRP Award Addresses, GARL00000002-9.

Get Account Activations. (Accessed on September 29, 2021). XRPSCAN API.
　　　https://api.xrpscan.com/api/v1/account/{address}/activations.

Get Account Exchanges. (Accessed on September 29, 2021). Ripple Data API v2.
　　　https://data.ripple.com/v2/accounts/{address}/exchanges.

Get Exchanges. (Accessed on September 29, 2021). Ripple Data API v2.
　　　https://data.ripple.com/v2/exchanges/{base_currency}+{base_issuer}/
　　　{counter_currency }+{counter_issuer}.

Get Transaction. (Accessed on September 29, 2021). Ripple Data API v2.
　　　https://data.ripple.com/v2/transactions/{transaction_hash}.

GSR00000348.

GSR00000467A.

GSR00006693.

GSR00007297.

GSR Loan and Purchase Agreement_Chris Larsen Trust, GSR00008433-442.

History. (Accessed on September 29, 2021). XRP Ledger Foundation.
　　　https://xrpl.org/history.html.

Joint Submission by the Parties to Hon. Analisa Torres. February 15, 2021, Dkt. No. 45.

Larsen, Chris [@chrislarsensf]. (2020, September 22). *As some of you may have noticed, I moved
　　　an $XRP wallet to NYDIG. I've known the founders for a while, and am impressed by
　　　their security and top notch institutional standards -- this is truly custody 2.0. Check them
　　　out at nydig.com* [Tweet]. Twitter.
　　　https://twitter.com/chrislarsensf/status/1308459310574264325.

List of Chris Larsen Addresses, LARSEN_NAT 00000102.

Mishel, Lawrence and Wolfe, Julia. CEO compensation has grown 940% since 1978. (2019, August 14). Economic Policy Institute. https://www.epi.org/publication/ceo-compensation-2018.

Murphy, Kevin J. Executive compensation: Where we are, and how we got there. In Handbook of the Economics of Finance, vol. 2, pp. 211-356. Elsevier, 2013.

Our Team. (Accessed on September 29, 2021). GSR. https://www.gsr.io/our-team.

Polo_gsr_trades, ████████_00001699.

Q4 2020 XRP Markets Report, https://ripple.com/insights/q4-2020-xrp-markets-report.

Q1 2017 XRP Markets Report, https://ripple.com/insights/q1-2017-xrp-markets-report.

Q2 2017 XRP Markets Report, https://ripple.com/insights/q2-2017-xrp-markets-report.

Q3 2017 XRP Markets Report, https://ripple.com/insights/q3-2017-xrp-markets-report.

Q4 2017 XRP Markets Report, https://ripple.com/insights/q4-2017-xrp-markets-report.

Ritter, Jay R. and Welch, Ivo (2002). A Review of IPO Activity, Pricing and Allocations. Yale ICF Working Paper No. 02-01 (February 2002). Available at SSRN: http://dx.doi.org/10.2139/ssrn.296393.

Ripple Adds Several New Banks to Global Network. (2016, September 15). Ripple Press. https://ripple.com/ripple_press/ripple-adds-several-new-banks-global-network.

Ripple Financial Services, July 2013, RPLI_SEC 0088287.

Ripple – Funding, Financials, Valuation & Investors. (Accessed on September 29, 2021). Crunchbase. https://www.crunchbase.com/organization/ripple-labs/company_financials.

Ripple Labs, Inc. Consolidated Financial Statements As of December 31, 2014 At 16, RPLI_SEC 0090955.

Ripple Raises $55 Million in Series B Funding. (2016, September 15). Ripple Press. https://ripple.com/ripple_press/ripple-raises-55-million-series-b-funding.

Roberts, Jeff John. Genesis expands crypto footprint with custody acquisition. (2020, May 21). Fortune. https://fortune.com/2020/05/21/genesis-cryptocurrency-vo1t-bitcoin.

Ripple - 2015 FS, RPLI_SEC 0426161-187.

Ripple Financial Statements 2013 and 2014 - with notes, RPLI_SEC 0090938-962.

Ripple Financial Statements 2016 and 2017 OCR, NY-9875_T_00017816-854.

Ripple Financial Statements 2017 and 2018 OCR, RPLI_SEC 0267872-911.

Wind, Wietse. WietseWind/fetch-xrpl-transactions. (Accessed on September 29, 2021). GitHub repository. https://github.com/WietseWind/fetch-xrpl-transactions.

XRP. (Accessed on September 29, 2021). XRP Ledger Foundation. https://xrpl.org/xrp-overview.html.

XRP Explorer. (Accessed on September 29, 2021). Bithomp. https://bithomp.com/explorer/rDCgaaSBAWYfsxUYhCk1n26Na7x8PQGmkq.

XRP Explorer. (Accessed on September 29, 2021). Bithomp. https://bithomp.com/explorer/rGFuMiw48HdbnrUbkRYuitXTmfrDBNTCnX.

XRP II Master Agreement – ███ 11.29.2014, RPLI_SEC 0259585-593.

XRP price today, XRP to USD live, marketcap and chart. (Accessed on October 4, 2021). CoinMarketCap. https://coinmarketcap.com/currencies/xrp.

XRP Programmatic Sales Reporting FY14 to Date v2, RPLI_SEC 74559.

Any other documents or materials identified in my report, including data obtained from CoinMarketCap and CryptoTick.

XIII.   APPENDIX D: IDENTIFICATION OF GSR ADDRESSES

Summary of Sources

57.   The data are sourced from the 2014-2016 GSR liquidity extraction report[74] ("extraction report"), detailing GSR's activities with respect to Client "Ripple Labs" and Bot "2t", as well as publicly available blockchain data.[75]

Context: The Liquidity Extraction Report

58.   The "Daily Summary" tab of the extraction report describes daily trading activities of GSR on behalf of Ripple via Bot 2t. The "Comments" column (column S) reports, among other events, payouts to Ripple and commission fees received by GSR. Many cells in the "Comments" column contain transaction hashes on the XRP Ledger, which is inferred to correspond with the aforementioned payouts and commission fees based on other context given in the "Comments" cells and the balance changes of USD and EUR documented in columns Q and R. It is also inferred that "TPWR" as used in the "Comments" column refers to an address (or set of addresses) controlled by Ripple that receives the aforementioned payouts, and "GSR" as used in the "Comments" column refers to an address (or set of addresses) controlled by GSR that receives the aforementioned commission fees.

59.   In the "Details" tab of the extraction report, sums of XRP amounts are given daily and correspond with the amount of "Total XRP" owned by GSR for the corresponding date in the

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[74] Excel Export - 2014-2016 - 2t - Liquidity extraction report (Bates RPLI_SEC 0679467-467).

[75] This report used XRP blockchain data from two sources: i) an application programming interface (API) provided by Ripple (Ripple Data API v2), available at https://data.ripple.com/v2/transactions/{transaction_hash}, https://data.ripple.com/v2/exchanges/{base_currency}+{base_issuer}/{counter_currency}+{counter_issuer} and https://data.ripple.com/v2/accounts/{address}/exchanges; and ii) the full history of the XRP Ledger for use in Google's BigQuery data warehouse, available at https://github.com/WietseWind/fetch-xrpl-transactions. The latter source is provided by Wietse Wind, founder of XRPL Labs (https://wietse.com/bio).

"Daily Summary" tab;[76] it is inferred that addresses listed in column A of the "Details" tab are GSR-controlled. In particular, it is inferred that ███[77] is a GSR-controlled address.

60.   Descendants of a certain address 'N' are defined to be any address 'M' such that 'N' activated 'M', where activation is meant in the conventional sense that 'M' first received XRP from 'N'.[78] A genealogy of address 'N' is the recursively-generated tree with root 'N' and branches given by the descendants of 'N', the descendants of the descendants of 'N', and so on. A depth-first search is performed using XRPScan's API[79] to construct the genealogy of ███. This genealogy tree has depth four, i.e., there are at most four edges between the root and any leaf.

Identification of GSR Addresses Used in Figures 1-4

61.   The term "GSR" as used in Figures 1-4 refers to a set of addresses whose identification is explained in this section. Every string in the "Comments" column in the "Daily Summary" tab of the extraction report with more than 60 characters was extracted and, after removing punctuation and whitespace characters, verified to be a valid transaction hash on the XRP Ledger, with one exception.[80] For each such transaction hash, the date of the transaction was retrieved as well as the associated sending address from the aforementioned BigQuery tables. The resulting set of sending addresses ("candidate wallets") was analyzed to determine the number of transactions, out of those listed in the "Comments" column, each candidate wallet initiated, as well as the dates of the first and last instances of such transactions. The results can be seen in Table 4.

---

[76] For example, the amount in cell F43, "Details" tab, corresponding to December 1, 2014, matches the amount in cell G3, "Daily Summary" tab, also corresponding to December 1, 2014.
[77] ███ is an abbreviation for XRP address rPy███████████████████.
[78] https://xrpl.org/accounts.html#creating-accounts.
[79] https://api.xrpscan.com/api/v1/account/{address}/activations.
[80] The exception occurs in cell S705, "Daily Summary" tab, with the string "https://blockchain.info/tx/e5b6ba00fe8c1754bd0e36eecbad5456473eaf61965737d8c0c7b16a55cef2dc", corresponding to a transaction made by GSR on the Bitcoin blockchain regarding a purchase of BTC.

Table 4 – Activity of Candidate Wallets.
This table provides the summary of the activity of the candidate wallets as discussed in Appendix D. The 195 transaction hashes identified in the "Comments" column of the extraction report were attributed to the candidate wallet that initiated the transaction, and the set of such transactions for each candidate wallet is described.

Address	Number of Transactions	Date of First Transaction	Date of Last Transaction
█	2	November 1, 2016	December 2, 2016
	6	February 15, 2016	November 1, 2016
	3	March 11, 2015	March 11, 2015
	1	March 20, 2015	March 20, 2015
	14	September 10, 2015	November 5, 2015
	20	January 14, 2015	August 21, 2015
	1	March 17, 2015	March 17, 2015
	117	August 21, 2015	January 21, 2017
	1	March 29, 2016	March 29, 2016
	1	August 18, 2016	August 18, 2016
	1	September 28, 2016	September 28, 2016
	23	February 24, 2015	March 19, 2015
	5	March 11, 2015	March 11, 2015

62.   The only candidate wallets that made transactions in 2016 are ████████

████████. The former two, ████ and ████, are owned by Poloniex and Bitstamp

respectively,[94] and their presence in the candidate wallet set is a result of GSR buying or selling

XRP through the respective off-chain digital asset platform.[95] The fourth address, ████ is used by

GSR to collect commission fees and corresponds with "GSR" as used in the "Comments" column

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[94] Identities sourced from https://bithomp.com/explorer/rDCgaaSBAWYfsxUYhCk1n26Na7x8PQGmkq and
https://bithomp.com/explorer/rGFuMiw48HdbnrUbkRYuitXTmfrDBNTCnX.
[95] For example, line 3, cell S705, "Daily Summary" tab.

of the "Daily Summary" tab of the extraction report. The fifth address, █████, is unidentified, but it can reasonably be excluded from consideration since it was responsible for only one transaction mentioned in the "Comments" column; moreover, this single transaction corresponds to an "order from Patrick to sell... XRP for... █████."[96] The sixth address, █████ is the recipient of "TPWR" payouts throughout the extraction report; the single transaction appearing in the "Comments" column for which █████ is responsible corresponds to an event where GSR "received 50k from TPWR for buying,"[97] which explains its presence in the candidate wallet set. The final candidate wallet of the six that made at least one transaction in 2016, █████ was responsible for by far the greatest number of transactions, as seen in Table 4. It is possible to conclude that █████ is GSR-controlled and is responsible for the aforementioned payout and commission fee transactions. Moreover, it can be inferred that, as far as the extraction report indicates, █████ is the only GSR-controlled wallet with payout responsibilities in 2016.

63.   A table of transactions was constructed in which either the sending address or the receiving address is a candidate wallet; the subset of this table of successful transactions[98] was retrieved in which either the sending address or the receiving address is █████ All such transactions in which the *receiving* address is █████ are of the Payment type, none of which are transfers of XRP.[99] Of the 109 addresses that make Payments to █████ at least once in 2016, all but four are members of the █████ genealogy, so it is inferred that these 105 addresses are GSR-controlled. The remaining four addresses that are not members of the genealogy are █████ █████

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[96] Cell S630, "Daily Summary" tab.
[97] Cell S671, "Daily Summary" tab.
[98] Encoded as "tesSUCCESS" on the XRP Ledger.
[99] This, among other factors, suggests that other addresses are exchanging XRP for non-XRP assets (e.g., USD) on the XRP Ledger on behalf of █████ which in turn uses the non-XRP assets for payouts and commission fees.

███ and ███ These were previously identified as Poloniex, Bitstamp, "TPWR," and "GSR" (the recipient of commission fees), respectively.

64.   The 105 addresses that make at least one Payment to ███ in 2016 and which are not Poloniex, Bitstamp, "TPWR," or "GSR," as discussed above, constitute the set of addresses termed "GSR" in Figures 1-4.

XIV.   APPENDIX E: METHODOLOGY FOR BLOCKCHAIN ANALYSIS AND FLOW OF XRP FROM LARSEN AND GARLINGHOUSE ADDRESSES

A. Methodology for Blockchain Tracing

65.   The blockchain tracing analysis starts with i) lists produced to the SEC that identify XRP addresses that are under Larsen's or Garlinghouse's control[100] and ii) publicly available XRP blockchain data which includes the full history of every transaction.[101] From the lists produced to the SEC, there are 28 Larsen-identified addresses and 19 Garlinghouse-identified addresses. Then, the "first-in, first-out" (FIFO) forensic accounting methodology is applied to trace the flow of XRP out of those Larsen-identified and Garlinghouse-identified addresses. The XRP from these addresses is traced until one of the following scenarios: i) XRP reaches a "GSR-associated" address,[102] ii) XRP reaches an "identified address" such as a digital asset exchange or other known entities on the XRP blockchain,[103] iii) XRP reaches a non-identified address with over 1,000 transactions (labeled as "high-activity address"),[104] iv) XRP is returned to one of the Larsen-

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[100] List of Chris Larsen Addresses (Bates LARSEN_NAT 00000102); Garlinghouse Subpoena Response Spreadsheet, "Request 4" Tab (Bates GARL00000001-1); Garlinghouse XRP Award Addresses (Bates GARL00000002-9).

[101] This report used XRP blockchain data from two sources: i) an application programming interface (API) provided by Ripple (Ripple Data API v2), available at https://data ripple.com/v2/transactions/{transaction_hash} and ii) the full history of the XRP Ledger for use in Google's BigQuery data warehouse, available at https://github.com/WietseWind/fetch-xrpl-transactions. The latter source is provided by Wietse Wind, founder of XRPL Labs (https://wietse.com/bio).

[102] "GSR-associated" addresses were identified from liquidity extraction reports produced to the SEC (Bates RPLI_SEC 0679467-467, GSR00000102, GSR00000103, GSR00000441, GSR00000442, GSR00000444, GSR00000446, GSR00000447, GSR00000448, GSR00000449, GSR00000452, GSR00000453, GSR00000454, GSR00000455, GSR00000460, GSR00000461, GSR00000462, GSR00000463, GSR00000464, GSR00000465, GSR00000466, GSR00000467). More details can be found in Appendix D.

[103] The identities of certain addresses on the XRP blockchain can be derived from publicly available sources online. These include data from XRP blockchain explorers (blockchain explorers enable users to view blockchain data from a web interface), e.g., bithomp.com which lists the identity behind certain XRP addresses, and from social media sites such as twitter.com.

[104] Addresses that have had over 1,000 transactions and were labelled "high-activity" because it is possible that they are digital asset platforms that have not been identified.

identified or Garlinghouse-identified addresses, v) less than 5 XRP is flowing out of an address,[105] or vi) XRP is transferred over 13 hops.[106]

66.   For the purposes of this report, funds are only traced if they involve "Payment" and "AccountDelete" transactions of XRP. Payment transactions entail direct transfers of a certain asset from an address to another address. AccountDelete transactions entail a deletion of an address (its transaction history remains in the ledger history) and a transfer of all assets in that address to another address. There exist Payment transactions of other assets, such as USD, which are excluded from this analysis. Other types of transactions excluded for the purpose of this tracing analysis are other XRP balance-affecting changes on the ledger, such as: i) "offers" – buy/sell offers exchanging XRP for another asset at a given exchange rate, ii) "checks" – IOUs that can be cashed by the receiving party up to an expiration time and iii) "payment channels" – safeboxes where XRP is stored and can be retrieved by the receiving party. To exclude the above balance-affecting transactions means that this report assumed such transactions or changes did not actually occur.

B. Flow of XRP from Larsen and Garlinghouse Addresses

67.   This section provides a summary of the flow of XRP out of Larsen's and Garlinghouse's identified addresses based on i) direct transfers (1 hop only) and ii) tracing XRP over multiple hops.

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[105] Tracing was not done for transactions less than 5 XRP because: i) tracing minute amounts is computationally intensive and does not impact the results significantly, so a lower bound is necessary, and ii) 5 XRP has typically been the largest fee that has been charged in the course of a transaction.

[106] Due to the exponential growth in the number of addresses and transactions to trace for each additional hop, the analysis stopped at 13 hops for the Larsen-identified addresses. Less than 20,000 XRP was traced that went beyond 13 hops before reaching one of the criteria above, representing less than 0.001% of the XRP flowing out of Larsen-identified addresses. XRP flowing out of Garlinghouse-identified addresses was not transferred over two hops before it hit one of the other criteria above.

68.   As noted in the tracing methodology described above, the XRP flowing from the identified addresses could have been transferred to other XRP addresses up to 13 times before reaching an identified destination, such as a digital asset platform. Hence, it is possible that the ownership of the XRP changed hands between when it left one of the identified addresses and when it reached a digital asset exchange, e.g., through an over-the-counter (OTC) sale, as an exchange for a good or service, as an investment or as a donation. Indeed, this happened with some of Larsen's XRP since, as alluded to the main report, he sold XRP in OTC sales and to friends who themselves could have subsequently sold their XRP on digital asset platforms. In general, fewer transfers of a digital asset provides more confidence that the digital asset is still in the possession of the original holder. As such this Appendix provides an accounting of funds both i) directly transferred over 1 hop from the identified addresses and ii) transferred over multiple hops.

69.   In general, the point of the tracing is not to pinpoint where all the funds went and exactly when they were transferred to other parties. Nevertheless, it is possible to infer that significant amounts of XRP originating from Larsen's and Garlinghouse's identified addresses were transferred and traced to GSR as well as digital asset platforms where they could have been sold. Whether or not the traced XRP was actually sold at digital asset platforms would require having detailed account data from all digital asset platforms where XRP was traced to have reached, which was not available at the time of this report's writing.

Direct Transfers of XRP

Figure 13 – Visualization of Direct transfers from the Larsen-Identified Addresses.
This figure illustrates the flow of funds from Larsen's identified XRP addresses, from left to right. The thickness of each category denotes the relative size, in XRP, of funds traced. The largest recipient of funds was GSR. "Other Addresses" are addresses that were not identified.
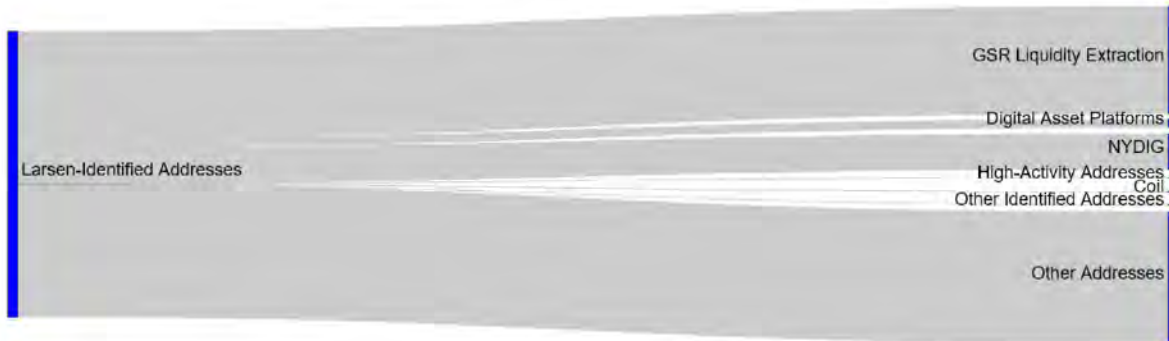
Table 5 – Direct Transfer Amounts from the Larsen-Identified Addresses.
This table provides the summary of blockchain analysis of the flow of funds out of Larsen's identified addresses via 1 hop only. The US dollar (USD) equivalent value shown is the value of the XRP at the time that it left one of the Larsen-identified addresses. Analysis is as of December 22, 2020.

Address Type	XRP Transferred (million)	USD Equivalent (million)
GSR Liquidity Extraction	1,496	495
NYDIG[107]	500	117
Bitstamp (Digital Asset Platform)	87	51
Coinbase (Digital Asset Platform)	27	7
Coil (Micropayments Start-up Funded by Ripple)[108]	17	5
Kraken (Digital Asset Platform)	9	3
Other Identified Addresses (Internet Archive & XRP Tip Bot)	0.3	0.1
Other Addresses (not Identified)	1,840	394
Total	**3,976**	**1,072**

Values rounded to the nearest 1 million XRP and 1 million USD, except for "Other Identified Addresses" which is rounded to the nearest hundred thousand.

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[107] NYDIG is a technology and financial services firm providing digital asset services to institutions and private clients (https://nydig.com/); Larsen publicly disclosed that he moved XRP to NYDIG in September 2020 (https://twitter.com/chrislarsensf/status/1308459310574264325).

[108] https://www.prnewswire.com/news-releases/ripples-xpring-makes-1-billion-xrp-grant-to-drive-xrp-adoption-and-advance-coils-monetized-platform-for-creators-300902194.html.

Figure 14 – Visualization of Direct transfers from the Garlinghouse-Identified Addresses.
This figure illustrates the flow of XRP from Garlinghouse's identified XRP addresses. The largest flows were to GSR. Analysis is as of December 22, 2020.

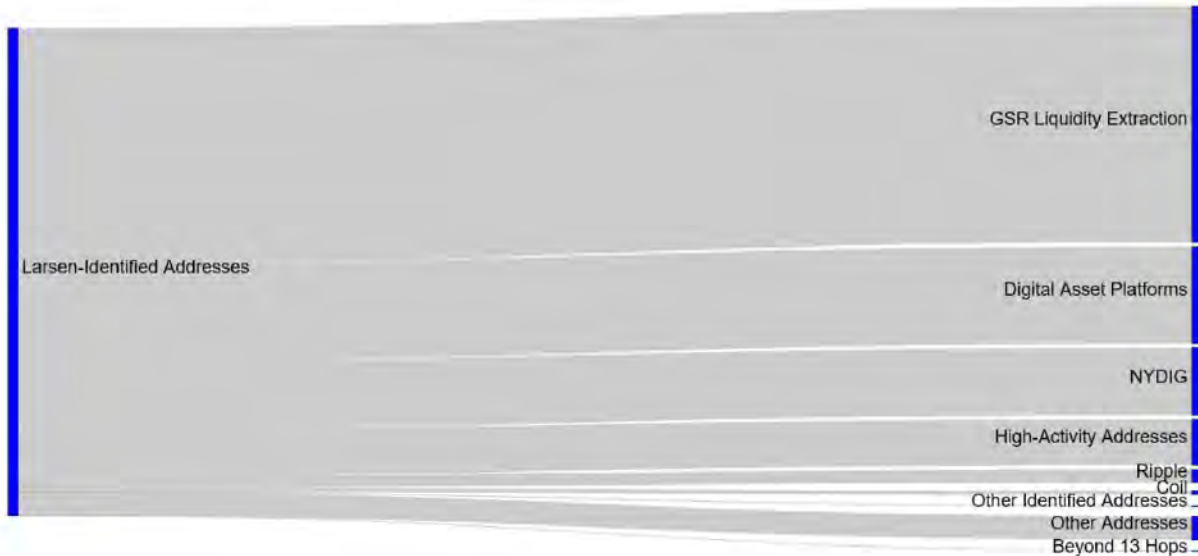**Table 6 – Direct Transfer Amounts from the Garlinghouse-Identified Addresses.**
This table provides the summary of blockchain analysis of the flow of funds out of Garlinghouse's identified addresses via 1 hop only. The US dollar (USD) equivalent value shown is the value of the XRP on the date that it left one of the Garlinghouse-identified addresses. Analysis is as of December 22, 2020.

Address Type	XRP Transferred (million)	USD Equivalent (million)
GSR Liquidity Extraction	167	104
Ripple	62	25
Bitstamp (Digital Asset Platform)	36	21
Bitfinex (Digital Asset Platform)	2	1
Coinbase (Digital Asset Platform)	0.3	0.1
Kraken (Digital Asset Platform)	0.2	0.1
Other Addresses (not Identified)	110	35
Total	**377**	**186**

Values rounded to the nearest 1 million XRP and 1 million USD, except for Coinbase and Kraken which are rounded to the nearest hundred thousand.

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Tracing of XRP over Multiple Hops

Figure 15 – Visualization of Flow of Funds from the Larsen-Identified Addresses.
This figure illustrates the flow of funds from Larsen's identified XRP addresses, from left to right. The thickness of each category denotes the relative size, in XRP, of funds traced. The largest recipient of funds was GSR, followed by digital asset platforms.

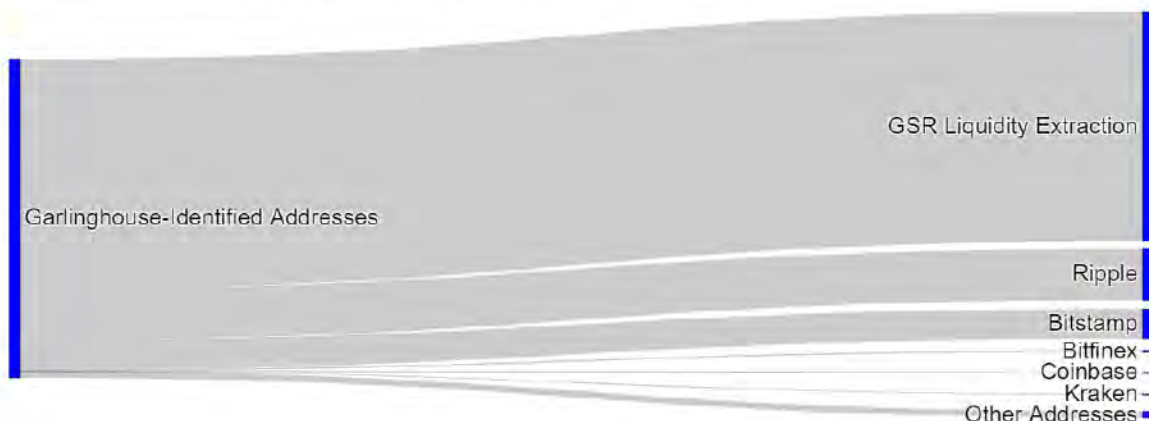**Table 7 – Value of XRP Traced from the Larsen-Identified Addresses.**
This table provides the summary of blockchain analysis of the flow of funds out of Larsen's identified addresses. The US dollar (USD) equivalent value shown is the value of the XRP on the date that it left one of the Larsen-identified addresses. Analysis is as of December 22, 2020.

Address Type	XRP Traced (million)	USD Equivalent (million)	Weighted Average Number of Hops
GSR Liquidity Extraction	1,926	599	1.5
Digital Asset Platforms	794	244	2.8
NYDIG[109]	550	131	1.1
High-Activity (Addresses with > 1,000 Transactions)	377	54	3.2
Ripple	106	27	2.0
Coil (Micropayments Start-up Funded by Ripple)[110]	30	5	1.9
Other Identified Addresses (e.g., Internet Archive)	1.0	0.1	4.8
Other Addresses (not Identified)[111]	193	13	2.6
Total	**3,976**	**1,072**	**1.9**

Values rounded to the nearest 1 million XRP and 1 million USD, except for "Other Identified Addresses" which is rounded to the nearest hundred thousand.

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Figure 16 – Visualization of Flow of Funds from the Garlinghouse-Identified Addresses.
This figure illustrates the flow of XRP from Garlinghouse's identified XRP addresses. The largest flows
were to GSR. Analysis is as of December 22, 2020.

Table 8 – Value of XRP Traced from the Garlinghouse-Identified Addresses.
This table provides the summary of blockchain analysis of the flow of funds out of Garlinghouse's
identified addresses. The US dollar (USD) equivalent value shown is the value of the XRP on the date that
it left one of the Garlinghouse-identified addresses. Analysis is as of December 22, 2020.

Address Type	XRP Traced (million)	USD Equivalent (million)	Weighted Average Number of Hops
GSR Liquidity Extraction	277	139	1.4
Ripple	62	25	1.0
Bitstamp (Digital Asset Platform)	36	21	1.0
Bitfinex (Digital Asset Platform)	2	1	1.0
Coinbase (Digital Asset Platform)	0.3	0.1	1.0
Kraken (Digital Asset Platform)	0.2	0.1	1.0
Other Addresses (not Identified)	0.0001	0.0001	1.0
Total	**377**	**186**	**1.2**

Values rounded to the nearest 1 million XRP and 1 million USD, except for Coinbase and Kraken which are
rounded to the nearest hundred thousand and "Other Addresses" which is rounded to the nearest hundred.

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[109] NYDIG is a technology and financial services firm providing digital asset services to institutions and private
clients (https://nydig.com/); Larsen publicly disclosed that he moved XRP to NYDIG in September 2020
(https://twitter.com/chrislarsensf/status/1308459310574264325).
[110] https://www.prnewswire.com/news-releases/ripples-xpring-makes-1-billion-xrp-grant-to-drive-xrp-adoption-and-
advance-coils-monetized-platform-for-creators-300902194.html.
[111] The XRP that was traced beyond 13 hops is included in "Other Addresses (not identified)".